UNITED STATES PATENT AND TRADEMARK OFFICE

**BEFORE THE PATENT TRIAL AND APPEAL BOARD**

APPLE INC.,
Petitioner,

v.

TELEFONAKTIEBOLAGET LM ERICSSON,
Patent Owner

**U.S. PATENT NO. 10,470,203**

Case IPR2022-00340

# DECLARATION OF FRIEDHELM RODERMUND IN SUPPORT OF PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 10,470,203

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I, Friedhelm Rodermund, do hereby declare as follows:

## I. INTRODUCTION AND ENGAGEMENT

1. I have been retained in this matter by Apple Inc. ("Petitioner" or "Apple") to provide testimony regarding 3GPP's standard business practices for record keeping and publishing technical specifications, change request proposals, reports, and other documents developed during the course of standards activities carried out by the 3rd Generation Partnership Project ("3GPP") and the European Telecommunications Standards Institute ("ETSI").

2. I have been asked to provide my opinions regarding the authenticity and dates of public accessibility of the following 3GPP documents:

- T-doc R1-1719932, which represents a document with the title "Remaining issues on UL data transmission procedure" (hereinafter "R1-1719932", Ex. 1006)
- T-doc R1-1720097, which represents a document with the title "Remaining details of UL data transmission procedures in NR" (hereinafter "R1-1720097", Ex. 1008)
- Version 15.0.0 of technical specification 3GPP TS 38.213 ("Technical Specification Group Radio Access Network; NR; Physical layer procedures for control (Release 15)") (hereinafter "TS 38.213 v15.0.0", Ex. 1005)

- Version 15.0.0 of technical specification 3GPP TS 38.331 ("Technical Specification Group Radio Access Network; NR; Radio Resource Control (RRC) protocol specification (Release 15)") (hereinafter "TS 38.331 v15.0.0", Ex. 1004)

3. As an ETSI Project Manager and Secretary, from June 1998 to December 2004, I have personal knowledge of 3GPP's standard business and records keeping practices. I continued following 3GPP's work ever since. Thus, based on my experience, personal knowledge, and review of 3GPP's business records, I am able to testify regarding the authenticity of certain documents published by 3GPP and the timing of their publication.

4. I am also knowledgeable about document management practices and the usage of email reflectors in TSG RAN WG1 and WG2. This is due to the fact that all 3GPP working groups used the same document repository on http://ftp.3gpp.org and all working groups use the same email exploder tool. Thus, I'm able to testify regarding the availability and authenticity of any 3GPP documents and any 3GPP exploder emails.

5. I am being compensated for my time spent on this matter at my usual rate of €450 per hour. My fee is not contingent on the outcome of this or any matter, or on the content of any of the testimony I give in this declaration. I have no financial interest in Petitioner.

6. I have been informed that Ericsson (hereinafter referred to as "Patent Owner") alleges ownership and is the current assignee of U.S. Patent No. 10,470,203 ("the '203 Patent") (Ex. 1001). I have no financial interest in the Patent Owner or the '203 patent.

## II. BACKGROUND AND QUALIFICATIONS

7. I have more than 20 years of experience working with standards development organizations including the Third Generation Partnership Project ("3GPP"), the European Telecommunications Standards Institute ("ETSI"), and the Open Mobile Alliance ("OMA"). I have particular experience with the development of standards related to cellular telecommunications, including the standards for the Universal Mobile Telecommunications System ("UMTS"), Long Term Evolution ("LTE"), and 5G, which are all standards developed by the 3GPP. A true and correct copy of my curriculum vitae (C.V.) is attached as Appendix A.

8. I attended the University of Technology Aachen in Aachen, Germany, where I performed graduate studies in Electrical Engineering with a focus on telecommunications technologies ("Dipl.-Ing. TH" degree). I also attended the University of Technology Trondheim in Trondheim, Norway, and completed my Diploma thesis, "Design of a dual processor computer for digital signal processing in power electronics," in 1993.

9. From December 1993 to June 1998, I worked at Mannesmann Mobilfunk as a System Engineer and Project Manager in Quality Assurance and Technical Standards. One of my responsibilities was to ensure by managing and performing related test activities that cellular network equipment was compatible with the Global System for Mobile Communications ("GSM") standard developed by ETSI. During that time, I also started working as a standards delegate. I attended my first ETSI meeting in 1996 (although I was already following ETSI developments from 1992 during my studies).

10. From June 1998 to December 2004, I worked at ETSI as a project manager for various ETSI Special Mobile Group ("SMG") and 3GPP working groups. First, I served as a secretary of SMG4 "Data Services" and SMG8 "Base Stations Testing." Then, as a project manager with the ETSI Mobile Competence Center ("MCC"), I supported establishing 3GPP as the new international standards development organization for cellular telecommunications. One of my roles was acting as Secretary for 3GPP's Technical Specifications Group Terminals, Working Group ("T2"), the group which played a leading role in the creation of standards for Multimedia such as the Multimedia Messaging Service ("MMS").

11. Later, I was a secretary of the highest-level Technical Specifications Group Terminals which was besides other things responsible for the development of test specifications including tests for the radio interface.

12. I edited all technical specifications produced by my working groups and presented results to the parent body for approval. I attended all meetings (apart from some sub-working group meetings) and was also responsible for compiling meeting reports, for handling all the meeting documents, and managing the work plan. It was also my role to guide the groups and to advise the chairmen regarding 3GPP working methods and procedures including document handling, and to make sure delegates were aware of their company's obligations under the 3GPP Intellectual Property Right policy.

13. As part of my responsibilities at ETSI, I acted as a 3GPP custodian of records by personally managing 3GPP's public File Transfer Protocol (ftp) folders, which I used to make publicly accessible various 3GPP documents, including versions of 3GPP specifications, technical reports, liaison statements, change requests, contributions, agendas, meeting reports, and other 3GPP documents from my working groups. I am also knowledgeable about document management practices used in other working groups and within 3GPP in general with regard to making documents publicly accessible through the same, public ftp server of 3GPP.

14. Since I left ETSI as a staff member in 2005, I have been continuously involved in standardization activities, including with Open Mobile Alliance, ETSI,

and 3GPP. Since 2017, I also have been attending the ETSI IPR Special Committee, which is responsible for the maintenance of the ETSI IPR Policy.

15. After I left ETSI, I worked from January 2005 to October 2014 at Vodafone, first as a Project Manager for Mobile Broadcast Standards, and then as Vice Chairman of the Device Management working group of the Open Mobile Alliance, and then as a Senior Standards Strategist, all with responsibilities as described on my C.V. At Vodafone, I was deeply involved in standards work with ETSI and 3GPP and other standards setting organizations, including as a delegate to 3GPP SA1 "Services." As part of my responsibilities, I attended selected 3GPP meetings, submitted documents to 3GPP, used 3GPP resources (including 3GPP's ftp server) extensively, and remained knowledgeable about 3GPP policies and procedures with regard to document management and public accessibility. I was also involved in the creation of patents, defense activities related to patent litigations, and patent evaluation, mostly in the context of standards development.

16. Since leaving Vodafone in 2014, I have performed consulting work regarding Internet of Things (IoT) and Machine to Machine (M2M) technology and standards, first at Friedhelm Rodermund Consulting and then as the Founder and Director of IOTECC GmbH. In connection with my work, I regularly deal with standards such as OMA's Lightweight M2M, 3GPP's LTE, Narrowband IoT (NB-IoT) and 5G standards. And I have extensively used 3GPP resources and have

remained knowledgeable about 3GPP policies and procedures with regard to document management and public accessibility.

17. I also provide consulting services related to patents, in particular around 3GPP Standard Essential Patents ("SEPs"), and I have been working as an expert witness on a number of occasions. I continue to closely follow the maintenance of the ETSI IPR Policy as a delegate to the ETSI IPR Special Committee. Furthermore, I'm conducting a seminar on SEPs and the Internet of Things at the Technical University of Ilmenau, Germany.

18. At the time of writing this declaration, I am following – including attending selected meetings - the following standards committees: ETSI oneM2M, ETSI IPR Special Committee, Open Mobile Alliance, and 3GPP.

19. A copy of my curriculum vitae, which includes a detailed description of my experience and education, is attached as Appendix A. A list of litigation matters on which I have worked over the last five years is also included in my curriculum vitae.

## III. SUMMARY OF MY OPINIONS

20. It is my opinion that R1-1719932 (Ex. 1006) is an authentic 3GPP T-doc and would have been publicly accessible through ftp.3gpp.org no later than November 18, 2017.

21. It is my opinion that R1-1720097 (Ex. 1008) is an authentic 3GPP T-doc and would have been publicly accessible through ftp.3gpp.org no later than November 18, 2017.

22. It is my opinion that TS 38.213 v15.0.0 (Ex. 1005) is a technical specification published by 3GPP and would have been publicly accessible through ftp.3gpp.org as of January 3, 2018.

23. It is my opinion that TS 38.331 v15.0.0 (Ex. 1004) is a technical specification published by 3GPP and would have been publicly accessible through ftp.3gpp.org as of January 4, 2018.

## IV. PUBLICATION OF 3GPP SPECIFICATIONS AND RELATED DOCUMENTS

### A. General Practices

24. Unless otherwise noted, the following is an accurate description of 3GPP general practices from 1998 to the present, regardless of whether I use the present or past tense to describe those practices.

25. 3GPP was established in 1998 by a group of telecommunications standard development organizations from Japan, Korea, China, Europe, and the United States to jointly develop worldwide standards for mobile telecommunications. Today, 3GPP consists of seven partners: Association of Radio Industries and Businesses, Japan ("ARIB"), Alliance for Telecommunications Industry Solutions, USA ("ATIS"), China Communications Standards Association

(“CCSA”), European Telecommunications Standards Institute (“ETSI”), Telecommunications Technology Association, Korea (“TTA”), Telecommunication Technology Committee, Japan (“TTC”). In addition to being one of the founding partners, ETSI hosts the Mobile Competence Centre (“MCC”), which provides administrative and technical support to the day-to-day work of 3GPP. Furthermore, ETSI manages 3GPP’s IT services such as the 3GPP website, ftp server, and email exploders.

26. 3GPP is the world’s leading organization for developing and maintaining cellular telecommunications standards, which it has done since its foundation in 1998. As noted above and in my C.V., I began working for 3GPP, as part of my work at ETSI, the European-based organizational partner of 3GPP.

27. In the ordinary course of its regularly conducted business activities, and pursuant to its standard business practices, 3GPP publishes technical specifications, proposals, reports, and other documents related to the development of cellular telecommunications standards. Such documents are published for the purposes of discussion and establishment of industry standards for cellular telecommunications. This has been 3GPP’s ordinary course of business since when I began working at ETSI in 1998.

28. In the ordinary course of 3GPP’s regularly conducted business activities, and pursuant to its standard business practices, all draft technical

specifications, proposals, reports, and other temporary documents to be discussed or considered in relation to 3GPP's telecommunications standards activities were, and continue to be, assigned a temporary document number and made publicly available, including on the ftp server associated with the 3GPP website, currently residing at ftp.3gpp.org. Such documents are referred to as "T-docs." Final versions of the technical specifications also were, and continue to be, publicly available from that same ftp server.

29. The names and the structure of 3GPP working groups can be found below[1]:

[1] See https://www.3gpp.org/specifications-groups

| Project Co-ordination Group (PCG) | | |
|---|---|---|
| **TSG RAN**<br>Radio Access Network | **TSG SA**<br>Service & System Aspects | **TSG CT**<br>Core Network & Terminals |
| RAN WG1<br>Radio Layer 1 spec | SA WG1<br>Services | CT WG1<br>User Equipment to Core Network protocols |
| RAN WG2<br>Radio Layer 2 spec<br>Radio Layer 3 RR spec | SA WG2<br>Architecture | CT WG3<br>Interworking with external networks |
| RAN WG3<br>lub spec, lur spec, lu spec<br>UTRAN O&M requirements | SA WG3<br>Security<br><br>SA3-LI<br>SA3 subgroup on Lawful Interception | CT WG4<br>Core Network Protocols |
| RAN WG4<br>Radio Performance<br>Protocol aspects | SA WG4<br>CODECs | CT WG6<br>Smart Card Application Aspects |
| RAN WG5<br>Mobile Terminal<br>Conformance Testing | SA WG5<br>Telecom Management | |
| | SA WG6<br>Mission-critical applications | |

30. Each Technical Specification Group (TSG) or Working Group adopts a structured numbering system for the documents associated with their meetings, and those systems typically follow a consistent numbering system as shown in the following example: xminnzzzz. The numbering system normally comprises five logical elements: (1) x: a single letter corresponding to the TSG; where in 2007/2008 x was one of R (Radio Access Network), C (Core and Terminals), S

(Service and System Aspects), or G (GSM/EDGE Radio Access Network); (2) m: A single character corresponding to the Working Group identity (typically 1, 2, 3, etc.) or, in the case of the TSG itself, the letter “P”; (3) i: Normally the hyphen character “-”; (4) nn: the calendar year of the meeting to which the document was submitted; (5) zzzz: a running number (some Working Groups use 5 digits).

31. In the ordinary course of 3GPP’s regularly conducted business activities, and pursuant to its standard business practices, from December 1998 onwards, 3GPP published all of its T-docs and all final versions of its technical specifications on its ftp server, which has always been easily and publicly accessible from its website and currently resides at ftp.3gpp.org.

32. As early as December 1998, 3GPP’s ftp server was freely accessible to the general public with no login, password, or membership requirement.

33. By 1999, at least 100 companies were members of 3GPP (by December 2020: 719 companies), ranging from Bosch to Ericsson to Nokia to Samsung and generally including those interested in the discussion, creation, and adoption of cellular telecommunications standards, including UMTS. Each of these companies typically delegated multiple individuals to regularly participate in 3GPP meetings. Further, pursuant to 3GPP’s standard business practices, 3GPP working groups sent emails notifying these individuals as soon as new or additional documents had been uploaded to 3GPP’s ftp server. Thus, not only did the general

public have access to the documents on the ftp server, but some of the most interested members of the public—those working to develop standards for cellular telecommunication or working to implement the standards—were personally informed of their availability by email. Based on my experience with 3GPP and the telecommunications industry, I would expect any person implementing a cellular network or device, e.g., an 5G network or device, to consult the corresponding specifications on the 3GPP ftp server, as well as other related documents. The whole purpose of 3GPP creating and making these specifications available was so that engineers and other individuals would have ready access to them when developing and implementing cellular networks and devices.

34. 3GPP specifications bear a specification number consisting of four or five digits, e.g., 09.02 or 29.002. The first two digits define the specification series which are defined to group the different aspects of the 3GPP system into e.g. requirements, service aspects, radio aspects codecs, security aspects, and test specifications. The series digits are followed by two additional digits for the 01 to 13 series or three further digits for the 21 to 55 series. The subjects of the individual specification series are explained on 3GPP's website at https://www.3gpp.org/specifications/specification-numbering, and reproduced below:

| Subject of specification series | 3G and beyond / GSM (R99 and later) | GSM only (Rel-4 and later) | GSM only (before Rel-4) |
|---|---|---|---|
| General information (long defunct) | | | 00 series |
| Requirements | 21 series | 41 series | 01 series |
| Service aspects ("stage 1") | 22 series | 42 series | 02 series |
| Technical realization ("stage 2") | 23 series | 43 series | 03 series |
| Signalling protocols ("stage 3") - user equipment to network | 24 series | 44 series | 04 series |
| Radio aspects | 25 series | 45 series | 05 series |
| CODECs | 26 series | 46 series | 06 series |
| Data | 27 series | 47 series (none exists) | 07 series |
| Signalling protocols ("stage 3") -(RSS-CN) and OAM&P and Charging (overflow from 32.- range) | 28 series | 48 series | 08 series |
| Signalling protocols ("stage 3") - intra-fixed-network | 29 series | 49 series | 09 series |
| Programme management | 30 series | 50 series | 10 series |
| Subscriber Identity Module (SIM / USIM), IC Cards. Test specs. | 31 series | 51 series | 11 series |
| OAM&P and Charging | 32 series | 52 series | 12 series |
| Access requirements and test specifications | | 13 series (1) | 13 series (1) |
| Security aspects | 33 series | (2) | (2) |
| UE and (U)SIM test specifications | 34 series | (2) | 11 series |
| Security algorithms (3) | 35 series | 55 series | (4) |
| LTE (Evolved UTRA), LTE-Advanced, LTE-Advanced Pro radio technology | 36 series | - | - |
| Multiple radio access technology aspects | 37 series | - | - |
| Radio technology beyond LTE | 38 series | - | - |

35. The 5G New Radio (NR) standard is covered in the "38 series" and is further subdivided into separate sections or specifications. Each specification can span from a few pages to hundreds of pages. One full version of the 5G standard is massive, spanning tens of thousands of pages.

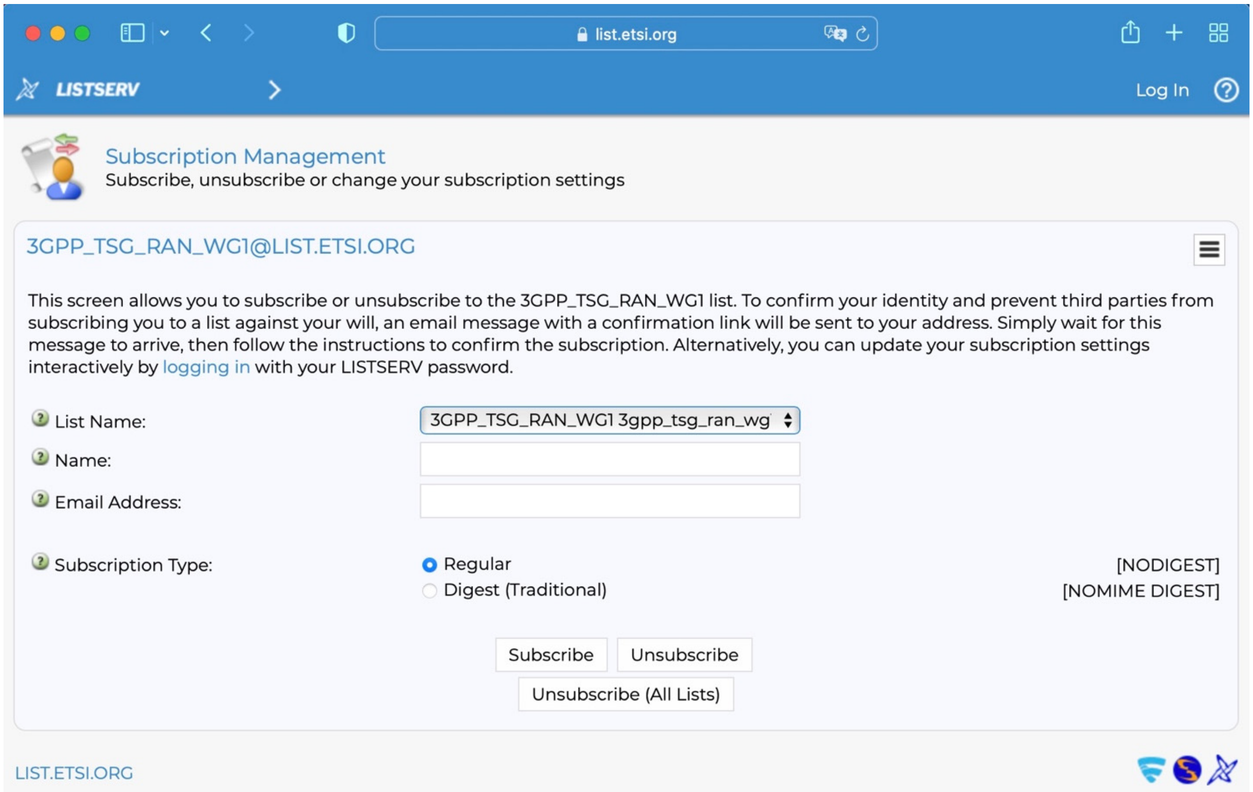
36. In the ordinary course of 3GPP's regularly conducted business activities, and pursuant to its standard business practices, T-docs are usually

uploaded to 3GPP's ftp server and website before the meeting where they are to be discussed. Documents created or revised during the course of a meeting are normally uploaded at the latest during the week following the meeting (e.g., the meeting report of the meeting is usually published for review during the week following the meeting).

37. In the ordinary course of 3GPP's regularly conducted business activities, and pursuant to its standard business practices, 3GPP maintains archives that include different versions of the specifications, as well as email communications to its membership, including emails announcing the uploading of new or additional documents to 3GPP's ftp server. These archives are created at the time the emails are initially sent.

38. At least as early as July 1999, all of 3GPP's email archives, including the dedicated email list for TSG RAN WG1 and WG2 were freely accessible to the general public at https://list.etsi.org/ with no login, password, or membership requirement. The screenshot below represents the subscription page of the 3GPP RAN WG1 and WG2 email list demonstrating that this webpage is publicly available and that only email address and name have to be entered to join the email list. Alternatively, everyone interested can obtain a LISTSERV password for managing subscriptions interactively without email confirmations. I can confirm

that this webpage looked similar in 2018 and that subscription was already possible for every interested individual since the early days of 3GPP in 1999.




39. Each of 3GPP's member companies typically assigned one or more individuals to regularly participate in these email lists. Thus, not only did the general public have access to the emails in 3GPP's email archives, but some of the most interested members of the public–those working to develop standards for cellular telecommunication–personally received copies of such emails through their participation in the email lists.

40. By June 1999, 3GPP's email archives were well-known to persons in the cellular telecommunications industry as a source of public information and of

technical specifications, proposals, meeting announcements, technical discussions and reports regarding industry standards and technological advances.

41. Based on my experience with 3GPP and the telecommunications industry, I would expect a person interested in the development of cellular standards, e.g., 5G, to consult the emails archives of the working groups and TSGs that person is interested in, and/or, to be subscribed to the corresponding email reflectors to receive any email notifications in real-time.

42. 3GPP specifications almost always are duplicated in at least two and sometime more locations on the ftp server. One location corresponds to a "snapshot" of the specifications corresponding to a particular plenary meeting cycle, e.g., the 2018-12 snapshot contains a snapshot of numerous specifications after the December 2018 3GPP plenary meetings. The second location is an "archive" that contains all versions over time for a given specification. While 3GPP aims to upload the updated specifications to both locations at the same time, occasionally there may be a small difference in the upload date, and thus the date stamp, for the same specification uploaded to the two locations. Additionally, specifications which are not yet approved (so call "draft" specifications) are available as T-docs at working group and at plenary meetings (as soon the working group decides to submit the specification to the plenary meeting for information or approval).

43. The timestamp on 3GPP's ftp server shows the date when the document was uploaded the last time. Thus, the timestamp shows the latest possible date the document became publicly available and accessible on 3GPP's ftp server. The given document might have been available earlier and the original timestamp might have been overwritten because the document was uploaded again. According to my experience, this is something which happened quite frequently. Thus, the ftp timestamp is reliable as the latest possible upload date but one cannot determine whether it represents the first upload of a document to the ftp server.

44. 3GPP's working practice to store their documents on their ftp server, as described above, has not changed over time. Starting from the first 3GPP meetings in 1998 until present, all WGs and plenary meetings are represented by dedicated meeting folders on the ftp server. These meeting folders include the documents discussed at the meetings. Both the folders and the documents are accessible to the public. Almost every week, a new meeting folder with the respective documents is added. In addition to the plenary and WG meeting folders, and some other folders, there is also the "Specs" folder, which holds all 3GPP specifications including the aforementioned "snapshot" and archive folders. Since the early days of 3GPP a new folder is added inside the "Specs" folder after each TSG plenary meeting to hold the latest versions of specifications approved at those

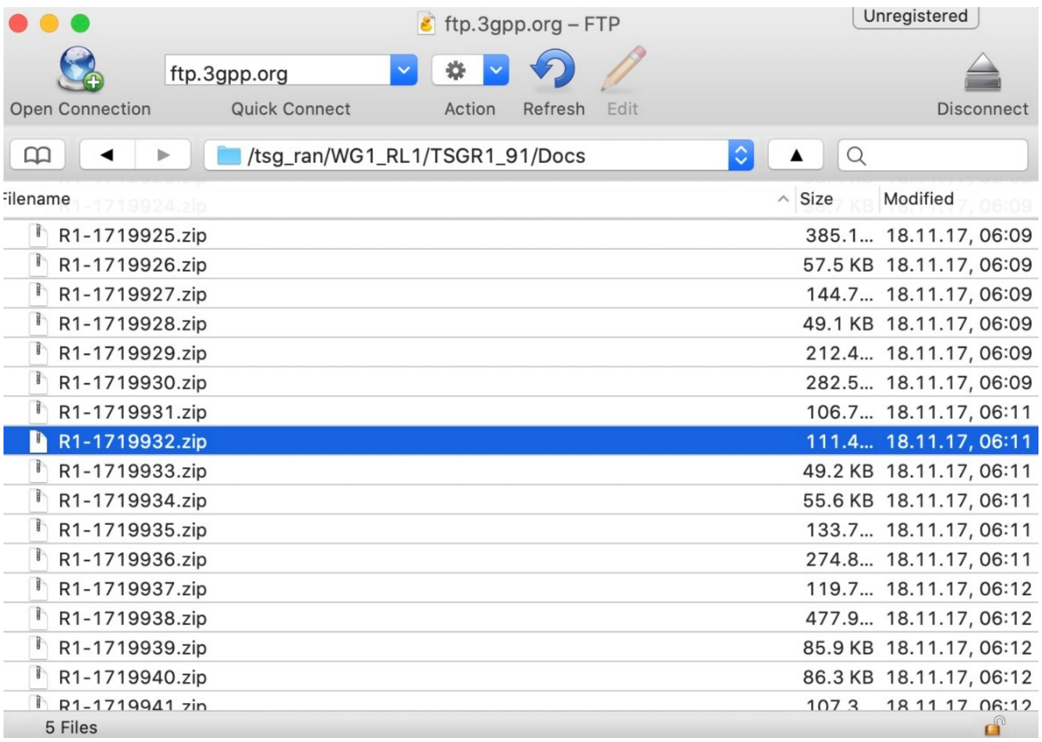
TSG plenary meetings. This is still 3GPP's working practice today; thus, this practice has not changed over time.

### B. Specific Documents

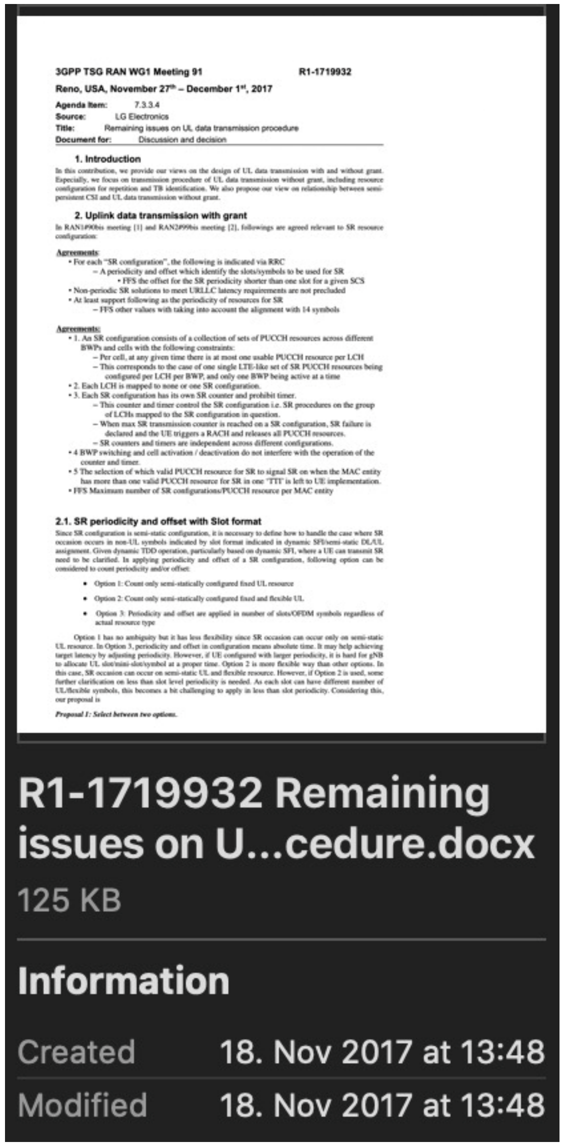
#### 1. R1-1719932

45. Based on my personal knowledge and my review of 3GPP's business records, I recognize Ex. 1006 as a true and correct copy of T-doc R1-1719932, which represents a document submitted by LG Electronics with the title "Remaining issues on UL data transmission procedure." The document presents the author's views on transmission procedure of UL data transmission without grant. On its face, R1-1719932 refers to the RAN WG1 meeting #91 held on November 27$^{th}$- December 1st, 2017 in Reno, USA. Thus, based on my personal knowledge and experience with ETSI's and 3GPP's standard business practices, this information tells me that R1-1719932 was available either prior or during that meeting to at least all attending 3GPP members. The availability of the document is confirmed by the date stamp, November 18, 2017, shown on the historic 3GPP ftp server for the corresponding downloadable file ("R1-1719932.zip"), as maintained by the Internet Archive at https://web.archive.org/web/20171217002833/http://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_91/Docs as well as the date stamp for the present-day listing of the same document on the 3GPP ftp server

https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_91/Docs. Thus, based on my personal knowledge and experience with ETSI's and 3GPP's standard business practices, this information tells me that this document was available to all 3GPP members and the general public by November 18, 2017, at the latest.




46. In addition, the information for the downloaded and extracted T-doc file states a Last Modified date of "18. Nov 2017." Here is a screenshot showing those file details:



3GPP TSG RAN WG1 Meeting 91 R1-1719932

Reno, USA, November 27th – December 1st, 2017

**Agenda Item:** 7.3.3.4
**Source:** LG Electronics
**Title:** Remaining issues on UL data transmission procedure
**Document for:** Discussion and decision

## 1. Introduction

In this contribution, we provide our views on the design of UL data transmission with and without grant. Especially, we focus on transmission procedure of UL data transmission without grant, including resource configuration for repetition and TB identification. We also propose our view on relationship between semi-persistent CSI and UL data transmission without grant.

## 2. Uplink data transmission with grant

In RAN1#90bis meeting [1] and RAN2#99bis meeting [2], followings are agreed relevant to SR resource configuration:

Agreements:
- For each "SR configuration", the following is indicated via RRC
  - A periodicity and offset which identify the slots/symbols to be used for SR
    - FFS the offset for the SR periodicity shorter than one slot for a given SCS
- Non-periodic SR solutions to meet URLLC latency requirements are not precluded
- At least support following as the periodicity of resources for SR
  - FFS other values with taking into account the alignment with 14 symbols

Agreements:
- 1. An SR configuration consists of a collection of sets of PUCCH resources across different BWPs and cells with the following constraints:
  - Per cell, at any given time there is at most one usable PUCCH resource per LCH
  - This corresponds to the case of one single LTE-like set of SR PUCCH resources being configured per LCH per BWP, and only one BWP being active at a time
- 2. Each LCH is mapped to none or one SR configuration.
- 3. Each SR configuration has its own SR counter and prohibit timer.
  - This counter and timer control the SR configuration i.e. SR procedures on the group of LCHs mapped to the SR configuration in question.
  - When max SR transmission counter is reached on a SR configuration, SR failure is declared and the UE triggers a RACH and releases all PUCCH resources.
  - SR counters and timers are independent across different configurations.
- 4 BWP switching and cell activation / deactivation do not interfere with the operation of the counter and timer.
- 5 The selection of which valid PUCCH resource for SR to signal SR on when the MAC entity has more than one valid PUCCH resource for SR in one 'TTI' is left to UE implementation.
- FFS Maximum number of SR configurations/PUCCH resource per MAC entity

### 2.1. SR periodicity and offset with Slot format

Since SR configuration is semi-static configuration, it is necessary to define how to handle the case where SR occasion occurs in non-UL symbols indicated by slot format indicated in dynamic SFI/semi-static DL/UL assignment. Given dynamic TDD operation, particularly based on dynamic SFI, where a UE can transmit SR need to be clarified. In applying periodicity and offset of a SR configuration, following option can be considered to count periodicity and/or offset:

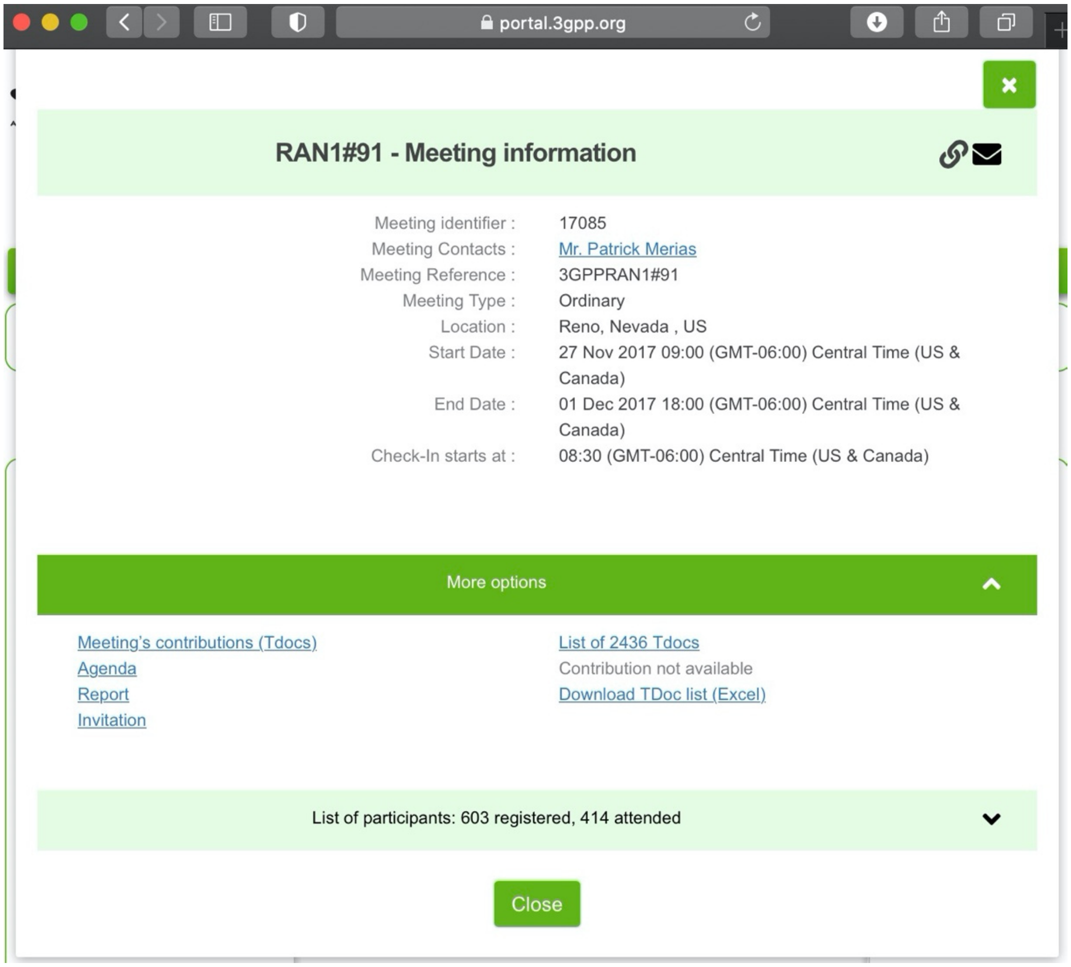
- Option 1: Count only semi-statically configured fixed UL resource
- Option 2: Count only semi-statically configured fixed and flexible UL
- Option 3: Periodicity and offset are applied in number of slots/OFDM symbols regardless of actual resource type

Option 1 has no ambiguity but it has less flexibility since SR occasion can occur only on semi-static UL resource. In Option 3, periodicity and offset in configuration means absolute time. It may help achieving target latency by adjusting periodicity. However, if UE configured with larger periodicity, it is hard for gNB to allocate UL slot/mini-slot/symbol at a proper time. Option 2 is more flexible way than other options. In this case, SR occasion can occur on semi-static UL and flexible resource. However, if Option 2 is used, some further clarification on less than slot level periodicity is needed. As each slot can have different number of UL/flexible symbols, this becomes a bit challenging to apply in less than slot periodicity. Considering this, our proposal is

***Proposal 1: Select between two options.***



47. The official meeting report of the RAN WG1 meeting #91 held on November 27th- December 1st, 2017 in Reno, USA can be found in Appendix B. According to the 3GPP website at https://portal.3gpp.org/Meetings.aspx#/ which is shown by the screen shot below, that meeting was attended by 414 individuals (out of 603 registered participants):




48. The meeting report has a document list attached (Appendix C) which mentions T-doc R1-1719932 marked as "available" which clearly indicates that the document was available at the meeting. The screen shot below shows the related excerpt of the document list:

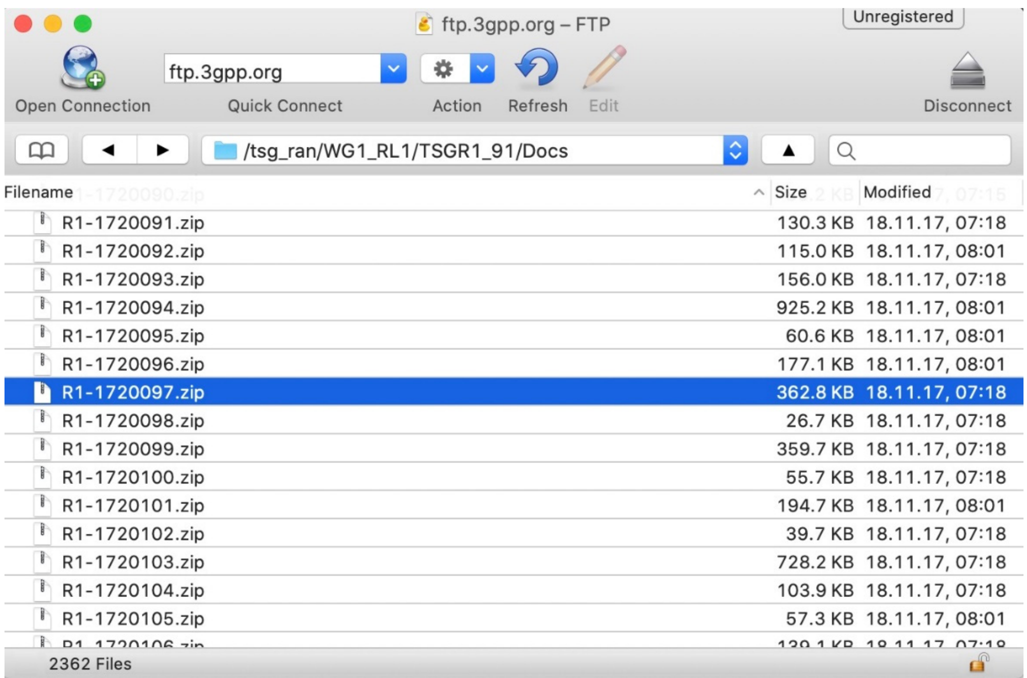
| TDoc | Title | Source | Contact | Agenda item | Agenda item description | TDoc Status | Reservation date | Uploaded |
|---|---|---|---|---|---|---|---|---|
| R1-1719932 | Remaining issues on UL data transmission | LG Electronics | Youngwoo Yun | 7.3.3.4 | UL data transmission | available | 2017-11-15 10:33:03 | 2017-11-18 06:12:31 |

49. Thus, based on my personal knowledge and experience with ETSI's and 3GPP's standard business practices, this information tells me that this document was available to all 3GPP member companies and to the general public by November 18, 2017 at the latest.

### 2. R1-1720097

50. Based on my personal knowledge and my review of 3GPP's business records, I recognize Ex. 1008 as a true and correct copy of T-doc R1-1720097, which represents a document submitted by Intel Corporation with the title "Remaining details of UL data transmission procedures in NR." The document presents the author's view on uplink (UL) data transmission procedures including enhancement on grant-based uplink transmission and uplink grant-free transmission. On its face, R1-1720097 refers to the RAN WG1 meeting #91 held on November 27th- December 1st, 2017 in Reno, USA. Thus, based on my personal knowledge and experience with ETSI's and 3GPP's standard business practices, this information tells me that R1-1720097 was available either prior or during that meeting to at least all attending 3GPP members. The availability of the document is confirmed by the date stamp, November 18, 2017, shown on the historic 3GPP ftp server for the corresponding downloadable file ("R1-1720097.zip"), as maintained by the Internet Archive at

https://web.archive.org/web/20171217002833/http://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_91/Docs as well as the date stamp for the present-day listing of the same document on the 3GPP ftp server https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_91/Docs. Thus, based on my personal knowledge and experience with ETSI's and 3GPP's standard business practices, this information tells me that this document was available to all 3GPP members and the general public by November 18, 2017, at the latest.




51. In addition, the information for the downloaded and extracted T-doc file states a Last Modified date of "18. Nov 2017." Here is a screenshot showing those file details:

Page 1

**3GPP TSG RAN WG1 Meeting 91** **R1-1720097**
**Reno, USA, November 27th – December 1st, 2017**

**Source:** **Intel Corporation**
**Title:** **Remaining details of UL data transmission procedures in NR**
**Agenda item:** **7.3.3.4**
**Document for:** **Discussion and Decision**

1 Introduction

In the previous meeting, the common aspects of waveform determination, multi-slot transmission, frequency hopping, and others were discussed and some progress was achieved. In this contribution, we present our view on UL data transmission procedures including enhancement on grant-based UL transmission and uplink grant-free transmission. In particular, the common aspects for grant-based and grant-free transmissions are discussed in section 2, the SR aspects for grant-based transmission are discussed in section 3, and the remaining issues of Type 1 and Type 2 grant-free transmissions are discussed in section 4.

2 Common UL Transmission Aspects

2.1 Configuration of Repetitions

The repetitions and multi-slot transmission were extensively discussed at the last meeting. It was agreed that TB spanning multiple slots can be realized by the repetitions of a TB with RV cycling. However, the following aspects need to be further discussed for both grant-based and grant-free UL transmissions schemes:

- Support of non-continuous in time repetitions. The support on non-continuous in time repetitions may not be justified for grant-based scheduling. The gNB schedules resources in a short window and can select frequency resources based on dynamic channel quality estimations. In this case, attempt to achieve time diversity for grant-based transmissions is not justified. However, for grant-free UL transmissions, the channel quality based scheduling is not easily possible, therefore maximization of channel diversity and interference randomization may be crucial to achieve target requirements for both latency critical and latency tolerant services. These aspects are discussed in more details in section 4.1 of this contribution.
- Support of mini-slot repetitions. As it was argued above, at least for grant-free transmission, the repetitions of slots/mini-slots of the same TB may not be consecutive in time. For an open-loop operation as is typical for grant-free UL transmissions, use of repetitions of a smaller data channel duration provides the opportunity at the gNB for an early decoding success event in case of favourable channel conditions. Having this in mind, restricting transmission to single mini-slot per slot violates the primary targets of supporting UL grant-free transmissions. However, if gNB decides to have a continuous transmission shorter than a slot, it can always configure a proper mini-slot duration without repetitions. For example, instead of configuration of two aggregated 2-symbol mini-slots, gNB can always configure single 4-symbol mini-slot.

**Proposal 1**

- *For UL transmission with grant, the repetitions are contiguous in valid slots*
- *For UL transmission without grant, mini-slot repetitions within a slot are supported*

The number of repetitions itself should be configurable, as it was agreed. For grant-based UL and Type 2 grant-free, it is still FFS whether only RRC or RRC + L1 signalling is used. In our view, generalizing the signalling to RRC + L1 is a more optimal and "forward looking" approach. It would also be an important differentiating feature of Type 2 comparing to Type 1 when the number of repetitions could change dynamically based on changing propagation conditions. As for the concrete design of the signalling, it is preferred that a set of values for repetition number is configured by RRC and the index of the particular value is conveyed in DCI.

**Proposal 2**

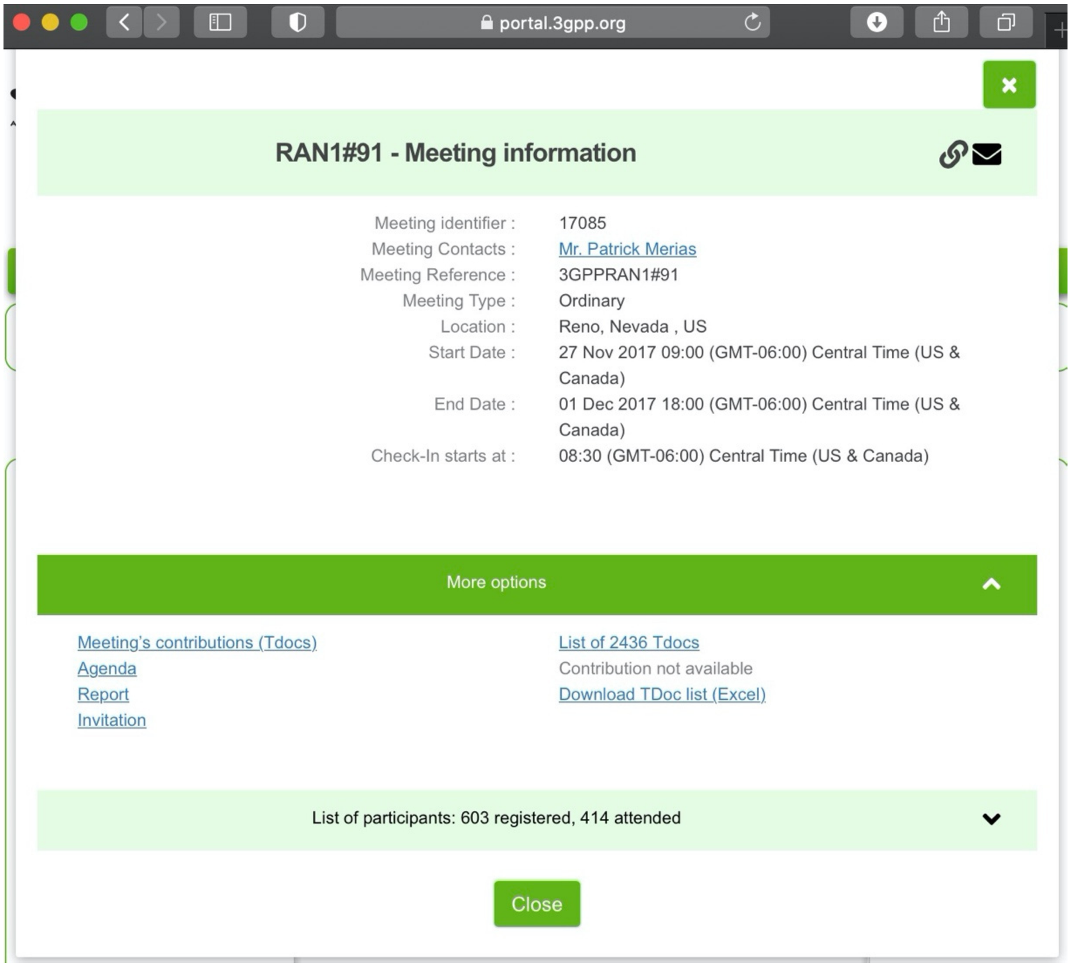
- *The number of repetitions K for UL transmission with grant and Type 2 UL transmission without grant is indicated by DCI grant/activation from a set of values that are configured via RRC*

2.2 Frequency Hopping

Previously during the NR work/study item the frequency hopping was agreed for DFT-s-OFDM waveform which does not support distributed transmission. Further, the following agreements were



52. The official meeting report of the RAN WG1 meeting #91 held on November 27th- December 1st, 2017 in Reno, USA can be found in Appendix B. According to the 3GPP website at https://portal.3gpp.org/Meetings.aspx#/ which is shown by the screen shot below, that meeting was attended by 414 individuals (out of 603 registered participants):



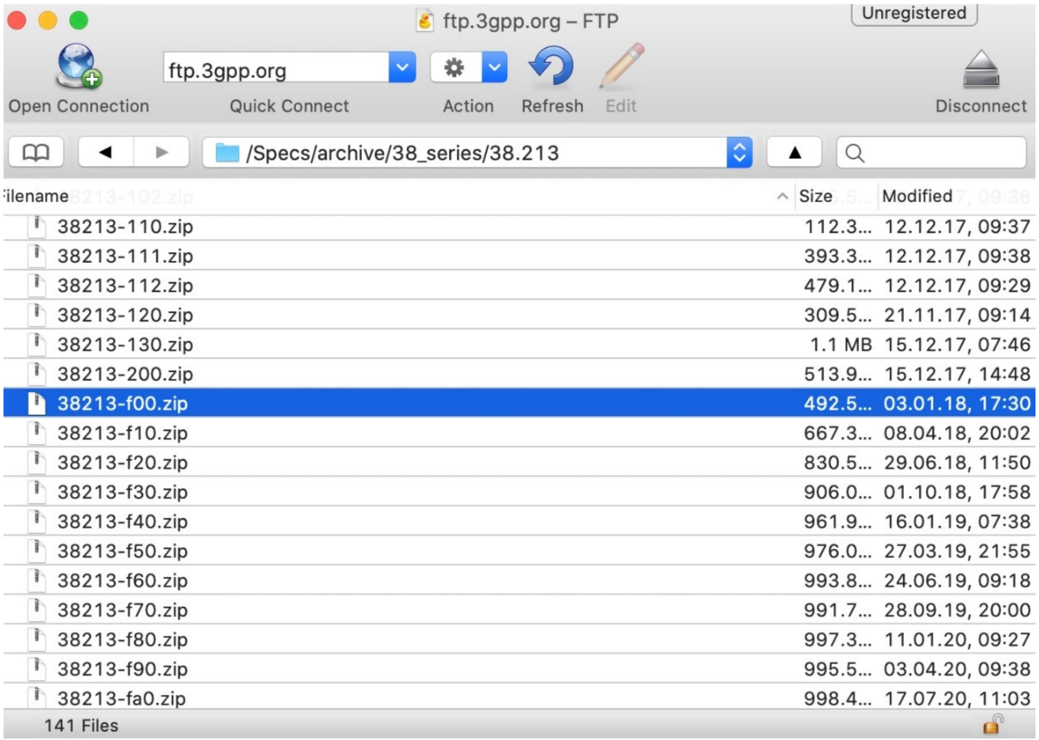

53. The meeting report has a document list attached (Appendix C) which mentions T-doc R1-1720097 marked as "available" which clearly indicates that the document was available at the meeting. The screen shot below shows the related excerpt of the document list:

| TDoc | Title | Source | Contact | Agenda item | Agenda item description | TDoc Status | Reservation date | Uploaded |
|---|---|---|---|---|---|---|---|---|
| R1-1720097 | Remaining details of UL data transmission procedures in NR | Intel Corporation | Seunghee Han | 7.3.3.4 | UL data transmission procedure | available | 2017-11-15 16:30:09 | 2017-11-18 07:18:52 |

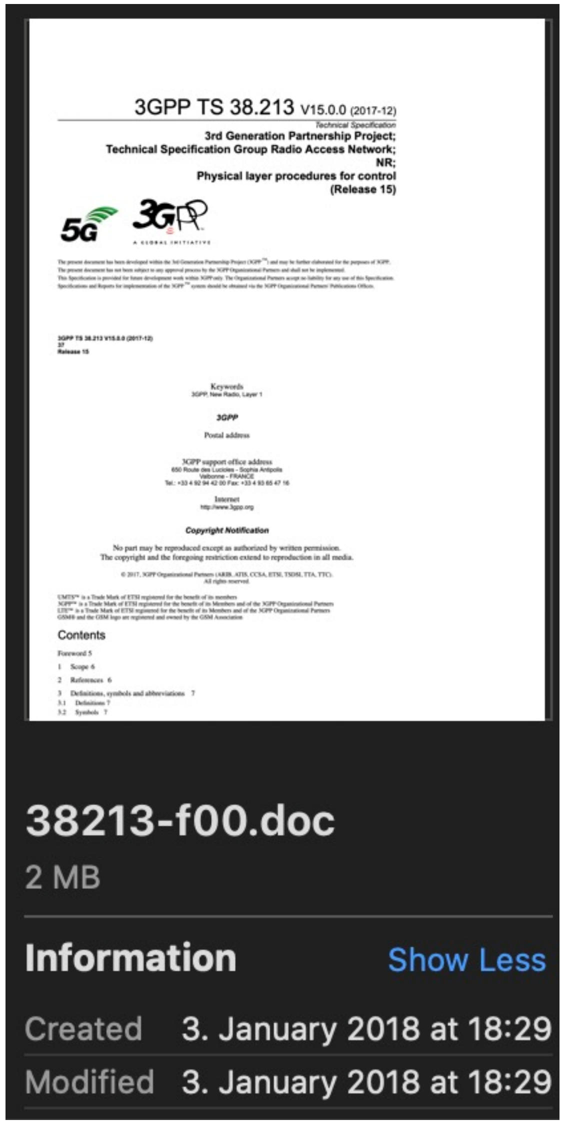
54. Thus, based on my personal knowledge and experience with ETSI's and 3GPP's standard business practices, this information tells me that this document was available to all 3GPP member companies and to the general public by November 18, 2017 at the latest.

### 3. TS 38.213 v15.0.0

55. Based on my personal knowledge and my review of 3GPP's business records, I recognize Ex. 1005 as a true and correct copy of version 15.0.0 of technical specification 3GPP TS 38.213 ("Technical Specification Group Radio Access Network; NR; Physical layer procedures for control (Release 15)") which shows on its cover page "2017-12" as the year (2017) and month (December) during which this document was released by 3GPP. The document was published and freely available on 3GPP's ftp server by January 3, 2018. This is confirmed by the date stamp shown on the historic 3GPP ftp server for the corresponding downloadable file ("38213-f00.zip"), as maintained by the Internet Archive at http://web.archive.org/web/20180126175011/http://www.3gpp.org/ftp/Specs/archive/38_series/38.213/, as well as the date stamp for the present-day listing of the same document on the 3GPP ftp server at https://www.3gpp.org/ftp/Specs/archive/38_series/38.213 as shown by the screenshot below:




56. In addition, the information for the downloaded and extracted specification file states a last Modified date of "3. January 2018." Here is a screenshot showing those file details:

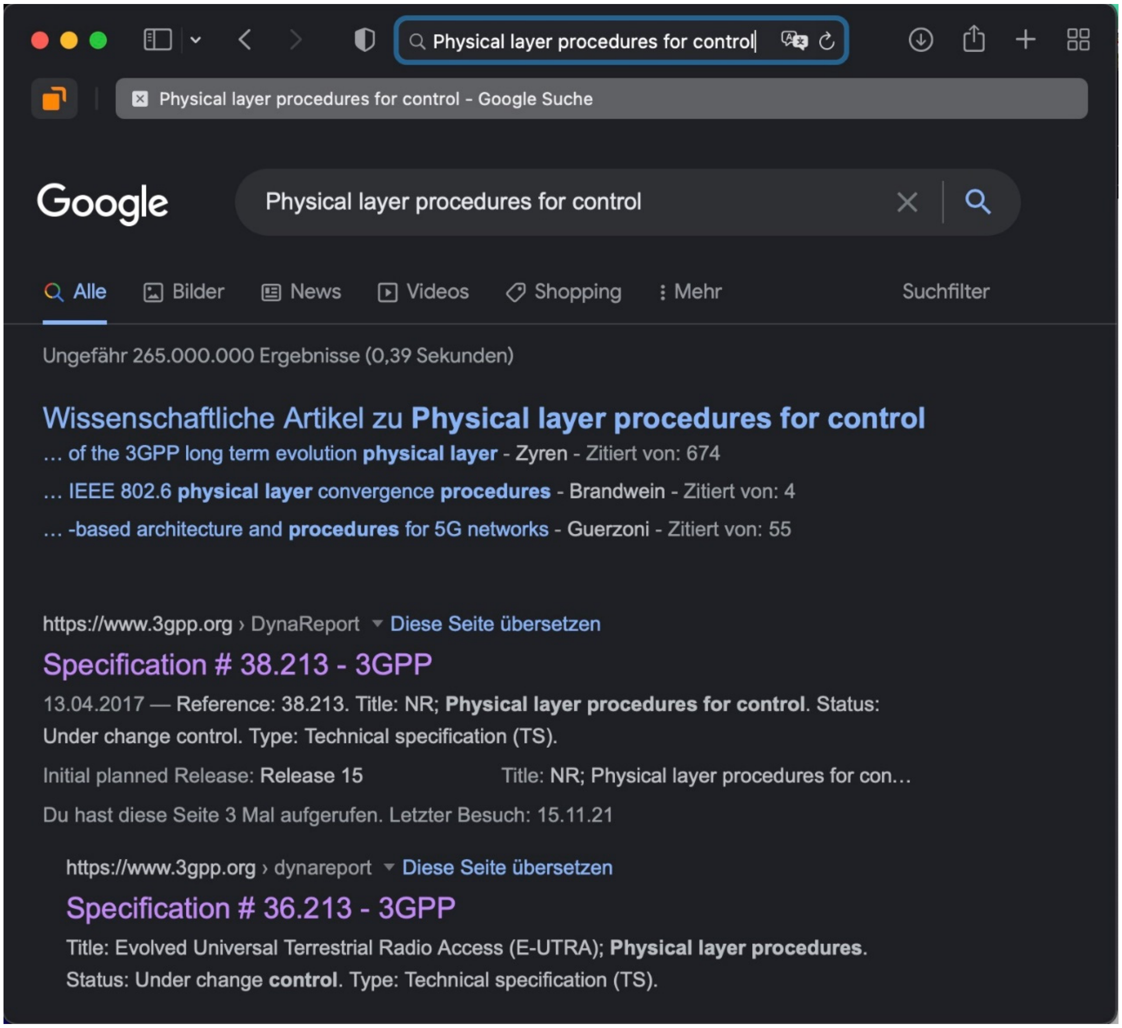



57. Thus, based on my personal knowledge and experience with ETSI's and 3GPP's standard business practices, this information tells me that this document was available to all 3GPP members and the general public by January 3, 2018, at the latest.

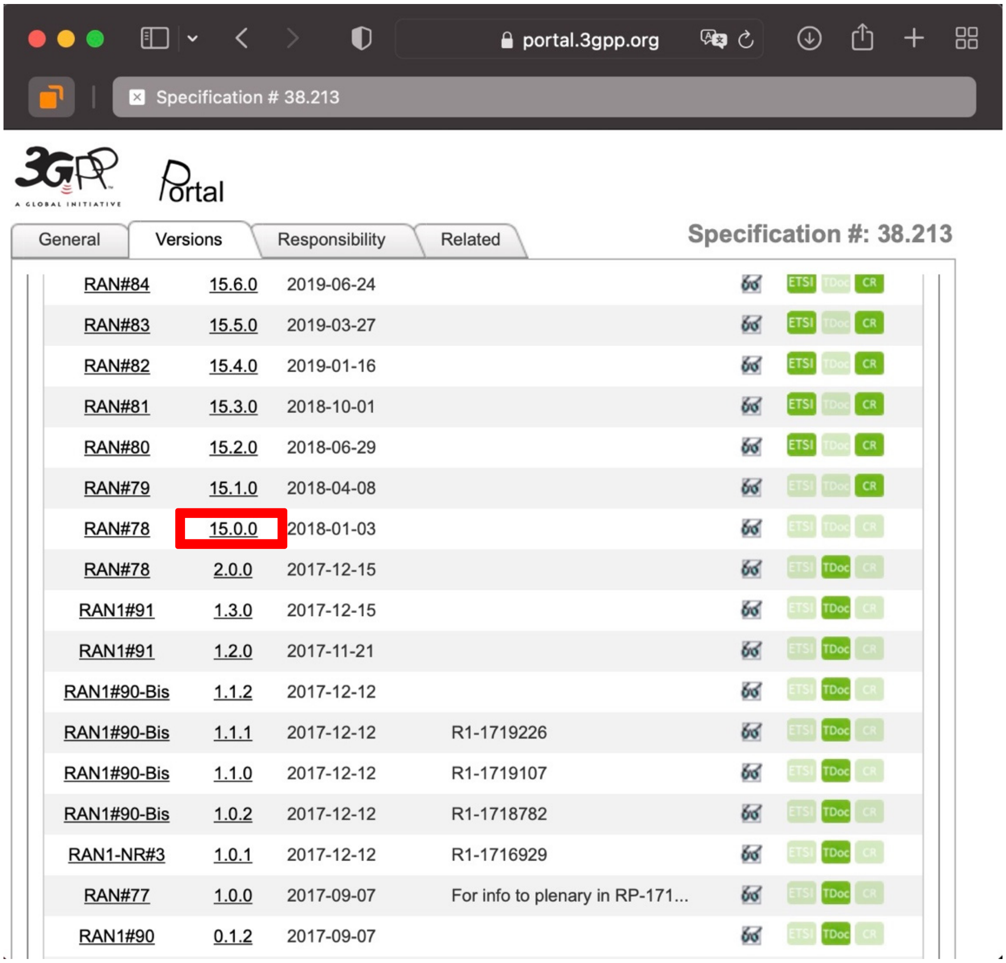
58. Furthermore, the availability of the document was announced by the RAN WG1 secretary via the public 3GPP_TSG_RAN_WG1 email exploder on

January 16, 2018, as shown in Appendix D. As of today, the 3GPP_TSG_RAN_WG1 email exploder has around 1528 subscribers as can be seen at https://list.etsi.org/. Based on my experience, I would expect over 1000 subscribers for the 3GPP_TSG_RAN_WG1 email exploder by 2018.

59. I believe that a person without prior knowledge of 3GPP and/or the technical specification (TS) number would have been able to easily find the TS for download via internet search. For instance, a Google search for "Physical layer procedures for control" provides the TS number "38.213" as one of the top results as can be seen in the screen shot below:




60. Following the provided search result link "Specification # 38.213 – 3GPP" leads to a 3GPP web page offering under the tab "Versions" download links to all versions of TS 38.213 including version 15.0.0, as shown by the screenshot below:



portal.3gpp.org

Specification # 38.213

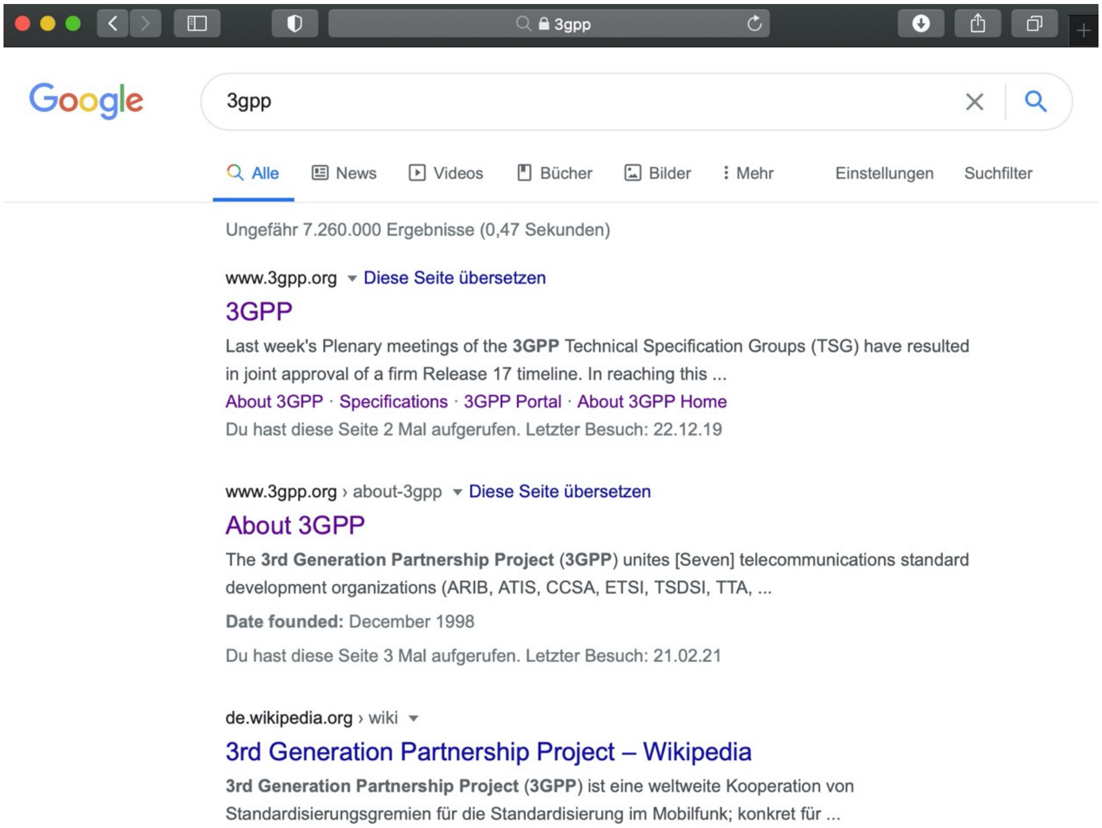
3GPP A GLOBAL INITIATIVE Portal

General | Versions | Responsibility | Related

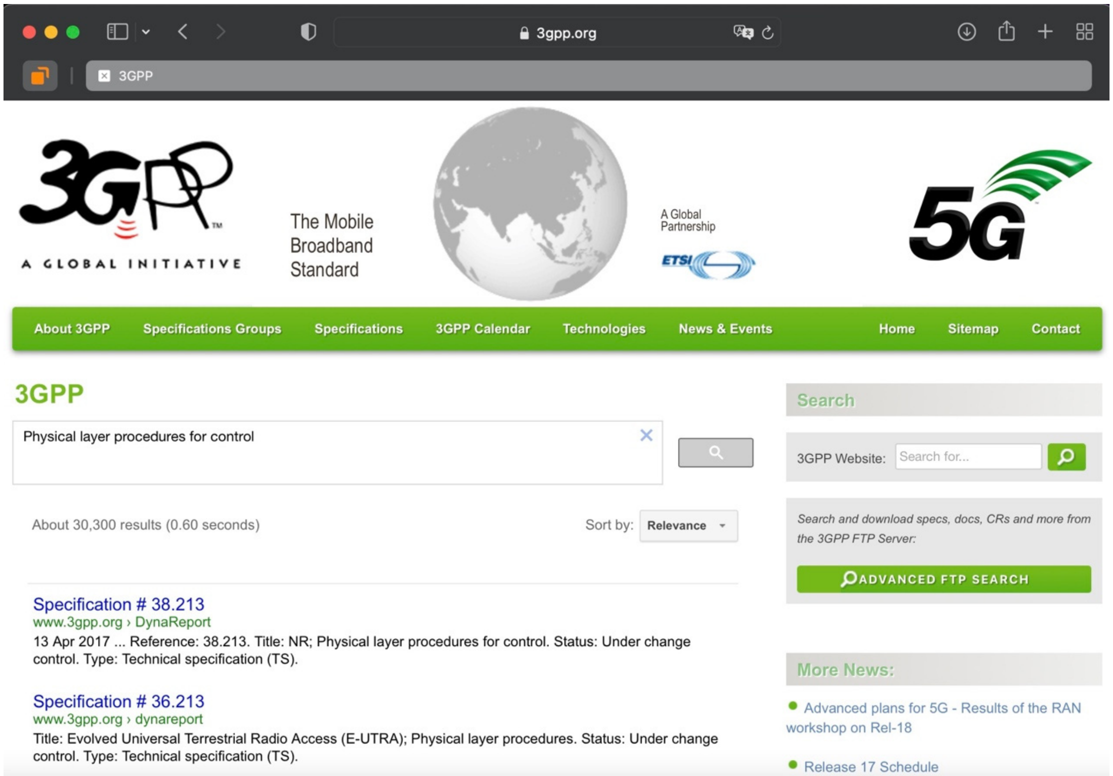
Specification #: 38.213

| | | | |
|---|---|---|---|
| RAN#84 | 15.6.0 | 2019-06-24 | |
| RAN#83 | 15.5.0 | 2019-03-27 | |
| RAN#82 | 15.4.0 | 2019-01-16 | |
| RAN#81 | 15.3.0 | 2018-10-01 | |
| RAN#80 | 15.2.0 | 2018-06-29 | |
| RAN#79 | 15.1.0 | 2018-04-08 | |
| RAN#78 | 15.0.0 | 2018-01-03 | |
| RAN#78 | 2.0.0 | 2017-12-15 | |
| RAN1#91 | 1.3.0 | 2017-12-15 | |
| RAN1#91 | 1.2.0 | 2017-11-21 | |
| RAN1#90-Bis | 1.1.2 | 2017-12-12 | |
| RAN1#90-Bis | 1.1.1 | 2017-12-12 | R1-1719226 |
| RAN1#90-Bis | 1.1.0 | 2017-12-12 | R1-1719107 |
| RAN1#90-Bis | 1.0.2 | 2017-12-12 | R1-1718782 |
| RAN1-NR#3 | 1.0.1 | 2017-12-12 | R1-1716929 |
| RAN#77 | 1.0.0 | 2017-09-07 | For info to plenary in RP-171... |
| RAN1#90 | 0.1.2 | 2017-09-07 | |

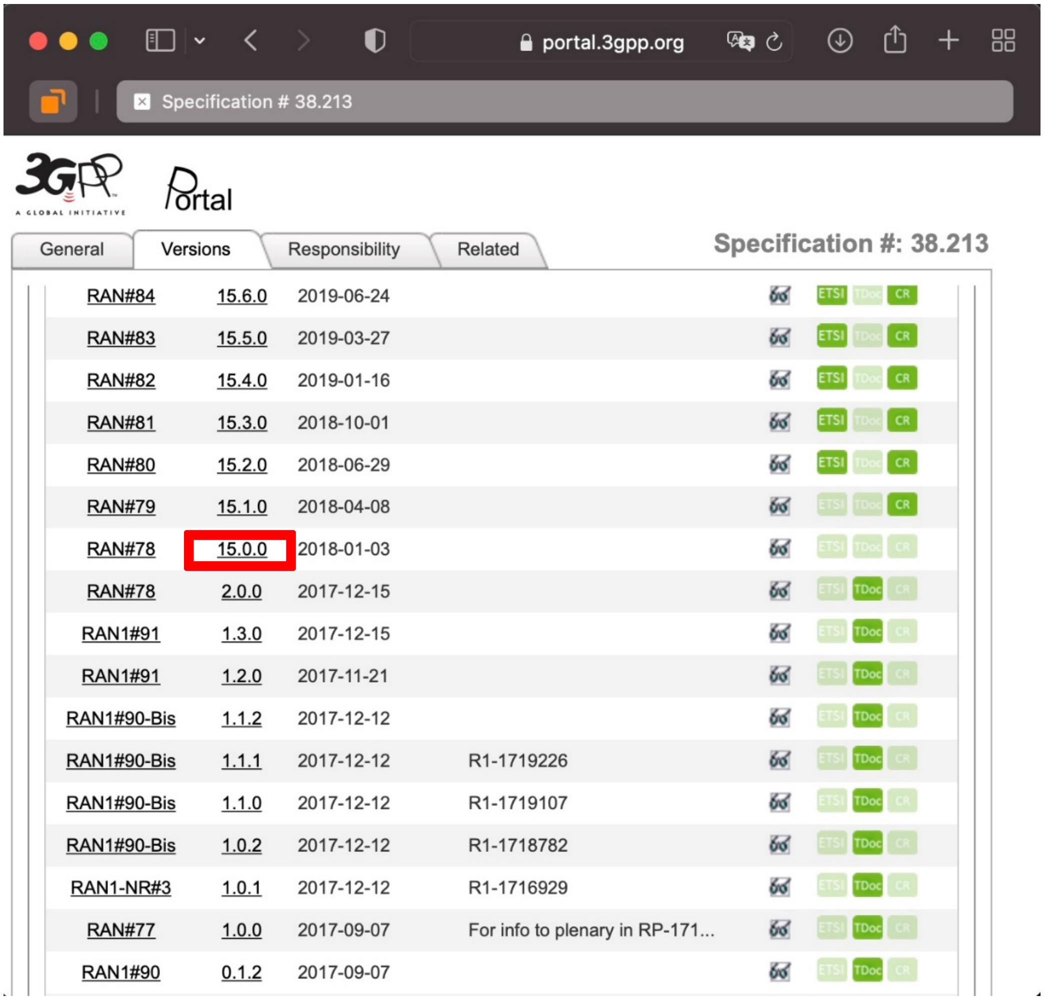
61. 3GPP is a very well-known SDO as of today and certainly was already very well-known in 2016. A person aware of 3GPP could have found TS 38.213 v15.0.0 also via a different route. Searching for "3GPP" leads to the 3GPP website htpp://www.3gpp.org, as can be seen by the screen shot below:




62. Entering "Physical layer procedures for control" into the search box of the 3GPP web site provides "Specification # 38.213" as the top result, as can be seen by the screen shot below:




63. Following the provided search result link on "Specification # 38.213" leads to the same 3GPP web page as mentioned in paragraph 47 offering under the tab "Versions" download links to all versions of TS 38.213 including version 15.0.0, as shown by the screenshot below:



portal.3gpp.org

Specification # 38.213

3GPP A GLOBAL INITIATIVE Portal

General | Versions | Responsibility | Related

Specification #: 38.213

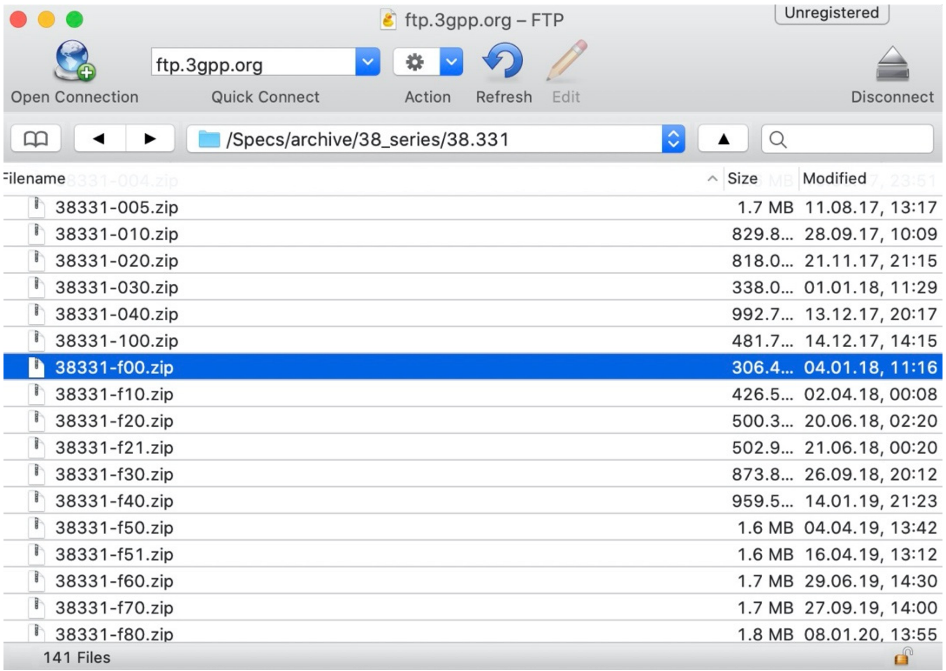
| | | | | |
|---|---|---|---|---|
| RAN#84 | 15.6.0 | 2019-06-24 | | ETSI TDoc CR |
| RAN#83 | 15.5.0 | 2019-03-27 | | ETSI TDoc CR |
| RAN#82 | 15.4.0 | 2019-01-16 | | ETSI TDoc CR |
| RAN#81 | 15.3.0 | 2018-10-01 | | ETSI TDoc CR |
| RAN#80 | 15.2.0 | 2018-06-29 | | ETSI TDoc CR |
| RAN#79 | 15.1.0 | 2018-04-08 | | ETSI TDoc CR |
| RAN#78 | 15.0.0 | 2018-01-03 | | ETSI TDoc CR |
| RAN#78 | 2.0.0 | 2017-12-15 | | ETSI TDoc CR |
| RAN1#91 | 1.3.0 | 2017-12-15 | | ETSI TDoc CR |
| RAN1#91 | 1.2.0 | 2017-11-21 | | ETSI TDoc CR |
| RAN1#90-Bis | 1.1.2 | 2017-12-12 | | ETSI TDoc CR |
| RAN1#90-Bis | 1.1.1 | 2017-12-12 | R1-1719226 | ETSI TDoc CR |
| RAN1#90-Bis | 1.1.0 | 2017-12-12 | R1-1719107 | ETSI TDoc CR |
| RAN1#90-Bis | 1.0.2 | 2017-12-12 | R1-1718782 | ETSI TDoc CR |
| RAN1-NR#3 | 1.0.1 | 2017-12-12 | R1-1716929 | ETSI TDoc CR |
| RAN#77 | 1.0.0 | 2017-09-07 | For info to plenary in RP-171... | ETSI TDoc CR |
| RAN1#90 | 0.1.2 | 2017-09-07 | | ETSI TDoc CR |

64. The above example searches illustrate that it is very easy for an interested member of the public without prior knowledge of the TS number and even without prior knowledge of 3GPP to locate any version of TS 38.213, including version 15.0.0, for download.

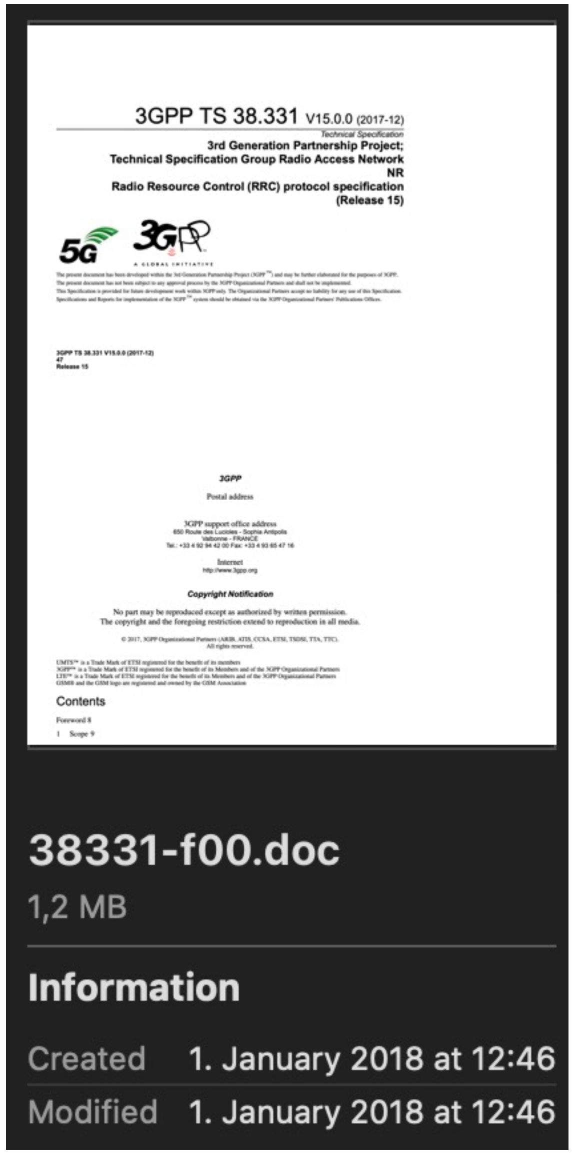
65. The above searches were performed at the time of writing this report. According to my personal experience, similar searches done in January 2018 or around that timeframe would have similarly provided the path to download version 15.0.0 of TS 38.213.

#### 4. TS 38.331 v15.0.0

66. Based on my personal knowledge and my review of 3GPP's business records, I recognize Ex. 1004 as a true and correct copy of version 15.0.0 of technical specification 3GPP TS 38.331 ("Technical Specification Group Radio Access Network; NR; Radio Resource Control (RRC) protocol specification (Release 15)"), which shows on its cover page "2017-12" as the year (2017) and month (December) during which this document was released by 3GPP. The document was published and freely available on 3GPP's ftp server by January 4, 2018. This is confirmed by the date stamp shown on the historic 3GPP ftp server for the corresponding downloadable file ("38331-f00.zip"), as maintained by the Internet Archive at https://web.archive.org/web/20180123165249/http://www.3gpp.org/ftp/Specs/archive/38_series/38.331/ , as well as the date stamp for the present-day listing of the same document on the 3GPP ftp server at https://www.3gpp.org/ftp/Specs/archive/38_series/38.331 as shown by the screenshot below:



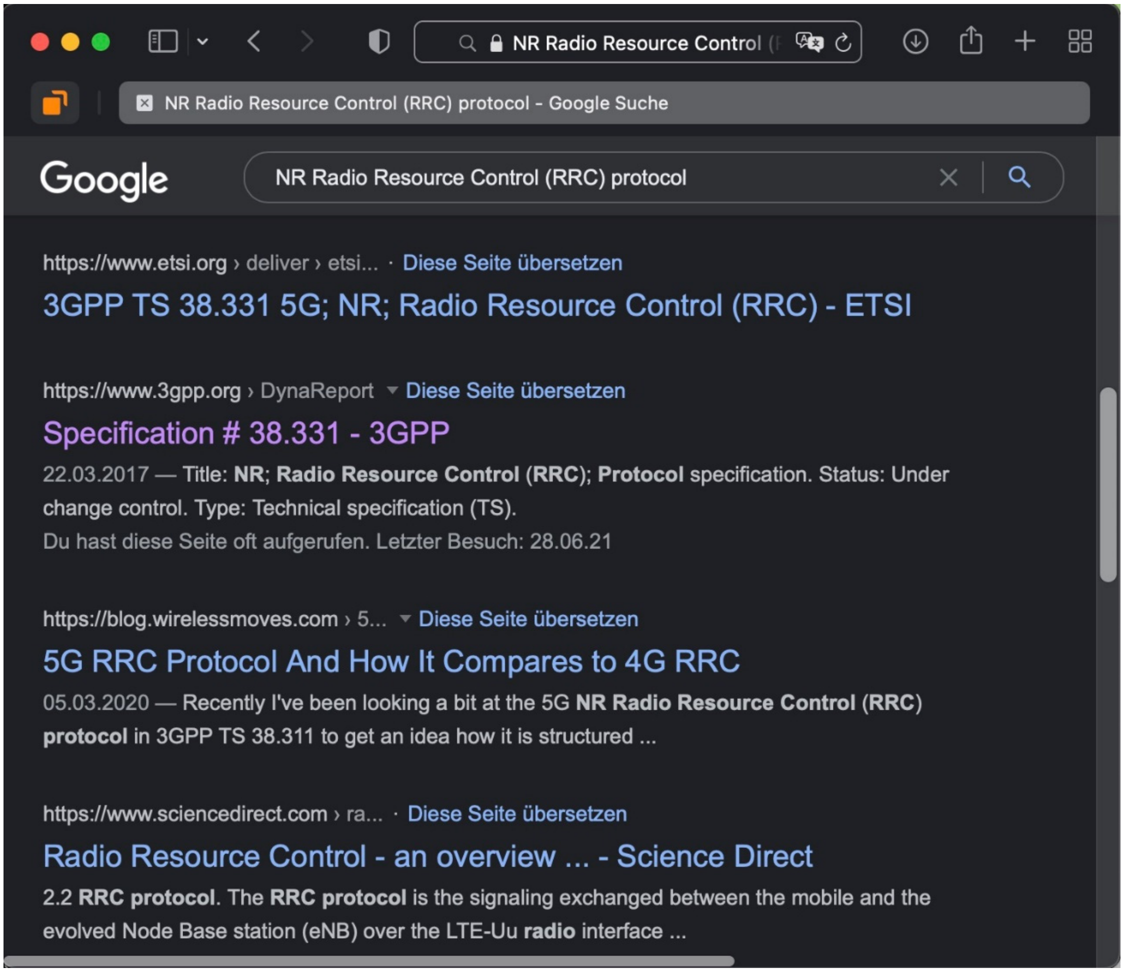

67. In addition, the information for the downloaded and extracted specification file states a last Modified date of "1. January 2018." Here is a screenshot showing those file details:



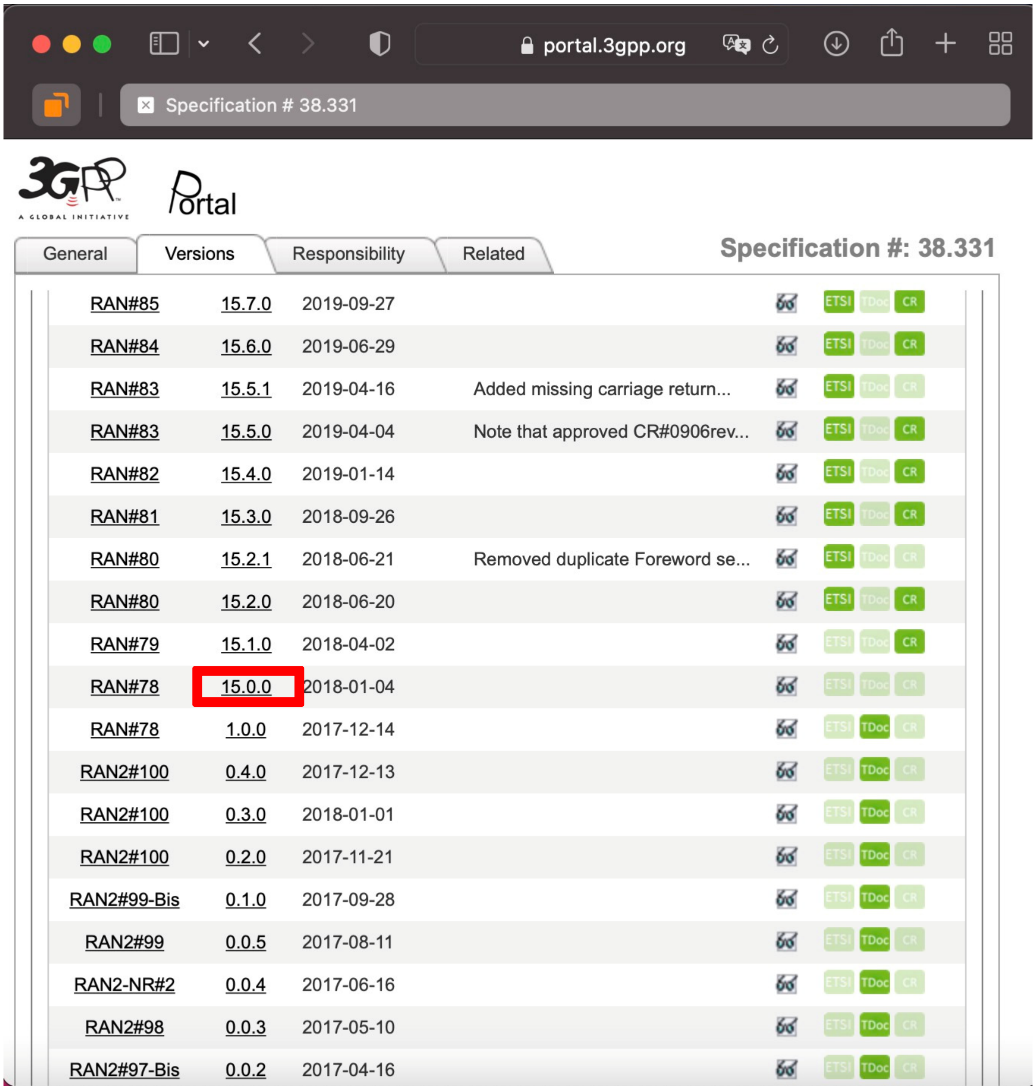

68. Thus, based on my personal knowledge and experience with ETSI's and 3GPP's standard business practices, this information tells me that this document was available to all 3GPP members and the general public by January 4, 2018, at the latest.

69. Furthermore, the availability of the document was announced by the RAN WG2 secretary via the public 3GPP_TSG_RAN_WG2 email exploder on January 4, 2018, as shown in Appendix D. As of today, the 3GPP_TSG_RAN_WG2 email exploder has around 1138 subscribers as can be seen at https://list.etsi.org/. Based on my experience, I would expect over 1000 subscribers for the 3GPP_TSG_RAN_WG2 email exploder by 2018.

70. I believe that a person without prior knowledge of 3GPP and/or the technical specification (TS) number would have been able to easily find the TS for download via internet search. For instance, a Google search for "NR Radio Resource Control (RRC) Protocol" provides the TS number "38.331" as one of the top results as can be seen in the screen shot below:

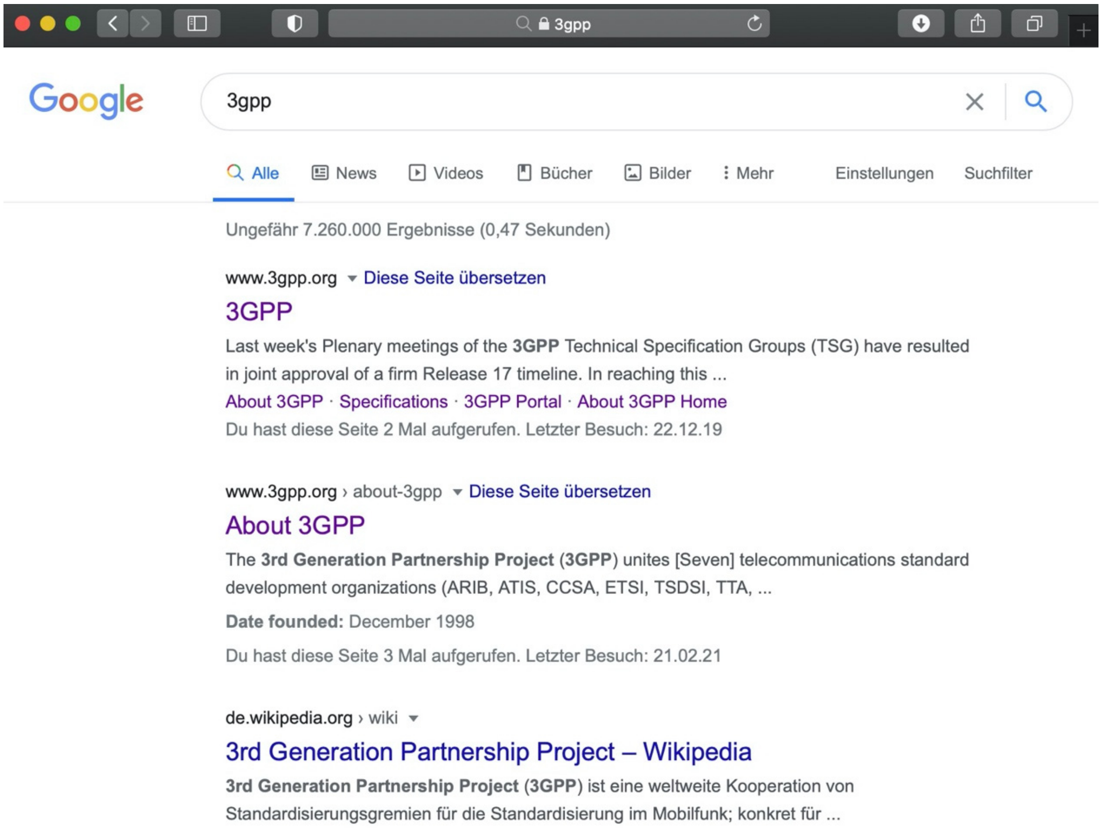



71. Following the provided search result link "Specification # 38.331 – 3GPP" leads to a 3GPP web page offering under the tab "Versions" download links to all versions of TS 38.331 including version 15.0.0, as shown by the screenshot below:

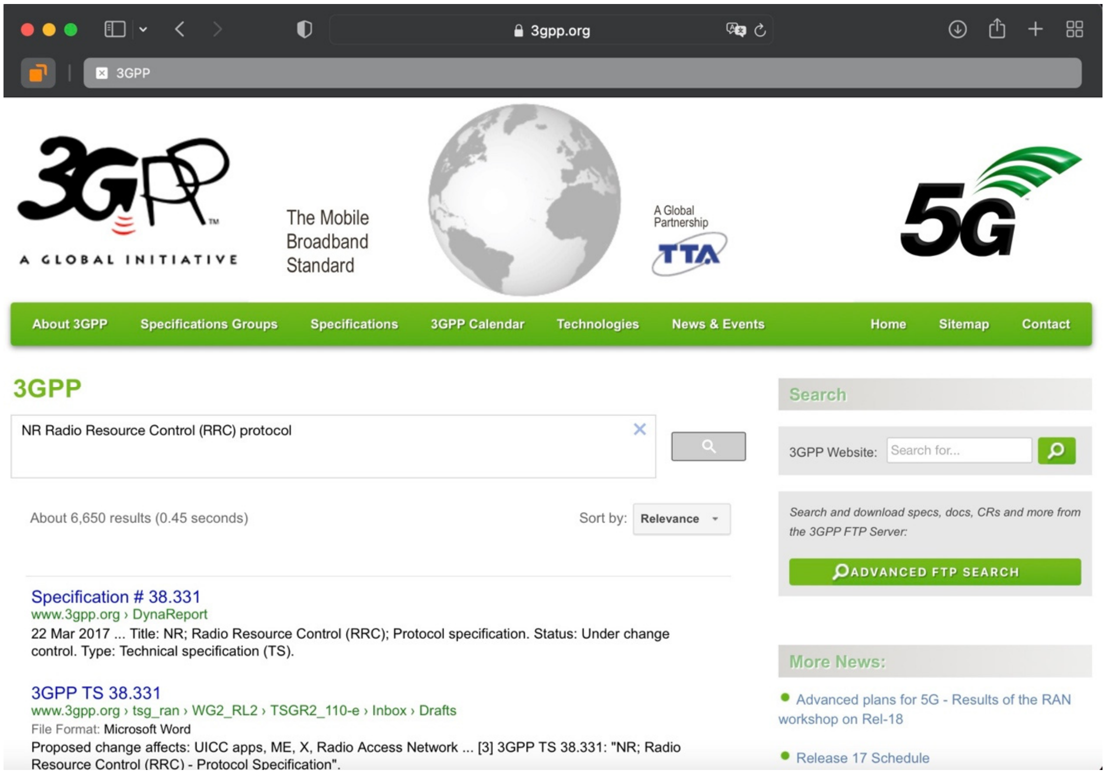



| | | | | | | |
|---|---|---|---|---|---|---|
| RAN#85 | 15.7.0 | 2019-09-27 | | ETSI | TDoc | CR |
| RAN#84 | 15.6.0 | 2019-06-29 | | ETSI | TDoc | CR |
| RAN#83 | 15.5.1 | 2019-04-16 | Added missing carriage return... | ETSI | TDoc | CR |
| RAN#83 | 15.5.0 | 2019-04-04 | Note that approved CR#0906rev... | ETSI | TDoc | CR |
| RAN#82 | 15.4.0 | 2019-01-14 | | ETSI | TDoc | CR |
| RAN#81 | 15.3.0 | 2018-09-26 | | ETSI | TDoc | CR |
| RAN#80 | 15.2.1 | 2018-06-21 | Removed duplicate Foreword se... | ETSI | TDoc | CR |
| RAN#80 | 15.2.0 | 2018-06-20 | | ETSI | TDoc | CR |
| RAN#79 | 15.1.0 | 2018-04-02 | | ETSI | TDoc | CR |
| RAN#78 | 15.0.0 | 2018-01-04 | | ETSI | TDoc | CR |
| RAN#78 | 1.0.0 | 2017-12-14 | | ETSI | TDoc | CR |
| RAN2#100 | 0.4.0 | 2017-12-13 | | ETSI | TDoc | CR |
| RAN2#100 | 0.3.0 | 2018-01-01 | | ETSI | TDoc | CR |
| RAN2#100 | 0.2.0 | 2017-11-21 | | ETSI | TDoc | CR |
| RAN2#99-Bis | 0.1.0 | 2017-09-28 | | ETSI | TDoc | CR |
| RAN2#99 | 0.0.5 | 2017-08-11 | | ETSI | TDoc | CR |
| RAN2-NR#2 | 0.0.4 | 2017-06-16 | | ETSI | TDoc | CR |
| RAN2#98 | 0.0.3 | 2017-05-10 | | ETSI | TDoc | CR |
| RAN2#97-Bis | 0.0.2 | 2017-04-16 | | ETSI | TDoc | CR |

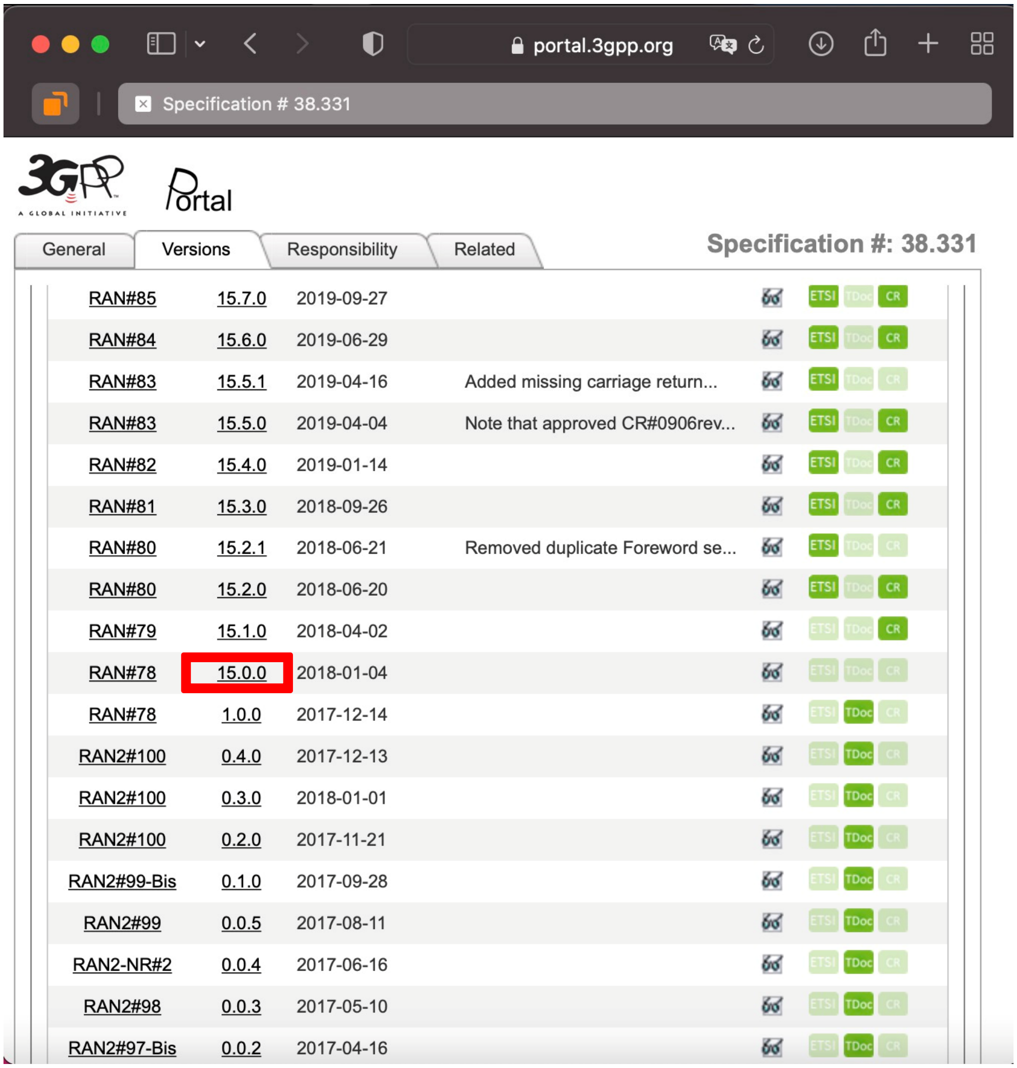
72. 3GPP is a very well-known SDO as of today and certainly was already very well-known in 2016. A person aware of 3GPP could have found TS 38.331 v15.0.0 also via a different route. Searching for "3GPP" leads to the 3GPP website htpp://www.3gpp.org, as can be seen by the screen shot below:




73. Entering "NR Radio Resource Control (RRC) Protocol" into the search box of the 3GPP web site provides "Specification # 38.331" as the top result, as can be seen by the screen shot below:




74. Following the provided search result link on "Specification # 38.331" leads to the same 3GPP web page as mentioned in paragraph 47 offering under the tab "Versions" download links to all versions of TS 38.331 including version 15.0.0, as shown by the screenshot below:




| | | | | |
|---|---|---|---|---|
| RAN#85 | 15.7.0 | 2019-09-27 | | ETSI TDoc CR |
| RAN#84 | 15.6.0 | 2019-06-29 | | ETSI TDoc CR |
| RAN#83 | 15.5.1 | 2019-04-16 | Added missing carriage return... | ETSI TDoc CR |
| RAN#83 | 15.5.0 | 2019-04-04 | Note that approved CR#0906rev... | ETSI TDoc CR |
| RAN#82 | 15.4.0 | 2019-01-14 | | ETSI TDoc CR |
| RAN#81 | 15.3.0 | 2018-09-26 | | ETSI TDoc CR |
| RAN#80 | 15.2.1 | 2018-06-21 | Removed duplicate Foreword se... | ETSI TDoc CR |
| RAN#80 | 15.2.0 | 2018-06-20 | | ETSI TDoc CR |
| RAN#79 | 15.1.0 | 2018-04-02 | | ETSI TDoc CR |
| RAN#78 | 15.0.0 | 2018-01-04 | | ETSI TDoc CR |
| RAN#78 | 1.0.0 | 2017-12-14 | | ETSI TDoc CR |
| RAN2#100 | 0.4.0 | 2017-12-13 | | ETSI TDoc CR |
| RAN2#100 | 0.3.0 | 2018-01-01 | | ETSI TDoc CR |
| RAN2#100 | 0.2.0 | 2017-11-21 | | ETSI TDoc CR |
| RAN2#99-Bis | 0.1.0 | 2017-09-28 | | ETSI TDoc CR |
| RAN2#99 | 0.0.5 | 2017-08-11 | | ETSI TDoc CR |
| RAN2-NR#2 | 0.0.4 | 2017-06-16 | | ETSI TDoc CR |
| RAN2#98 | 0.0.3 | 2017-05-10 | | ETSI TDoc CR |
| RAN2#97-Bis | 0.0.2 | 2017-04-16 | | ETSI TDoc CR |

75. The above example searches illustrate that it is very easy for an interested member of the public without prior knowledge of the TS number and even without prior knowledge of 3GPP to locate any version of TS 38.331, including version 15.0.0, for download.

76. The above searches were performed at the time of writing this report. According to my personal experience, similar searches done in January 2018 or

around that timeframe would have similarly provided the path to download version 15.0.0 of TS 38.331.

## V. AVAILABILITY FOR CROSS-EXAMINATION

77. In signing this declaration, I recognize that the declaration may be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I also recognize that I may be subject to cross examination in the case and that cross examination will take place within the United States. If cross examination is required of me, I will cooperate to the best of my ability to appear for cross examination within the United States during the time allotted for cross examination.

### A. Right To Supplement

78. I reserve the right to supplement my opinions in the future to respond to any arguments that the Patent Owner raises and to take into account new information as it becomes available to me.

### B. Signature

79. I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false

statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

80. I declare under penalty of perjury that the foregoing is true and correct.

Dated: January 19, 2022

______________________________
Friedhelm Rodermund

APPENDIX A

# CURRICULUM VITAE

## I. PERSONAL DATA

Name: **Friedhelm RODERMUND**

Mailing address: Am Steiner Graben 18
56077 Koblenz, Germany

Phone: +49 172 2606489

Email: friedhelm.rodermund@iotecc.com

## II. PROFESSIONAL EXPERIENCE

**Summary**

Senior expert in telecommunications and Internet of Things (IoT) technology. 25 years of experience within the mobile communications industry, and several years in the IoT domain in various roles such as project management, technology innovation and evolution, standards development, technology strategy, patent creation and support of patent litigations, and development/introduction of new services.

Widely recognized standards expert who was actively involved in leading roles in the development of key standards for mobile telephony/data and service anablers across standards development organizations such as 3GPP, ETSI, GSMA, IETF, OMA, and oneM2M. Currently focussing on standards for the Internet of Things.

Founder and director of IOTECC GmbH which provides consulting services around technologies and standards enabling the Internet of Things, and provides consulting services related to patents for mobile telcommunications and IoT.

**01/2015 – present** **IOTECC GmbH** **Koblenz, Germany**

Founder and CEO
- Mobile telecommunications, Internet of Things (IoT) and Machine to Machine (M2M) technology and standards consulting
- Telecommunications and IoT patent consulting
  - Consulting services around telecommunications and IoT patents in particular related to ETSI, 3GPP, and OMA standards
  - State of the art/prior art research services related to patent creation e.g. for new 5G patents
  - Prior art research, patent infringement analysis related to litigations and validity actions
  - Advising on Standards Development Organisations (SDO) working processes and IPR policy, ETSI IPR Special Committee delegate
  - Experienced expert witness (please see section III for a list of supported actions)

**11/2014 – 12/2014** **Friedhelm Rodermund Consulting** **Koblenz, Germany**

Internet of Things (IoT) Consultant
- M2M/IoT standards development and introduction of new M2M/IoT services

**01/2011 – 10/2014** **Vodafone Germany / Vodafone Group R&D** **Düsseldorf, Germany**

Senior Standards Strategist
- Representing Vodafone in various standardisation bodies
- Driving the standardisation of the Internet of Things
- Work item lead, technical editor and key contributor of Open Mobile Alliance (OMA) “Lightweight M2M (LwM2M)” – the new standard for the Internet of Things
- Advising and supporting various M2M projects related to e.g. automotive, smart metering, health, industry
- Advising on the introduction of new M2M technologies and services
- Leading Proof of Concepts of emerging technologies
- Involved in innovation projects
- Supporting the creation and protection of Intellectual Property

**01/2009 – 12/2010** **Vodafone Germany** **Düsseldorf, Germany**

Vice Chairman Open Mobile Alliance (OMA) Device Management (DM)
- Responsible for Vodafone’s Device Management standardisation
- As OMA DM Vice Chairman, co-leading the group, chairing committee meetings and web conferences, steering the technical direction, management of the different work items
- Editor of several specifications, rapporteur of various work items
- Support of projects for the introduction of device management
- Delegate to 3GPP SA1 where I was responsible for the introduction of MTC (machine type communications) related service/network requirements

**01/2005 – 12/2008** **Vodafone Germany** **Düsseldorf, Germany**

Project Manager Mobile Broadcast Standards
- Responsible for Mobile Broadcast standardisation across different broadcast systems/standards bodies and across all Vodafone local operations
- Responsible for Mobile Broadcast standardisation strategy development and implementation
- Delegation Lead for the Open Mobile Alliance (OMA) BCAST working group
- Initiated and managed the BCAST device profile development in the BMCO Forum
- Leading the "Service Protection" (pay-TV) stream of the German DVB-H Consortium
- Filed several patents
- Supporting patent litigations and patent portfolio evaluation (various technical areas)

**04/2003 – 12/2003** **GSM Association** **London, United Kingdom**

Member of the MMS Task Force
- Verification of the MMS operator interworking framework
- Supporting the definition and specification of the MMS functional evolution
- Acting as a “link” between 3GPP and GSMA in the area of MMS

**06/1998 – 12/2004** **European Telecommunications Standards Institute (ETSI)**
**Sophia Antipolis, France**

01/2002 – 12/2004: Secretary 3GPP Technical Specifications Group *“Terminals”* and Terminals Working Group 2 *“Terminal Services and Capabilities”*

01/1999 – 12/2001: Secretary 3GPP Terminals Working Group 2 *“Terminal Services and Capabilities”* and GERAN 3 *“Base Station Testing”*

06/1998 – 03/1999: Secretary ETSI SMG4 *“Data Services”* and SMG8 *“Base Station Testing”*

- Supported the establishment of 3GPP (3rd Generation Partnership Project) as the leading standards organization for mobile telecommunications
- Project manager and secretary of TSG “Terminals” reponsbile for Terminal Conformance Testing, Terminal Services and Capabilities, Universal Subscriber Identity Module (USIM)
- Project manager and secretary of Terminals Working Group 2 “Terminal Services and Capabilities” that was responsible for Terminal Execution Environments, Messaging including Short Message Service (SMS), Cell Broadcast Service (CBS), Enhanced Messaging Service (EMS), Multimedia Messaging Service (MMS), Terminal Interfaces incl. AT-commands, Generic User Profile, Data Synchronization and others
- Establishment and management of the Work Plan and follow-up and report on the progress of the related work items
- Advising the chairmen and the standards groups on technical, procedural and political issues
- Editorship of various GSM and UMTS technical specifications
- Responsible for presenting the technical results of the working groups to the parent body
- Responsible for the communication with other standards bodies inside and outside 3GPP
- PR activities (articles, interviews)

**12/1993 – 06/1998 Mannesmann Mobilfunk GmbH Düsseldorf, Germany**

System Engineer and Project Manager in Quality Assurance and Technical Standards

- Leadership and management of acceptance test projects in the area of GSM Base Station Controller (BSC) and GSM Base Station (BTS) hardware and software.
- Leading project teams of around 15 people
- Responsible for the clearance of releasing new software/hardware into the network
- Supported Request for Quotations, supplier evaluation and pre-selection, project manager of System Verification as a central part of the supplier selection process.
- Representation of Mannesmann Mobilfunk to the ETSI standardization group “Standardization Technical Committee SMG3 System Architecture”
- Conduction of product and hardware development quality audits
- Representative of Mannesmann Mobilfunk in A-interface interoperability testing activities
- Member of BSS product planning group which was defining operator requirements for future BSS releases
- Development of process improvements for type acceptance

## III. LIST OF SUPPORTED PATENT LITIGATIONS AND VALIDITY ACTIONS

2021

Optis Cellular Technology LLC et al. v. Apple
Claim No. HP-2019-000006 (High Court of Justice, Business and Property Courts of England and Wales)
On behalf of Apple
Counsel: WilmerHale
Role: Expert witness and consulting services

2020

Panoptis Patent Management LLC et al. v. Apple Inc.
Civil Action No. 2:19-cv-66 (E.D. Tex.)
On behalf of Apple
Counsel: WilmerHale
Role: Expert witness at bench trial

2020

Sol IP, LLC v. AT&T Mobility, LLC et al.
Civil Action No. 2:18-cv-526 (E.D. Tex.)
On behalf of AT&T, Verizon, Sprint
Counsel: Gibson Dunn
Role: Expert witness and consulting services

2020

Bell Northern Research LLC v. LG Electronics Inc. et al.
Civil Action No. 18-CV-2864-CAB-BLM (S.D. Cal.)
On behalf of LG Electronics Inc.
Counsel: Fish&Richardson
Role: Expert witness and consulting services

2019

Conversant Wireless Licensing S.a.r.l. v. LG Electronics Deutschland GmbH
Civil Action No. 7 O 3277/18 (Landgericht Munich, Germany)
On behalf of LG Electronics Deutschland GmbH
Counsel: Wildanger Kehrwald Graf von Schwerin & Partner mbB
Role: Expert witness and consulting services

2019

Bell Northern Research, LLC v. Huawei Device Co., Ltd, et al.
Civil Action No. 3:18-cv-01784-CAB-BLM
On behalf of Huawei
Counsel: Fish&Richardson
Role: Expert witness and consulting services

2019

Uniloc USA, Inc., et al. v. Samsung Electronics America, Inc. and Samsung Electronics Co. Ltd.
Civil Action Nos. 2:18-cv-00040-JRG, 2:18-cv-00041-JRG, 2:18-cv-00042-JRG and 2:18-cv-00044-JRG (United States District Court for the Eastern District of Texas)
On behalf of Samsung
Counsel: Greenberg Traurig
Role: Expert witness and consulting services

2019

Uniloc USA, Inc., et al. v. Huawei Device USA, Inc. et al.
Civil Action No. 2:18-cv- 00072-JRG-RSP (E.D. Tex.)
On behalf of Huawei
Counsel: McGuireWoods

Role: Expert witness and consulting services

2019

Microsoft Corporation v. Uniloc 2017 LLC
Inter Partes Review of U.S. Pat. No. 7,167,487
Inter Partes Review of U.S. Pat. No. 7,075,917
On behalf of Microsoft and on behalf of Apple as joinder petitioner
Counsel: Klarquist Sparkman (Microsoft), Erise IP (Apple)
Role: Expert witness and consulting services

2019

Qualcomm v. KFTC
South Korean Case, Seoul High Court
On behalf of intervenor Apple supporting the KFTC
Counsel: Boies Schiller Flexner
Role: Expert witness

2018/19

Evolved Wireless, LLC v. Apple, Inc.
Civil Action No. 1:15-cv-00542-JFB-SRF
On behalf of Apple
Counsel: DLA Piper
Role: Expert witness and consulting services

2018/19

Cisco Systems Inc. v. Traxcell Technologies
Inter Partes Review of Traxcell Technologies patents
On behalf of Cisco
Counsel: King&Spalding
Role: Expert witness and consulting services

2018/19

Qualcomm Inc. v. Apple Inc.
Civil Action No. 3:17- cv-02398-DMS-MDD (United States District Court for the Southern District of California)
Civil Action No. 3:17-cv-02402-WQH-MDD
Certain Mobile Electronic Devices and Radio Frequency and Processing Components Thereof (II), Inv. No. 337-TA-1093
Inter Partes Review of U.S. PATENT NO. 9,154,356
Cases IPR2019-00047, IPR2019-00048, IPR2019-00049, IPR2019-00128, IPR2019-00129
On behalf of Apple and Intel
Counsel: WilmerHale
Role: Expert witness and consulting services

2018/19

Apple Inc. v. Qualcomm Inc.
Civil Action No. 3:17-CV-00108-GPC-MDD (United States District Court for the Southern District of California)
On behalf of Apple
Counsel: Fish&Richardson, Boies Schiller Flexner
Role: Expert witness and consulting services

2018

3G Licensing, S.A. et al. v. LG Electronics Inc. et al
Inter Partes Review of U.S. Patent No. 7,995,091
On behalf of LG Electronics
Counsel: Fish&Richardson
Role: Expert witness

2017

Huawei Technologies Co. LTD. v. T-Mobile US, Inc. & T-Mobile USA, Inc.

E.D. Tex. Case Nos. 2:16-cv-00052-JRG-RSP; 2:16-cv-00055-JRG-RSP; 2:16-cv-00056-JRG-RSP; and 2:16-cv-00057-JRG-RSP
On behalf of T-Mobile
Counsel: Gibson Dunn
Role: Expert witness and consulting services

2016
Koninklijke KPN N.V. v. Samsung Electronics America, Inc. et al.
Civil Action No. 14-cv-1165
On behalf of Samsung Electronics
Counsel: Baker Botts
Role: Expert witness and consulting services

2016
SSH v. Sony
OLG Düsseldorf, Germany
On behalf of SSH
Counsel: Cohausz&Florack
Role: Technical expert support

2015/16
LG Electronics v. Core Wireless Licensing S.A.R.L.
Inter Parles Review of U.S. Patent No. 8,165,049
On behalf of LG Electronics
Counsel: Greenberg Traurig
Role: Expert witness

2015/16
Core Wireless Licensing S.A.R.L. v. LG Electronics Inc. and LG Electronics MobileComm U.S.A., Inc
Civil Action No. 2:14-cv-911 (lead case) and Civil Action No. 2:14-cv-912 (consolidated)
On behalf of LG Electronics
Counsel: Greenberg Traurig, Sidley Austin
Role: Expert witness

2015
Intellectual Ventures I LLC v. T-Mobile USA, Inc. & T-Mobile US, Inc.
D. Del. Case No. 1:13-cv-01632
Intellectual Ventures II LLC v. T-Mobile USA, Inc. & T-Mobile US, Inc.
D. Del. Case No. 1:13-cv-01633
On behalf of T-Mobile
Counsel: Gibson Dunn
Role: Technical expert support

## IV. EDUCATION

**10/1984 – 10/1993** **University of Technology Aachen** **Aachen, Germany**
Graduate of Electrical Engineering with a focus on telecommunications technologies (Dipl.-Ing. TH)

**10/1992 – 04/1993** **University of Technology Trondheim** **Trondheim, Norway**
Diploma Thesis "Design of a dual processor computer for digital signal processing in power electronics"

## V. LANGUAGES

German, English, French

## VI. RECENT PUBLICATIONS

- ”Unlocking the internet of things and driving the need for interoperability”, Global Telecoms Business, December 2013
- “The need for standardisation in the M2M services layer”, Global Telecoms Business, February 2014
- Co-authored white paper “Lightweight M2M: Enabling device management and applications for the internet of things”, Open Mobile Alliance, March 2014
- “Objects are a new way to create M2M applications”, Global Telecoms Business, April 2014
- “The need for standardisation in the M2M services layer”, M2M Now, July 2015

**3GPP TSG RAN WG1 Meeting #92** **R1-1801301**
**Athens, Greece, 26th February – 2nd March 2018**

**Source:** **MCC Support**

**Title:** **Final Report of 3GPP TSG RAN WG1 #91 v1.0.0**
**(Reno, USA, 27th November – 1st December 2017)**

**Document for:** **Approval**

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A GLOBAL INITIATIVE

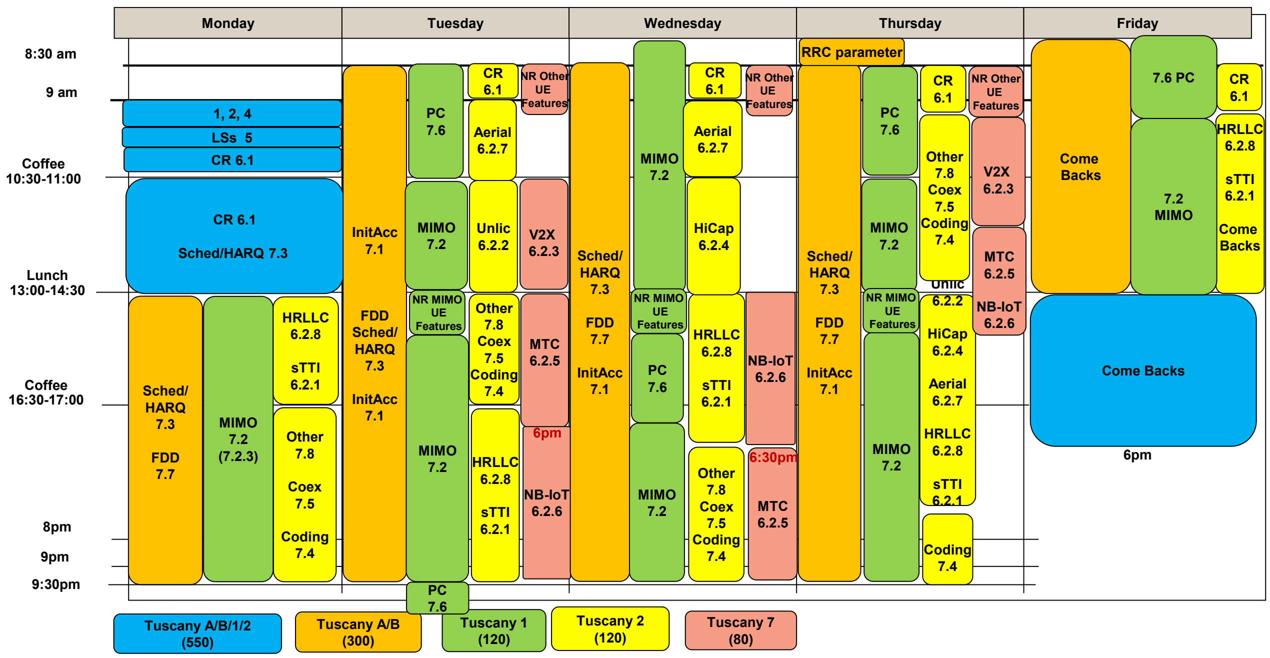
3GPP TSG RAN WG1 Meeting #92 R1-1801301
Athens, Greece, 26th February – 2nd March 2018

**Table of contents**

**Main facts summary**

The 3GPP TSG WG RAN1#91 meeting, hosted by the North American Friends of 3GPP, was held at the Peppermill Reno Resort, Nevada, USA.
The meeting started at 9:00 on Monday 27th November and finished at 17:55 on Friday 1st December 2017.
The number of attending delegates, having confirmed their participation through the electronic check-in application, was 412**.**
Note that the number of registered was 603.

The schedule of the week was as follows:




**The list of action points that required RAN1 close follow-up is listed in Annex F (end of document).**

The number of contributions for this meeting was **2361**.

Note: The amount of documents includes those discussed during the email discussion session post meeting.

| | |
|---|---|
| | Contribution is agreed/approved |
| | Contribution is not pursued (no consensus) |
| | Further discussion is required – come-back needed |
| | Working assumption |
| | Specific action needed from MCC |
| | Contribution is for email discussion/approval |

# 1 Opening of the meeting

Mr Wanshi Chen (RAN1 Chairman) welcomed the participants of the RAN WG1 #91 meeting and opened the meeting at 09:00.

Mr Scott Migaldi from T-Mobile USA on behalf of the North American Friends of 3GPP, AT&T, BlackBerry, Cohere Technologies, DISH, Ericsson, Intel, InterDigital Communications, Motorola Solutions, NextNav, Nokia, QUALCOMM, Rogers Communications, Sprint, T-Mobile USA and Verizon Wireless, welcomed the delegates, and detailed the domestic arrangements for the full week.

## 1.1 Call for IPR

*The attention of the members of this Technical Specification Group was drawn to the fact* ***that 3GPP Individual Members have the obligation*** *under the IPR Policies of their respective Organizational Partners to* ***inform their respective*** *Organizational Partners* ***of Essential IPRs they become aware of****.*
*The members take note that they are hereby invited:*

- *to investigate whether their organization or any other organization owns IPRs which were, or were likely to become Essential in respect of the work of 3GPP.*
- *to notify their respective Organizational Partners of all potential IPRs, e.g., for ETSI, by means of the IPR Information Statement and the Licensing declaration forms (e.g. see the ETSI IPR forms http://webapp.etsi.org/Ipr/).*

## 1.2 Competition law statement

*The Chairman also drew Member's attention to the fact that 3GPP activities are subject to antitrust and competition laws and that compliance with said laws is therefore required of any participant of this WG meeting including the Chairman and Vice Chairmen. In case of question, please contact your legal counsel.*
*The present meeting will be conducted with strict impartiality and in the interests of 3GPP.*
*Furthermore, the Chairman reminded Members that timely submission of work items/contributions in advance of WG meetings is important to allow for full and fair consideration of such matters.*

## 1.3 Network usage conditions

*The PCG has laid down the following network usage conditions:*

**Users shall not use the network to engage in illegal activities. This includes activities such as copyright violation, hacking, espionage or any other activity that may be prohibited by local laws**.

**Users shall not engage in non-work related activities that consume excessive bandwidth** or cause significant degradation of the performance of the network.
Since the **network is a shared resource**, users should exercise some basic etiquette when using the 3GPP network at a meeting. It is understood that high bandwidth applications such as downloading large files or video streaming might be required for business purposes, but delegates should be strongly discouraged in performing these activities for personal use. Downloading a movie or doing something in an interactive environment for personal use essentially wastes bandwidth that others need to make the meeting effective. The meeting chairman should remind end users that the network is a shared resource; the more one user grabs, the less there is for another. Email and its attachments already take up significant bandwidth (certain email programs are not very bandwidth efficient). In case of need the chair can ask the delegates to restrict IT usage to things that are essential for the meeting itself.

**1. DON'T place your WiFi device in ad-hoc mode**
**2. DON'T set up a personal hotspot in the meeting room**
**3. DO try 802.11a if your WiFi device supports it**
**4. DON'T manually allocate an IP address**
**5. DON'T be a bandwidth hog by streaming video, playing online games, or downloading huge files**
**6. DON'T use packet probing software which clogs the local network (e.g., packet sniffers or port scanners)**

## 1.4 Check-in for Registered Delegates

*The attention of the delegates to this meeting was drawn to the fact that it is not permitted to check in other delegates on their behalf. In the event of technical difficulties preventing check-in, delegates should present themselves in person to the Secretary.*

### 1.5 Aspects related to RAN1 Meeting Management

Delegates are encouraged to check R1-1721392 for some thoughts on RAN1 meeting management.
**Discussion:** Regarding proposal "outside meetings" (slide 7), uploading files to ftp is an issue to some companies' internal policies (Panasonic, Huawei)
MCC should check whether other options can be made available.
General comment: make sure email thread subject remains unchanged when replying to email – makes the tracking much easier to all.

# 2 Approval of Agenda

**R1-1719300 Draft Agenda of RAN1#91 meeting RAN1 Chair**
Wanshi Chen (RAN1 Chair) proposed the agenda for the meeting, as well the schedule of the week.
**Discussion:** No comments.
**Decision:** The agenda is approved.

# 3 Highlights from RAN plenary

This section is void for this meeting.

# 4 Approval of Minutes from previous meeting

**R1-1719301 Report of RAN1#90bis meeting ETSI**
The document was presented by Patrick Merias from MCC (ETSI Mobile Competence Center) and provides the report from last RAN1#90bis meeting in Prague.
**Discussion:** Status on CRs regarding the introduction of feCoMP (though CRs to 36.211 & 36.212 got already agreed over email thread [90b-LTE-03]) will be treated under AI6.2.
**Decision:** The document is approved.
**Post meeting:** MCC noticed that Tdoc_list attached to R1-1719301 was not the final version – delegates are encouraged downloading an updated version from the 3GU portal.

# 5 Incoming Liaison Statements

**R1-1719314 LS on CR for Reference Signals for MBSFN with 1.25kHz and 7.5khz sub-carrier spacing RAN2, Qualcomm**
**Decision:** The document is noted.
R1-1720383 Reply LS on CR for Reference Signals for MBSFN with 1.25kHz and 7.5khz sub-carrier spacing Qualcomm Incorporated
**R1-1720019 [draft] Reply LS on CR for Reference Signals for MBSFN with 1.25kHz and 7.5khz sub-carrier spacing Intel Corporation**
**Decision:** The draft LS in R1-1720019 is endorsed. Final LS is approved in R1-1721431.

**R1-1719323 LS reply on the Power Splitting across Different TTI Lengths in UL RAN4, Huawei**
**Decision:** The document is noted.
**R1-1719326 Reply LS on implication of sTTI operation on UL ON/OFF time mask RAN4, Qualcomm**
**Decision:** The document is noted.
**R1-1719329 Reply LS on UE capability signalling for sTTI configurations RAN4, Ericsson**
**Decision:** The document is noted. Details to be handled under 6.2.1

**R1-1719315 LS on RAN2 agreements for Rel-15 LAA RAN2, Ericsson**
**Decision:** The document is noted. Details to be handled under 6.2.2

**R1-1719311 LS to RAN1 on the agreements on carrier and resource selection in CA RAN2, LG Electronics**
**Decision:** The document is noted. Details to be handled under 6.2.3

**R1-1719305 LS on Early Data Transmission RAN2, Qualcomm**
**Decision:** The document is noted. Related to 6.2.5 & 6.2.6. Prepare a reply LS – Alberto (Qualcomm). See 6.2.6.

**R1-1719322 Reply LS to R1-1715304 LS on minimum time for DL-to-UL and UL-to-DL switching on one NB-IoT carrier for TDD NB-IoT UEs RAN4, Ericsson**
**Decision:** The document is noted.
**R1-1719333 Reply LS on measurement accuracy improvement RAN4, Huawei**

**Decision:** The document is noted. Details to be handled under 6.2.6

**R1-1719303 FURTHER INFORMATION RELATED TO DRAFT NEW REPORT FOR IMT-2020 EVALUATION ITU-R WP5D**
**Discussion:** Note the topic is mainly handled in the 3GPP ITU-R ad hoc but requires that experts contribute there, i.e. interested delegates should subscribe to the email reflector 3GPP_TSG_RAN_AHG1@list.etsi.org
**Decision:** The document is noted.

**R1-1719313 LS on NR PBCH content RAN2, Qualcomm**
RAN2 concluded that the size of the information in NR MIB for quick identification that cell is not campable would be 2-bit.
RAN2 agreed that at least one spare bit is needed for RAN2 use in future.
**Discussion:** Ericsson confirmed that it was already taken into account
**Decision:** The document is noted.
**R1-1719337 LS on PRB grid in the NR RAN4, Nokia**
RAN4 asks RAN1 to indicate if all the PRB grid shifts for all SCSs higher than the Reference SCS are supported and whether there are further constraints on the PRB alignment for different SCSs that should be taken into account in RAN4.
**Decision:** The document is noted.
**R1-1719384 Draft reply LS on PRB grid in the NR Huawei, HiSilicon**
**Decision:** The document is noted. Details to be handled under 7.1.2.1. Note that a reply LS is necessary for R1-1719337

**R1-1719306 Response LS on NR Paging Occasion RAN2, LG Electronics**
- In LTE, one Paging Occasion (PO) is a subframe where there may be P-RNTI transmitted on PDCCH or MPDCCH or, for NB-IoT on NPDCCH addressing the paging message.
- PO defines a number of slots where the UE has to monitor the PDCCH (TS 38.300 section 9.2.5). RAN2 has not decided whether or not the message is in the same slot(s). RAN2 assume that RAN1 can make this decision. RAN2 think that paging design should consider UE power consumption.

**Decision:** The document is noted. Details to be handled under 7.1.3

**R1-1719320 LS reply to PRACH BW aspects RAN4, Samsung**
- The agreed PRACH preamble formats will be confined within the minimum bandwidth that will be supported by all NR UEs in the uplink.

**Decision:** The document is noted. Details to be handled under 7.1.4.1

**R1-1719316 LS on RA Preamble Power Ramping RAN2, Samsung**
- Two counters PREAMBLE_TRANSMISSION_COUNTER and PREAMBLE_POWER_RAMPING_COUNTER are defined in MAC specification.
- MAC entity initializes PREAMBLE_TRANSMISSION_COUNTER and PREAMBLE_POWER_RAMPING_COUNTER to 1 when the Random procedure is initiated.
- MAC entity increments PREAMBLE_TRANSMISSION_COUNTER by 1 if RAR reception is not successful or contention resolution is not successful.
- A new notification, power ramping counter suspension notification should be defined in NR. Layer 1 provides this notification to MAC layer in case UL TX beam for PRACH retransmission is changed. If this notification is received, MAC entity does not increment PREAMBLE_POWER_RAMPING_COUNTER by one for PRACH retransmission.

**Decision:** The document is noted. Details to be handled under 7.1.4.2

**R1-1719334 Reply LS on NR initial access and mobility RAN4, ZTE**
- If inter-frequency measurement based on multiple SMTCs across different configured frequency carriers, it provides flexibility on NW side to configure appropriate SMTC for each frequency layer. This is based on the assumption that SMTC offset across different configured frequency carriers are properly configured such that per UE based measurement gap configuration can be used to measure different configured frequency layers. If inter-frequency measurement is based on single SMTC across all configured frequency carriers, it could restrict the SMTC configuration at NW side. For example, the SMTC periodicity could be the longest one among all of the frequency layers and the SMTC window duration could be the longest one either.
- RAN4 has not identified any concerns related to multiple SMTCs across different frequency carriers while having single SMTC across all configured frequency carriers could restrict network configurations.
- RAN4 thinks there would be no AGC operation issues with respect to SS block composition and SS burst set composition for 120 kHz and 240 kHz subcarrier spacing.

**Decision:** The document is noted. Details to be handled under 7.1.5

**R1-1719328** **Reply LS CSI-RS patterns and densities** **RAN4, Nokia**

RAN4 informs RAN1 that it is feasible to use 2-port ECP/NCP CSI-RS with D=1 depending on the CSI-RS bandwidth and CSI-RS power boosting. Additionally, RAN4 sees it feasible to support a range of densities for 1 port CSI-RS resource configurations, for beam management purposes. RAN4 think feasible density value options may include at least 1, 2, 3, 4, 6 and 12 REs/port/PRB depending on the CSI-RS bandwidth and CSI-RS power boosting.

**Decision:** The document is noted. Details to be handled under 7.2.2

**R1-1719307** **LS on formula or table for L1 data rate** **RAN2, Ericsson**

RAN2 asks RAN1 to provide a formula or table for determining the L1 data rate from the UE's band combinations and baseband capabilities

**Decision:** The document is noted.

R1-1720149 On formula or table for L1 data rateEricsson

R1-1720150 Draft LS reply on formula or table for L1 data rate Ericsson

**Decision:** Details to be handled under 7.3.3.5. A reply LS is necessary.

**R1-1719309** **LS on UE RF related parameters, capabilities and features for NR** **RAN2, NTT DOCOMO**

RAN2 asks RAN4 to provide their feedback on UR RF parameters, capabilities and features described in this LS.

**Discussion:** No action to RAN1, RAN4 is working on it.

**Decision:** The document is noted. No reply needed from RAN1.

**R1-1719312** **LS on RAN2 agreements related to BWP** **RAN2, Huawei**

- UE behaviour on the BWP that is deactivated:
  - not transmit on UL-SCH on the BWP;
  - not monitor the PDCCH on the BWP;
  - not transmit PUCCH on the BWP;
  - not transmit on PRACH on the BWP;
  - do not flush HARQ buffers when doing BWP switching (unless an issue is identified)
- RAN2 will not support MAC CE BWP switching on top of DCI.

**Decision:** The document is noted.

**R1-1719385** **Draft reply LS on wideband operation** **Huawei, HiSilicon**

**Discussion:** reply to R4-1711963 – MCC to check any updates from RAN4

**Decision:** The document is noted. Details to be handled under 7.3.4.1.

**R1-1719331** **LS reply to subcarrier alignment** **RAN4, Huawei**

- For UL sharing from network and UE perspective with LTE/NR UL subcarrier alignment, the switching time between LTE and NR shall be minimized to guarantee system performance.
  - In order to allow different implementations e.g. Digital rotator (~0us), RF shift (<20us), UE switching time between LTE and NR shall be defined as UE capability with the two options ~0us and <20us.
  - For a UE reporting capability of "~0us" the switching time between LTE and NR is ~0us in all UL sharing cases except the following case:
    - The UE is using UL sharing from UE perspective with the UL CBW for LTE and NR being different OR NR UL uses SCS =60KHz, the switching time is FFS
  - For a UE reporting capability of "<20us" the switching time between LTE and NR is below 20us in all cases
  - RAN4 shall define the corresponding requirements for this switching time

  Note: UE switching time includes LO re-tuning time and any additional related interruption time due to RF and BB transition between LTE and NR, excluding the normal LTE transient period (20us) or NR transient period (10us), which will be captured in the time mask requirement.

**Decision:** The document is noted. Details to be handled under 7.5

**R1-1719317** **LS on RAN2 agreements related to PHR** **RAN2, Samsung**

- The power headroom information will still be carried in MAC CE.
- Virtual and real PHR type 1 and Type 2 are supported
- At least PHR trigger conditions defined in LTE should be reused in NR
- Assume BWP does not impact the PHR MAC CE format design.
- RAN2 designs NR PHR format with assumption that the field PH is 6-bit, as in LTE.
- As in LTE, V field is used in NR to indicate whether PH is based on real transmission or a reference format, and the presence of the $P_{CMAX,c}$ octet.
- NR supports PHR format consisting of bitmap, type 2 PH subfield for PCell, type 2 PH subfield for either PUCCH SCell or PSCell, and type 1 PH subfields in the ascending order of ServCellIndex.
- The presence of type 2 PH is explicitly configured by RRC signalling.

- One octet of bitmap is used for indicating the presence of PH per SCell when the highest SCellIndex of SCell with configured uplink is less than 8. Otherwise four octets are used. Editor's note "it depends on whether we support 32 carriers"
- P field indicates whether the MAC entity applies power backoff due to power management.
- FFS For EN-DC how to ensure we are referring to the right specification for the PHR table.

**Decision:** The document is noted.
**R1-1719327** **LS reply on UE Power Class and Power Control** **RAN4, Intel**
Reply LS to R1-1716743 on UE power class and power control
**Decision:** The document is noted. Details to be handled under 7.6

**R1-1719324** **LS to RAN1 on NR UE transient time for FR1 and FR2** **RAN4, Ericsson**
RAN4 agreed the following switching time parameter with respect to NR UE transient periods:

| | FR1 | FR2 |
|---|---|---|
| ON-to-ON | 10 μs | 5 μs |

ON-to-ON time refers to switching time related to change of power between consecutive UL transmissions
Other switching time requirements due to e.g. antenna switching, frequency hopping which require PLL retuning, beam switching, etc are discussed separately.
OFF-to-ON and ON-to-OFF switching time parameters are agreed earlier:
**Decision:** The document is noted.
**R1-1719336** **LS to RAN1 and RAN2 on Definition of synchronous and asynchronous Dual connectivity in Rel-15 LTE-NR combinations** **RAN4, Ericsson**
**Decision:** The document is noted.
**R1-1719338** **LS on FS_REAR SI conclusion** **SA2, Huawei**
**Decision:** The document is noted.
**R1-1719460** **LS on UE baseband processing capability RAN2, NTT DOCOMO**
**Decision:** The document is noted.

R1-1720233 [Draft] Reply LS on SPS and Grant-free Samsung
R1-1720234 DL SPS operation for NR Samsung
R1-1720547 Discussion on the support of downlink SPS in NR InterDigital, Inc.
R1-1720548 [Draft] LS response to RAN2 on SPS and Grant free InterDigital, Inc.
To be handled under 7.3.3.4

R1-1721035 Impact of power class and P_cmax definition on power control procedures Ericsson
To be handled under 7.6

The following LSs are not to be treated online, but noted by RAN1
R1-1719304 Reply LS on FS_REAR study outcome RAN2, Huawei
R1-1719308 Reply LS on mixed numerologies FDM operation RAN2, Intel
R1-1719310 LS on SSTD measurements for EN-DC RAN2, NTT DOCOMO
R1-1719318 LS on system information broadcast for CU/DU split scenario RAN3, CATT
R1-1719319 Reply LS on NR handover related parameters RAN4, Intel
R1-1719321 LS reply on Support for fake gNB detection mechanisms RAN4, Ericsson
R1-1719325 LS on single Tx switched UL RAN4, Apple
R1-1719330 LS to RAN5 cc RAN1 and RAN2 on UE beamlock function RAN4, Keysight
R1-1719332 LS reply on NR UE baseband capabilities signalling RAN4, Intel
R1-1719335 LS on gaps for SS block measurement in NRRAN4, Ericsson
R1-1719339 Reply LS to RAN 2 on QCIs for EPC based ULLC SA2, Vodafone

Qualcomm requested to open R1-1719332 due to potential impact to RAN1:
**R1-1719332** **LS reply on NR UE baseband capabilities signalling** **RAN4, Intel**
**Decision:** The document is noted. Clearly there is a typo in the "Action" section.

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Incoming LSs received in the course of the week:
**R1-1721522** **LS on BWP related agreements** **RAN2, LGE**
**Decision:** The document is noted.

**R1-1721524** **LS to RAN1 on beam recovery failure** **RAN2, Nokia**
**Decision:** The document is noted. To be handled in the MIMO session.

**R1-1721590** **LS to RAN1 on HARQ agreements** **RAN1, Samsung**

**Decision:** The document is noted.

**R1-1721591** **LS to RAN1 on GF/SPS agreements** **RAN2, Huawei**
**Decision:** The document is noted.

**R1-1721602** **LS on required information for NSA on X2** **RAN3, Nokia**
**Decision:** The document is noted. Draft reply LS to be prepared in R1-1721646 – Karri (Nokia)
**Friday**
**R1-1721646** **[DRAFT] Response LS on required information for NSA on X2** **Nokia**
**Decision:** The document is noted. Further revised in **R1-1721704** after more offline. Final LS is approved in R1-1721716 with the following update:

- Keep the table, by also adding a sentence that "the table is the one recommended from RAN1 to RAN2. Final parameters are up to RAN2

**R1-1721633** **Reply LS on Supportable RNTI Length on DCI** **RAN2, Ericsson**
**Decision:** The document is noted.

**R1-1721643** **Reply LS on Minimum Bandwidth** **RAN4, CATT, NTT DOCOMO**
**Decision:** The document is noted.

**R1-1721666** **LS on VoIP packet sizes and transport blocks** **RAN2, Ericsson**
**Decision:** The document is noted.

**R1-1721691** **LS reply on SSTD measurements for EN-DC** **RAN4, Ericsson**
**Decision:** The document is noted.

**R1-1721695** **LS on cells not broadcasting SIB1** **RAN2, Ericsson**
**Decision:** The document is noted.

R1-1721482 Reply LS on QCIs for EPC based ULLC SA1, Vodafone

# 6 E-UTRA

## *6.1 Maintenance of E-UTRA Releases 8 – 14*

**R1-1721232** **Chairman's notes of AI 6.1 Maintenance of E-UTRA Releases 8 – 14** **Ad-Hoc chair (Ericsson)**
The document was presented by RAN1 Chair on behalf of Havish Koorapaty.
**Decision:** The document is endorsed, incorporated below.

### 6.1.1 Maintenance of E-UTRA Release 8 – 13

**R1-1721166** **Follow-up on 3GPP Response LS (R4-164972)** **Wi-Fi Alliance, CableLabs, Qualcomm, Ericsson**
**Decision:** The document is noted.

MTC
**R1-1720020** **Correction on MPDCCH assignment procedure for Type1-MPDCCH common search space** **Intel Corporation**
**Decision:** The document is noted. Discuss further offline
**R1-1721118** **Correction on MPDCCH assignment procedure for Type1-MPDCCH common search space** **Intel**

**R1-1720378** **Correction on scrambling sequence identity for 2+4 PRBs sets in MPDCCH** **NEC, Qualcomm, Panasonic**
**Decision:** The draft CR is endorsed. The final CR is agreed in R1-1721078 (CR401, Rel-13) and R1-1721079 (CR402, Rel-14).

**R1-1720545** **Correction on the SI-RNTI for MPDCCH** **Intel Corporation**
Discussion: Huawei → the CR should be brought to RAN2 for decision.
Intel: would prefer send an LS to RAN2
**Decision:** The above issue should be addressed in RAN2

**R1-1720379** **Correction on resource elements reserved for CRS for PBCH with repetition** **NEC**
**Decision:** The draft CR is endorsed. The final CR is agreed in R1-1721081 (CR403, Rel-13) and R1-1721082 (CR404, Rel-14).

**R1-1720543 UE uplink gap capability signaling description Nokia, Nokia Shanghai Bell**
Proposal: Add text to TS36.211 to explicitly reference when ue-CE-NeedULGaps is used.
**Discussion:** Not essential acc.to Huawei
**Decision:** The document is noted. Further revised in:
**R1-1721161** UE uplink gap capability signaling description Nokia, Nokia Shanghai Bell
The final CR is in R1-1721262 (CR0408, Rel-13)
R1-1721162 UE uplink gap capability signaling description Nokia, Nokia Shanghai Bell
The final CR is in R1-1721263 (CR0409, Rel-14)

**R1-1720834 Correction to timing advance for BL/CE UEs Qualcomm Incorporated**
**Decision:** The document is noted. Further revised in:
**R1-1721190 Correction to timing advance for BL/CE UEs Qualcomm Incorporated**
MCC: Change formatting problem (blue font).

**R1-1720835 Correction to determination of number of PUCCH repetitions for BL/CE UE Qualcomm Incorporated**
Change the description of the determination of the number of repetitions to be consistent with TS 36.211.
**Discussion:** ZTE would prefer to do the opposite – CR to 36.211 instead of correcting 36.213.
**Decision:** The document is noted.

NB-IoT
**R1-1720218 Correction of NRS-CRS power offset configuration for NB-IoT ZTE, SaneChips**
**Decision:** The document is noted. Further revised in:
**R1-1721288 Correction of NRS-CRS power offset configuration for NB-IoT ZTE, SaneChips**
**Decision:** The document is endorsed. The final CR is agreed in R1-1721298 (CR1008, Rel-14)

**R1-1720386 Typo correction for table 16.5.1.2.1-1 Qualcomm Incorporated**
**Decision:** The draft CR is endorsed with the change from Cat D to Cat F. The final CR is agreed in R1-1721083 (CR996, Rel-13) and R1-1721084 (CR997, Rel-14)

MTC&NB-IoT
**R1-1720542 Preamble timing ambiguity during PDCCH order Nokia, Nokia Shanghai Bell**

CA
**R1-1721066 Clarification for DAI for eCA Qualcomm Incorporated (R1-1720384)**
**Decision:** The draft CR is endorsed. Final CR is agreed in R1-1721086 (CR269, Rel-13) & R1-1721087 (CR270, Rel-14)

**R1-1720385 Usage of PUCCH format 3 with more than 5 CC Qualcomm Incorporated**
**Decision:** The draft CR is endorsed. Final CR is agreed in R1-1721088 (CR998, Rel-13) and R1-1721089 (CR999, Rel-14)

### 6.1.2 Maintenance of Release 14 Enhanced Licensed-Assisted Access to Unlicensed Spectrum

**R1-1721068 Corrections on UCI multiplexing on PUSCH ASUSTEK COMPUTER (SHANGHAI)** (R1-1719962)
Proposal 1: Make the following correction on section 5.2.2.6 and 5.2.4.1 of TS 36.212:

$$N_{\text{symb}}^{PUSCH} = \left(2\cdot\left(N_{\text{symb}}^{\text{UL}}-1\right)-N_{\text{SRS}}-N_{\text{start}}^{PUSCH}-N_{\text{end}}^{PUSCH}\right)$$

Proposal 2: RAN1 should further discuss how to handle the following correction:

- $N_{\text{symb}}^{\text{PUSCH}}$ is the number of SC-FDMA symbols in the current PUSCH transmission sub-frame given by $N_{\text{symb}}^{PUSCH\text{-}initial} = \left(2\cdot\left(N_{\text{symb}}^{\text{UL}}-1\right)-N_{\text{SRS}}-N_{\text{start}}^{PUSCH}-N_{\text{end}}^{PUSCH}\right)$, where
  - $N_{SRS}$ is equal to 1 for non-BL/CE UEs and BL/CE UEs in CEModeA
    - if UE configured with one UL cell is configured to send PUSCH and SRS in the same subframe for the current subframe, or

Proposal 3: RAN1 can consider adopt changes for $N_{\text{start}}^{PUSCH}$ and $N_{\text{end}}^{PUSCH}$ to differentiate "the subframe" between"the subframe for initial transmission" and "the current subframe". A corresponding text proposal is appended.
**Decision:** The document is noted. Revised draft CRs in R1-1721105 and R1-1721106.

**R1-1721105 Correction on deriving number of available symbols for PUSCH ASUSTeK**
**Decision:** The draft CR is endorsed. Final CR is agreed in R1-1721120 (CR0273, Rel-14).

**R1-1721106** **Correction on number of SRS symbol for UCI multiplexing** **ASUSTeK**
**Decision:** The draft CR is endorsed. Final CRs are agreed in R1-1721121 (CR0274, Rel-12, F), in R1-1721122 (CR0275, Rel-13, A) and in R1-1723123 (CR0276, Rel-14, A).

### 6.1.3 Maintenance of Release 14 V2V/V2X services based on LTE sidelink

**R1-1720220** **Correction on sidelink index field name in DCI format 5A for V2V in 36.213** **CATT**
**Decision:** The draft CR is endorsed. The final CR is agreed as CR1000 (Rel-14, F) in R1-1721090.

**R1-1720987** **Summary of [90b-LTE-02] on the list of MCS-TBS problematic cases for Rel-14 V2X PSSCH decoding** **HUAWEI TECHNOLOGIES Co. Ltd.**
Proposal 1: Discuss at RAN1#91 on how to capture the consolidated lists for Case 1-4.
Proposal 2: Discuss at RAN1#91 on whether to capture the list for Case 5.
**Decision:** The document is noted. How to capture it is for further offline discussion.

**R1-1720910** **Handling of list of MCS-TBS problematic cases** **CATT**
**R1-1721292** **[Draft] LS on problematic MCS-TBS configurations for PSSCH decoding** **Huawei**
**Decision:** LS is approved in R1-1721299. Final LS should have R1-1721293 as an attachment.
**R1-1721293** **Summary of email discussion [90b-LTE-02] on the list of MCS-TBS problematic cases for Rel-14 V2X PSSCH decoding** **Huawei, HiSilicon**

R1-1721138 Discussion on subframe numbering issue in partial network coverage LG (Late contribution)

### 6.1.4 Maintenance of Release 14 Full-Dimension MIMO for LTE

**R1-1720387** Correction on the scale factor for semi-OL rank-1 Qualcomm Incorporated
**Decision:** The draft CR is endorsed and final CR is agreed in R1-1721261 (CR0407, Rel-14)

**R1-1721201** **Draft 213 CR on correcting the scale factor for semi-OL rank-1** **Qualcomm Incorporated**
**Decision:** The draft CR is endorsed and final CR is agreed in R1-1721260 (CR1005, Rel-14)

**R1-1719854** **Discussion on CBSR for advanced CSI** **LG Electronics**
**R1-1720021** **Evaluation of CBSR with different beam restriction granularities** **Intel Corporation**
**R1-1720235** **Codebook subset restriciton for advanced CSI codebook** **Samsung**
**R1-1720715** **On Advanced CSI codebook subset restriction** **Ericsson**
**R1-1720764** **Codebook Subset Restriction in advanced CSI** **Huawei, HiSilicon**
**R1-1721065** **Codebook Subset Restriction in advanced CSI** **Huawei, HiSilicon**

**R1-1721198** **WF on CBSR for Advanced CSI** **Intel, Ericsson**
**R1-1721297** **WF on CBSR for Advanced CSI Codebook** **Huawei, HiSilicon, Samsung, Ericsson, Intel**
**R1-1721266** **WF on CBSR for advanced CSI** **LG Electronics, Qualcomm, Nokia, NSB, ZTE, CATT, NTT Docomo**
**Decision:** The document is noted.

### 6.1.5 Maintenance of Release 14 Further Enhanced MTC for LTE

**R1-1719707** **Correction of section references for feMTC** **Ericsson**
**Decision:** The draft CR is endorsed. Final CR is agreed in R1-1721092 (CR271, Rel-14).

**R1-1720388** **Correction for TBS determination under larger TBS for random access response grant** **Qualcomm Incorporated**
**Decision:** The draft CR is endorsed. Final CR is agreed in R1-1721091 (CR1001, Rel-14).

### 6.1.6 Maintenance of Release 14 Enhancements of NB-IoT for LTE

**R1-1719709** **Clarification of carrier indication in DCI format N1 in NB-IoT** **Ericsson**
**R1-1721272** **Clarification of carrier indication in DCI format N1 in NB-IoT** **Ericsson**
**Decision:** The draft CR is endorsed. Final CR is in R1-1721300 (CR1009, Rel-14).

**R1-1719485** **On Rel-14 NB-IoT RACH power control** **Huawei, HiSilicon**

**R1-1719708** **On improved random access procedure for Rel-14 NB-IoT** **Ericsson**
Proposal 1: RAN1 agrees that NPRACH power ramping is performed within a CE level, and is reset when CE level ramping is performed.

Proposal 2: RAN1 agrees that the NPRACH path-loss based power control is specified with a CE specific preamble received target.
Proposal 3: RAN1 agrees to define the CE specific preamble received target for CE levels 1 and 2 as:

- *preambleInitialReceivedTargetPowerCE1 = preambleInitialReceivedTargetPower - 10·LOG10($N_{REP,CE0}$) - $G_{CE1}$·LOG2($N_{REP,CE1}$ / $N_{REP,CE0}$)*
- *preambleInitialReceivedTargetPowerCE2 = preambleInitialReceivedTargetPowerCE1 - $G_{CE2}$·LOG2($N_{REP,CE2}$ / $N_{REP,CE1}$)*
- *with $G_{CE1/2} \in \{0, 2, 3, 4\}$ dB.*

Proposal 4: RAN1 agrees to apply the Release 14 power control mechanisms according to Proposals 1, 2, 3 to Release 14 devices regardless of their initial selected CE level.
Proposal 5: RAN1 agrees that a device should autonomously select the most suitable PHR mapping table to use and indicate in Msg3 which of the two available PHR mapping tables that was used.

**Decision:** The document is noted.

**R1-1719724 NPRACH power control for Rel-14 NB-IoT ZTE, SaneChips**

- Proposal 1: Without clear understanding of the root cause of the problem and the efficacy of proposed solution supported by simulation result, there is great concern to confirm the working assumption.
- Proposal 2: If the working consumptions is confirmed, then at least it is required to introduce CE level based power ramping counter for CE 0 and CE 1 while reuse PREAMBLE_TRANSMISSION_COUNTER as the counter for total NPRACH attempts (preambleTransMax-CE).
- Proposal 3: If the working consumptions is confirmed, the for the Rel-14 NB-IoT UEs which shall not perform level ramping when it measures NRSRP higher than “NRSRP threshold of CE level 0 + Δ”, reset and restart CE 0 power ramping counter when whenever it reaches maxNumPreambleAttemptCE, before PREAMBLE_TRANSMISSION_COUNTER reaches preambleTransMax-CE.
- Proposal 4: If the working consumptions is confirmed, for a Rel-14 UE which has just level ramped from NPRACH level 0 to CE1 in a RACH procedure, the CE level power ramping counter should be reset.
- Proposal 5: Principles of power ramping equation, such as PREAMBLE_RECEIVED_TARGET_POWER settings, should be reused.
- Proposal 6:For Rel-14 NB-IoT, it is suggest to include the ramp-up power in the initial Msg3 transmission if NPRACH has power ramping

$$P_{\mathrm{O\_NORMINAL\_NPUSCH,c}}(2)$$
$$= P_{\mathrm{O\_PRE}} + (\mathrm{PREAMBLE\_TRANSMISSION\_COUNTER\_CE} - 1) * \mathrm{powerRampingStep} + \Delta_{\mathrm{PREAMBLE\_Msg3}}$$

- Proposal 7: Indications can be introduced in the SIB to enable the optional Rel-14 power control behavior.

**Decision:** The document is noted.

**R1-1720564 Support of new NPRACH power control mechanisms SoftBank Corp.**

- The new functionalities should apply to (A) both IDLE and CONNECTED mode, and (B) anchor and non-anchor carrier.
- RAN1 (and RAN2) to discuss whether these new functionalies can allow early implementation in Rel-13.
- RAN1 to discuss whether the new functionality can be mandated for random access on non-anchor carrier.

**Decision:** The document is noted.

**R1-1719486 Correction of interference in NB-IoT RACH procedure Huawei, HiSilicon**
Discuss further offline
**R1-1721124 Way forward on NPRACH power control Huawei, HiSilicon, ZTE, Sanechips, Softbank**
**R1-1721211 Way forward on NPRACH power control Huawei, HiSilicon, ZTE, Sanechips, Softbank, Ericsson**
**Decision:** Proposals in R1-1721211 are considered agreed
**R1-1721252 Correction of interference in NB-IoT RACH procedure Huawei, HiSilicon**
Email approval until Dec 6, 2017 (Huawei: Zhe)
**R1-1721301 [Draft] Correction of interference in NB-IoT RACH procedure Huawei**
**Decision:** The document is endorsed and final LS is approved in R1-1721302.

R1-1721058 Clarification on 2 HARQ process applicability to UE-specific search space Huawei, HiSilicon
Late submission
**R1-1721059 Clarification on 2 HARQ process applicability to UE-specific search space Huawei, HiSilicon**
**Late submission**
**R1-1721259 Clarification on 2 HARQ process applicability to UE-specific search space Huawei, HiSilicon**
**Decision:** The final CR is agreed in R1-1721303 (CR1010, Rel-14)
**R1-1721113 DL and UL CE level non-corresponding issue in NB-IoT CMCC**
**Decision:** Discuss further in RAN1#92

### 6.1.7 Other

eVoLTE

**R1-1719507** **Correction on higher layer parameter for eVoLTE** **Huawei**

The parameter name *PUSCHEnh-Configuration* in 36.213 to configure eVoLTE is aligned with 36.331 to *pusch-EnhancementsConfig*.

**Decision:** The draft CR is endorsed (update cover page from push to pusch). The final CR is agreed in R1-1721093 (CR1002, Rel-14).

**R1-1719710** **Correction of section reference for eVoLTE** **Ericsson**

**Decision:** The draft CR is endorsed and final CR is agreed in R1-1721094 (CR0272, Rel-14).

SRS Carrier Switching

**R1-1720389** **Correction for dropping rules in intra-band SRS carrier switching.** **Qualcomm Incorporated**

**Decision:** The draft CR is endorsed (update cover page from push to pusch). The final CR is agreed in R1-1721095 (CR1003, Rel-14).

**R1-1720391** **Correction for PUSCH puncturing in SRS carrier switching** **Qualcomm Incorporated**

Add the clarification that the puncturing of PUSCH also applies to the last symbol of the subframe. Also, correct OFDM to SC-FDMA.

**Decision:** The document is noted. For further offline discussion

**R1-1721178** **Correction for PUSCH puncturing in SRS carrier switching** **Qualcomm Incorporated, Huawei, HiSilicon**

**Decision:** The draft CR is endorsed and final CR is agreed in R1-1721200 (CR0406, Rel-14).

Modulation Enhancements

**R1-1720390** **Discussion on modulation enhancements** **Qualcomm Incorporated, Samsung, KDDI, T-Mobile USA, NTT Docomo, Ericsson, Verizon**

Observation 1: The static association between MCS/TBS and modulation scheme leads to suboptimal modulation selection in some cases, such as different CFI values or number of CSI-RS ports.

Observation 2: The following solutions can be considered for modulation scheme selection:

- Solution 1: Select modulation scheme based on TBS and number of REs used for rate matching.
- Solution 2: Introduce “Modulation overriding” field in DCI to change the modulation scheme.
- Solution 3: Introduce an alternative table for 256QAM by RRC configuration.

Proposal: RAN1 to find adopt one of the solutions above.

**Discussion:** .Apologizes for late submission of R1-1721055, actually was submitted to RAN4 – before they decided to send it to RAN1. Don’t see a need for enhancement of 256QAM MCS table.

**Decision:** The document is noted. For further offline discussion

R1-1721055 Performance of 256QAM Intel Corporation
Late submission

**R1-1721268** **WF on modulation enhancements** **Qualcomm, Intel, Verizon, KDDI, Samsung**

**Decision:** Proposals in R1-1721268 are considered agreed

SSF Configuration 10

**R1-1720596** **CR of TS36.213 for introduction of new UE behavior for special subframe configuration 10** **CMCC**

**Decision:** The draft CR is endorsed with the following update: change Cat from B to F; revert the change to 7.2.3. The final CR is agreed in R1-1721097 (CR1004, Rel-14), also including the change in R1-1721064.

**R1-1720597** **CR of TS36.211 for introduction of new UE behavior for special subframe configuration 10** **CMCC**

**Decision:** The draft CR is endorsed with the following update: change Cat from B to F. The final CR is agreed in R1-1721098 (CR405, Rel-14).

**R1-1719593** **EPDCCH case selection for special subframe configuration 10** **MediaTek Inc.**

**R1-1721064** **Draft CR - Correction to EPDCCH case selection for special subframe configuration 10** **MediaTek Inc., Nokia, Nokia Shanghai Bell**

Revision of R1-1721060 and R1-1719594

Others

**R1-1720767** **On SRS antenna switching** **Huawei, HiSilicon**

Propsal1: Enhance SRS antenna switching for the following antenna configurations on UE side

- 1T4R and 2T4R

- 1T8R and 2T8R

**Discussion:** Supported by Softbank
Ericsson/Huawei: more offline discussion is needed.
**Decision:** The document is noted. CR drafted in R1-1720766.
R1-1720766 Enhancement of SRS antenna switching in 36.213 Huawei, HiSilicon

**R1-1721228 WF on Enhancement on SRS Switching Huawei, HiSilicon, SoftBank, Vodafone, CATR, CATT, CMCC**
Agreement:

- Support SRS antenna switching for 1T4R and 2T4R UE antenna configuration in Rel-15

**R1-1721229 Enhancement of SRS antenna switching in 36.213 Huawei, HiSilicon, Softbank**

R1-1720902 New WID Proposal: 400Khz NB-IOT Reliance Jio

## 6.2 LTE Release 15

R1-1720962 Introduction of reduced control plane latency Ericsson
R1-1720963 Control Plane latency reduction Ericsson

**feCoMP CRs**
R1-1719240 Introduction of feCoMP into 36.211 Ericsson Rel-15 36.211 14.4.0 feCOMP_LTE-Core CR0400, B
**Decision:** The CR was agreed over email thread [90b-LTE-03] prior to RAN1#91.

R1-1721061 Introduction of feCoMP into 36.212 Huawei, HiSilicon Rel-15 36.212 14.4.0 feCOMP_LTE-Core CR0268, B
**Decision:** The CR was agreed over email thread [90b-LTE-03] prior to RAN1#91. Revision of R1-1720986.

**R1-1721071 Introduction of feCoMP into 36.213 Motorola Mobility Rel-15 36.213 14.4.0 feCOMP_LTE-Core CR0995, B**
**Decision:** The CR is endorsed with the following updates: WI code to "feCOMP_LTE-Core", removing the editor note in Section 7. Final CR is agreed in R1-1721099 (CR 0995, Rev 1).

### 6.2.1 Shortened TTI and processing time for LTE - WID in RP-171468

**R1-1721233 Chairman's notes of AI 6.2.1 Shortened TTI and processing time for LTE Ad-Hoc chair (Ericsson)**
The document was presented by RAN1 Chair on behalf of Havish Koorapaty.
**Decision:** The document is endorsed, content incorporated below.

**R1-1721215 [Draft] LS on additional agreements for shortened TTI and processing time for LTEEricsson**
**Decision:** LS is approved in R1-1721216.

**Friday:**
Rapporteur to capture the list of agreements by 12/2 by email
Draft CRs by spec editors by 12/7, to be endorsed by 12/12 by email

R1-1719959 Editor's document of open issues on sPT and sTTI for the 36.212 specification Huawei

#### 6.2.1.1 Remaining details on shortened processing time for 1ms TTI

R1-1719447 Remaining details on shortened processing time for 1ms TTI Huawei, HiSilicon
R1-1719661 Remaining issues of shortened processing time for 1ms TTI ZTE, Sanechips
R1-1719947 Remaining details on shortened processing time for 1ms TTI Nokia, Nokia Shanghai Bell
R1-1721067 Summary of [90b-LTE-14]Email approval on remaining issues for 1 ms + FS2 (sTTI and 1 ms) + FS3 Samsung (rev of R1-1720236)
R1-1720237 Remaining details on shortened processing time for 1ms TTI Samsung
R1-1720392 Remaining details on shortened processing time for 1ms TTI Qualcomm Incorporated
R1-1720522 Configuration and UE capabilities for 1ms n+3 Ericsson

Agreement:
For a UE configured with shortened processing time, the legacy UL channel interleaver mechanism is reused.

Agreement:

- When 'PUSCH trigger A' field set to '0', the following is used to support n+3 timing in LAA SCell.
  - When shortened processing time is configured to a UE, the UE performs a corresponding PUSCH transmission in subframe(s) $n+l+k+i$, where $l$ = 3 for 'PUSCH trigger A' field set to '0' in the corresponding DCI format 0A/0B/4A/4B and where the value of $p+l+k$ is at least 3 otherwise.

Agreement: **[RAN2 impact]**
A UE shall report the maximum number of CSI processes for aperiodic CSI in TM10 it can update with the minimum value of $n_{CQI\_ref}$ = {legacy value-1}.

Agreement:
Previous agreement is **changed** per below.

For semi-static HARQ-ACK codebook determination in FS1,

- HARQ-ACK transmission in subframe n consists of HARQ-ACK bits:
  - for PDSCH(s) transmitted in the serving cell(s) configured with shortened processing time corresponding to PDCCH detected in USS in subframe n-3 or corresponding to PDCCH detected in CSS in subframe n-4,
  - ~~**and**~~ for PDSCH(s) transmitted in the serving cell(s) not configured with shortened processing time corresponding to PDCCH/EPDCCH detected in subframe n-4.
  - **and for serving cell(s) where PDCCH/EPDCCH has not been detected**
- Note: HARQ-ACK bit index is increased over cell index.
- **Note: In the case of PCell only scheduling, HARQ-ACK is reported only for the PCell**

Agreement:
In case the DCI is found in CSS and when a UE configured with shortened processing time and detects PDCCH carrying DCI format 0/1A with the CRC scrambled by the C-RNTI, the UE shall consider that the PDCCH corresponds to the legacy processing time.

Agreement:
For FS1 and for a UE configured with shortened processing time, the DAI counter is increased over the scheduled n+4 carriers and the scheduled n+3 carriers for which HARQ feedback is expected in the same UL subframe. The total DAI is increased over time to capture the fact that n+3 carriers can be scheduled after n+4 carriers.

Agreement:
Regarding DAI for a UE configured with shortened processing time, the table for DL HARQ-ACK timing from PDSCH to HARQ-ACK is used as a DL association set.

Agreement:
In case the UE is not configured with sTTI, the maximum number of DL HARQ processes for n+3 1ms TTI is the same as for n+4 1ms TTI.

### 6.2.1.2 Remaining details on shortened TTI with shortened processing time

R1-1719957 Summary of email approval [90b-LTE-13] on remaining details of sPDSCH/sPUSCH design Huawei

#### 6.2.1.2.1 Remaining aspects related to interaction between different TTI lengths

R1-1719448 Aspects related to interaction between different TTI lengths Huawei, HiSilicon
R1-1719845 On interaction between different TTI lengthsNokia, Nokia Shanghai Bell
R1-1719855 Remaining issues on collision handling between different TTI lengths LG Electronics
R1-1719856 Summary of email approval [90b-LTE-12] on sPUSCH/sPUCCH power control and UL collision handling between different TTI lengths LG Electronics
R1-1720022 Remaining aspects related to interaction between different TTI lengths Intel Corporation
R1-1720238 Remaining aspects related to interaction between different TTI lengths Samsung
R1-1720393 Remaining aspects related to interaction between different TTI lengths Qualcomm Incorporated
R1-1720523 Aspects related to the dynamic switching between 1ms TTI and sTTI Ericsson
R1-1720768 Remaining details on uplink collision handling between different TTI lengths ITRI

Agreement:
In case sPUCCH is transmitted (regardless of whether or not there is a collision with 1 ms), all HARQ-ACK bits for 1ms TTI from the configured carriers are always included in case fixed codebook size (including also single carrier case) is configured for 1ms TTI. This translates to the following behaviour:

- PDSCH assignment detected and sPDSCH assignment not detected

    - → DTX on sPUCCH + all HARQ-ACK bits for 1ms TTI on PUCCH
- PDSCH assignment detected and sPDSCH assignment detected
    - → include all HARQ-ACK bits for 1ms TTI + sHARQ-ACK bits on sPUCCH
- PDSCH assignment not detected and sPDSCH assignement detected
    - → include all HARQ-ACK bits for 1ms TTI + sHARQ-ACK bits on sPUCCH
- PDSCH assignment not detected and sPDSCH assignment not detected
  → DTX on sPUCCH and DTX on PUCCH

Agreement:
In case sPUCCH is transmitted, the HARQ-ACK bits for 1ms TTI are determined based on 1 ms DAI in DCI in case dynamic codebook size is configured for 1ms TTI.

Agreement: **[RAN2 impact]**
For the delta-F of slot-sPUCCH format 1, {-1,0,1,2,3,4,5,6} are supported.

Agreement: **[RAN2 impact]**
The configured delta_F for subslot-sPUCCH format 1a also applies to subslot-sPUCCH format 1

Proposal: **[RAN2 impact]**
In case of switching from 1-slot PDSCH scheduled within sTTIs n-$W_{DL}$ to n-1 (i.e. including all CCs) to a 2-symbol sPDSCH in sTTI/slot n (i.e. including all CCs):
- Whether the UE skips processing 1-slot sPDSCH(s) is up to the UE implementation.
- In case UE skips 1-slot sPDSCH processing, the legacy procedures are applied. If the UE skips decoding, the physical layer indicates to higher layers that the transport block(s) is not successfully decoded.
- The value of $W_{DL}$ is a UE capability with the value range of 0 to k-1, where k is the DL HARQ processing time for 1-slot sPDSCH.
- The UE should attempt to skip the processing of as small number of 1-slot sPDSCH(s) as possible.

In case of switching from the reception of 1-slot sPUSCH grants within sTTIs n-$W_{UL}$ to n-1 (i.e. including all CCs) to the 2-symbol sPUSCH grant in sTTI/slot n (i.e. including all CCs):
- Whether the UE skips processing/transmission of 1-slot sPUSCH(s) is up to the UE implementation.
- As in case of eLAA procedures, also in case of skipping, the UE should request data from higher layers based on the issued 1-slot sPUSCH grant(s)
- The value of $W_{UL}$ is a UE capability with the value range of 0 to k-1, where k is the 1-slot TTI UL scheduling time.
- The UE should attempt to skip the processing/transmission of as small number of 1-slot sPUSCH(s) as possible.

Agreement:
In case of collision between PUCCH and sPUCCH in the same subframe on a given carrier for a UE,
- The PUCCH is not transmitted (including the SR that was prepared to be transmitted as part of the PUCCH)
- If sPUCCH contains valid SR resources, SR that was prepared as part of the PUCCH transmission is transmitted on the sPUCCH

Agreement:
In case sPUSCH is transmitted and in case dynamic codebook size is configured for 1 ms TTI, the HARQ-ACK bits for 1ms TTI are determined based on 1 ms DAI in DCI.

Agreement:
UE behaviour in case of sPUSCH transmission when simultaneous transmission of sPUCCH and sPUSCH is not configured and in case fixed codebook size is configured:
- PDSCH assignment detected and sPDSCH assignment not detected
    - → no sHARQ-ACK bits on sPUSCH + all HARQ-ACK bits for 1ms TTI on sPUSCH
- PDSCH assignment detected and sPDSCH assignement detected
    - → include all HARQ-ACK bits for 1ms TTI + sHARQ-ACK bits on sPUSCH
- PDSCH assignment not detected and sPDSCH assignement detected
    - → include all HARQ-ACK bits for 1ms TTI + sHARQ-ACK bits on sPUSCH
- PDSCH assignment not detected and sPDSCH assignment not detected
    - → no HARQ bits on sPUSCH

Agreement:
In case of collision between PUSCH and sPUCCH in the same subframe on a given carrier, the UE should attempt to drop/stop as soon as possible (up to UE implementation) the whole/remaining transmission of PUSCH and shall transmit sPUCCH, and the UE shall not resume the dropped/stopped transmission.

- HARQ-ACK of PUSCH is transmitted on sPUCCH
  - Spatial bundling for HARQ-ACK of PUSCH before mapping onto 1-slot sPUCCH is supported when configured
  - Spatial bundling for HARQ-ACK of PUSCH before mapping onto 2/3-OS sPUCCH is applied.
  - Joint coding of HARQ-ACK for PDSCH and sHARQ-ACK for sPDSCH is supported
- CSI of PUSCH is dropped

Agreement:
In case a UE is not capable of simultaneous transmission of different TTI lengths across different carriers for a given band combination, and if UL channels with different TTI lengths are collided across different carriers for the band combination, all of the longer TTI channel(s) (including also PRACH) for the band combinations(are) dropped/stopped.

Agreement:
In case of collision of 1ms TTI and multiple sTTIs of potentially different channel types within the same subframe on the same carrier (e.g., primary cell of a PUCCH group), and if sTTI is carrying 1 ms HARQ-ACK, HARQ-ACK of 1ms TTI is carried on the first sTTI of those colliding sTTIs

Agreement:
If a UE is configured with simultaneous transmission of PUSCH and PUCCH, and if PUSCH, PUCCH, and sPUCCH are collided within the same subframe on a given carrier, the UE should attempt to drop/stop as soon as possible (up to UE implementation) the whole/remaining transmission of PUSCH and PUCCH, and shall transmit sPUCCH. The UE shall not resume the dropped/stopped transmission.

- HARQ-ACK of PDSCH is transmitted on sPUCCH.
- CSI on PUSCH or PUCCH is dropped.

Agreement:
In the context of HARQ process sharing between TTI and sTTI, the TB size of a codeword for transmission/reception using a specific (s)TTI length is limited by the maximum supported TBS for that respective (s)TTI length.
Note: The circular buffer rate-matching is based on the TTI length of the initial transmission

Agreement:
For the equation in 3GPP TS 36.212, the following changes are applied:

- For slot-PDSCH

$$N_{IR} = \left\lfloor \frac{N_{soft}}{2K_C \cdot K_{\mathrm{MIMO}} \cdot \min(M_{\mathrm{DL\_HARQ}}, M_{\mathrm{limit}})} \right\rfloor$$

- For subslot-PDSCH

$$N_{IR} = \left\lfloor \frac{N_{soft}}{6K_C \cdot K_{\mathrm{MIMO}} \cdot \min(M_{\mathrm{DL\_HARQ}}, M_{\mathrm{limit}})} \right\rfloor$$

Using Kmimo = 1. M_limit is not changed

Agreement:
For PHR transmitted on sPUSCH, the PHR is reported for all activated UL carriers

- For a carrier not configured with sTTI, the principle of legacy PHR computation is reused, i.e.
  - If PUSCH is scheduled on this carrier in the subframe containing the UL sTTI in which the PHR is transmitted, the PHR for this carrier is an actual PHR for the scheduled PUSCH.
  - Otherwise, the PHR for this carrier is a virtual PHR computed assuming the PHR calculation for the subframe.
- For a carrier configured with sTTI
  - If sPUSCH is scheduled on this carrier in the UL sTTI in which the PHR is transmitted, the PHR for this carrier is an actual PHR for the scheduled sPUSCH.
  - If sPUSCH is not scheduled on this carrier, the PHR for this carrier is a virtual PHR computed assuming the PHR calculation for the UL sTTI in which the PHR is transmitted.

Agreement:
For PHR transmitted on PUSCH, the PHR is reported for all activated UL carriers

- Independent of whether sTTI is configured or not for the carrier, the legacy PHR computation is reused

- If PUSCH is scheduled on this carrier in the subframe in which the PHR is transmitted, the PHR for this carrier is an actual PHR for the scheduled PUSCH.
- Otherwise, the PHR for this carrier is a virtual PHR computed assuming the PHR calculation for the subframe.

Agreement:
Regarding UE behaviour in case simultaneous transmission of different TTI lengths across different carriers is allowed/supported but when the UE is power-limited,

- TTI channel(s) with lower priority (e.g., longer TTI) is(are) dropped/stopped until the condition that the UE becomes non-power-limited is met
- The following UE behaviors are defined:
  - As long as there are transmissions with different TTI lengths and the UE is power-limited, transmissions with longer TTI lengths are dropped/stopped, based on the following priority rules:

| |
|---|
| sPUSCH with HARQ-ACK of P1 / sPUCCH of P1 > sPUSCH with HARQ-ACK of P2 / sPUCCH of P2 ><br>PUSCH with HARQ-ACK of P1 / PUCCH of P1 > PUSCH with HARQ-ACK of P2 / PUCCH of P2><br>sPUSCH without HARQ-ACK with DMRS of P1 > sPUSCH without HARQ-ACK with DMRS of P2 ><br>sPUSCH without HARQ-ACK without DMRS of P1 > sPUSCH without HARQ-ACK of P2 ><br>PUSCH without HARQ-ACK of P1> PUSCH without HARQ-ACK of P2 ><br>• For subslot/slot/subframe PUSCH: Lower cell index > higher cell index |

  - NOTE: P1 – primary PUCCH group, P2 – secondary PUCCH group, if present.
  - HARQ-ACK of the dropped/stopped channel is transmitted on the channel (to be transmitted without dropping/stopping) with the highest priority.
  - CSI of the dropped/stopped channel is dropped.
  - After the dropping/stopping, if there is only a single TTI for transmission, and if the UE is still power limited, the power allocations in 36.213 are applied.

Agreement:
Regardless of whether or not a UE is capable of simultaneous transmission of different TTI lengths across different carriers, UCI of dropped/stopped channel is not allowed to be piggybacked onto channel of different PUCCH group, and will be dropped if there is no channel to be transmitted within the same PUCCH group containing the dropped/stopped channel.

Agreement:
Regarding how to determine HARQ-ACK bits of PDSCH when transmitting sPUSCH or sPUCCH, no carrier bundling is supported for HARQ-ACK of PDSCH.

Agreement:
No separate handling of sPUCCH format 4 power control between 2-OS and 3-OS sTTI is supported.

Agreement:
No separate handling of sPUCCH format 1/1a/1b power control between 2-OS and 3-OS sTTI is supported.

#### 6.2.1.2.2 Remaining details on DL control channel design

R1-1719449 Remaining details on DL control channel design Huawei, HiSilicon
R1-1719613 Summary of email discussion [90b-LTE-09] on sPDCCH resource reuse for sPDSCH Nokia, Nokia Shanghai Bell
R1-1719857 Remaining issues on DL control channel design LG Electronics
R1-1719858 Summary of email approval [90b-LTE-07] on details of sDCI formats LG Electronics
R1-1719948 On remaining details on DL control channel design Nokia, Nokia Shanghai Bell
R1-1719956 Summary of email approval [90b-LTE-08] on remaining details of sPDCCH design and search space Huawei
R1-1720023 Remaining details on DL control channel design Intel Corporation
R1-1720239 Remaining details on sPDCCH-related aspects Samsung
R1-1720394 Remaining details on DL control channel design Qualcomm Incorporated
R1-1720524 Remaining aspects of sPDCCH, search space and sDCI Ericsson
R1-1720916 Remaining details of sTTI DL control channel design Motorola Mobility, Lenovo

Agreement:
In case of SPDCCH and PBCH/PSS/SSS collision, PBCH/PSS/SSS blocks (including reserved CRS REs) punctures the SPDCCH candidate on the overlapping REs

- For DMRS based SPDCCH, the UE is not required to use the sPRG which is/are partially overlapped with PBCH/PSS/SSS for SPDCCH monitoring.

Agreement:
Reception of a PDCCH spanning four symbols is not supported for sTTI operation

Agreement: **[RAN2 impact]**
An optional UE capability is introduced to indicate the maximum number of blind decodes in UE-specific search space in one subframe for CCs configured with sTTI operation, including both legacy DCI formats and sDCI

- The number of blind decodes supported by the UE is the field value X*68
  - Value ranges for X from 4 to 32

Agreement: **[RAN2 impact]**
A UE can be configured with up to two RB sets for sPDCCH monitoring that apply to MBSFN subframes, and up to two RB sets for sPDCCH monitoring that apply to non-MBSFN subframes.

Agreement:
The kth sPRG for sPDCCH and sPDSCH contains PRB# 2k and 2k+1, regardless of sTTI length

Agreement: **[RAN2 impact]**
The granularity of RB allocation for configuring an sPDCCH RB set is 1 RB for CRS-based SPDCCH.
The granularity of RB allocation for configuring an sPDCCH RB set is 2 RB for DMRS-based SPDCCH, aligned with the sPRG.

Agreement:
The maximum size of the overall search space for sDCI on PDCCH and SPDCCH in an sTTI for 1-slot sTTI is 32 sCCEs.

Agreement: **[RAN2 impact]**
The number of PDCCH candidate(s) M_sDCI^((L)) at aggregation level L for monitoring sDCI1 in legacy PDCCH region is

- less than or equal to 2 for aggregation level 4 and 8,
- less than or equal to 6 for aggregation level 1 and 2

Agreement: **[RAN2 impact]**
The number of sPDCCH candidate(s) M_sDCI^((L)) at aggregation level L for monitoring sDCI1 in sPDCCH region is

- less than or equal to 2 for aggregation level 4 and 8,
- less than or equal to 6 for aggregation level 1 and 2

Agreement:
For localized CRS-based sPDCCH:

- The modulated symbols for a localized CRS-based sPDCCH are mapped to the REs according to step 1-2 below:
  - Step 1: Perform a block interleaver within the sREGs for the sPDCCH candidate with aggregation level L, where the number of rows equal to L and the number of columns equal to 4 (i.e. the number of sREGs in an sCCE). The sREGs are written into the matrix row by row and read out column by column
  - Step 2: The modulated symbols are mapped to available REs within the interleaved sREGs in increasing order (i.e. one by one manner)

Agreement:
The scrambling sequence generator for DL DMRS, sPUSCH, sPDSCH, sPDCCH shall be initialized at the start of each subframe as for 1 ms operation.

Agreement: **[RAN2 impact]**
For determing the sCCEs corresponding to sPDCCH candidate m of the sPDCCH search space at aggregation level L in sPDCCH RB set p in sTTI k, $Y_{p,k}^{L} = Y_{p}^{L}$ for all *k,* is configured by higher layer signaling.

Agreement:
If DL and UL sDCI size alignment is supported, a 1-bit DL/UL differentiation flag is inserted into the fields of DL and UL sDCI format.

Agreement:
The size of DAI field in sDCI is the same as the legacy DAI field.

The counting mechanism for CA is the same as in legacy

Agreement:
The size of MIMO-related field (e.g., TPMI information for precoding, precoding information) in DL sDCI format is the same as that in legacy LTE.

Agreement: The size of RA field in DL sDCI format is as below.

| Bandwidth / RA type | 5 MHz | 10 MHz | 15 MHz | 20 MHz |
|---|---|---|---|---|
| Type 0 | 4 bits | 8 bits | 6 bits | 8 bits |
| Type 2 | 6 bits | 6 bits | 8 bits | 9 bits |

Agreement: The bit size of DMRS indication field of DL sDCI format is 1 bit.

Agreement: Resource allocation type field is removed from the baseline fields of UL sDCI format.

Agreement: Multi-cluster flag is removed from the baseline fields of UL sDCI format.

Agreement: The size of 'Cyclic Shift Field mapping table' (IFDMA or not) for DMRS field is 1 bit.

Agreement: The size of RA field in UL sDCI format is as below.

| Bandwidth / RA type | 5 MHz | 10 MHz | 15 MHz | 20 MHz |
|---|---|---|---|---|
| Type 0 | 5 bits | 7 bits | 8 bits | 9 bits |

Agreement: **[RAN2 impact]**
Per RB-set, a UE can be configured to operate in one of the following four modes of sPDCCH rate-matching operation

- Mode 1: UE rate-matches only around the sDCI scheduling the sPDSCH (if transmitted in the sPDCCH RB-set), otherwise no rate-matching is performed for the RB set.
- Mode 2: UE rate-matches around the whole sPDCCH RB set
- Mode 3: UE rate-matches around the whole sPDCCH RB set if sDCI scheduling the sPDSCH is found in the RB-set, otherwise no rate-matching is performed for the RB set.
- Mode 4: UE rate-matches around the whole sPDCCH RB set if sDCI scheduling the sPDSCH is not found in the RB-set, otherwise UE rate-matches only around the sDCI scheduling the sPDSCH (if transmitted in the sPDCCH RB-set)
- In case two RB sets are overlapping where the sDCI scheduling the sPDSCH, the sDCI is assumed to be found in both RB sets.

Agreement:
The overall search space configured to a UE for monitoring sDCI in PDCCH region is limited up to X CCEs for 2/3-symbol sTTI.

- X=28

Agreement:
For CRS-based sPDCCH transmission using SFBC, the modulated symbols are not mapped to the orphan REs (i.e. skip the orphan REs)

- Note: An orphan RE is present in an sREG in case of an odd number of available REs

Agreement: The maximum number of DL/UL HARQ processes is 16 for FS1 and FS2.

Agreement: The size of HARQ process ID field in DL and UL sDCI formats is 4 bits.

Agreement:
For CRS-based sPDCCH, the logical sCCEs corresponding to sPDCCH candidate m of the sPDCCH search space at aggregation level L are given by

$$\left\{\left(Y_{p,k}^{L} + L\cdot\left\{\left\lfloor \frac{m\cdot N_{\mathrm{sCCE,p,k}}}{L\cdot M_{\mathrm{p,k}}^{(L)}} \right\rfloor \bmod \left\lfloor N_{\mathrm{sCCE,p,k}}/L \right\rfloor\right\} + i\right) \bmod N_{\mathrm{sCCE,p,k}}\right\}$$

where $Y_{p,k}^{L}$ is determined by higher layer signaling, $i = 0,\ldots,L-1$, $N_{sCCE,p,k}$ is the total number of sCCEs in sPDCCH RB set p of sTTI k, $m = 0,\ldots,M_{p,k}^{(L)}-1$ and $M_{p,k}^{(L)}$ is the number of sPDCCH candidates to monitor at aggregation level L in sTTI k.

Note: The subscript k is removed for the $Y_{p,k}^{L}$ and $N_{sCCE,p,k}$

Agreement:
For localized DMRS-based sPDCCH, the logical sCCEs corresponding to sPDCCH candidate m of the sPDCCH search space at aggregation level L are given by

$$\left\{\left(Y_{p,k}^{L}+L\cdot\left\{\left\lfloor\frac{m\cdot N_{\mathrm{sCCE,p,k}}}{L\cdot M_{\mathrm{p,k}}^{(L)}}\right\rfloor \bmod \left\lfloor N_{\mathrm{sCCE,p,k}}/L\right\rfloor\right\}+i\right) \bmod N_{\mathrm{sCCE,p,k}}\right\}$$

where $Y_{p,k}^{L}$ is determined by higher layer signaling, $i=0,\ldots,L-1$, $N_{sCCE,p,k}$ is the total number of sCCEs in sPDCCH RB set p of sTTI k, $m=0,\ldots,M_{p,k}^{(L)}-1$ and $M_{p,k}^{(L)}$ is the number of sPDCCH candidates to monitor at aggregation level L in sTTI k.

Note: The subscript k is removed for the $Y_{p,k}^{L}$ and $N_{sCCE,p,k}$

Agreement:
M_total, the maximum allowable number of sPDCCH candidates, equals to 6 for subslot operation and 12 for slot operation.

Agreement:
For FS1 and for a UE configured with {2,7} sTTI combination and dynamic codebook size, the DAI counter is increased over the scheduled carriers, and then the DL sTTIs, for which HARQ feedback is expected in the same UL slot. The total DAI is increased over time.

Agreement: Whether dynamic codebook size for sTTI operation can be configured or not follow legacy rules.

Agreement: All MUST-related fields are removed from the baseline DL sDCI format

Agreement:
- SRS request fields are removed from the baseline fields of DL/UL sDCI format for FS1.
- Whether SRS triggering via sDCI format is supported for FS2 is a UE capability
- SRS is transmitted in the first valid SRS transmission opportunity in or after slot n+4 when the SRS is triggered in slot n.

Agreement:
Aperiodic ZP CSI-RS resource indicator for PDSCH RE mapping field is removed from the baseline fields of DL sDCI format.

Agreement:
In case DCI and sDCI sizes are aligned, a 1-bit sDCI/DCI flag is inserted into the baseline fields of DL and UL sDCI format in sTTI number #0.

Agreement:
The size of Cyclic Shift for DMRS and IFDMA configuration field in UL sDCI format is 1 bit.
- Note that Cyclic Shift for DMRS and OCC index and IFDMA configuration field in the baseline UL sDCI format is replaced with Cyclic Shift for DMRS and IFDMA configuration field considering that OCC is not applied to DMRS for sPUSCH.

Agreement:
On a cell where the UE is monitorng for UL and DL sDCI, the size of the UL and DL sDCI are aligned by zero padding.

R1-1719613 **Summary of email discussion [90b-LTE-09] on sPDCCH resource reuse for sPDSCH** **Nokia, Nokia Shanghai Bell**

Agreement:
2-bit L1-based dynamic sPDCCH reuse indication is present in sPDSCH assignments transmitted on sPDCCH if L1-based re-use indication is configured by higher layers.

Agreement: **[RAN2]**
The UE can be configured by higher layers with L1 based sPDCCH reuse indication, using one of the following three L1 indication options:
1. 1-bit indication for each RB set (denoted as state {1,1}) applicable in case of 2 sPDCCH RB-sets are configured for monitoring
2. 2-bit indication for the first RB set (denoted as state {2,0}), applicable for 1 or 2 configured sPDCCH RB-sets
3. 2-bit indication for the second RB set (denoted as state {0,2}, applicable in case of 2 sPDCCH RB-sets configured for monitoring

Based on the L1 based sPDCCH reuse indication configuration, the following rate-matching behavior of sPDSCH around sPDCCH resources is applied:

- In case of state {1,1}, the one bit for each of the two sPDCCH RB sets indicates if the UE is to rate-match the allocated sPDSCH around the overlapping resources with the respective sPDCCH RB set
- In case state {2,0} or {0,2} is configured, the first (k=1) or second set sPDCCH RB-set (k=2) is split in two parts, where
  - the first bit indicates the rate-matching of sPDSCH around the overlap with sCCE#0 to SCCE#(floor($N_{sCCE,k}$/2)-1) of the k-th sPDCCH RB set and
  - the 2nd bit indicates the rate-matching of the sPDSCH around the overlap with sCCE#(floor($N_{sCCE,k}$/2)) to sCCE#$N_{sCCE,k}$-1 of the k-th sPDCCH RB-set.

A bit value of 1 indicates the rate-matching of sPDSCH around the overlapping respective indicated sPDCCH resources.
NOTE: For state {2,0} or {0,2}, the RRC configured rate-mathing mode is applied for sCCEs belonging only to the RB-set not having L1-indication, i.e. RB set associated with state '0'.
NOTE: Regardless of RRC configured rate-matching mode and dynamic L1-based re-use indication, the SPDSCH is rate-matched around the corresponding sPDSCH assignment.
NOTE: In case of state {1,1}, or if both sets are configured without L1-based re-use indication and at least one set is configured with rate-matching, the rate-matching should be assumed independent of other indication.

#### 6.2.1.2.3 Remaining details on UL control channel design

| | | |
|---|---|---|
| R1-1719451 | Remaining details on UL control channel design | Huawei, HiSilicon |
| R1-1719662 | Remaining issues of sPUCCH design | ZTE, Sanechips |
| R1-1719663 | Summary of email discussion 90b-LTE-10 on sPUCCH format design | ZTE, Sanechips |
| R1-1719846 | Remaining details on UL control channel design | Nokia, Nokia Shanghai Bell |
| R1-1719859 | Remaining issues on sPUCCH design | LG Electronics |
| R1-1720240 | Remaining details on sPUCCH-related aspects | Samsung |
| R1-1720395 | Remaining details of UL control channel design | Qualcomm Incorporated |
| R1-1720525 | Remaining aspects of UL control for sTTI | Ericsson |
| R1-1720934 | Discussion on remaining details on UL control channel | KT Corp. |
| R1-1720969 | Discussion on remaining details on UL control channel | KT Corp. |
| Withdrawn | | |

Agreement:
For 1-slot sPUCCH format 1/1a/1b without frequency hopping, the cyclic shift randomization, OCC variations and occupied PRB follow the principle of 1ms PUCCH format 1/1a/1b.

Agreement:
For 1-slot sPUCCH format 3, the OCC and occupied PRB follow the principle of 1ms PUCCH format 3.

Agreement:
For 1-slot sPUCCH format 1/1a/1b, with frequency hopping the cyclic shift randomization, and occupied PRB follow the principle of 1ms PUCCH format 2/2a/2b.

Agreement:
For 2/3os sPUCCH format 1/1a/1b, the cyclic shift randomization, and occupied PRB follow the principle of 1ms PUCCH format 2/2a/2b with the restriction that all possible sPUCCH resource indices in one sPUCCH resource group by configuration need to be mapped to the same PRB pair.

Agreement:
For 2/3os sPUCCH format 1/1a/1b, all SR resource configured by higher layer are mapped to the same PRB pair.

Agreement:
Change the previous agreement as per below:

| |
|---|
| For PF1-based 7-OS sPUCCH format, the cyclic shifts on different sPUCCH symbols and the OCC in different slots can be different for a given UE. Cyclic shift randomization and OCC variations are re-used from 1 ms operation to support multiplexing with legacy PUCCH format ~~1/1a/1b/~~2.<br>- Note: the OCC is not applied when frequency hopping is enabled. |

Agreement:
In case of single RB subslot-SPUCCH format 4 allocation and payload of 21 or 22 bits, the UE is not expected to transmit 21 or 22 bits in one PRB.

Agreement: **[RAN2 impact]**
In case positive SR and 2-bit HARQ-ACK are to be transmitted on 2/3-OS sPUCCH in sequence based 2/3-OS sPUCCH, four sPUCCH resources are configured for SR with 2-bit HARQ-ACK.

- The four resources are used for SR+'ACK, ACK', SR+'ACK, NACK', SR+'NACK, ACK', SR+'NACK, NACK' respectively.

Agreement:
When only positive SR is to be transmitted on 2/3-symbol sequence based 2-bit sPUCCH, the SR is transmitted on the sPUCCH resource that is used to transmit SR+'NACK, NACK'.

Agreement:
The shortened format of slot-sPUCCH and 3os subslot-sPUCCH is used in the same cases that the shortened format of PUCCH is used in case of collision with SRS

Agreement:
In case of collision between SRS and sPUSCH the same rate-matching rules apply as in legacy.

- The TBS scaling factor for subslot-sPUSCH is 1/12 in case the last symbol is dropped due to SRS and there is only one data symbol remaining.

Agreement:
The previous agreement is changed according to below:

| |
|---|
| For special subframe configurations 10, ~~both~~ sPUSCH ~~and sPUCCH~~ transmission is supported in UpPTS |
| Do not support HARQ-ACK on sPUSCH in UpPTS for SSC 10 |

Agreement: **[RAN2 impact]**
For the periodicity of sSR sent on 2/3-OS sPUCCH, 2ms periodicity is supported in addition to {1 sTTI, 2 sTTI, 3 sTTI, 4 sTTI, 5 sTTI, 1ms, 5ms, 10 ms}.

Agreement: **[RAN2 impact]**
For 2/3-OS sequence based sPUCCH, all four sPUCCH resource groups configured by RRC have four sPUCCH resources.

- In case of 1-bit HARQ-ACK transmission, the first two resources in the indicated groups are used.
- In case of 2-bit HARQ-ACK transmission, all the four resources in the indicated groups are used.

Agreement: **[RAN2 impact]**
A shortened version of PUCCH Format 4 is used for sPUCCH format 4 for 2/3os and the number of configured RBs is one of the values in the set {1,2,3,4,5,6,8}.

Agreement:
For PF4-based 2/3-OS sPUCCH format design, IFDMA is not supported, i.e., reuse the shortened version of PUCCH Format 4.

#### 6.2.1.2.4 Remaining details on DL data channel design

R1-1719452 sPDSCH and DL DMRS design for short TTI Huawei, HiSilicon
R1-1719664 Remaining issues on DL data channel designZTE, Sanechips
R1-1719949 On remaining details on DL data channel design Nokia, Nokia Shanghai Bell
R1-1720024 Remaining details of sPDSCH designs Intel Corporation
R1-1720241 Remaining details on sPDSCH-related aspects Samsung
R1-1720396 Remaining details of DL data channel design Qualcomm Incorporated
R1-1720402 Summary of [90b-LTE-11] email discussion on remaining details of CSI reporting Qualcomm Incorporated
R1-1720526 Remaining aspects of sPDSCH Ericsson

Agreement:
sPRG size is 2 for both 2/3os and 7os sTTI and resource allocation type 2

Agreement:
The legacy RIV formula for PDCCH DCI format 1C is reused for 10, 15 and 20 MHz bandwidth by replacing $N_{\mathrm{RB}}^{\mathrm{step}}$ with sRBG size.

Agreement:
The baseline DMRS pattern for sPDSCH/sPDCCH is applied for MBSFN subframes where CSI-RS is not configured in case of subslot operation. In case of slot operation, the baseline DMRS pattern is used in both slots for MBSFN subframes.

Agreement:
The DMRS pattern is shifted for sPDSCH/sPDCCH in MBSFN subframes in sTTI for subslot operation having collision between baseline DMRS and configured ZP and NZP CSI-RS.

Agreement: **[RAN2 impact]**
The UE MIMO capability definition is reused for sTTI but is separately reported

Agreement: **[RAN2 impact]**
If sTTI specific A-CSI reporting is supported, for a bandwidth class with a single CC, the max. number of CSI processes supported on a CC within a band with PDSCH TM10 is reported separately for the 1ms TTI and sTTI operations.

Agreement: **[RAN2 impact]**
If sTTI specific A-CSI reporting is supported, for a bandwidth class with multiple CCs, the max. number of CSI processes supported on a single CC within a band with PDSCH TM10 is reported separately for the 1ms TTI and sTTI operations.

Agreement: **[RAN2 impact]**
If sTTI specific A-CSI reporting is supported, for a bandwidth class with multiple CCs, the max. number of CSI processes supported on all CCs within a band with PDSCH TM10 is reported separately for the 1ms TTI and sTTI operations.

Agreement: **[RAN2 impact]**
If sTTI specific A-CSI reporting is supported, for the sTTI operation, the UE capability which indicates the maximum number of CSI processes to be updated across CCs is reported separately from that of the 1ms TTI operation.

Agreement: **[RAN2 impact]**
If sTTI specific A-CSI reporting is supported, the UE is not expected to update CSI associated with all sTTI CSI requests except the max(N_y-N_u,0) when the UE has N_u unreported CSI associated with other aperiodic sTTI CSI requests. A CSI process associated with an sTTI CSI request shall only be counted as unreported in an sTTI before the sTTI where sPUSCH carrying the corresponding CSI is transmitted. The value of N_y is a UE capability, and defined as the maximum number of sTTI CSI processes that the UE is required to update across the CCs.

Agreement: **[RAN2 impact]**
The ratio of the PDSCH EPRE to CSI-RS EPRE for 1ms TTI and sTTI are configured jointly.

Agreement: **[RAN2 impact]**
If sTTI specific A-CSI reporting is supported, for PMI reporting, the codebook size restriction is separately (compared to 1 ms operation) indicated via RRC signaling.

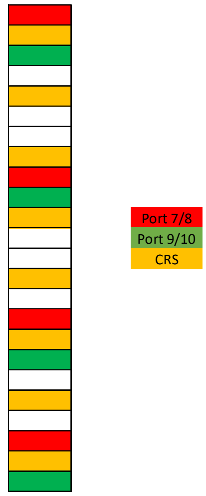
Agreement:

If the UE is configured with eMIMO type parameter, then CSI is reported on either PUSCH or PUCCH, and, then A-CSI is not triggerd by sDCI and not reported on sPUSCH.

Agreement: **[RAN2]**
One of resource allocation types 0 or 2 is configured for sPDSCH via RRC signaling.

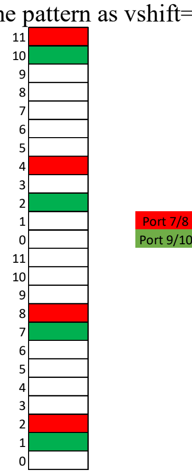
Agreement:
For sTTI CSI reporting, the reference resource is defined based on the sTTI.

Agreement:
For subslot-PDSCH/sPDCCH, within a non-MBSFN subframe the shift of the DMRS in case of CRS vshift 1 is:



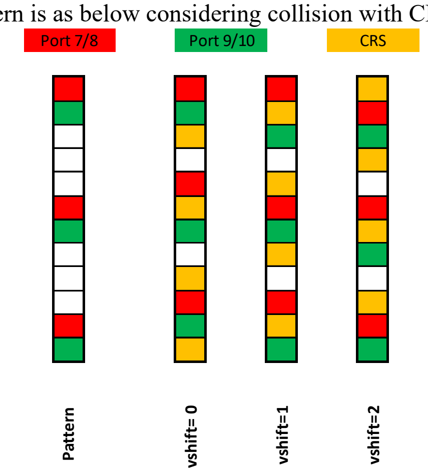

vshift=1

Agreement:
For subslot-PDSCH/sPDCCH, within an sTTI of an MBSFN subframe having collision between baseline DMRS and configured ZP and NZP CSI-RS, the shifted DMRS pattern (the same pattern as vshift=0 for non-MBSFN subframe) below is applied:




Agreement:
For 1-slot PDSCH, the same shift of the DMRS is applied for all sTTIs within a non-MBSFN subframe.

Agreement:
For 1-slot PDSCH, the shifted DMRS pattern is as below considering collision with CRS:



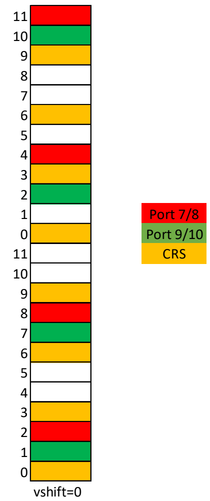

Agreement:

For 1-slot SPDCCH in slot#1, within an MBSFN subframe, the baseline DMRS pattern for subslot sPDSCH/SPDCCH is used.

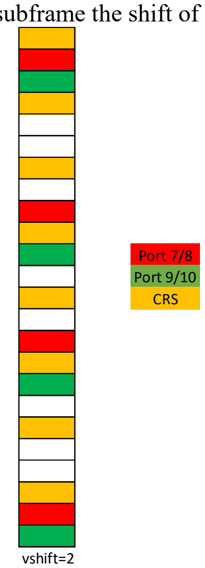
Agreement:
For 1-slot SPDCCH, within a non-MBSFN subframe, the CRS shifted DMRS pattern is as for subslot sPDSCH/SPDCCH.

Agreement:
For subslot-PDSCH/sPDCCH, within a non-MBSFN subframe, a single shift of the DMRS is applied only in sTTIs where the baseline DMRS pattern is colliding with CRS or in sTTI having collision between baseline DMRS and configured ZP and NZP CSI-RS, otherwise the baseline pattern is used.

Agreement:
For subslot-PDSCH/sPDCCH, within a non-MBSFN subframe the shift of the DMRS in case of CRS vshift 0 is:




Agreement:
For subslot-PDSCH/sPDCCH, within a non-MBSFN subframe the shift of the DMRS in case of CRS vshift 2 is:




Agreement:
For sPDSCH scheduled on a 5 MHz carrier, the RIV formula is defined as the legacy RIV formula from DCI format 1C is reused assuming 4RB starting position granularity, and one additional bit indicates the starting position, first or third RB within the first 4RB RBG. For CRS-based sPDSCH scheduled on a 5 MHz carrier, if the allocated PRBs includes the last sRBG, the last sRBG is increased to size 5.

Agreement:
For 1-slot sPUCCH format 1/1a/1b without frequency hopping, the cyclic shift randomization, OCC variations and occupied PRB follow the principle of 1ms PUCCH format 1/1a/1b.

Agreement:
For 1-slot sPUCCH format 3, the OCC and occupied PRB follow the principle of 1ms PUCCH format 3.

Agreement:
For 1-slot sPUCCH format 1/1a/1b, with frequency hopping the cyclic shift randomization, and occupied PRB follow the principle of 1ms PUCCH format 2/2a/2b.

Agreement:
For 2/3os sPUCCH format 1/1a/1b, the cyclic shift randomization, and occupied PRB follow the principle of 1ms PUCCH format 2/2a/2b with the restriction that all possible sPUCCH resource indices in one sPUCCH resource group by configuration need to be mapped to the same PRB pair.

Agreement:
For 2/3os sPUCCH format 1/1a/1b, all SR resource configured by higher layer are mapped to the same PRB pair.

Agreement:
Change the previous agreement as per below:

| |
|---|
| For PF1-based 7-OS sPUCCH format, the cyclic shifts on different sPUCCH symbols and the OCC in different slots can be different for a given UE. Cyclic shift randomization and OCC variations are re-used from 1 ms operation to support multiplexing with legacy PUCCH format ~~1/1a/1b/~~2.<br>- Note: the OCC is not applied when frequency hopping is enabled. |

Agreement:
In case of single RB subslot-SPUCCH format 4 allocation and payload of 21 or 22 bits, the UE is not expected to transmit 21 or 22 bits in one PRB.

Agreement:
For configured transmission mode of sPDSCH, the UE is only monitoring the TM dependent sDCI format.

**R1-1720402** **Summary of [90b-LTE-11] email discussion on remaining details of CSI reporting Qualcomm Incorporated**

Agreement:
For the subslot-sTTI operation, the reference CSI resource is a 2-symbol sTTI.

Agreement:
A fixed CRS overhead for subslot shall be assumed over the CSI reference resource, assuming the average number of CRS REs per sTTI (rounded up to the closest integer)

- if a 4-port CRS is configured, the overhead per sTTI is 4 REs per RB
- if a 2-port CRS is configured, the overhead per sTTI is ceil(16/6)=3

Agreement:
The number of available REs assumed for the reference resource for slot operation is the legacy value divided by 2.

Agreement:
The number of available REs assumed for the reference resource for sub-slot operation is the legacy value divided by 6

Agreement:
The CSI-RS overhead should not be considered over reference resource.

Agreement:
For aperiodic CSI reporting under the sTTI operation, $n_{CQI,ref}$ is defined with the sTTI granularity.

Agreement:
If the UE is configured with one of the DMRS-based TMs, the DMRS overhead should be considered as in the legacy case.

Agreement:
The CSI subband sizes for 2/3-symbol and 1-slot sTTI operation, modified as:

| System Bandwidth $N_{\mathrm{RB}}^{\mathrm{DL}}$ | Sub-band size | |
|---|---|---|
| | Mode 2-x (*k*) | Mode 3-x (*k*) |
| 6 - 7 | NA | NA |
| 8 - 10 | 4 | 4 |
| 11 - 26 | 12 | 12 |
| 27 - 63 | 12 | 12 |
| 64 - 110 | 12 | 12 |

Agreement:
The sTTIs in the MBSFN subframes are not considered as valid DL sTTIs for TM1-8 for sTTI CSI reporting.

Agreement:
The reported CSI shall be according to the TM configured in the subframe type where the trigger was received.

Agreement:
For sTTI CSI reporting, all the legacy aperiodic reporting modes are supported.

#### 6.2.1.2.5 Remaining details on UL data channel design

R1-1719453 sPUSCH and UL DMRS design for sPUSCH Huawei, HiSilicon
R1-1719847 Remaining details on UL data channel design Nokia, Nokia Shanghai Bell
R1-1719860 UCI on subslot sPUSCH LG Electronics
R1-1720025 Remaining details of sPUSCH designs Intel Corporation
R1-1720242 Remaining details on sPUSCH-related aspects Samsung
R1-1720397 Remaining details of UL data channel design Qualcomm Incorporated
R1-1720527 Remaining aspects of sPUSCH Ericsson
R1-1720769 Remaining details on power headroom report for sTTI operation ITRI
R1-1720770 CSI reporting for sTTI operation ITRI

Agreement:
For a UE configured with sTTI, the legacy UL channel interleaver mechanism for UL-SCH data is reused.

Agreement: **[RAN2 impact]**
For sPUSCH power control, the higher-layer parameter *AccumulationEnabled* is separately configured for sTTI and 1 ms operation

Agreement: **[RAN2 impact]**
- Two possible beta offset value for each of HARQ-ACK and RI are configured by RRC for subslot operation. The used beta offset value (the first or the second value configured) is indicated in the UL sDCI by a single bit. Fot slot operation a single beta factor is configured by RRC and no indication is included in sDCI.
- For UCI mapping on 2/3-symbol sPUSCH with 2 data symbols, the HARQ-ACK is mapped from the end of the data symbol closest to DMRS symbol (or in case of no DMRS symbol, i.e. DD is indicated in UL grant, to the first data symbol) by puncturing sPUSCH data REs, the RI is mapped from the end of the other data symbol rate matched by sPUSCH data, and PMI/CQI are mapped from the start of the data symbols in the time first frequency second manner, which are rate matched by sPUSCH data.
- For UCI mapping on 2/3-symbol sPUSCH with 1 data symbol, the RI is mapped from the end of the data symbol rate matched by sPUSCH data, followed by HARQ-ACK by puncturing sPUSCH data REs (puncturing the symbol from bottom to the top, as in legacy), PMI/CQI are mapped from the start of the data symbol, which are rate matched by sPUSCH data.

Agreement:
For DMRS of 2/3-symbol sPUSCH, IFDMA RPF=1 is supported

Agreement:
For DMRS of 2/3-symbol sPUSCH, one field in sDCI indicates the cyclic shift and comb index, and one field in sDCI indicates the IFDMA configuration.

Agreement:
For DMRS of 2/3-symbol sPUSCH, DMRS port multiplexing is supported by different cyclic shifts for RPF=1, and by combination of combs and cyclic shifts for RPF=2 for 4-layer 2/3OS sPUSCH.

Agreement:

For DMRS of 1-slot sPUSCH, one field in sDCI indicates the cyclic shift and comb index, and one field in sDCI indicates the IFDMA configuration.

Agreement:
For a configured transmission mode of sPUSCH, only one transmission scheme corresponding to the configured transmission mode is supported (i.e., a fallback transmission scheme on sPUSCH is not supported).

Agreement:
In case of subslot-PUSCH, up to 3 contiguous sTTIs within the same slot can use shared DMRS

Agreement:
For sPUSCH scheduled on a 5 MHz carrier, the RIV formula is defined as the legacy RIV formula from DCI format 1C is reused assuming 4RB starting position granularity.

Agreement:
The 1-bit CS field is coded as per table below:

| 1-bit CS field in UL grant | $n_{\mathrm{DMRS},\lambda}^{(2)}$ | | | | $\varpi$ | | | |
|---|---|---|---|---|---|---|---|---|
| | $\lambda=0$ | $\lambda=1$ | $\lambda=2$ | $\lambda=3$ | $\lambda=0$ | $\lambda=1$ | $\lambda=2$ | $\lambda=3$ |
| '0' | 0 | 6 | 3 | 9 | 0 | 0 | 1 | 1 |
| '1' | 6 | 0 | 9 | 3 | 1 | 1 | 0 | 0 |

Agreement:
The following is used to determine Q' for UCI on sPUSCH.

$$Q' = \min\left(\left\lceil \frac{O \cdot M_{sc}^{PUSCH-initial} \cdot N_{symb}^{PUSCH-initial} \cdot \beta_{offset}^{PUSCH}}{\sum_{r=0}^{C-1} K_r} \right\rceil, x \cdot M_{sc}^{PUSCH}\right)$$

X = 1 for subslot sTTI
X = 2 for slot sTTI

#### 6.2.1.2.6 Remaining details on FS2 aspects

R1-1719457 TDD-specific design for short TTI Huawei, HiSilicon
R1-1719665 Remaining issues on FS2 aspects ZTE, Sanechips
R1-1720243 Remaining details on FS2 aspects Samsung
R1-1720398 Remaining details of FS2 aspects Qualcomm Incorporated
R1-1720528 FS2 aspects of short TTI Ericsson
R1-1720598 Discussion on remaining TDD specific sTTI issues CMCC

Agreement:
For slot sTTI in FS2 and for SSC 1,2,3,4,6,7,8, the following pre-defined table is used for the timing between UL grant and sPUSCH. In the following table describing k, sPUSCH is transmitted in slot n+k, where the corresponding UL grant is received in slot n.

| TDD UL/DL | slot number *n* | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Configuration | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 0 | 4 | 4 | 4, 5 | 5,6 | | | | | | | 4 | 4 | 4, 5 | 5,6 | | | | | | |

Agreement:
For the timing between sPDSCH and HARQ-ACK, the following table is used for SSC 0-10.

- Note: Different numbers in the table below can apply to different SSCs as in case of the same table in legacy.

| TDD UL/DL | slot number *n* | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conf. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 0 | | | | | 4 | 4 | 4 | 4 | | | | | | | 4 | 4 | 4 | 4 | | |
| 1 | | | | | 6,5 | 5,4 | 4 | 4 | | | | | | | 6,5 | 5,4 | 4 | 4 | | |
| 2 | | | | | 8,7,12,11 | 7,6,5,4 | | | | | | | | | 8,7,12,11 | 7,6,5,4 | | | | |
| 3 | | | | | 14,13,12 | 12,11,10 | 10,9 | 9,8 | 8,7 | 7,6 | | | | | | | | | | |
| 4 | | | | | 16,15,14,13 | 13,12,11,10 | 10,9,8,7 | 7,6,5,4 | | | | | | | | | | | | |
| 5 | | | | | 18,17,16,15,14, 13,12, 22,21 | 12,11,10,9,8,7,6, 5,4 | | | | | | | | | | | | | | |
| 6 | | | | | 6 | 6 | 6 | 6 | 6 | 6 | | | | | 4 | 4 | 4 | 4 | | |

NOTE: The number highlighted in red are invalid in case sPDSCH transmission in the second slot in each special subframe is not supported in SSC 1,2,6,7

Agreement:
For slot sTTI in FS2 and SSC 0,5,9,10, the following pre-defined table is used for the timing between UL grant and sPUSCH. In the following table describing k, sPUSCH is transmitted in slot n+k, where the corresponding UL grant is received in slot n. The red-colored font is for SSC 10.

| TDD UL/DL | slot number *n* | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Configuration | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 6 | 4,5 | 5,6 | 6,7,11 | | | | | | | | 4 | 4 | 4,5 | | | | | | | 4 |

Agreement:
UL Index for scheduling for SSC10 and TDD UL/DL configuration 0 for slot number 2 and 12, and, for TDD UL/DL configuration 6 for slot number 2, is 2-bit, defined as below:

| Bit | |
|---|---|
| 00 | 6,7,11 |
| 01 | 6 |
| 10 | 7 |
| 11 | 11 |

**Conclusion:** sPDSCH transmission in the second slot in each special subframe for SSC 1,2,6,7 is not supported**.**

#### 6.2.1.2.7 Other

R1-1719450 sPDCCH multiplexing with data Huawei, HiSilicon
R1-1719455 sPUSCH and sPUCCH power control Huawei, HiSilicon
R1-1719456 Soft buffer for short TTI Huawei, HiSilicon
R1-1719666 Remaining issues on SPS design for shortened TTI ZTE, Sanechips
R1-1719848 On CSI Reporting for sTTI Nokia, Nokia Shanghai Bell
R1-1719861 Discussion on sTTI SPS LG Electronics
R1-1719950 On SPS operation for shorter TTI Nokia, Nokia Shanghai Bell
R1-1719953 UL PC in CA scenario Huawei, HiSilicon
R1-1719954 sTTI scheduling Huawei, HiSilicon
R1-1719955 SPS for short TTIHuawei, HiSilicon
R1-1719958 Summary of email discussion [90b-LTE-16] on SPS details Huawei
R1-1720399 Remaining details of SPS for sTTI operation Qualcomm Incorporated
R1-1720529 Multiplexing sPDCCH with sPDSCH/PDSCH Ericsson
R1-1720530 On CSI reporting for sTTI Ericsson
R1-1720531 UE capabilities for sTTI Ericsson
R1-1720532 SPS for sTTI Ericsson
R1-1720907 UCI on sPUSCH Huawei, HiSilicon
R1-1720908 Discussion on sDCI2 Huawei, HiSilicon
R1-1720909 Multi-sTTI scheduling Huawei, HiSilicon
R1-1720917 CSI aspects of shortened TTI Motorola Mobility, Lenovo
R1-1720918 SPS for sTTI Motorola Mobility, Lenovo
R1-1720932 Multi-sTTI scheduling Ericsson

Agreement:
In addition to sPDCCH in other sTTIs, UE shall also monitor PDCCH of sTTI#0 for validation of a sDCI with SPS assignments for sPDSCH and sPUSCH.

Agreement:
In case of collision between non-SPS PUSCH and SPS sPUSCH (not carrying HARQ-ACK) in the same subframe on a given carrier, the UE shall transmit SPS sPUSCH transmission and drop/stop non-SPS PUSCH transmission

- HARQ-ACK of non-SPS PUSCH is transmitted via SPS sPUSCH.
- CSI of non-SPS PUSCH is dropped.

Agreement:
In case of collision between non-SPS PUSCH and SPS sPUSCH (carrying HARQ-ACK) in the same subframe on a given carrier, the UE shall transmit SPS sPUSCH transmission and drop/stop non-SPS PUSCH transmission

- HARQ-ACK of non-SPS PUSCH is transmitted via SPS sPUSCH.

- CSI of non-SPS PUSCH is dropped.

Agreement:
In case of collision between SPS PUSCH and non-SPS sPUCCH in the same subframe on a given carrier, the UE shall transmit non-SPS sPUCCH transmission and drop/stop SPS PUSCH transmission.
- Potential HARQ-ACK bits from 1 ms is transmitted via non-SPS sPUCCH.
- CSI of SPS PUSCH is dropped

Agreement:
The unused field for SPS operation are set for validation of SPS activation/release
- The list of unused fields:
  - Activation: TPC ('0'), FFS: DMRS ('0'),
  - Release: TPC ('0'), DMRS ('0'), MCS ('1'), RB assignment ('1')

Agreement:
The most significant bit of the modulation and coding scheme field (MCS) in the sDCI for SPS activation is not fixed to zero.

Agreement:
The TPC in DCI format 3/3A is considered in the power control of sPUCCH corresponding to SPS-sPDSCH/SPS-sPUSCH in SPS operation. The power control loop for SPS is not impacted by the UL/DL sDCI. The power control loop for non-SPS is not impacted by DCI format 3/3A.

Agreement: **[RAN2 impact]**
The TPC-index for DCI format 3/3A is separately configured by RRC as part of the SPS configuration (i.e. TPC-PDCCH-config IE) for sTTI and TTI.

Agreement:
The processing timing of DCI format 3/3A in sTTI operation is according to legacy n+4 subframe processing timeline.

Agreement:
For DL SPS in subslot TTI with periodicity of 1 sTTI, no DMRS sharing for DL SPS, and the 1-bit DMRS-indication field in DL sDCI for DL SPS is set to '0' for validation. Every sTTI contains DMRS for DMRS-based sPDSCH transmission.

Agreement:
For UL SPS in subslot TTI with periodicity of 1 sTTI, 1-bit is used to indicate the UL DMRS pattern according to table below. The remaining bit for the UL DMRS indication is used for activation (set to '0'). For release, both bits are set to '1'.

| sDCI field (1-bit) | sTTI 0 | sTTI 1 | sTTI 2 | sTTI 3 | sTTI 4 | sTTI 5 |
|---|---|---|---|---|---|---|
| 0 (no sharing) | R D D | R D | R D | R D | R D | R D D |
| 1 | R D D | D D \| R | R D | D D \| R | R D | R D D |
| R: Reference symbol<br>D: Data<br>\| : sTTI border | | | | | | |

Agreement: **[RAN 2 impact]**
For UL sTTI SPS operation, different DMRS and/or RPF can be configured by RRC (3-bit CS and 1-bit RPF). The CS and RPF fields in the sDCI are set to zero.

#### *6.2.1.3 Remaining details on maximum TA and processing time*

R1-1719454 Maximum TA and processing time reduction Huawei, HiSilicon
R1-1720244 Remaining details on maximum TA and processing time Samsung
R1-1720401 Remaining details of maximum TA and processing time Qualcomm Incorporated
R1-1720538 Number of HARQ processes for sTTI Ericsson LM Withdrawn
R1-1720919 Remaining details of maximum TA and processing timeline for sTTI and sPT Motorola Mobility, Lenovo
R1-1720990 Remaining details of max TA and processing time Ericsson LM

Agreement:
For DL/UL combination of {2, 7}, the UL grant for sPUSCH in slot#x of SF#N is sent:
- For x=0: in sTTI#4 of SF#N-3, sTTI#5 of SF#N-3 or sTTI#0 of SF#N-2

- For x=1: in sTTI#1, sTTI#2 or sTTI#3 of SF#N-2

Agreement: **[RAN2 impact]**
For subslot operation the UE can, relating to processing timeline Set 1 and Set 2, indicate the support of either Set 1 or Set 2 for a given reported UE capability. A support of Set 1 implicitly means a support of Set 2, and either set 1 or set 2 can be configured to the UE.

Agreement: **[RAN2 impact]**
If a UE is configured with subslot sTTI operation for a set of features, i.e., with multiple RB sets of different RS types and/or length, where at least one configured feature requires Set 2 conditions, a single configured processing timeline and maximum TA from higher layer signalling is configured from Set 2 for that PUCCH group. Otherwise, the eNB may configure the UE with a single configured processing timeline and maximum TA from either Set 1 or Set 2.

#### 6.2.1.4 Other

R1-1719952 Remaining details of CSI feedback for sTTI Huawei, HiSilicon
R1-1720400 Link-level evaluation of DL data transmission under symbol-dependent impact Qualcomm Incorporated

### 6.2.2 Enhancements to LTE operation in unlicensed spectrum - *WID in RP-170848*

**R1-1721234 Chairman's notes of AI 6.2.2 Enhancements to LTE operation in unlicensed spectrum Ad-Hoc chair (Ericsson)**
The document was presented by RAN1 Chair on behalf of Havish Koorapaty.
**Decision:** The document is endorsed, content incorporated below.

**R1-1721279 WF on AUL HARQ and Resource Allocation Nokia, Broadcom, Cablelabs, Ericsson, Huawei, HiSilicon, Intel, LGE, Nokia Shanghai Bell, Qualcomm, Samsung, WILUS**

Agreement: AUL subframes are indicated to UE with an RRC-configured bitmap

Agreement: AUL supports both TM1 and TM2

Agreement: For TM1, DCI format 0A is used for AUL activation / deactivation
- FFS: whether to use DCI format 0A or 4A with TM2 (note: if DCI 0A is used, the contents will be redefined)

Agreement: The same DCI is used for activation and deactivation

Agreement: The same DCI size is used for AUL activation/deactivation and AUL-DFI

Agreement: The same RNTI used to scramble the CRC parity bits of AUL-DFI is used to scramble the CRC parity bits of AUL (de) activation DCI.

Agreement: A flag to differentiate between AUL activation/deactivation and AUL-DFI is included into the “AUL DCI”

Agreement: For TM2 with AUL, PMI and MCS for the 2nd CW are included into AUL activation / deactivation DCI [0A or 4A]

Agreement:
- UL DMRS Cyclic Shift and OCC can be indicated for an AUL user:
- FFS: UE specific RRC configuration or by using AUL activation / deactivation DCI.

Agreement:
- AUL transmissions are not allowed in the subframes belonging to the DMTC window of the serving cell irrespective of the RRC configured bitmap.
- FFS: RMTC

Agreement: HARQ-ACK AUL-DFI for a PUSCH transmitted at subframe n is expected at earliest at subframe n+4.

Agreement: AUL-DFI does not include a field indicating MCS

Agreement: For a AUL-DFI received in subframe n,

- PMI (if included in AUL-DFI) in subframe n is applied after subframe n+3
- TPC in AUL-DFI in subframe n is applied in the same way as if it had been received through DCI format 3/3A

Agreement: Default HARQ-ACK value in AUL-DFI is NACK.
Note: after the eNB has reported an ACK/NACK for a given HARQ process once, the HARQ-ACK is set again to the default value, NACK.

Agreement: AUL-DFI only transmission by eNB based on Rel-13 Cat-4 LBT priority class is supported.

Agreement: AUL retransmission timer is RRC configured.

#### *6.2.2.1 Multiple starting and ending positions in a subframe for UL*

R1-1721039 **Summary of email discussion [90b-LTE-18] on partial UL subframes** **Huawei, HiSilicon**

Agreement: In case the 1st subframe of a reference UL burst based on Type 1 channel access is Mode 1 partial UL subframe, the partial subframe as well as the next subframe are considered for CWS adjustment.

- If at least one of the TBs in the partial UL subframe and the next subframe is received correctly, the contention window is reset. Otherwise, it is increased.

Agreement: In case the partial subframe is the only subframe included in the reference UL burst, the partial subframe is used for CWS adjustment.

**Proposal:**
For a UE which is allowed to apply Mode 1 UL partial subframe within the MCOT acquired by the eNB, there is no restriction on LBT attempt number or position, i.e. the UE is allowed to perform Type 2 channel access before any slot of the UL burst if the LBT attempt for the previous slot fails.

**Proposal:**

- If the UE is allowed Mode 1 UL partial subframe transmission at the beginning of symbol #7 of only the first subframe of a set of consecutively allocated subframes, the Release 14 Type 2 channel access procedure can be used unchanged.
- If the UE is allowed Mode 1 UL partial subframe transmission at the beginning of symbol #7 of every subframe of a set of consecutively allocated subframes, the number of possible LBT attempts by the UE within the shared COT shall be limited to the number of consecutively allocated UL subframes.

R1-1721075 **WF on LBT for Mode 1 UL transmissions in FeLAA, CableLabs, Broadcom, Comcast, HPE, Brocade, Charter Communications, Blackberry**

Agreement:
If the UE is allowed Mode 1 UL partial subframe transmission, the number of possible Type 2 LBT attempts by the UE within the shared COT shall be limited to n+1, where n is the number of consecutively allocated UL subframes.

- Note: This applies regardless of the type or number of grants that were used to schedule the consecutively allocated UL subframes and for cases where there maybe gaps of one symbol or less between the consecutively allocated subframes as in Rel-14

Agreement: For a UE which is allowed to apply Mode 1 UL partial subframe outside the MCOT acquired by the eNB, there is no restriction on LBT attempt number or position, i.e. the UE is allowed to continue Type 1 channel access before any slot of the UL burst if the LBT attempt for the previous slot fails.

Agreement: If a UL grant schedules a UL burst by multiple-subframe scheduling operation with Mode 1, Mode 1 is applied for all subframes of the UL burst.

Agreement: The TBS of the Mode 2 partial UL subframe is scaled by the factor of 0.5.

Agreement: Re-interpret the legacy bit field in 0A/0B/4A/4B for indicating the starting positions of {#7, #7+25us, #7+25us+TA, #8} when a Mode 2 partial subframe is scheduled.

Agreement: When UCI is sent along with UL-SCH, the UCI is rate-matched in the 2nd slot of a subframe with Mode 1 operation, regardless this Mode 1 subframe is actually full or partial.

Agreement: UCI is rate-matched in the 2nd slot of the Mode 2 partial UL subframe.

**Proposal:**
No additional ending positions are introduced for partial UL subframe except symbol #6, #12, and #13.

**R1-1721074 WF on multiple ending positions in a UL subframe in FeLAA CableLabs, Broadcom, Comcast, HPE, Charter Communications, Brocade, Blackberry**

Agreement: The TBS of a subframe ending at symbol #6 is scaled by a factor of 0.5

Agreement: UCI is rate-matched in the 1st slot of a subframe ending in symbol #6.

R1-1719849 Multiple starting and ending positions in a subframe for UL Nokia, Nokia Shanghai Bell
R1-1719862 Discussion on multiple starting and ending positions for LAA UL LG Electronics
R1-1720026 Remaining details on uplink starting and ending positions in a subframe for FS3 Intel Corporation
R1-1720245 Multiple starting and ending positions for UL Samsung
R1-1720369 Remaining issues on multiple starting and ending points for LAA UL Ericsson Japan K.K.
R1-1720403 Multiple starting and ending positions in a subframe in UL Qualcomm Incorporated
R1-1720872 Channel access for UL partial subframe on LAA Scell WILUS Inc.

### 6.2.2.2 *Autonomous uplink access with Frame Structure type 3*

Email discussion on Autonomous uplink access control signalling until February 8, 2018. Nokia (Timo)

#### 6.2.2.2.1 Resource allocation for autonomous UL access

R1-1719850 Summary of email discussion [90b-LTE-19] on AUL resource allocation Nokia

R1-1719498 Remaining issues for AUL resource allocation Huawei, HiSilicon
R1-1719851 Resource Allocation for Autonomous UL Access Nokia, Nokia Shanghai Bell
R1-1719863 Resource allocation and control siganling for autonomous UL access LG Electronics
R1-1720027 Remaining Details for Resource Allocation for Autonomous Uplink Transmissions Intel Corporation
R1-1720246 Resource allocation for autonomous UL access Samsung
R1-1720372 on AUL Configuration and Activation Ericsson Japan K.K.
R1-1720404 Resource allocation for automonous UL access Qualcomm Incorporated

#### 6.2.2.2.2 HARQ for autonomous uplink access

R1-1720540 Summary of 90b-LTE-20 email discussion on AUL HARQ design Ericsson Japan K.K.

R1-1719499 Remaining issues for AUL HARQ operation Huawei, HiSilicon
R1-1719852 HARQ for autonomous uplink access Nokia, Nokia Shanghai Bell
R1-1719864 HARQ operation for autonomous UL access LG Electronics
R1-1720028 Remaining Details for HARQ for Autonomous Uplink Transmissions Intel Corporation
R1-1720247 HARQ for autonomous UL access Samsung
R1-1720373 Remaining Issues on AUL HARQ Design Ericsson Japan K.K.
R1-1720405 HARQ for autonomous UL access Qualcomm Incorporated
R1-1720914 Remaining details for AUL-UCI Motorola Mobility Germany GmbH

#### 6.2.2.2.3 Channel access for autonomous UL access

Email approval until February 8, 2018 on channel access for autonomous UL access. Intel (Salvatore)

R1-1720029 Summary of email discussion [90b-LTE-21] on AUL channel access Intel Corporation

R1-1719500 Remaining issues on AUL channel access Huawei, HiSilicon
R1-1719853 On channel access for autonomous UL access Nokia, Nokia Shanghai Bell
R1-1719865 Channel access procedure for autonomous UL access LG Electronics
R1-1720030 Channel access mechanism for autonomous UL transmission Intel Corporation
R1-1720248 Channel access for autonomous UL access Samsung
R1-1720374 on AUL Channel Access Ericsson Japan K.K.
R1-1720406 Channel access mechanism for autonomous UL access Qualcomm Incorporated
R1-1720873 Discussion on channel access for AUL transmission WILUS Inc.

**R1-1721269 WF on CWS adjustment for AUL with HARQ-ACK reception Huawei, HiSilicon, Ericsson, Intel, Nokia, Nokia Shanghai Bell, CableLabs, WILUS, Broadcom**

Agreements:

- If the UE receives a UL grant or an AUL-DFI, the contention window size for all the priority classes is adjusted as following:
  - The contention window size at the UE is reset for all the priority classes if:
    - A UL grant is received and the NDI bit for at least one of the active HARQ processes (i.e. TB not disabled) associated with HARQ_ID_ref is toggled ; OR
    - An AUL-DFI is received and indicates ACK for at least one of the active HARQ processes (i.e. TB not disabled) associated with HARQ_ID_ref
  - The contention window size of all priority classes at the UE is increased to the next higher value if:
    - A UL grant is received and the NDI bit(s) of all the active HARQ processe(s) for the reference subframe are not toggled; OR
    - A UL grant is received and does not schedule any active HARQ process (i.e. TB not disabled) for the reference subframe; OR
    - An AUL-DFI is received which does not indicate ACK for at least one of the active HARQ processes for the reference subframe.
  - The CWS is reset to the minimum value if the maximum CWS is used for K consecutive LBT attempts for transmission only for the priority class for which maximum CWS is used for K consecutive LBT attempts.
    - K is selected by UE implementation from the set of values from (1, …,8).
  - The NDI value(s) received in the UL grant or the HARQ-ACK value(s) received in the earliest AUL-DFI after n_ref+3 is used for adjusting the CWS, where n_ref is the reference subframe.
  - HARQ_ID_ref is the HARQ ID of n_ref.
  - RAN1 shall specify the CWS adjustment for the case of no A/N reception until which the UE is not allowed to perform Cat.4 LBT and transmit AUL in case of no A/N or UL grant reception.
    - FFS: Handling of ACK/NACK or UL grant in case multiple consecutive recent Cat.4 LBT AUL bursts were transmitted without waiting for any AUL-DFI or UL grant.

**R1-1721271 WF on PDCCH transmission within a UE acquired COT Ericsson, Nokia, Huawei, Intel, LG, KT, Samsung**

Proposal:

- A UE initiated COT using CAT4 LBT can be shared with the eNB to allow PDCCH only transmission carrying DL control information.
- For PDCCH transmission within a UE acquired COT, the PDCCH transmission is limited to a partial ending subframe of up to 3 OS length.
- DL uses Type 2 channel access (25us LBT) within a UE acquired COT.
- UL-DL-UL sharing is not allowed
- FFS: The eNB may send DL control information to any UE within the indicated DL subframe.
- FFS: If subframe level gap is allowed between the AUL burst and PDCCH transmission
- FFS: How the UE indicates the remaining COT for the DL.

**R1-1721245 WF on AUL Channel Access Intel, Ericsson, Huawei, HiSilicon, Nokia, Nokia Shanghai Bell, WiLUS**

Proposal:
When an AUL UE is allocated to occupy the full channel bandwidth, i.e., all the interlaces, the UE is configured with AUL-specific PUSCH start offset value range for AUL transmission. The randomly generated offset within a specific range is supported for an AUL UE.

- UE can be configured with different value ranges for the AUL transmission outside of eNB obtained MCOT and for the AUL transmission inside of eNB obtained MCOT.
- FFS: the offset value range and resolution.
- FFS: random offset determination.

Proposal:
When an AUL UE is allocated to occupy partial channel bandwidth, i.e., not all the interlaces, the UE is configured with exact AUL-specific PUSCH start offset value for AUL transmission.

- UE can be configured with different value offset for the AUL transmission outside of eNB obtained MCOT and for the AUL transmission inside of eNB obtained MCOT.
- FFS: the possible set of offset value

Agreement: CP extension is transmitted from the AUL starting position until the start of symbol #1, and is less than one symbol long.

- FFS: if starting at subframe boundary

Agreement: The reference subframe is the first subframe of the most recent UL (SUL/AUL) burst of contiguous subframes that is transmitted after performing a category 4 LBT procedure with the following timing:
- At least 4 subframes prior to a UL grant reception or an AUL Downlink feedback information
- FFS: multiple reference subframes can be supported

R1-1721072 WF on CW Update for AUL in FeLAA CableLabs, Broadcom, Comcast, HPE, Charter Communications, Brocade, Blackberry
R1-1721073 WF on UE to eNB COT sharing in AUL in FeLAA CableLabs, Broadcom, Comcast, HPE, Charter Communications, Brocade, Blackberry
R1-1721076 WF to eNB to UE COT sharing in Autonomous UL in FeLAA CableLabs, Broadcom, Comcast, HPE, Charter Communications, Brocade, Blackberry

##### 6.2.2.2.4 Other

R1-1719497 Support for partial subframe transmission for UL on SCell with frame structure 3 Huawei, HiSilicon
R1-1720407 Miscellaneous aspects Qualcomm Incorporated
R1-1720933 RV selection fro AUL transmissions Ericsson Japan K.K.

### 6.2.3 3GPP V2X Phase 2 - WID in RP-171740

**R1-1721235 Chairman's notes of AI 6.2.3 3GPP V2X Phase 2 Ad-Hoc chair (NTT DOCOMO)**
The document was presented by Kazuaki Takeda from NTT DOCOMO.
**Decision:** The document is endorsed, content incorporated below.

#### *6.2.3.1 Carrier Aggregation (up to 8 PC5 carriers)*

R1-1720408 Carrier Aggregation for V2X Phase 2 Qualcomm Incorporated

##### 6.2.3.1.1 Mode-4 support

R1-1719511 Remaining details of mode-4 resource selection and power sharing for eV2X Huawei, HiSilicon
R1-1719654 Carrier selection and resource selection in SL CA ZTE, Sanechips
**R1-1721139 WF on carrier selection rule and resource selection procedure for mode 4 CA LG Electronics, Huawei, HiSilicon, ZTE**

Agreements:
- Confirm the following working assumption made in RAN1#90bis meeting with the following update:
  - For a given MAC PDU, RAN1 assumes that a single carrier is provided by higher layer for its transmission.
  - From RAN1 perspective, the following factors can be taken into account for TX carrier selection.
    - CBR
    - UE capability (e.g. number of TX chains, implementation related aspects such as power budget sharing capability, TX chain retuning capability)
  - For a given MAC PDU, a single carrier is used for transmission and potential retransmission of this MAC PDU.
  - From RAN1 perspective, once a carrier is selected, the same carrier is used for all MAC PDUs of the same sidelink process at least until resource reselection is triggered for that same sidelink process based on Rel-14 triggering conditions and, if any, new Rel-15 triggering conditions.
    - Note that the UE is not precluded to switch transmission chains between component carriers for different sidelink processes.

**R1-1721223 Offline summary for mode 4 CA LG Electronics**

Agreements:
- From RAN1 understanding, the limited TX capability means that the UE cannot support transmission(s) over carrier(s) in a subframe due to
  - (a) Number of TX chains smaller than the number of configured TX carriers or
  - (b) UE doesn't support the given band combination or
  - (c) TX chain switching time or
  - (d) UE cannot fulfill the RF requirement due to, e.g., PSD imbalance
- For a UE with limited TX capability, RAN1 considers the following options for resource selection in mode 4 CA.

- Option 1-1: When the UE performs the resource selection for a certain carrier, any subframe of that carrier shall be excluded from the reported candidate resource set if using that subframe exceeds its TX capability limitation under the given resource reservation in the other carriers.
  - FFS details, e.g., the carrier resource selection order should consider PPPP of transmission and CBR.
- Option 1-2: If the per-carrier independent resource selection leads to transmissions beyond the TX capability of the UE in a subframe, UE re-does resource reselection within the given reported candidate resource set until the resultant transmission resources can be supported by the UE.
  - FFS: whether it is up to UE implementation
  - FFS details, e.g., the carrier resource selection order should consider PPPP of transmission and CBR.
- Option 2: After performing the per-carrier independent resource selection, the UE shall drop transmission in a subframe where using that subframe exceed its TX capability limitation.
  - FFS details of dropping rule, e.g., whether/how to consider PPPP and CBR
- FFS whether/how to consider other aspects (e.g., half duplex problem) in terms of resource selection

- Down-select one combination among the followings:
  - Option 1-1 for (a), (b), and (c)
    - the UE shall drop transmission in a subframe where using that subframe is beyond TX capability with (d)
  - Option 1-1 for (a), (b), and (c)
    - UE re-does resource reselection within the given reported candidate resource set until the resultant transmission resources fulfill TX capability with (d)
  - Option 1-2 for (a), (b), and (c) + Option 2 for (d)
  - Option 1-1 for (a), (b), (c), and (d)
  - Option 1-2 for (a), (b), (c), and (d)
  - Option 2 for (a), (b), (c), and (d)

**R1-1721101** **WF on new triggering conditions for resource/carrier reselection on CA in mode 4** **CATT, OPPO**
**R1-1721126** **WF on Sidelink Component Carrier Selection for LTE V2V Communication,** **Intel, Qualcomm, NEC**
**R1-1721102** **WF on resource selection on carrier aggregation in mode 4** **CATT**
**R1-1721104** **WF on non-contiguous RX CA for V2X** **LG Electronics, Qualcomm, Samsung, Nokia, Nokia Shanghai Bell**

Agreement

- RAN1 specification of CA for LTE-V2X will be also applicable to "reception over non-contiguous carriers", which RAN1 consdiers to be useful, in some operations scenarios
- Inform RAN4 of the above RAN1 understanding – LS (R1-1721270) - Hanbyul (LGE) – Final version is approved in R1-1721285 R1-1721274

R1-1719679 Discussion on Mode-4 supporting for V2X Sidelink CA Scheduling ITRI
R1-1719750 Discussion on Mode 4 support for V2X carrier aggregation Lenovo, Motorola Mobility Late submission
R1-1719866 Discussion on carrier aggregation in sidelink mode 4 operation LG Electronics
R1-1719976 Mode 4 support in eV2X carrier aggregation Guangdong OPPO Mobile Telecom
R1-1720031 Physical layer aspects of sidelink carrier aggregation for mode-4 LTE V2V communication Intel Corporation
R1-1720119 On Mode-4 Support for CA Ericsson
R1-1720158 Discussion on carrier aggregation for mode 4 in V2X phase 2 CATT
R1-1720249 mode-4 support in V2X CA Samsung
R1-1720471 Discussion on carrier aggregation in sidelink mode 4 operation Sony
R1-1720478 Discussion on UE behaviour of mode 4 in case of multiple carriers Panasonic
R1-1720484 Mode 4 support for V2X carrier aggregation Nokia, Nokia Shanghai Bell
R1-1720775 On carrier aggregation using mode 4 resource selection NTT DOCOMO, INC.

#### 6.2.3.1.2 Synchronization

R1-1720485 Discussion on synchronization for SL CA Nokia, Nokia Shanghai Bell
R1-1720120 On Synchronization Aspects for PC5 CA Ericsson
R1-1720159 Discussion on synchronization for carrier aggregation in V2X Phase 2 CATT
**R1-1721137** **WF on synchronization in sidelink CA** **LGE, Qualcomm, NTT DOCOMO**
**R1-1721128** **WF on SLSS/PSBCH transmission for sidelink CA** **Huawei, HiSilicon, ITRI, ZTE, Samsung, OPPO, Nokia, Nokia Shanghai Bell**
**R1-1721129** **WF on synchronization reference selection for sidelink CA** **Huawei, HiSilicon, ITRI, CATT**

**R1-1721247 Summary of offline discussions on PC5 CA synchronization Qualcomm**

Agreements:

- Higher layers can configure set of carrier(s) (Set-A) that can potentially be used as the synchronization carrier for the potential carriers configured for Tx and Rx for CA
  - If this set is empty, Rel-14 independent synchronization is used per carrier
    - RAN1 assumes that carriers can only be aggregated in this behaviour if they use the same synchronization reference (e.g. GNSS, or same eNodeB)
  - If this set is non-empty:
    - Set-A must be a subset of the set of potential carriers configured for Tx and Rx for CA
      - Note: this includes the case when Set-A is the same as the set of potential carriers configured for Tx and Rx for CA
      - Note: At any given time, the UE may not be capable of reception and/or transmission on one or more of the configured synchronization carriers due to limited Rx and/or Tx chains
    - UE determines the available set of synchronization carriers (Set-B) as the subset of Set-A based on the carriers which the UE is currently aggregating.
      - Note: This does not exclude the UE implementation or proper higher layer configuration that allows Set-B to be the same or a subset of Set-A by choosing the carriers its aggregating.
  - Within the Set-B of available set of synchronization carriers:
    - If no potential synchronization carrier is present, Rel-14 behaviour of independent synchronization per carrier is assumed.
    - If only one potential synchronization carrier is present, UE shall use derive time/frequency of all the aggregated carriers from the synchronization reference of the synchronization carrier.
    - If two or more potential synchronization carriers are present, FFS how the UE selects one of the carrier to be used as the synchronization carrier.
- The following working assumption is confirmed in the context of this agreement
  - From the transmitting UE perspective, a single synchronization reference is used for all aggregated carriers
    - When a UE transmits multiple MAC PDUs on multiple carriers, timing on all transmission carriers is aligned
- Working assumption: From the receiving UE perspective, a single synchronization reference is used for reception of all aggregated carriers
  - This does not preclude UE to monitor different synchronization sources on the different carriers
- Note that the terminology used in this agreement (e.g. synchronization carrier, Set-A, Set-B) are limited to this agreement.

R1-1719514 Remaining details for synchronization for carrier aggregation on sidelink Huawei, HiSilicon
R1-1719655 Synchronization in Sidelink CA ZTE, Sanechips
R1-1719680 Discussion on Synchronization aspect for V2X carrier aggregation ITRI
R1-1719867 Remaining issues on synchronization for sidelink CA LG Electronics
R1-1719977 Synchronization in eV2X carrier aggregation Guangdong OPPO Mobile Telecom
R1-1720032 Synchronization aspects for LTE V2V sidelink carrier aggregation Intel Corporation
R1-1720250 Synchronization in V2X CA Samsung
R1-1720409 Synchronization for V2X PC5 Carrier Aggregation Qualcomm Incorporated
R1-1720776 Discussion on synchronization for carrier aggregation NTT DOCOMO, INC.

#### 6.2.3.1.3 Other

R1-1720251 Other considerations on V2X CA Samsung
R1-1720486 Tx power allocation in SL CA Nokia, Nokia Shanghai Bell

### *6.2.3.2 Support for 64-QAM*

R1-1720033 Support of 64QAM for LTE V2V sidelink communication Intel Corporation
**R1-1721250 Summary of RAN1 Offline Discussion on 64 QAM Support Intel Corporation**

Agreements:

- Conduct additional evaluation to determine required modification for MCS table and TBS scaling factor in R15 using the following criteria:
  - PSSCH spectrum efficiency vs SNR performance (where SNR is defined at 1% BLER)
  - PSSCH low data rate considerations. Balanced performance between PSCCH and PSSCH at low MCS indexes

- Granularity of SNR difference between adjacent PSSCH spectrum efficiency points (CDF of delta SNR)
- Peak spectral efficiency in case of retransmission
- Spectrum efficiency vs SNR for RV2 only reception

- Conduct additional link level evaluations using assumptions in Section 3 in R1-1721250.
- New MCS table should not have problematic MCS indexes in case of 2 TTI transmissions (i.e. reception of RV0 and RV2) assuming that puncturing is applied to the first symbol of initial transmission and retransmission.

Agreement
- RAN1 agrees to finalize principle defining MCS/TBS tables at the RAN1 #92 meeting

R1-1721125 WF on TBS Scaling for LTE V2V Sidelink Communication Intel, Ericsson, Samsung, ZTE, OPPO
R1-1721143 WF on 64QAM support Qualcomm, LGE
R1-1719508 Remaining details of 64-QAM support for eV2X Huawei, HiSilicon
R1-1719656 Support for 64QAM ZTE, Sanechips
R1-1719868 Discussion on 64QAM support in PC5 operation LG Electronics
R1-1719978 64QAM support for eV2X Guangdong OPPO Mobile Telecom
R1-1720121 Supporting 64QAM on PC5 Ericsson
R1-1720160 Discussion on 64QAM modulation scheme in V2X phase 2 CATT
R1-1720252 High order modulation in V2X Samsung
R1-1720410 Support of 64-QAM for V2X Phase 2 Qualcomm Incorporated

#### ***6.2.3.3 Feasibility and gain of PC5 operation with Transmit Diversity***

R1-1720411 Transmit Diversity for V2X Phase 2 Qualcomm Incorporated

##### 6.2.3.3.1 Transmit diversity solutions

*For both PSSCH and PSCCH*
R1-1719513 Transmit diversity solutions for PSSCH and PSCCH Huawei, HiSilicon
**R1-1721256 WF on two-port Transmit Diversity design for PSCCH Huawei, HiSilicon**
**R1-1721257 WF on two-port Transmit Diversity design for PSSCH Huawei, HiSilicon**

Agreement
- Assuming the previous WA of introducing non-transparent transmit diversity is confirmed, for two-port non-transparent transmit diversity for PSSCH, downselect option 1 as WA among the following candidate schemes
  - Working assumption: Option 1: SFBC-based scheme (including PAPR preserving)
    - FFS whether to apply slot-level PVS
  - Option 2: STBC-based (including half symbol)

Note: Companies are encouraged to perform evaluations for the above options

R1-1721258 WF on two-port DMRS design Huawei, HiSilicon
R1-1719657 Discussion on transmit diversity for PC5 ZTE, Sanechips
R1-1719869 Discussion on transmit diversity support in PC5 based V2X LG Electronics
R1-1719979 Transmit diversity scheme in eV2X Guangdong OPPO Mobile Telecom
R1-1720034 Candidate transmit diversity schemes for LTE V2V sidelink communication Intel Corporation
R1-1720123 Transmit diversity solutions for Rel-15 PSCCH and PSSCH transmissions Ericsson
R1-1720147 Low PAPR SFBC for V2X transmit diversity Mitsubishi Electric RCE
R1-1720161 Discussion on Tx diversity schemes in PC5 CATT
R1-1720253 Transmit diversity schemes for PSSCH Samsung
R1-1720487 Discussions on Transmit diversity schemes and DMRS for PSSCH Nokia, Nokia Shanghai Bell
R1-1720777 Transmission diversity solutions NTT DOCOMO, INC.

##### 6.2.3.3.2 Evaluation results

*For both PSSCH and PSCCH*

R1-1720162 Evaluation results for Tx diversity schemes in PC5 CATT
R1-1719512 Performance evaluation of transmit diversity for eV2X Huawei, HiSilicon
R1-1719658 Evaluation results of TxD ZTE, Sanechips

R1-1720035 Evaluation of candidate transmit diversity schemes for LTE V2V sidelink communication Intel Corporation
R1-1720148 Low PAPR SFBC evaluations for PSSCH Mitsubishi Electric RCE
R1-1720254 Evaluation results for Tx diversity for PSSCH Samsung
R1-1720488 Evaluations of transmit diversity schemes for V2X Nokia, Nokia Shanghai Bell
R1-1720778 Evaluation results for transmission diversity schemes NTT DOCOMO, INC.

#### 6.2.3.3.3 Other

R1-1720122 DMRS design for two port PSSCH transmission Ericsson
R1-1720255 Impact of transmit diversity on PC5 interface Samsung
R1-1720256 Control signaling for Tx diversity transmission of PSSCH and PSCCH Samsung

### *6.2.3.4 Resource pool sharing between mode-3 and mode-4 users*

**R1-1720412 Resource pool sharing between Mode 3 and Mode 4 Qualcomm Incorporated**
**R1-1720779 Resource pool sharing between UEs using mode 3 and UEs using mode 4 NTT DOCOMO, INC.**
**R1-1721273 Offline summary of radio resource pool sharing between UEs using mode 3 and UEs using mode 4 NTT DOCOMO**
**R1-1721349 Offline summary of radio resource pool sharing between UEs using mode 3 and UEs using mode 4 NTT DOCOMO**

**Conclusion**
Companies are encouraged to analyse solutions' impact to Rel-14 UEs using Mode 3 and Mode 4 respectively when considering the solutions for resource pool sharing with Rel-15 UEs using Mode 3 and Mode 4.

R1-1721112 WF on scenario for radio resource pool sharing between UEs using mode 3 and UEs using mode 4 NTT DOCOMO, LGE
R1-1721127 WF on Resource Pool Sharing by Mode-3/Mode-4 UEs Intel, Qualcomm
R1-1721140 WF on resource pool sharing between UEs using mode 3 and 4 LG Electronics, Qualcomm, ZTE
R1-1721142 WF on V2X resource pool sharing Huawei, HiSilicon, ITRI
R1-1719509 Discussion on resource pool sharing for eV2X Huawei, HiSilicon
R1-1719659 Consideration for resource pool sharing between mode 3 and mode 4 ZTE, Sanechips
R1-1719681 Discussion on Resource Pool Sharing for eNB-Controlled and UE-Autonomous in V2X Communication ITRI
R1-1719752 On mode 3 and mode 4 pool sharing NEC
R1-1719870 Discussion on resource pool sharing between UEs using mode 3 and 4 LG Electronics
R1-1719980 Resource pool sharing between mode 3 and mode 4 Guangdong OPPO Mobile Telecom
R1-1720036 Resource selection latency reduction for LTE V2V sidelink communication Intel Corporation
R1-1720112 Resource Pool Sharing between V2X Mode 3 and Mode 4 UEs Fraunhofer HHI
R1-1720125 Resource pool sharing between mode 3 and mode 4 UEs Ericsson
R1-1720163 Discussion on resource pool sharing between mode 3 and mode 4 CATT
R1-1720257 Resource pool sharing among mode 3/4 UEs Samsung
R1-1720476 Discussion on resource pool sharing between UEs in mode 3 and UEs in mode 4 Panasonic
R1-1720489 On Resource pool sharing between mode-3 and mode-4 Nokia, Nokia Shanghai Bell

### *6.2.3.5 Maximum time reduction between packet arrival at layer 1 and resource selection for transmission*

**R1-1721251 Summary of offline discussions on Latency reduction CATT**

Agreements:
- The minimum value of T2 can be reduced to support Layer 1 latency reduction.
- (Pre)configuration based selection of minimum value of T2 is supported.
- The minimum value of T2 is selected from a set of values.
  - The set of values includes at least 20ms, and a value lower than 20ms (FFS how many additional values).
  - FFS: whether the (pre)configuration is per PPPP, CBR range, per carrier, or if it intends to have a similar behaviour as a rel-14 UE, etc.

R1-1721141 WF on V2X further latency reduction Huawei, HiSilicon, ITRI
R1-1721160 WF on reducing the maximum time between packet arrival and resource selected for transmission LG Electronics, ZTE

R1-1719510 Discussion on latency reduction for eV2X Huawei, HiSilicon
R1-1719660 Consideration for maximum time reduction ZTE, Sanechips
R1-1719682 Discussion on Latency Reduction for V2X Phase 2 ITRI
R1-1719751 Discussion on latency reduction for V2X Lenovo, Motorola Mobility
Late submission
R1-1719871 Discussion on maximum time reduction between packet arrival and selected transmission resource LG Electronics
R1-1719981 Latency reduction for eV2X Guangdong OPPO Mobile Telecom
R1-1720037 Sidelink resource pool sharing for eNB-controlled and UE-autonomous V2V transmission modes Intel Corporation
R1-1720124 Reducing time-to-transmit for V2X Ericsson
R1-1720164 Discussion on latency reduction between packet arrival and resource selection CATT
R1-1720258 Discussion on latency smaller than 20 Samsung
R1-1720413 Reduction of time between packet arrival and transmisison Qualcomm Incorporated
R1-1720477 Discussion on latency reduction for V2X phase 2 Panasonic
R1-1720490 On Maximum time reduction between packet arrival at layer 1 and resource selection for transmission Nokia, Nokia Shanghai Bell
R1-1720780 Reducing the maximum time between packet arrival and selected resource for data transmission NTT DOCOMO, INC.

#### *6.2.3.6 Other*

R1-1719683 Discussion on Short TTI for V2X Phase 2 ITRI
R1-1719872 Evaluation results of PC5 operation with Short TTI LG Electronics
Late submission
R1-1720165 Discussion on shorten TTI in PC5 CATT
R1-1720166 Evaluations for shorten TTI in PC5 CATT

### 6.2.4 Enhancements for high capacity stationary wireless link and introduction of 1024 QAM for LTE - WID in RP-171738

**R1-1721236 Chairman's notes of AI 6.2.4 Enhancements for high capacity stationary wireless link and introduction of 1024 QAM for LTE Ad-Hoc chair (Ericsson)**
The document was presented by RAN1 Chair on behalf of Havish Koorapaty.
**Decision:** The document is endorsed, content incorporated below.

**R1-1719506 Draft LS on RRC parameters on HCS Huawei, HiSilicon**
Email approval on RRC parameters and the working assumption on number of RRC configurations of MCS table until Dec 7, 2018 (Huawei: Yubo)

#### *6.2.4.1 Remaining details on support for 1024QAM for DL channels*

Email discussion to produce a single proposal for TBS/MCS/CQI tables until February 8, 2018 (Qualcomm: Alberto)
Input to the email discussion should be provided by January 18, 2018

**R1-1719505 Remaining details on support of DL 1024QAM Huawei, HiSilicon**
**R1-1719731 Discussion on CQI and MCS table ZTE, Sanechips**
**R1-1719732 CQI signalling on 1024QAM ZTE, Sanechips**
**R1-1720038 On support of 1024QAM Intel Corporation**
**R1-1720414 Introduction of 1024QAM for PDSCH Qualcomm Incorporated**
**R1-1720491 Discussion on 1024QAM DL Nokia, Nokia Shanghai Bell**

Agreement: All code blocks in any newly defined TBS have the same size and zero filler bits

Agreement: The target peak data rate is 1 Gbps for a UE with 4 layers per component carrier and two component carriers.
- Note: This target is only for determining the maximum TBS size and does not have any implications on the definition of UE categories.

Agreement: The largest TBS size for a single layer and for two layers are chosen to be able to meet the target peak data rate.
- FFS: Whether the maximum code rate of 0.931 has to be revisited

Agreement: The largest TBS for a single layer is 125808 and for two layers is 251640.

Working Assumption: One RRC configuration of CQI/MCS table is used for 1024QAM for both codewords.

Agreement: Introduce two maximum $I_{\mathrm{TBS}}$ entries for 1024QAM, with an RRC parameter selecting between both.

Agreement: The same modulation (including constellation mapping) definition is used for initial transmission and retransmissions.

Agreement: Order CQI and MCS indices according to spectral efficiency.

#### 6.2.4.2 Other

*Including remaining issues (if any) for DM-RS overhead reduction*

R1-1720039 Remaining details of DM-RS overhead reduction Intel Corporation

### 6.2.5 Even further enhanced MTC for LTE - *WID in RP-171427*

**R1-1721237 Chairman's notes of AI 6.2.5 Even further Enhanced MTC for LTE Ad-Hoc chair (NTT DOCOMO)**
The document was presented by Kazuaki Takeda from NTT DOCOMO.
**Decision:** The document is endorsed, content incorporated below.

#### 6.2.5.1 Reduced system acquisition time

*Physical layer aspects of improved cell search and/or system information acquisition performance*

R1-1719349 Reduced system acquisition time for MTC Ericsson
R1-1720415 Reduced system acquisition time Qualcomm Incorporated

**R1-1721165 Summary of Reduced system acquisition time for MTC Ericsson**

Conclusion:
- Wait for RAN4 input on whether changes on physical layer are necessary for PBCH or not.

**R1-1721163 WF on Enhanced PHY Resynchronization for efeMTC Ericsson, Nokia, NSB, Sony, Sierra Wireless**

Agreement
- In evaluating improved cell search and/or system information acquisition performance for UEs with apriori information, the following are considered based on the agreed scenarios (B, C, and D)
    - Synchronization signal
        - Periodicity, duration, power boosting, bandwidth, and resource usage
    - UE complexity impact, UE memory, and DSP complexity
    - Combining of synchronization signals

R1-1719461 Cell search and system information acquisition improvements in eFeMTC Huawei, HiSilicon
R1-1719711 System acquisition time reduction for MTC ZTE, SaneChips
R1-1719873 System information acquisition time enhancement in MTC LG Electronics
R1-1720040 System acquisition time reduction for efeMTC Intel Corporation
R1-1720126 Reducing system acquisition time for efeMTC Nokia, Nokia Shanghai Bell
R1-1720157 Enhanced PSS Analysis Sierra Wireless, S.A.
R1-1720259 Discussion on enhanced synchronization signals and resynchronization signals Samsung
R1-1720465 MTC Synchronisation Signal evaluations for efeMTCSony

#### 6.2.5.2 Early data transmission

*Physical layer aspects of support for data transmission during the random access procedure*

**R1-1721168 Summary of Early Data Transmission for eMTC Huawei**
**R1-1721175 WF on Early data transmission Huawei, HiSilicon**

Agreements:
- Maximum TBS for early data transmission in Msg3 is 1000 bits for PRACH CE levels 0 and 1 and 936 bits for PRACH CE levels 2 and 3
- Ask RAN2 whether one reserved bit in MAC RAR can be used for EDT feature

Send reply LS (R1-1721242) –indicating RAN1 will select from Rel-13 PUSCH TBS values. Ask RAN2 how many TBS values are needed. Final LS is approved in R1-1721255.

R1-1719462 Early data transmission for eFeMTC Huawei, HiSilicon
R1-1720041 Early data transmission for efeMTC Intel Corporation

R1-1719350 Early data transmission for MTC Ericsson
R1-1719722 On early data transmission for eMTC ZTE, SaneChips
R1-1719874 Data transmission during random access procedure in MTC LG Electronics
R1-1720127 Data transmission during random access procedure Nokia, Nokia Shanghai Bell
R1-1720260 Discussion on Early data transmission for eMTC Samsung
R1-1720466 Early data transmission on Msg 3 Sony

#### 6.2.5.3 Downlink channel power efficiency

*Physical signal/channel that can be efficiently decoded or detected prior to decoding MPDCCH/PDSCH*

**R1-1721173 Summary of 6.2.5.3 Downlink channel power efficiency Qualcomm**

Agreement: At least in a UE's DRX cycle, one WUS informs UE whether to monitor the PO in a single DRX cycle

Working assumption

- At least in a UE's DRX cycle, how the UE knows the WUS time location, is:
  - A WUS has a time location which is configurable with respect to the associated PO(s) location(s)

Come back whether to confirm the working assumption on Thursday

**R1-1721155 WF on multi-level WUS configuration ZTE, Sanechips**
Also supported by Sony

**R1-1721164 WF on DL Channel Power Saving Signal in efeMTC Ericsson, Nokia, NSB, Sony, Sierra Wireless**

Agreements:

- There is at least one WUS parameter determined by at least SI for at least IDLE_MODE UE.
- The [maximum] WUS length in a cell is configurable
- Further study the benefits of potential diversity methods in WUS design
- Further study the benefits of potential inter-cell interference randomization methods in WUS design

Working assumption

- At least in a UE's DRX cycle, how the UE knows the WUS time location, is:
  - A WUS has a time location which is configurable with respect to the associated PO(s) location(s)

Agreement:
Send LS (R1-1721278) capturing WUS features to RAN2 – Magnus (Ericsson) – Final LS is approved in R1-1721282.

R1-1719728 Power consumption reduction for physical channels for MTC ZTE, SaneChips
R1-1720000 Considerations on the DL power consumption reduction for efeMTC Guangdong OPPO Mobile Telecom

R1-1719351 Downlink channel power efficiency for MTC Ericsson
R1-1719463 On 'wake-up signal' for eFeMTC Huawei, HiSilicon
R1-1719754 Remaining issues for wake-up signal for efeMTC vivo
R1-1719875 Discussion on wake up signal in MTC LG Electronics
R1-1720042 Power saving signal for efeMTC Intel Corporation
R1-1720128 Wake-up signal for efeMTC Nokia, Nokia Shanghai Bell
R1-1720156 Idle Mode Power Efficiency Reduction Sierra Wireless, S.A.
R1-1720261 DL power consumption reduction for eMTC Samsung
R1-1720417 Efficient monitoring of DL control channels Qualcomm Incorporated
R1-1720467 WUS evaluations for efeMTC Sony

**3GPP TSG RAN WG1 Meeting #92** **R1-1801301**
**Athens, Greece, 26th February – 2nd March 2018**

#### *6.2.5.4 Uplink HARQ-ACK feedback*

*Design of MPDCCH-based explicit HARQ-ACK feedback*

**R1-1721167** **Summary of Uplink HARQ-ACK feedback for MTC** **ZTE, Sanechips**

**R1-1721171** **WF on capabilities and configuration of UL HARQ-ACK feedback for MTC** **Ericsson, Intel, Qualcomm**
Continue offline discussion until Wedesday

**R1-1721158** **WF on Explicit HARQ-ACK feedback for multiple UEs** **ZTE, Sanechips, Intel, Ericsson, Qualcomm**
Supported by Sierra Wireless
**R1-1721114** **WF on Explicit HARQ-ACK feedback for multiple UEs** **Samsung, Huawei, HiSilicon, Nokia, Nokia Shanghai Bell**
Supported by Lenovo, NTT DOCOMO

**Conclusion**
Continue discussion until RAN1#92

**R1-1721157** **WF on Explicit HARQ-ACK feedback for a single UE** **ZTE, Sanechips, Ericsson, Intel, Qualcomm**

Agreements:

- For the explicit HARQ-ACK feedback signaling,
  - For CE mode A, unused state(s) in the "resource assignment" field in DCI format 6-0A is used to indicate explicit HARQ-ACK feedback for a single UE.
    - FFS: If other fields are set to predetermined values
  - For CE mode B, unused state(s) in the "MCS" field in DCI format 6-0B is used to indicate explicit HARQ-ACK feedback for a single UE.
    - FFS: If other fields are set to predetermined values

Working assumption

- One unused DCI state in each CE mode is used for indicating:
  - Early termination of MPDCCH monitoring and early termination of any ongoing PUSCH transmission
- Another unused DCI state in each CE mode is used for indicating:
  - Early termination of any ongoing PUSCH transmission (without early termination of MPDCCH monitoring)
- It can be left up to RAN2 whether the new feedback signaling should also be used for termination of MPDCCH monitoring not related to UL HARQ (re)transmissions (e.g. MPDCCH monitoring related to DL transmissions).

Send the LS in R1-1721185 to RAN2 – Alberto (Qualcomm)

R1-1721185 is approved in R1-1721254 with the following updates.
It is RAN1 understanding that the Case 1 does not need any change to RAN2 specification. For Case 2, RAN1 would like to ask RAN2 if that use case will be/is supported by RAN2 for early termination of MPDCCH monitoring. In case it is not and will not be, RAN1 will revisit the working assumption.
**2. Actions to RAN2:**
RAN1 respectfully requests RAN2 to provide feedback on the above working assumption, and whether Case 2 will be~~is~~/is supported by RAN2 for early termination of MPDCCH monitoring.

R1-1721159 WF on search space for explicit HARQ-ACK feedback ZTE, Sanechips

R1-1719712 Remaining issues on UL HARQ-ACK feedback for MTC ZTE, SaneChips
**R1-1720262** **Uplink HARQ-ACK feedback for eMTC** **Samsung**

R1-1719464 Further considerations on HARQ-ACK feedback for PUSCH in eFeMTC Huawei, HiSilicon
R1-1719352 Uplink HARQ-ACK feedback for MTC Ericsson
R1-1719739 Uplink HARQ-ACK feedback in efeMTC Lenovo, Motorola Mobility
Late submission
R1-1719876 Discussion on early termination of uplink repetitions for MTC LG Electronics
R1-1720043 HARQ-ACK feedback for efeMTC UL transmission Intel Corporation
R1-1720129 Uplink HARQ-ACK feedback in efeMTC Nokia, Nokia Shanghai Bell
R1-1720418 Uplink HARQ-ACK feedback Qualcomm Incorporated
R1-1720468 Early termination for PUSCH repetition Sony
R1-1720781 Views on UL HARQ-ACK feedback design NTT DOCOMO, INC.

#### 6.2.5.5 Increased PDSCH spectral efficiency

*Remaining details of CQI table for 64QAM support*

**R1-1721225 Summary of section 6.2.5.5 on PDSCH DL spectral efficiency for efeMTC Sony**
**R1-1721224 WF on Option B CQI table for efeMTC Sony, Ericsson, Sierra Wireless, Orange, Verizon**

Working assumption
- When a UE is configured both with 64QAM and *csi-NumRepetitionCE-r13* > 1,
  - A single CQI table covers the range from QPSK with 32 times repetition up to 64QAM without repetition

**R1-1721226 WF on usage of Option B CQI table for efeMTC Sony, Ericsson**

Working assumption
- eNodeB can optionally configure the UE to use the option B CQI table at least for 64QAM capable UE irrespective of whether 64QAM is configured or not

R1-1720469 CQI reporting for efeMTC supporting 64QAM Sony
R1-1719353 Increased PDSCH spectral efficiency for MTC Ericsson
R1-1719713 Remaining details on CQI table for 64QAM support for MTC ZTE, SaneChips
R1-1720109 CQI table for 64-QAM Huawei, HiSilicon
R1-1720130 Remaining issue on supporting DL 64QAM for efeMTC Nokia, Nokia Shanghai Bell
R1-1720419 CQI table for 64-QAM Qualcomm Incorporated

#### 6.2.5.6 Increased PUSCH spectral efficiency

*Remaining details on design of sub-PRB allocation*

**R1-1721130 Summary of Increased PUSCH spectral efficiency for MTC Sierra Wireless**

**R1-1721133 WF on Sub-PRB Subcarriers and Modulation Sierra Wireless, Sony, Ericsson, Qualcomm, Verizon, Orange, AT&T**

Working assumption
- For Sub-PRB transmissions the following shall be supported:
  - Option 1 includes only the following
    - 6 subcarriers with QPSK modulation
    - 3 subcarriers with QPSK modulation
    - 2 subcarriers with Pi/2 BPSK modulation
  - Option 2 includes only the following
    - 4 subcarriers with QPSK modulation
    - 2 subcarriers with Pi/2 BPSK modulation
  - Option 3 includes only the following
    - 6 subcarriers with QPSK modulation
    - 3 subcarriers with QPSK modulation
  - Select one of options 1, 2 and 3

**R1-1721267 WF on Sub-PRB Subcarriers and Modulation Option1 Sierra Wireless, Qualcomm, Sony, Ericsson**

Agreements:
Confirm the above WA and choose option 1 with the following changes:
- For Sub-PRB allocation, only the following are supported:
  - 6 subcarriers with SC-FDMA QPSK modulation, at least for CE Mode A
    - FFS: CE Mode B
  - 3 subcarriers with SC-FDMA QPSK modulation
  - 3 subcarriers with SC-FDMA Pi/2 BPSK modulation
    - The Pi/2 rotation is performed across SC-FDMA symbols
    - Use only 2 adjacent subcarriers out of the 3 allocated subcarriers with DFT-spread of length 2
      - FFS: which 2 subcarriers out of the 3 allocated subcarriers are used
      - Working assumption: The 2 used subcarriers shall be fixed per cell in specification

- FFS: semi-statically configured
- FFS: Frequency hopping case

Agreement:
Send LS (R1-1721277) capturing Sub-PRB features to RAN4 – Johan (Ericsson) – Final LS is approved in R1-1721283.

**R1-1721131** **WF on Sub-PRB Mode A Support** **Sierra Wireless, Nokia, NSB, Sony, at&t, Qualcomm**

Agreement
- Confirm WA: Sub-PRB shall be supported in CE Mode A.
  - RAN1 will prioritize optimization of Sub-PRB for CE Mode B over optimization of Sub-PRB for CE Mode A.

**R1-1721132** **WF on Sub-PRB Multiple RU Support** **Sierra Wireless, Samsung, Nokia, NSB, Intel, Sony, ZTE**

Agreement
- When the Sub-PRB feature is used,
  - Mapping one TB to 1 RU shall be supported at least for CE Mode A
  - Mapping one TB to a maximum of [FFS:2 or 4] resource units (RUs) shall be supported
  - Sub-PRB allocation shall support a maximum TBS of 1000 bits for CE Mode A and 936 bits for CE Mode B
    - Maximum TBS within a single RU is FFS

**R1-1721103** **WF on Sub-PRB Modulated Symbols Mapping** **Sony, Qualcomm, Samsung, Sierra Wireless**
**R1-1721116** **WF on repetition for Sub-PRB allocation** **Samsung**
**R1-1721115** **WF on piggyback UCI for Sub-PRB allocation** **Samsung**

Agreement
- UCI Piggybacking on PUSCH with sub-PRB allocation is not supported.
  - FFS: which UL channel is dropped

R1-1720155 Sub-PRB Design Analysis Sierra Wireless, S.A.
R1-1719465 On Sub-RB resource allocation for MTC PUSCH Huawei, HiSilicon

R1-1719354 Increased PUSCH spectral efficiency for MTC Ericsson
R1-1719714 Details on sub-PRB allocation design for MTC ZTE, SaneChips
R1-1720044 Design of sub-PRB PUSCH for efeMTC Intel Corporation
R1-1720131 Design of PUSCH Sub-PRB Allocation Nokia, Nokia Shanghai Bell
R1-1720263 Discussion on sub-PRB allocation for eFeMTC Samsung
R1-1720420 Increased PUSCH spectral efficiency Qualcomm Incorporated
R1-1720470 Sub-PRB transmissions for efeMTC Sony
R1-1720609 Remaining issues for sub-PRB allocation Sharp

#### *6.2.5.7 Other*

R1-1720421 Modulation enhancements for eMTC Qualcomm Incorporated
R1-1721286 On the interest of more flexible resource allocation for efeMTC Orange Spain (rev of R1-1720541)

### 6.2.6 Further enhancements of NB-IoT - *WID in RP-172063*.

**R1-1721238** **Chairman's notes of AI 6.2.6 Further enhancements of NB-IoT** **Ad-Hoc chair (NTT DOCOMO)**
The document was presented by Kazuaki Takeda from NTT DOCOMO.
**Decision:** The document is endorsed, content incorporated below.

Agreement
Send LS (R1-1721281) to RAN on power consumption reduction progress – Matthew (Huawei)
**Friday:**
**R1-1721281** **Draft LS on power consumption reduction progress** **Huawei**
**Decision:** The LS is endorsed in principle. Email approval (along with the list of agreements as attachment – to be prepared by Yutao, Ericsson) till 12/5 – Matthew (Huawei)

#### *6.2.6.1 Latency and power consumption reduction*

*Where solutions are specified, draft CRs to be provided to RAN#78*

##### 6.2.6.1.1 Power consumption reduction for paging and connected-mode DRX

**R1-1721169 Summary of power saving signal in NB-IoT**

### 6.2.6.1.1.1 Wake-up signal functions

**R1-1721180 Way Forward on function of power saving signal for IDLE mode paging Huawei, HiSilicon**

R1-1719355 Wake-up signal functions for NB-IoT Ericsson
R1-1719470 On functions of power saving signal Huawei, HiSilicon

R1-1719590 On synchronization aspects for NB-IoT Wake Up Signal MediaTek Inc.
R1-1719726 Wake up signal function for NB-IoT ZTE, SaneChips
R1-1719755 Remaining details on wake-up signal functions for feNB-IoT vivo
R1-1719877 Discussion on wake up signal function in NB-IoT LG Electronics
R1-1719997 On wake-up signal functionalities Guangdong OPPO Mobile Telecom
R1-1720045 The function scope of wake-up signal for feNB-IoT Intel Corporation
R1-1720132 Functions of wake-up signal Nokia, Nokia Shanghai Bell
R1-1720422 Wake-up signal functions Qualcomm Incorporated

### 6.2.6.1.1.2 Wake-up signal configurations and procedures

**R1-1721182 Way Forward on configuration of power saving signal for IDLE mode paging Huawei, HiSilicon**

Agreements:

- The [maximum] duration of WUS is configured per NB-IoT carrier
  - FFS: WUS actual transmission duration can be shorter than the configured maximum duration of WUS.
    - Alt 1: The actual WUS duration is transmitted aligning to the start of the configured maximum duration of WUS.
    - Alt 2: The actual WUS duration is transmitted aligning to the end of the configured maximum duration of WUS.
- There is a non-zero gap from the end of configured [maximum] WUS duration to the associated PO
  - FFS: exact value of non-zero-gap
  - FFS if it is fixed in spec or configurable explicitly, or known implicitly from other configured parameters

**R1-1720264 Discussion on Wake up signal configuraion Samsung**

**R1-1721183 Way Forward on enabling and disabling of power saving signal for IDLE mode paging Huawei, HiSilicon**

Agreement:

- The network can enable or disable use of the WUS
  - How UE acquires information on WUS enabling/disabling is up to RAN2 decision

**Friday**
**R1-1721348 WF on Wake up Signal Details CMCC, Huawei, HiSilicon**

Agreements:

- The [maximum] duration of WUS is configured in SIB per NB-IoT carrier as one value from a list. FFS if the list:
  - depends on Rmax and if so the number of lists specified
  - is a single list for all Rmax

Note: The Rmax refers to the one configured for paging

- The non-zero gap from the end of the configured [maximum] WUS duration to the associated PO is configurable
  - FFS the minimum duration
  - FFS the configuration is explicit or implicitly derived

R1-1720133 Wake-up signal configurations and procedures Nokia, Nokia Shanghai Bell
R1-1719356 Wake-up signal configurations and procedures for NB-IoT Ericsson
R1-1719471 On configurations and procedures of power saving signal Huawei, HiSilicon

R1-1719727 Discussion on wake up signal configuration for NB-IoT ZTE, SaneChips
R1-1719878 Discussion on wake up signal configurations and procedures in NB-IoT LG Electronics
R1-1719998 On wake-up signal transmission scheme Guangdong OPPO Mobile Telecom
R1-1720046 Configurations of wake-up signal for feNB-IoT Intel Corporation
R1-1720423 Wake-up signal configurations and procedures Qualcomm Incorporated
R1-1720565 Avoiding the impact on MME SoftBank Corp.

#### 6.2.6.1.1.3 Detailed design of wake-up signal

**R1-1721188 WF on Wake-up Signal Transmission Qualcomm**

Agreement:
- UE can assume all the REs for transmission of WUS in a given subframe use the same antenna port.
- The UE shall not assume the transmission of WUS in more than X consecutive subframes use same antenna port.
  - FFS: value of X

**R1-1721189 WF on Wake-up Signal Design Qualcomm, Huawei, HiSilicon**
Supported by LGE

Agreement:
- WUS sequence is based on ZC-sequence
  - When designing WUS sequence, negative impact on legacy NSSS detection should be avoided.

Working assumption
- WUS sequence is a sequence mapping within one subframe as a basic unit and repeated/extended for multiple subframes to support larger coverage.
  - Prioritizie to minimize impact on UE synchronization performance.
- FFS: detailed design on time-varying of the WUS signal

Agreement
Send LS (R1-1721193) capturing the above agreements related to RAN2/4 specifications. - Xiaolei (Hisilicon)
Final LS is approved in R1-1721241.

R1-1719879 Wake up signal design in NB-IoT LG Electronics
R1-1720424 Wake-up signal design Qualcomm Incorporated

R1-1719357 Detailed design of wake-up signal for NB-IoT Ericsson
R1-1719472 On detailed design and evaluations of power saving signal Huawei, HiSilicon
R1-1719591 On design aspects for NB-IoT Wake Up Signal MediaTek Inc.
R1-1719725 Details design of wake up signal for NB-IoT ZTE, SaneChips
R1-1719999 On wake-up signal design Guangdong OPPO Mobile Telecom
R1-1720134 Considerations for design of wake-up signal Nokia, Nokia Shanghai Bell
R1-1720622 Discussion on WUS Sequence Design Samsung

#### 6.2.6.1.2 Data transmission during the random access procedure

**R1-1721170 Summary of Early Data Transmission for NB-IoT Huawei**
**R1-1721184 Way Forward on early data transmission in RACH for NB-IoT Huawei, HiSilicon**

Agreements:
- The number of MCS/TBS/RU states that can be used for EDT will be chosen from
  - Limited MCS/TBS/RU states
    - Alt. 0: 5 unused MCS/TBS/RU states and 0 bit in SIB
    - Alt. 1: As many as supported by using 1 spare bit from RAR and 0 bit in SIB
    - Alt. 2: As many as supported by using 2 spare bits from RAR and 0 bit in SIB
    - Alt. 3: As many as supported by using 2 bits in SIB and 0 spare bit in RAR
    - Alt. 4: As many as supported by using maximum TBS value in SIB and 0 spare bit in RAR
    - Alt. 5: 1 spare bit in RAR used for new/modified UL grant and 0 bit in SIB
- From RAN1's point of view,
  - Uplink subcarrier spacing field, subcarrier indication field, scheduling delay field and Msg3 repetition number field in RAR UL Grant for uplink EDT in Msg3 do not need to be changed according to current RAN2 agreements.

- The above applies to above Alts. 1-4

Agreement:
Send reply LS (R1-1721227) – Matthew (Huawei) indicating RAN1 will select from Rel-13 NB PUSCH TBS values. For NB-IoT, it is feasible to support at least 5 MCS/TBS/RU size combinations.
- Ask RAN2 how many TBS values are needed.

Note: R1-1721227 is in principle agreed.
Update for eMTC will be taken into account in R1-1721242
Final LS is approved in R1-1721255.

**R1-1721153** **WF on support of multi-tone Msg3 for early data transmission in NB-IoT** **ZTE, Sanechips**
Supported by Nokia NSB, Ericsson

R1-1719475 Early data transmission in RACH for NB-IoT Huawei, HiSilicon
R1-1719358 Data transmission during random access procedure for NB-IoT Ericsson
R1-1719592 On NB-IoT EDT indication via PRACH MediaTek Inc.
R1-1719723 On early data transmission for NB-IoT ZTE, SaneChips
R1-1719880 Data transmission during random access procedure in NB-IoT LG Electronics
R1-1720047 Early data transmission for feNB-IoT Intel Corporation
R1-1720135 Data transmission during random access procedure Nokia, Nokia Shanghai Bell
R1-1720265 Discussion on early data transmission for NB-IoT Samsung
R1-1720425 Physical layer aspects of data transmission during random access procedure Qualcomm Incorporated

#### *6.2.6.2 Reduced system acquisition time*

*Where solutions are specified, draft CRs to be provided to RAN#78*

R1-1720416 Physical layer aspects of early data transmission Qualcomm Incorporated

**R1-1721174** **Summary of 6.2.6.2 Reduced system acquisition time** **Qualcomm**

##### 6.2.6.2.1 Cell search

R1-1720136 Reducing cell search time for feNB-IoT Nokia, Nokia Shanghai Bell
R1-1719881 Cell search latency enhancement LG Electronics

R1-1719359 Cell search time reduction for NB-IoT Ericsson
R1-1719483 Reduction of NB-IoT synchronization time Huawei, HiSilicon, Neul
R1-1719715 Cell search enhancement for NB-IoT ZTE, SaneChips
R1-1720426 Enhancements to cell search Qualcomm Incorporated

##### 6.2.6.2.2 System Information

Agreement: SIB1-NB transmissions in non-anchor carrier are not further considered in Rel-15 for NB-IoT FDD.

**R1-1721186** **WF on Interpretation and application of subframes for additional SIB1-NB in FDD** **LG Electronics, Ericsson**

Agreement:
- Update the agreement from the RAN1#90bis meeting as follows
  - When additional SIB1-NBs are transmitted, the subframe(s) carrying additional SIB1-NB(s) can be declared as invalid downlink subframe by downlinkBitmap
    - Rel.15 UEs interpret invalid downlink subframes whose indices are corresponding to additional SIB1-NBs transmissions but not carrying additional SIB1-NB as valid downlink subframes only when the UE attempts to decode DCI format N0/N1 scrambled by C-RNTI in UE-specific search space or receive NPDSCH scheduled by DCI format N1 scrambled by C-RNTI in UE-specific search space.

**R1-1721187** **WF on Design of additional SIB1-NB in FDD** **LG Electronics, ZTE**

Agreement:
- For the repetition number 4 and 8, the total number of subframes for additional SIB1-NB transmission will be downselected between the following alternatives

- (Alt.1) no additional SIB1-NB transmission
- (Alt.2) half as many as that of the legacy SIB1-NB transmissions
- (Alt.3) the same as that of the legacy SIB1-NB transmissions

Agreement:

- For the repetition number 16, the total number of subframes for additional SIB1-NB transmission will be downselected between the following alternatives
  - (Alt.1) the same as that of the legacy SIB1-NB transmissions
  - (Alt.2) depends on code rate (e.g., TBS, #CRS/NRS ports, operation mode) of SIB1-NB
    - When the code rate of SIB1-NB is equal to or larger than X, additional SIB1-NB subframes are transmitted on every other subframe #3
    - Otherwise, additional SIB1-NB subframes are transmitted on every 4th subframe #3
    - If the total number of subframes for additional SIB1-NB transmission is less than that of the legacy SIB1-NB transmissions, the starting radio frame index of additional SIB1-NB transmission depends on Cell ID and the number of SIB1-NB repetition scheduled by MIB-NB

Note that this is not relevan to the case of 4 and 8 repetitions and this does not imply any selection among Alt. 1, 2, 3 in the above agreement

Agreement:

- The sequence of coded bits-to-subframe allocation of additional SIB1-NB transmission will be downselected between the following alternatives
  - (Alt.1) The additional SIB1-NB uses the same coded bits-to-subframes mapping as the legacy SIB1-NB
  - (Alt.2) reuse coded bits generated for existing SIB1-NB transmission while coded bits-to-subframe allocation is circularly shifted as much as 8 radio frames compared to the existing SIB1-NB transmission
  - (Alt.3) the coded bits that are mapped to subframe #3 used for additional SIB1-NB transmissions are generated by continuing reading from the virtual circular buffer

Agreement

- Scrambling sequence will be generated and applied to subframes for additional SIB1-NB following one of the alternatives below
  - (Alt.1) The additional SIB1-NB reuses the bit-level scrambling mechanism of legacy SIB1-NB, and uses the same symbol-level scrambling mechanism as NPBCH by replacing the initialization equation with $c_{init} = n_{RNTI} \cdot 2^{15} + (N_{ID}^{Ncell} + 1)((n_f mod\ 59) + 1)$
  - (Alt.2) The scrambling sequence generator for additional SIB1-NB transmission is initialized with $c_{init} = (n_{RNTI} - 1) \cdot 2^{15} + (N_{ID}^{Ncell} + 1)((n_f mod\ 61) + 1)$
  - (Alt.3) The scrambling sequence used for the new SIB1-NB subframe is generated based on advancing the Gold sequence generators used for generating the scrambling sequence for SIB1-NB in subframe #4 in the same frame by 2560 shifts
  - (Alt.4) Keep the same scrambling sequence as the legacy one if the additional SIB1-NB does not use the same coded bits-to-subframes mapping as the legacy SIB1-NB

**R1-1721210** **Reduction of NB-IoT system information acquisition time** **Huawei, HiSilicon, Neul** (Revision of R1-1719484)

R1-1719360 System information acquisition time reduction for NB-IoT Ericsson
R1-1719716 System information acquisition improvement for NB-IoT ZTE, SaneChips
R1-1719882 MIB-NB skipping and System information acquisition latency enhancement LG Electronics
R1-1720048 System information acquisition time reduction for feNB-IoT Intel Corporation
R1-1720137 Reducing system acquisition time for feNB-IoT Nokia, Nokia Shanghai Bell
R1-1720427 Enhancements to system information acquisiton Qualcomm Incorporated

#### 6.2.6.3 TDD

R1-1720431 Coexistence with NR Qualcomm Incorporated

##### 6.2.6.3.1 Downlink aspects

**R1-1721144** **Summary of NB-IoT TDD Downlink aspects** **Ericsson**
**R1-1721156** **WF on SIB1-NB transmission for TDD NB-IoT** **ZTE, Sanechips, Qualcomm, Intel, Ericsson**

Agreements:

- It is not supported that SIB1-NB is transmitted on both anchor and non-anchor carrier.
- At least for 16 repetioins for SIB1-NB transmission,
    - Whether SIB1-NB transmitted on anchor carrier or non-anchor one is indicated by MIB-NB.
    - When SIB1-NB is transmitted on non-anchor carrier, at least subframe #0 is used.
    - FFS: SIB1-NB can be transmitted on anchor carrier other than subframe #0
- FFS: The frequency position of non-anchor carrier is indicated by [0, 1, or 2] bits in MIB-NB for in-band scenario.
    - FFS: case for gurad-band and stand-alone scenarios
- FFS: Cases for 4 and 8 repetitions

**R1-1721213 Way Forward on SIB1-NB transmission in TDD NB-IoT Huawei, HiSilcom**

Agreement:
- The radio frame is determined by table-1

Table-1: Starting radio frame for SIB1-NB transmission on anchor carrier.

| Number of NPDSC repetitions | $N_{\mathrm{ID}}^{\mathrm{Ncell}}$ | Starting radio frame number for NB-SIB1 repetitions ($n_f$ *mod 256*) |
|---|---|---|
| 4 | $N_{\mathrm{ID}}^{\mathrm{Ncell}}$ mod 4 = 0 | 1 |
| | $N_{\mathrm{ID}}^{\mathrm{Ncell}}$ mod 4 = 1 | 17 |
| | $N_{\mathrm{ID}}^{\mathrm{Ncell}}$ mod 4 = 2 | 33 |
| | $N_{\mathrm{ID}}^{\mathrm{Ncell}}$ mod 4 = 3 | 49 |
| 8 | $N_{\mathrm{ID}}^{\mathrm{Ncell}}$ mod 2 = 0 | 1 |
| | $N_{\mathrm{ID}}^{\mathrm{Ncell}}$ mod 2 = 1 | 17 |
| [16] | [All PCIDs] | [1] |

R1-1721207 WF on DL interference randomization Qualcomm Incorporated
R1-1721212 Way Forward on NRS in TDD NB-IoT Huawei, HiSilicon
R1-1721220 WF on Other issues on SIB1-NB in TDD LG Electronics
R1-1719361 DL aspects of TDD for NB-IoT Ericsson
R1-1719477 On downlink TDD NB-IoT Huawei, HiSilicon
R1-1719717 Remaining details on downlink aspects to support TDD NB-IoT ZTE, SaneChips
R1-1719740 Views on TDD downlink aspect Lenovo, Motorola Mobility
Late submission
R1-1719883 Discussion on DL aspects in TDD NB-IoT LG Electronics
R1-1720049 Design of DL aspects for TDD support in feNB-IoT Intel Corporation
R1-1720138 Downlink aspects of TDD support in NB-IoT Nokia, Nokia Shanghai Bell
R1-1720266 Discussion on DL common channel/signal for TDD NB-IoT Samsung
R1-1720428 Downlink aspects of TDD Qualcomm Incorporated

#### 6.2.6.3.2 Uplink aspects

**R1-1721145 Summary of NB-IoT TDD UL aspects Ericsson**

**R1-1721194 WF on NPUSCH for NB-IoT TDD Ericsson, ZTE**

Agreement: For NPUSCH in NB-IoT TDD:
- For the NPUSCH transmissions with 15 kHz subcarrier spacing, both Multi-tone (3, 6, 12 subcarriers with RU lengths 4ms, 2ms, 1ms) and single tone (with RU length 8ms) transmissions are supported as in FDD NB-IoT for all the supported TDD configurations in TDD NB-IoT other than the TDD configuration #3 and [#6]. The number of supported subcarriers, and RU lengths for TDD configuration #3 and [#6] is FSS (The number of subcarriers and RU lengths as defined in FDD NB-IoT are not precluded).

**R1-1721230 WF on single tone NPUSCH for NB-IoT TDD Nokia, Nokia Shanghai Bell, LG Electronics**
**R1-1721152 WF on NPRACH TDD NB-IoT Design ZTE, Sanechips, LG Electronics**

R1-1721275 WF on NPRACH preamble format for short coverage LG Electronics, Qualcomm, IITH, CEWiT, Reliance Jio
R1-1721231 WF on NPRACH Design for NB-IoT TDD Nokia, Nokia Shanghai Bell
R1-1721192 WF on NPRACH for NB-IoT TDD Ericsson

R1-1719362 UL aspects of TDD for NB-IoT Ericsson
R1-1719478 On uplink TDD NB-IoT Huawei, HiSilicon
R1-1719718 Remaining details on uplink aspects to support TDD NB-IoT ZTE, SaneChips
R1-1719884 Discussion on UL aspects in TDD NB-IoT LG Electronics
R1-1720050 Design of UL aspects for TDD support in feNB-IoT Intel Corporation
R1-1720139 Uplink aspects of TDD support in NB-IoT Nokia, Nokia Shanghai Bell
R1-1720267 Discussion on UL channel for TDD NB-IoT Samsung
R1-1720429 Uplink aspects of TDD Qualcomm Incorporated
R1-1720610 Discussion on NB-IoT TDD-UL Sharp
R1-1720838 NB-IoT TDD UL PRACH for UL/DL configuration #2 IITH

#### 6.2.6.3.3 Common aspects

*E.g. Relaxations of MCL, latency, capacity targets; UL:DL configurations, special subframe, HARQ, etc.*

**R1-1721146 Summary of NB-IoT TDD Common aspects Ericsson**
**R1-1721222 WF on subframe configurations in TDD LG Electronics**

R1-1721176 WF on MCL or Latency relaxation of NB-IoT TDD Ericsson
R1-1721221 WF on Cross-carrier scheduling in TDD LG Electronics, Samsung
R1-1721214 WF on HARQ in TDD NB-IoT Huawei, HiSilicon

R1-1719363 DL/UL common aspects of TDD for NB-IoT Ericsson
R1-1719476 Common aspects for TDD NB-IoT Huawei, HiSilicon
R1-1719719 Remaining details on common aspects to support TDD NB-IoT ZTE, SaneChips
R1-1719741 Common Aspects of NB-IoT TDD Operation Lenovo, Motorola Mobility Late submission
R1-1719885 Discussion on common aspects in TDD NB-IoT LG Electronics
R1-1720051 Design of common aspects for TDD support in feNB-IoT Intel Corporation
R1-1720140 Common Aspects of NB-IoT TDD Operation Nokia, Nokia Shanghai Bell
R1-1720268 Discussion on 2 HARQ processes and cross carrier scheduling Samsung
R1-1720430 General considerations on TDD design Qualcomm Incorporated

#### *6.2.6.4 Other*

*Contributions on other Part A objectives can be submitted here.*

R1-1719364 Physical layer scheduling request for NB-IoT Ericsson
R1-1719365 Semi-persistent scheduling for NB-IoT Ericsson
R1-1719366 Narrowband measurement accuracy improvements for NB-IoTEricsson
R1-1719367 NPRACH false alarm reduction for NB-IoT Ericsson
R1-1719368 NPRACH range enhancements for NB-IoT Ericsson
R1-1719369 Small-cell support for NB-IoT Ericsson
R1-1719473 Use cases and design for physical layer scheduling request Huawei, HiSilicon
R1-1719474 On support of semi-persistent scheduling Huawei, HiSilicon
R1-1719479 Remaining details of NB-IoT measurements improvement Huawei, HiSilicon, Neul
R1-1719480 NPRACH enhancement for cell radius extension Huawei, HiSilicon
R1-1719481 On NPRACH false alarm reduction due to inter-cell interference Huawei, HiSilicon
R1-1719482 On the support of NB-IoT small cell Huawei, HiSilicon
R1-1719720 Considerations on physical layer aspects on SPS in NB-IoT ZTE, SaneChips
R1-1719721 Details on physical layer SR for NB-IoT ZTE, SaneChips
R1-1719729 NPRACH range enhancement ZTE, SaneChips
R1-1719730 NPRACH reliability enhancement for NB-IoT ZTE, SaneChips
R1-1719886 Discussion on Scheduling request in NB-IoTLG Electronics
R1-1719887 RRM measurement enhancement in NB-IoT LG Electronics
R1-1719888 Preamble structure for NPRACH enhancement LG Electronics
R1-1719889 Resource configuration for NPRACH enhancement LG Electronics

R1-1720141 Measurement accuracy improvement in NB-IoT Nokia, Nokia Shanghai Bell
R1-1720142 Support for semi-persistent scheduling in NB-IoT Nokia, Nokia Shanghai Bell
R1-1720143 Design of physical layer scheduling request Nokia, Nokia Shanghai Bell
R1-1720144 Small cell support in NB-IoT Nokia, Nokia Shanghai Bell
R1-1720145 NPRACH cell range enhancement in NB-IoT Nokia, Nokia Shanghai Bell
R1-1720146 NPRACH reliability enhancement in NB-IoT Nokia, Nokia Shanghai Bell
R1-1720269 Discussion on scheduling request for NB-IoT Samsung
R1-1720432 Modulation enhancements for NB-IoT Qualcomm Incorporated
R1-1720433 Physical layer scheduling request Qualcomm Incorporated
R1-1720434 Support of small cells Qualcomm Incorporated
R1-1720435 Improvement of PHY measurements Qualcomm Incorporated
R1-1720436 NPRACH support for large cell access Qualcomm Incorporated
R1-1720437 NPRACH Reliability Enhancement Qualcomm Incorporated
R1-1720438 Phyiscal layer impact of enhancements to RRC Connection Release Qualcomm Incorporated
R1-1720782 Views on SPS activation and deactivation mechanism NTT DOCOMO, INC.

### 6.2.7 Enhanced Support for Aerial Vehicles - *SID in RP-171050*

**R1-1721239 Chairman's notes of AI 6.2.7 Enhanced Support for Aerial Vehicles Ad-Hoc chair (Ericsson)**
The document was presented by RAN1 Chair on behalf of Havish Koorapaty.
**Decision:** The document is endorsed, content incorporated below.

**R1-1721305 Draft LS on RAN1 Conclusions and TPs approved in RAN1#91 Ericsson**
Approved in R1-1721310 with updates to the references and updated list of attached reference documents

**R1-1721307 Text Proposal for Conclusion Section of TR36.777 Ericsson, NTT DOCOMO, INC., Huawei, HiSilicon**
Agreed in R1-1721309 with removal of change marks

#### *6.2.7.1 Baseline Evaluation Results*

R1-1719469 Baseline evaluation for drones Huawei, HiSilicon
R1-1720052 Baseline evaluation results for UMa AV Intel Corporation
R1-1720514 Baseline Evaluation Results for Aerial Vehicles Nokia, Nokia Shanghai Bell
R1-1720569 Baseline evaluation results for LTE aerials ZTE,Sanechips
R1-1720783 On baseline evaluation results NTT DOCOMO, INC.
R1-1720857 Baseline evaluation results for RMa-AV Ericsson

**R1-1721109 Text proposal for baseline evaluation results Ericsson**
**R1-1721304 Text proposal for baseline evaluation results Ericsson**

#### *6.2.7.2 DL Interference Mitigation*

*On DL interference mitigation schemes and performance evaluations*
**R1-1719467 DL enhancements for drones Huawei, HiSilicon**
**R1-1720053 On Interference Mitigation schemes for DL Intel Corporation**

R1-1720472 DL interference mitigation for aerial vehicle Sony
R1-1720515 Downlink Interference Mitigation for Aerial Vehicles Nokia, Nokia Shanghai Bell
R1-1720859 On DL interference mitigation Ericsson
R1-1720912 DL interference mitigation for aerial vehicles Sequans Communications

**R1-1721110 Text Proposal for downlink interference mitigation Ericsson**
Agreed with the following modifications:

- Replace all occurences of "receive filtering" with "receive beamforming"
- "Downlink interference mitigation can be achieved in this case by using receive filtering at aerial UEs (for example, using a MMSE-IRC receiver)" in Section 7.2.3 as "Downlink interference mitigation can be achieved in this case by using receive beamforming at aerial UEs ~~(for example, using a MMSE-IRC receiver)~~"
- Remove note referring to MMSE IRC receiver in Table E.3-1.
- Modify "Since the use of directional antenna is up to the implementation at aerial UEs, enhancements are not needed" in Section 7.2.2 as "Enhancements are not needed if the use of directional antenna is left to implementation at aerial UEs"
- Update tables to separate the results for terrestrial and aerial UEs
- Include evaluation results with coordinated data and control transmission in Section 7.2.X in the TR along with the following description of the coordinated data and control transmission method used in the evaluations

- "In this solution, multiple cells belonging to the same or different sites are coordinated. Data, common signal/channels (e.g., synchronization signal and PBCH), and control channels can be jointly transmitted to the UEs. The coordinated cells could construct a larger cell for aerial UEs, and terrestrial UEs are served by physical cells without coordination, simultaneously. A dedicated DL resource within the PDSCH region of the coordinated cells can be reserved for these coordinated transmissions. "
  "There would be specification impact from this technique. The details would depend on the potential solutions for further study. It could include signaling for indicating the dedicated DL resource, procedure updates for cell (re-)selection and acquisition to apply to the coordinated cell, and cell ID for the coordinated cell. The capability and complexity of UE's measurement may be increased due to more cells measured. RAN4 requirement on the synchronization of time-frequency among coordinated transmissions will be needed. Enhancements on X2 signaling including capacity and latency may be needed to coordinate multiple cells from same or different sites."

- Include statements at the top of section 7.2 and 7.3
  - Caution should be exercised when drawing conclusions from results that were obtained under one or more of the following conditions
    - At load points that were significantly higher than the load points in the baseline assumptions
    - With an assumption that PDCCH SINR in the system is the same as the PDSCH SINR even though the reuse factors for PDCCH region in the system are lower than the PDSCH region especially if fewer UEs are scheduled per subframe.

**R1-1721296 Text Proposal for downlink interference mitigation Ericsson**
Agreed in R1-1721308 with a modification to change "Table 6-4" to "Table 6-7" at the end of the first paragraph of Annex E

**R1-1721119 WF on network coordination Huawei, HiSilicon, Sequans**

**R1-1721284 Text Proposal for DL enhancements for drones Huawei, HiSilicon**

#### 6.2.7.3 UL Interference Mitigation

*On UL interference mitigation schemes and performance evaluations*

R1-1720570 Potential enhancements on UL interference mitigation based on power control ZTE,Sanechips
R1-1720784 Views on issues and solutions in uplink NTT DOCOMO, INC.

R1-1719890 Interference Mitigation for Aerial Vehicles LG Electronics
R1-1720054 On Interference Mitigation schemes for UL Intel Corporation
R1-1720110 UL enhancements for drones Huawei, HiSilicon
**R1-1720516 Uplink Interference Mitigation for Aerial Vehicles Nokia, Nokia Shanghai Bell**
R1-1720860 On UL Interference Mitigation Ericsson

**R1-1721111 Text proposal for uplink interference mitigation Ericsson**
**R1-1721191 Text proposal for uplink problem NTT DOCOMO**

Agreement:
The TPs in R1-1721111 is agreed with the following additions.

- Incorporate the TP in R1-1721191
- Add the following to the TR at the end of Section 7.3. "Modification to the power control mechanism to take into account interference from neighboring cells can be considered. However, no evaluations were performed to assess the impact of such modifications."
- Add the following to the TR at the end of Section 7.3.3. "Uplink beamforming can potentially be used to mitigate interference although specific uplink beamforming techniques were not evaluated."

**R1-1721204 Text proposal for uplink interference mitigation Ericsson**

Agreement:
Modify the TP agreed in R1-1721204 as follows.

- Modify "Uplink beamforming can potentially be used to mitigate interference although specific uplink beamforming techniques were not evaluated." at the end of Section 7.3.3 to "Uplink beamforming can potentially be used to mitigate interference although the throughput of specific uplink beamforming techniques were not evaluated [REF]."

**R1-1721287 Text proposal for uplink interference mitigation Ericsson** (Revision of R1-1721204)

#### 6.2.7.4 Interference Detection

*Update RSRP statistics for interference detection*

R1-1720517 RSRP Statistics Results for Aerial Vehicles Nokia, Nokia Shanghai Bell

R1-1719466 Interference detection for drones Huawei, HiSilicon
R1-1720473 CRS collision for aerial vehicle Sony
R1-1720785 Updated RSRP statistics for interference detection NTT DOCOMO, INC.
R1-1720861 On RSRP statistics for aerial vehicles Ericsson

**R1-1721117 TP for capturing RSRP statistics in TR36.777 Ericsson**
Agreed with an update to the spreadsheet to include results from Huawei

**R1-1721243 TP for capturing RSRP statistics in TR36.777 Ericsson** (Revision of R1-1721117)

#### 6.2.7.5 Evaluation Results on Reliability

*Present evaluation results of latency for reliability taking into account RAN1 agreements from RAN1#90*

R1-1720571 Evaluation on reliability for LTE aerials ZTE,Sanechips

R1-1719487 Reliability evaluations for drones Huawei, HiSilicon
R1-1720862 Reflection on performance of LTE networks serving C2 aerial traffic Ericsson

**R1-1721202 Text proposal for reliability evaluation results Ericsson**
Agreed with the following modifications:

- Include the results from R1-1719487 in Annex G
- Include the following statements at the top of Annex G
  - Caution should be exercised when drawing conclusions from results that were obtained under one or more of the following conditions
    - At load points that were significantly higher than the load points in the baseline assumptions
    - With an assumption that PDCCH SINR in the system is the same as the PDSCH SINR even though the reuse factors for PDCCH region in the system are lower than the PDSCH region especially if fewer UEs are scheduled per subframe.

**R1-1721295 Text proposal for reliability evaluation results Ericsson** (rev of R1-1721202)

#### 6.2.7.6 Field measurement results

*On RAN1-related field measurement results to be captured to TR*

**R1-1720439 Field measurement results Qualcomm Incorporated**
R1-1720858 Further field measurement results for LTE connected aerials Ericsson

R1-1720111 Field measurements for drones Huawei, HiSilicon
R1-1721057 Field Measurement Results for Aerial Vehicles Nokia, Nokia Shanghai Bell (Revision of R1-1720518)
R1-1720572 Field measurement results for LTE aerials ZTE,Sanechips, Tongji university
R1-1720786 Field measurement results of aerial UE NTT DOCOMO, INC.

**R1-1721203 Text proposal for field measurement results Ericsson**

Agreement:

- Capture the following aspects related to field measurements in the TR in addition to those already captured in agreed TPs
  - RS-SINR (refer to section 5.1.23 of TS 36.214)
  - PDCCH BLER
  - UL data rate
  - Distribution of UL Tx Power

**R1-1721276 Text proposal for field measurement results Ericsson, Nokia, Nokia Shanghai Bell** (Revision of R1-1721203)

#### 6.2.7.7 Other

R1-1719468 Positioning for drones Huawei, HiSilicon
**R1-1720841 Text Proposal for DL enhancements for drones Huawei, HiSilicon**
**R1-1720842 Text Proposal for UL enhancements for drones Huawei, HiSilicon**
R1-1720843 Text Proposal for interference detection for drones Huawei, HiSilicon

### 6.2.8 Ultra Reliable Low Latency Communication for LTE - WID in RP-171489

**R1-1721240 Chairman's notes of AI 6.2.8 Ultra Reliable Low Latency Communication for LTE Ad-Hoc chair (Ericsson)**
The document was presented by RAN1 Chair on behalf of Havish Koorapaty.
**Decision:** The document is endorsed, content incorporated below.

**R1-1721043 Summary of email discussion [90b-LTE-25] on the link level evaluation assumptions for LTE URLLC Huawei**

#### 6.2.8.1 Remaining details of evaluations scenarios

**R1-1720537 Summary of email discussion [90b-LTE-24] on system level evaluation assumption and methodology for URLLC for LTE Ericsson**

Email approval on link level evaluations until January 18, 2018 (Huawei: Yubo)

Email approval on system level evaluations for the Indoor scenario until January 18, 2018 (Qualcomm: Kianoush)

Email approval on SINR calibration for the system level evaluations for the macro scenario until January 18, 2018. First input into the discussion should be provided by January 11, 2018 (Ericsson: Marten)

Email discussion on candidate techniques until January 18, 2018 (Nokia: Klaus)

Agreement: The UE noise figure adopted for system level simulations is 9 dB.
- Note: This does not have any implications on the demodulation requirements that will be set.

**Working assumption:**
For system level simulations, the system bandwidth on the UL is equally split between the number of UEs simulated. Each UE in each TTI/sTTI will be allocated 10 RBs (assuming 10 UE per sector and 100 RB system bandwidth) in a round-robin fashion.
- Note: This does not impact the RB allocations assumed for the link level simulations

Agreement: Electrical down-tilt (no mechanical tilt, reference is the horizontal plane) for system level evaluation is 8 degrees

Proposal:
In addition to the 5th percentile defined in ITU, it was also proposed by one company to look at the 10th percentile in the SINR for the associated link level simulations.

Agreement: Use the Indoor Hotspot-eMBB, Configuration A, and changing the carrier frequency to 2 GHz, evaluation configuration from “Guidelines for evaluation of radio interface technologies for IMT-2020 [IMT-2020.EVAL]” for deriving minimum SINR for link level evaluations

Agreement: The antenna configuration per TRxP for the eNB in the Hotspot scenario is (M,N,P,Mg,Ng) = (4,4,2,1,1), (dH,dV) = (0.5, 0.5)λ (Nomenclature is defined in “Guidelines for evaluation of radio interface technologies for IMT-2020 [IMT-2020.EVAL]”)

Agreement: The number of TXRUs per TRxP for eNB in the Hotspot scenario is 2, mapping as (Mp,Np,P,Mg,Ng) = (4,4,2,1,1)

Agreement: The full channel model in “ITU IMT2020 Eval“/38.901 is adopted for system level simulations, where the magnitude squared of the channel coefficients over time and frequency are averaged (to reflect long-term SINR) to determine the average path gain for each link

Agreement: Adopt the ITU assumption on 100% low-loss building types in the channel model for the macro deployment scenario

Agreement: Adopt a geographical distance based wrapping method for system level simulations for the macro deployment scenario

Proposal:
Adopt the indoor hotspot-eMBB, configuration A, with the following additions

| | |
|---|---|
| UL PUSCH power control parameters | α=1.0, P0, PUSCH=-106dBm (suggested value for UL SINR CDF distribution derivation and calibration)<br>Other values are not precluded. If other values are used, it shall be reported. |
| UL PUCCH power control parameters | P0, subframe-PUCCH = -116<br>P0, slot-SPUCCH = -113<br>P0, subslot-SPUCCH = -108<br>(suggested value for UL SINR CDF distribution derivation and calibration) |
| Bandwidth allocation | PUSCH: Equal bandwidth<br>PUCCH: 1 RB (To get a full load SINR for PUCCH, the same mutual interferers as for PUSCH are assumed but on a bandwidth of 1 RB) |
| Handover margin (dB) | 0 (i.e., the strongest cell is selected) |
| Simulation bandwidth | 20 MHz |
| UT attachment | Based on RSRP (formula (8.1-1) in TR36.873) from port 0 |
| Beam forming | Ideal |
| Wrapping around method | No wrapping around |
| TRxP number per site | 3 |
| Mechanical tilt | 110° in GCS |
| Electrical tilt | 90° in LCS |

Agreement: Use 700MHz as baseline for the carrier frequency in link level evaluations for the macro deployment scenario

Agreement: Use 2GHz as the baseline carrier frequency in link level evaluations for the indoor hotspot deployment scenario

Agreement: Use TDL-C and TDL-E as the baseline channel model for link level evaluations in TR 38.901 for the macro deployment scenario

Proposal: Use TDL as the baseline channel model for link level evaluations in TR 38.901 for the indoor hotspot deployment scenario

Proposal: Use {30ns, 300ns} as the scaling parameters of delay spreads in link level evaluations.

Proposal: Use {3km/h, 15km/h} as the UE speeds in link level evaluations.

Proposal: Company reports the resource allocation bandwidth used in the link level evaluation, which is up to 20MHz.

Proposal: At least use the 5%-ile SINR in system level evaluation as the SINR range in link level evaluations. FFS other SINR values.

Agreement: Use the following in link level simulations.

| | |
|---|---|
| Packet size | 32 bytes at Layer 2 PDU as a baseline. FFS an optional larger packet size. |

Agreeable Proposal: Use the following in link level simulations

| | |
|---|---|
| BS antenna configuration | 2 Tx/Rx ports<br>Other values (i.e., up to 256) are not precluded |
| UE antenna configuration | 2 Tx/Rx ports<br>Other values (i.e., up to 8) are not precluded |

Agreeable Proposal: Use the following in link level simulations

| | |
|---|---|
| Latency bound | 1ms, 10ms<br>Other values are not precluded<br>Companies report delay assumptions according to Table 1 in R1-166485 |

Agreeable Proposal: Use the following in link level simulations

| | |
|---|---|
| Sub-carrier spacing | 15kHz |
| TTI length | Subslot (2 or 3 symbols per TTI), slot (7 symbols per TTI, 0.5ms), 1ms TTI (14 symbols per TTI, 1ms)<br>Other values are not precluded |

Proposal: Use the following in link level simulations

| | |
|---|---|
| Modulation and coding rate | QPSK, 16QAM, 64QAM<br>1/12, 1/6, 1/3<br>Other MCS not precluded<br>Comparison should be made for the same spectrum efficiency |

Agreeable Proposal: Use 1 UE (other UE numbers are not precluded) in link level evaluations.

Proposal: Use practical channel estimation in link level evaluations.

Agreeable Proposal: Use TM2 in link level evaluations of PDSCH.

Agreeable Proposal: Use 2 CRS ports for TM2 as baseline in link level evaluations of PDSCH.

Proposal: The link adaption is disabled for link level evaluation of PDSCH.

Proposal: Use MMSE as the receiver type in link level evaluation.

R1-1719502 Evaluation assumption and preliminary results for LTE URLLC Huawei, HiSilicon
R1-1719667 Discussion on SLS results and LLS assumption for LTE URLLC ZTE, Sanechips
R1-1720055 Preliminary System Level Evaluations for LTE URLLC Intel Corporation
R1-1720270 Discussion on remaining details of evaluation scenarios for LTE URLLC Samsung
R1-1720440 Remaining details of evaluations scenarios Qualcomm Incorporated
**R1-1721062 Evaluation scenarios for URLLC Ericsson** (Revision of R1-1720533)

#### 6.2.8.2 *Candidate techniques enabling URLLC for LTE*

R1-1719503 Design impact on reliability for LTE URLLC Huawei, HiSilicon
R1-1719583 ACK/NACK feedback reliability for LTE URLLC MediaTek Inc.
R1-1719668 Candidate techniques for LTE URLLC ZTE, Sanechips
R1-1719891 Potential techniques for URLLC in LTE LG Electronics
R1-1719951 On candidate techniques enabling URLLC for LTE Nokia, Nokia Shanghai Bell
R1-1720056 On design aspects enabling URLLC for LTE Intel Corporation
R1-1720271 Discussion on possible techniques for LTE URLLC Samsung
R1-1720441 Candidate techniques enabling URLLC for LTE Qualcomm Incorporated
R1-1720534 URLLC design for LTE Ericsson
R1-1720920 Candidate techniques enabling URLLC for LTE Motorola Mobility, Lenovo

#### 6.2.8.3 *Other*

R1-1719504 LTE URLLC and eMBB multiplexing Huawei, HiSilicon
R1-1720442 Design impact on low latency for LTE UL URLLC Huawei, HiSilicon
R1-1720443 Discussion on new scenarios and requirements for URLLC service Huawei, HiSilicon
**R1-1721289 Discussion on new scenarios and requirements for URLLC service Huawei, HiSilicon, Vodafone** (Revision of R1-1720443)
R1-1720535 Evaluation of latency in LTE Ericsson
**R1-1721063 Indoor evaluation scenario for URLLC Ericsson** (Revision of R1-1720536)

# 7 NR - WID in RP-172115

*Refer to RP-172108 for work plan.*

R1-1721046 TS38.201 v1.1.0 NR; Physical layer general description NTT DOCOMO
R1-1721047 TS38.202 v1.1.0 NR; Physical layer services provided by the physical layer Qualcomm
R1-1721048 TS38.211 v1.2.0 NR; Physical channels and modulation Ericsson
R1-1721049 TS38.212 v1.2.0 NR; Multiplexing and channel coding Huawei
R1-1721050 TS38.213 v1.2.0 NR; Physical layer procedures for control Samsung

R1-1721051 TS38.214 v1.2.0 NR; Physical layer procedures for data Nokia
R1-1721052 TS38.215 v1.2.0 NR; Physical layer measurements Intel Corporation (UK) Ltd

R1-1720787 Updated work plan for Rel-15 NR WI NTT DOCOMO, INC.
R1-1720788 Proposals on UE feature list NTT DOCOMO, INC.

**Thursday morning**
**R1-1721581 List of RRC parameters Ericsson**
**Decision:** The list of RRC parameters is endorsed.
**R1-1721582 [Draft LS] LS on RRC parameters for NR Ericsson**
**Discussion:** Huawei → LS states "final" excel sheet – are we certain that no further updates are going to be made before the end of week?
RAN1 chair: no topics having RRC impact are expected to come up
**Decision:** The document is endorsed and final LS is approved in R1-1721616.

**Friday**
**R1-1721698 Draft RAN1 input to 38.300 Nokia**
**Decision:** The document is noted, for email discussion/approval till 12/6 – Karri (Nokia).

**R1-1721707 NR UE feature list NTT DOCOMO, AT&T**
**Decision:** The document is noted.
**R1-1721496 NR Features and Capabilities Qualcomm Incorporated**
**Decision:** The document is noted.
Conclusion: NR UE features list will be revisited at the next meeting.

**NR specs**
NR spec editors to update specs by 12/8, to be commented on and be endorsed by 12/12 by email.
MCC: Regarding the editors' notes in the specs, WG has the best judgment for deciding whether or not the notes should be left in the spec. Note that a spec can come under change control at 80% complete, and nothing prevents leaving some of those notes in. Nevertheless, as it is generally agreed that all editors notes should come out before bringing a spec under change control, let's try to achieve this in the versions going to plenary for approval.

## *7.1 Initial access and mobility*

R1-1720964 Open issues on RRC parameters for Initial access and mobility Ericsson

### 7.1.1 Remaining Details on Synchronization signal

**R1-1721466 Summary of 7.1.1 Remaining Details on Synchronization signal Ericsson** (R1-1721381)
**Decision:** The document is noted.

Agreements:
- Confirming the working assumption on SS/PBCH bandwidth of X=20 PRB
- Confirming the working assumption of having the same DMRS density in the SSS symbols as already agreed for PBCH symbols
- Confirming the working assumption that the EPRE offset between SSS RE and PBCH DM-RS RE is 0 dB

Agreements:
- The SS block resource elements are:
  - Subcarriers 0 to 239 in all four symbols
- Subcarriers 48 to 55 and 183 to 191(according to the numbering in the definition of SS/PBCH block in 38.211) in symbols allocated to PSS and SSS are transmitted with zero power
- The REs not used for SS/PBCH block of any data PRB that partially or fully contain SS block resource elements are transmitted with zero power and other physical channels are rate matched around such PRBs
- Note: The SS/PBCH block PRB grid offset is applied to the whole SS/PBCH block and the above subcarrier numbering is before the shift

Agreements:
- Confirm the working assumption of:
  - NR supports the scheme of 'Group-Bitmap (8 bits) + Bitmap in Group (8 bits)' for actual transmitted SS/PBCH block position indication in RMSI for above 6GHz frequency range

Proposal on indication of multiple SS/PBCH blocks in frequency domain for rate matching purposes:

- The location of additional of multiple SS/PBCH blocks in frequency domain for rate matching purposes ~~is~~ can be signaled
- Signaling is UE specific RRC per SS/PBCH frequency location including
  - full L bitmap
  - absolute frequency
  - periodicity with offset=0
    - Note: periodicity can be the same or different the cell-defining SS block

Agreement: In Rel-15, no support of dedicated signalling of the location of additional multiple SS/PBCH blocks in frequency domain of a cell for rate matching purposes

Agreement: The periodicity of the SS/PBCH blocks for the serving cell is included in the RMSI of the serving cell

Agreement: For measurement, SSB frequency location (except for cell defining SS/PBCH blocks of the serving cell which supports standalone access) may or may not be located on the sync raster

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**Wednesday**
**R1-1721550 Summary of 7.1.1 Remaining Details on Synchronization signal Ericsson**
**Decision:** The document is noted.

Conclusion:

- gNB indication of transmitted SS block that partially or fully overlap with TDD GP or UL is considered an error in configuration and no UE behavior needs to be specified

Agreement: There is no indication of SS/PBCH block repetition in Rel-15.

Conclusion:

- No further action is needed in RAN1 on the issue raised in R1-1719756 regarding SS burst set composition for 30kHz SCS
- If there are LTE-NR coexistence bands that overlap with frequency bands that do not support LTE-NR coexistence, companies should raise this issue in RAN4.

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**Thursday**
**R1-1721588 Summary of 7.1.1 Remaining Details on Synchronization signal Ericsson**
**Decision:** The document is noted.

Agreements:

- gNB indication of the transmitted cell-defining SS blocks that partially or fully overlap with reserved resources is considered an error in configuration for the given transmitted cell-defining SS blocks
  - No UE behavior needs to be specified

Agreements:

- The time/frequency synchronization for a serving cell without a SS/PBCH block is based on the PCell or the pScell in the given cell group for the serving cell in Rel-15

Agreements:

- Support QCL between SSB and other broadcast signaling w.r.t. all parameters, i.e., spatial QCL, average channel gain, Doppler shift, Doppler spread, average channel delay, and channel delay spread.
- The broadcast signaling corresponds to the DMRS of NR-PDCCH transmitted in the CORESET for RMSI and the DMRS of NR-PDSCH for RMSI/broadcast OSI, the DMRS of NR-PDCCH transmitting Paging DCIs and the DMRS of NR-PDSCH transmitting Paging Messages, the DMRS of PDCCH and the DMRS of PDSCH conveying Msg2, the DMRS of PDCCH conveying Msg3 grant, the DMRS of PDCCH and if applicable the DMRS of PDSCH conveying Msg4.

**Friday**
**R1-1721601 Correcting NR OFDM Symbol Generation Intel**
**Decision:** The document is noted for email discussion/approval till 12/6 – Daewon (Intel)

R1-1719340 Remaining details of Synchronization Signal Design ZTE, Sanechips
R1-1719370 Remaining issues on NR SS Blocks Huawei, HiSilicon
R1-1719556 SS block transmissions in wideband carrier MediaTek Inc.
R1-1719620 Remaining details on Synchronization signal AT&T
R1-1719756 Discussion on Remaining Details on Synchronization signal vivo
R1-1719892 Remaining Details on Synchronization signal LG Electronics
R1-1719960 Multiple SS block transmissions in a wideband carrier ASUSTEK COMPUTER (SHANGHAI)
R1-1720057 Remaining details of SS/PBCH block Intel Corporation
R1-1720167 Remaining details on SS block transmission CATT
R1-1720563 On remaining details of SS/PBCH block ITL
R1-1720601 Optimization on the SSB Bitmap in Group indication in RMSI Xiaomi Technology
R1-1720621 On Remaining Details of Synchronization Signal Designs InterDigital, Inc.
R1-1720647 Remaining details on synchronization signal design Qualcomm Incorporated
R1-1720789 Remaining details on Synchronization signal NTT DOCOMO, INC.
R1-1720853 Remaining details on SS block transmissions OPPO
R1-1720935 Remaining details on synchronization signal Ericsson
R1-1721361 Remaining details related to SS blocks Nokia, Nokia Shanghai Bell
R1-1721434 Remaining details on sync signals Samsung
R1-1721497 OFDM baseband signal generation for initial access Samsung
R1-1721531 Summary on PRB Grid Offset Indication Samsung

### 7.1.2 Remaining Details on Broadcast signal/channel

#### *7.1.2.1 Remaining details on NR-PBCH*

**R1-1721467 Summary of 7.1.2.1 Remaining details on NR-PBCH Ericsson** (R1-1721382)
**Decision:** The document is noted.

Agreement**:**
- Confirm working assumption on NR-PBCH payload size of 56 bits (including CRC).

Agreements**:**
- Confirm working assumption that a 4-bit PRB grid offset is carried by NR-PBCH
- Discuss further how to specify the shift
- FFS: Use of reserved values (e.g., to indicate presence of RMSI, etc.) and possible joint coding
- 8 bits for RMSI configuration in PBCH
    - FFS whether or not to support joint coding (e.g., PRB grid offset+RMSI config., etc.)
    - If no RMSI is associated with SSB (if supported), FFS whether or not to reuse for other purposes
- Confirm the working assumption for PBCH 1st scrambling initialization, clarify that C_init = N^cell_ID
- The 2nd PBCH scrambling is a Gold sequence initialized by cell ID.
    - C_init = N^cell_ID

**R1-1721439 WF on frequency reference and raster definitions Qualcomm**
**Decision:** The document is noted. Should be discussed in the next offline session.

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**Wednesday**
**R1-1721551 Summary of 7.1.2.1 Remaining details on NR-PBCH Ericsson**
**Decision:** The document is noted.

Agreement**:**
- Define the 3 MSB of SS/PBCH block index (or 3 reserved bits in FR1), 1 bit half radio frame index, 4 LSB of SFN from the PBCH payload as physical layer generated signals. The rest of the PBCH payload will be provided by upper layers with 80 msec TTI.

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**Thursday**
**R1-1721589 Summary of 7.1.2.1 Remaining details on NR-PBCH Ericsson**
**Decision:** The document is noted.

**Friday**

**R1-1721684 WF on RMSI presence flag Qualcomm**

- RMSI presence is indicated by reserved value(s) in SSB-subcarrier-offset
- If no RMSI is present, RMSI-PDCCH-Config is used to signal the next sync raster that UE should search for cell-defining SSB

**Decision:** The document is noted, for email discussion/approval till 12/6 – Abjorn (Ericsson)

R1-1719341 Remaining details of NR-PBCH Design ZTE, Sanechips
R1-1719371 Remaining issues in PBCH Huawei, HiSilicon
R1-1719557 Remaining details on PBCH MediaTek Inc.
R1-1719621 Remaining details on NR-PBCH AT&T
R1-1719757 Remaining aspects on NR-PBCH contents and payload vivo
R1-1719893 Remaining Details on PBCH design and contents LG Electronics
R1-1720002 Remaining Details of NR PBCH contents Guangdong OPPO Mobile Telecom
R1-1720058 Remaining details of NR PBCH Intel Corporation
R1-1720168 Remaining details on NR-PBCH CATT
R1-1720273 Remaining details on NR-PBCH Samsung
R1-1720581 Details on PRB grid offset indication CMCC
R1-1720648 Remaining details on NR-PBCH Qualcomm Incorporated
R1-1720790 Remaining details on NR-PBCH NTT DOCOMO, INC.
R1-1720880 Remaining details on NR-PBCH Nokia, Nokia Shanghai Bell
R1-1720936 Remaining details on NR-PBCH Ericsson

#### *7.1.2.2 Remaining details on Remaining minimum system information*

**R1-1721473 Summary of Offline Discussion on RMSI CATT** (R1-1720169)
**Decision:** The document is noted.

**Agreements:**

- NR supports RMSI CORESET configuration such that the total bandwidth covering that of the SS/PBCH blocks and the initial active DL BWP containing RMSI CORESET when they occur in different time instances is confined within minimum carrier bandwidth
- NR supports RMSI CORESET configuration such that the total bandwidth covering that of the SS/PBCH blocks and the initial active DL BWP containing RMSI CORESET when they occur in the same time instance or different time instances is confined within UE minimum bandwidth
- Note: the above doesn't prohibit the case when the SS/PBCH blocks are fully contained within the initial active DL BWP containing RMSI CORESET

Agreements:

- RMSI CORESET configuration supports one-to-one association between one SS/PBCH block and one RMSI in wideband operation
  - RAN1 makes decision in this week on whether to support RMSI CORESET configuration with many-to-one association between multiple SS/PBCH blocks and one RMSI in wideband operation
    - No RRC impact is expected

Agreements:

- For RMSI CORESET configuration, support the following combinations of different numerologies for SS/PBCH blocks and the RMSI CORESETs in different time instances:
  - {SSB SCS, RMSI SCS} = {{15, 30}, {30, 15}, {120, 60}, {240, 60}, {240, 120}} kHz

Agreements:

- Confirm the following working assumption
  - (Working assumption) PBCH contents, except the SSB index, should be the same for all SS/PBCH blocks within an SSB burst set for the same centre frequency
- All of the RMSI CORESETs associated the SS/PBCH blocks within an SSB burst set should have the same settings (including time duration) except time-domain location related properties
  - FFS details of the time-domain related properties

Agreements:

- RMSI TTI is 160ms from RAN1 perspective
  - Send an LS to RAN2 to inform the above decision – Ren Da (CATT), R1-1721485

**Wednesday**

**R1-1721490** **[draft] LS on RMSI TTI CATT** (R1-1721485)

**Decision:** The document is endorsed and final LS is approved in R1-1721557.

**R1-1721554** **Summary of Offline Discussion on RMSI CATT**

**Decision:** The document is noted.

Agreement**:** RMSI PDCCH REG bundle size is 6 PRBs

**Thursday**

**R1-1721605** **Summary of Offline Discussion on RMSI CATT**

**Decision:** The document is noted.

Agreements**:**

- When the SS/PBCH blocks and corresponding RMSI CORESETs occur in different time instances,
    - The UE assumes that the RMSI CORESET monitoring window corresponding to an SS/PBCH block in the radio frame satisifies the condition mod(SFN,2)=0
    - Note: RMSI scheduling periodicity is up to gNB implementation

Proposals:

- When the SS/PBCH blocks and corresponding RMSI CORESETs occur in different time instances,
    - Configuration of the RMSI CORESET monitoring window
        - The monitoring window is associated with one SS/PBCH block in a burst set
            - monitoring window position
                - The starting slot index for the monitoring window for SSB $i$ is X + floor($i$/N), where slot is defined by RMSI numerology
                - Here, X is # of slots corresponding to {0, 2, 5} msec if SSB is mapped on the 1st half frame, or {0, 5, 7} msec if SSB is mapped on the 2nd half frame
                - N is the number of **search space sets** per slot, {1, 2}
            - monitoring window duration 2 slots
    - FFS The candidate symbol position(s) for RMSI **search space sets** start from the first OFDM symbol of the monitoring window.
    - FFS The RMSI CORESET(s) associated with a SS/PBCH could be transmitted in any of the candidate positions for the RMSI CORESETs within the CORESET window.

Agreements:

- When the SS/PBCH blocks and corresponding RMSI CORESETs occur in different time instances,
    - Configuration of the RMSI CORESET monitoring window
        - The monitoring window is associated with one SS/PBCH block in a burst set
            - monitoring window position, FFS details
            - monitoring window duration 2 slots
    - FFS The candidate symbol position(s)

**R1-1721627** **Summary of Offline Discussion on Frequency Offset Indication** **Samsung**

**Decision:** The document is noted.

**Friday**

Agreements:

- NR does not support RMSI CORESET configuration with many-to-one association between multiple SS/PBCH blocks and one RMSI in wideband operation.
- In Rel-15, NR does not support RMSI search space sets configuration where the SS/PBCH blocks and corresponding RMSI search space sets occur in the same time instances if the carrier frequency is lower than 6GHz.

Working assumption:

- NR supports RMSI search space sets configuration for the following combinations with the same numerologies of the SS/PBCH block, the RMSI search space sets, and PDSCH, where the SS/PBCH blocks, and corresponding RMSI search space sets and PDSCH occur in the same time instances.

- {SSB SCS, RMSI PDSCH SCS} = {120, 120} kHz
- Two symbols for PDCCH and two symbols for PDSCH.
- Note: This is pattern 3 in the RMSI search space sets configuration table.

- NR supports RMSI search space sets configuration for the following combinations with different numerologies of the SS/PBCH block and the RMSI PDSCH, when the SS/PBCH blocks and corresponding RMSI PDSCH occur in the same time instances.
  - {SSB SCS, RMSI PDSCH SCS} = {120, 60}, {240, 120} kHz
  - Note: This is pattern 2 in the RMSI search space sets configuration table.

Working assumption:

- For pattern 3, the RMSI CORESET monitoring window associated with the SS/PBCH block SSB_*i* in a burst set, is defined as follows:
  - The starting symbol index R for the RMSI CORESET monitoring window is the same as the starting symbol of the SSB;
  - The duration of the monitoring window is 1;
- For pattern 2, the RMSI CORESET monitoring window associated with the SS/PBCH block SSB_*i* in a burst set, is defined as follows:
  - The starting symbol index R for the RMSI CORESET monitoring window occurs earlier than the SSB symbols in the same slot or one slot before;
  - The duration of the monitoring window is 1;

<table>
<tr><th>Signals</th><th>SCS</th><th>corres. T/F res</th><th colspan="28">OFDM Symbols</th></tr>
<tr><td>SSB</td><td>120kHz</td><td>20PRBs x 4OS</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td></tr>
<tr><td>RMSI</td><td>60kHz</td><td>48PRBs x 1OS</td><td colspan="2">0</td><td colspan="2">1</td><td colspan="2">2</td><td colspan="2">3</td><td colspan="2">4</td><td colspan="2">5</td><td colspan="2">6</td><td colspan="2">7</td><td colspan="2">8</td><td colspan="2">9</td><td colspan="2">10</td><td colspan="2">11</td><td colspan="2">12</td><td colspan="2">13</td></tr>
<tr><td>RMSI</td><td>120kHz</td><td>24PRBs x 2OS</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td></tr>
</table>

<table>
<tr><th>Signals</th><th>SCS</th><th>corres. T/F res</th><th colspan="56">OFDM Symbols</th></tr>
<tr><td>SSB</td><td>240kHz</td><td>20 PRBs x 4OS</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>0</td><td>1</td><td>2</td><td>3</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td></tr>
<tr><td>RMSI CORESET</td><td>120kHz</td><td>48 PRBs x 1OS</td><td colspan="2">0</td><td colspan="2">1</td><td colspan="2">2</td><td colspan="2">3</td><td colspan="2">4</td><td colspan="2">5</td><td colspan="2">6</td><td colspan="2">7</td><td colspan="2">8</td><td colspan="2">9</td><td colspan="2">10</td><td colspan="2">11</td><td colspan="2">12</td><td colspan="2">13</td><td colspan="2">0</td><td colspan="2">1</td><td colspan="2">2</td><td colspan="2">3</td><td colspan="2">4</td><td colspan="2">5</td><td colspan="2">6</td><td colspan="2">7</td><td colspan="2">8</td><td colspan="2">9</td><td colspan="2">10</td><td colspan="2">11</td><td colspan="2">12</td><td colspan="2">13</td></tr>
<tr><td rowspan="2">RMSI CORESET</td><td rowspan="2">60kHz</td><td rowspan="2">96 PRBs x 1OS</td><td colspan="4">0</td><td colspan="4">1</td><td colspan="4" rowspan="2">2</td><td colspan="4" rowspan="2">3</td><td colspan="4" rowspan="2">4</td><td colspan="4" rowspan="2">5</td><td colspan="4">6</td><td colspan="4">7</td><td colspan="4" rowspan="2">8</td><td colspan="4" rowspan="2">9</td><td colspan="4" rowspan="2">10</td><td colspan="4" rowspan="2">11</td><td colspan="4" rowspan="2">12</td><td colspan="4" rowspan="2">13</td></tr>
<tr><td colspan="4">0</td><td colspan="4">1</td><td colspan="4">6</td><td colspan="4">7</td></tr>
</table>

Agreement:

- NR supports RMSI PDCCH aggregation levels of 4 CCEs, 8 CCEs, 16 CCEs.

Working assumption:

- The frequency offset in PRB level between RMSI CORESET and SS/PBCH block in the table is define as the frequency difference from the lowest PRB of RMSI to the lowest PRB of SS/PBCH block
  - Note: The offset in subcarrier level between the edge of SS/PBCH block PRB and RMSI CORESET PRB grid is indicated by PRB grid offset (SSB-subcarrier-offset) in PBCH (5 bits for below-6GHz and 4 bits for above-6GHz)
- For each of the following combination of SS/PBCH SCS and RMSI CORESET SCS, the multiplexing patterns between SS/PBCH block and RMSI (CORESET and PDSCH), RMSI CORESET BW, RMSI CORESET duration, and PRB-level offset are jointly coded in a table using 4 bits of RMSI configuration in NR-PBCH.

  - {SSB SCS, RMSI SCS} = {15, 15}, {15, 30}, {30, 15}, {30, 30}, {120, 60}, {120,120},{240, 60}, {240, 120}} kHz
- Definition for the multiplexing pattern tables SS/PBCH SCS and RMSI CORESET SCS
  - "Pattern 1" refers to the multiplexing pattern that SS/PBCH block and RMSI CORESET occur in different time instances, and SS/PBCH block TX BW and the initial active DL BWP containing RMSI CORESET overlap
  - "Pattern 2" refers to the multiplexing pattern that SS/PBCH block and RMSI CORESET occur in different time instances, and SS/PBCH block TX BW and the initial active DL BWP containing RMSI CORESET do not overlap
  - "Pattern 3" refers to the multiplexing pattern that SS/PBCH block and RMSI CORESET occur in the same time instance, and SS/PBCH block TX BW and the initial active DL BWP containing RMSI CORESET do not overlap
  - Note: The following figure is for information purpose only.

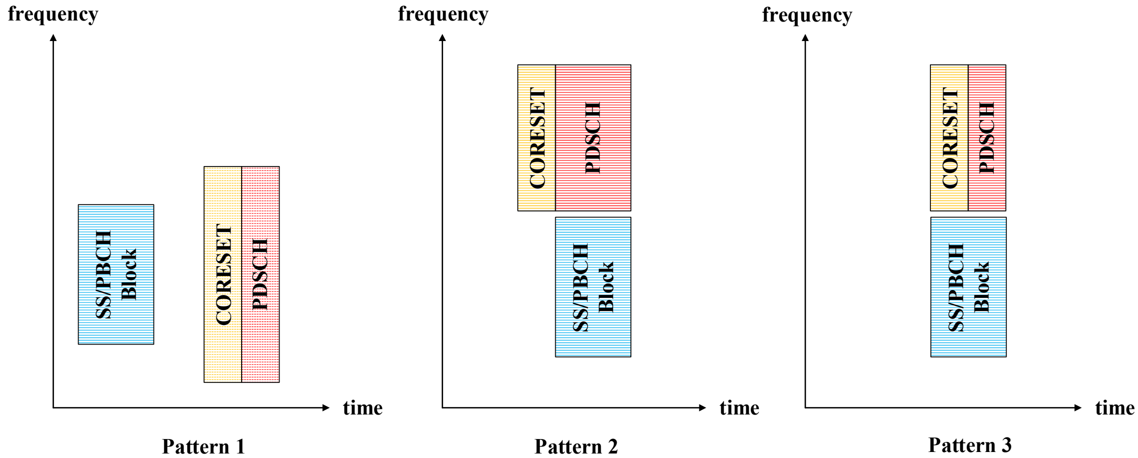


**Table 1 {SSB SCS, RMSI SCS} = {15, 15}kHz**

| Configuration Index | Multiplexing Pattern | CORESET BW in PRB | Number of Symbols for CORESET | Frequency Offset in PRB of RMSI CORESET numerology |
|---|---|---|---|---|
| 1 | Pattern 1 | 24 | 2 | 0 |
| 2 | Pattern 1 | 24 | 2 | 2 |
| 3 | Pattern 1 | 24 | 2 | 4 |
| 4 | Pattern 1 | 24 | 3 | 0 |
| 5 | Pattern 1 | 24 | 3 | 2 |
| 6 | Pattern 1 | 24 | 3 | 4 |
| 7 | Pattern 1 | 48 | 1 | 12 |
| 8 | Pattern 1 | 48 | 1 | 16 |
| 9 | Pattern 1 | 48 | 2 | 12 |
| 10 | Pattern 1 | 48 | 2 | 16 |
| 11 | Pattern 1 | 48 | 3 | 12 |
| 12 | Pattern 1 | 48 | 3 | 16 |
| 13 | Pattern 1 | 96 | 1 | 38 |
| 14 | Pattern 1 | 96 | 2 | 38 |
| 15 | Pattern 1 | 96 | 3 | 38 |
| 16 | Reserved | | | |

**Table 2 {SSB SCS, RMSI SCS} = {15, 30}kHz**

| Configuration Index | Multiplexing Pattern | CORESET BW in PRB | Number of Symbols for CORESET | Frequency Offset in PRB of RMSI CORESET numerology |
|---|---|---|---|---|
| 1 | Pattern 1 | 24 | 2 | 6 |
| 2 | Pattern 1 | 24 | 2 | 7 |
| 3 | Pattern 1 | 24 | 2 | 8 |
| 4 | Pattern 1 | 24 | 3 | 6 |
| 5 | Pattern 1 | 24 | 3 | 7 |
| 6 | Pattern 1 | 24 | 3 | 8 |
| 7 | Pattern 1 | 48 | 1 | 18 |
| 8 | Pattern 1 | 48 | 1 | 20 |
| 9 | Pattern 1 | 48 | 2 | 18 |
| 10 | Pattern 1 | 48 | 2 | 20 |
| 11 | Pattern 1 | 48 | 3 | 18 |
| 12 | Pattern 1 | 48 | 3 | 20 |
| 13 | Reserved | | | |
| 14 | Reserved | | | |
| 15 | Reserved | | | |
| 16 | Reserved | | | |

**Table 3 {SSB SCS, RMSI SCS} = {30, 15}kHz**

| Configuration Index | Multiplexing Pattern | CORESET BW in PRB | Number of Symbols for CORESET | Frequency Offset in PRB of RMSI CORESET numerology |
|---|---|---|---|---|
| 1 | Pattern 1 | 48 | 1 | 2 |
| 2 | Pattern 1 | 48 | 1 | 6 |
| 3 | Pattern 1 | 48 | 2 | 2 |
| 4 | Pattern 1 | 48 | 2 | 6 |
| 5 | Pattern 1 | 48 | 3 | 2 |
| 6 | Pattern 1 | 48 | 3 | 6 |
| 7 | Pattern 1 | 96 | 1 | 28 |
| 8 | Pattern 1 | 96 | 2 | 28 |
| 9 | Pattern 1 | 96 | 3 | 28 |
| 10 | Reserved | | | |
| 11 | Reserved | | | |
| 12 | Reserved | | | |
| 13 | Reserved | | | |
| 14 | Reserved | | | |
| 15 | Reserved | | | |
| 16 | Reserved | | | |

**Table 4 {SSB SCS, RMSI SCS} = {30, 30}kHz**

| Configuration Index | Multiplexing Pattern | CORESET BW in PRB | Number of Symbols for CORESET | Frequency Offset in PRB of RMSI CORESET numerology |
|---|---|---|---|---|
| 1 | Pattern 1 | 24 | 2 | 0 |
| 2 | Pattern 1 | 24 | 2 | 1 |
| 3 | Pattern 1 | 24 | 2 | 2 |
| 4 | Pattern 1 | 24 | 2 | 3 |
| 5 | Pattern 1 | 24 | 2 | 4 |
| 6 | Pattern 1 | 24 | 3 | 0 |
| 7 | Pattern 1 | 24 | 3 | 1 |
| 8 | Pattern 1 | 24 | 3 | 2 |
| 9 | Pattern 1 | 24 | 3 | 3 |
| 10 | Pattern 1 | 24 | 3 | 4 |
| 11 | Pattern 1 | 48 | 1 | 12 |
| 12 | Pattern 1 | 48 | 1 | 14 |
| 13 | Pattern 1 | 48 | 1 | 16 |
| 14 | Pattern 1 | 48 | 2 | 12 |
| 15 | Pattern 1 | 48 | 2 | 14 |
| 16 | Pattern 1 | 48 | 2 | 16 |

**Table 5 {SSB SCS, RMSI SCS} = {120, 60}kHz**

| Configuration Index | Multiplexing Pattern | CORESET BW in PRB | Number of Symbols for CORESET | Frequency Offset in PRB of RMSI CORESET numerology |
|---|---|---|---|---|
| 1 | Pattern 1 | 48 | 1 | 0 |
| 2 | Pattern 1 | 48 | 1 | 8 |
| 3 | Pattern 1 | 48 | 2 | 0 |
| 4 | Pattern 1 | 48 | 2 | 8 |
| 5 | Pattern 1 | 48 | 3 | 0 |
| 6 | Pattern 1 | 48 | 3 | 8 |
| 7 | Pattern 1 | 96 | 1 | 28 |
| 8 | Pattern 1 | 96 | 2 | 28 |
| 9 | Pattern 2 | 48 | 1 | [-42] if PRG grid not aligned and [-41] if PRG grid aligned |
| 10 | Pattern 2 | 48 | 1 | [49] |
| 11 | Pattern 2 | 48 | [2] | [-42] if PRG grid not aligned and [-41] if PRG grid aligned |
| 12 | Pattern 2 | 48 | [2] | [49] |
| 13 | Pattern 2 | [96] | 1 | [-42] if PRG grid not aligned and [-41] if PRG grid aligned |
| 14 | Pattern 2 | [96] | 1 | [97] |
| 15 | Pattern 2 | [96] | [2] | [-42] if PRG grid not aligned and [-41] if PRG grid aligned |
| 16 | Pattern 2 | [96] | [2] | [97] |

Note: Configurations 13, 14, 15, and 16 are supported only when carrier bandwidth is larger than 100MHz

**Table 6 {SSB SCS, RMSI SCS} = {120, 120}kHz**

| Configuration Index | Multiplexing Pattern | CORESET BW in PRB | Number of Symbols for CORESET | Frequency Offset in PRB of RMSI CORESET numerology |
|---|---|---|---|---|
| 1 | Pattern 1 | 24 | 2 | 0 |
| 2 | Pattern 1 | 24 | 2 | 4 |
| 3 | Pattern 1 | 48 | 1 | 14 |
| 4 | Pattern 1 | 48 | 2 | 14 |
| 5 | Pattern 3 | 24 | 2 | [-21] if PRG grid not aligned and [-20] if PRG grid aligned |
| 6 | Pattern 3 | 24 | 2 | 24 |
| 7 | Pattern 3 | [48] | 2 | [-21] if PRG grid not aligned and [-20] if PRG grid aligned |
| 8 | Pattern 3 | [48] | 2 | [48] |
| 9 | Reserved | | | |
| 10 | Reserved | | | |
| 11 | Reserved | | | |
| 12 | Reserved | | | |
| 13 | Reserved | | | |
| 14 | Reserved | | | |
| 15 | Reserved | | | |
| 16 | Reserved | | | |

Note: Configurations 7 and 8 are supported only when carrier bandwidth is larger than 100MHz

**Table 7 {SSB SCS, RMSI SCS} = {240, 60}kHz**

| Configuration Index | Multiplexing Pattern | CORESET BW in PRB | Number of Symbols for CORESET | Frequency Offset in PRB of RMSI CORESET numerology |
|---|---|---|---|---|
| 1 | Pattern 1 | 96 | 1 | 0 |
| 2 | Pattern 1 | 96 | 1 | 16 |
| 3 | Pattern 1 | 96 | 2 | 0 |
| 4 | Pattern 1 | 96 | 2 | 16 |
| 5 | Reserved | | | |
| 6 | Reserved | | | |
| 7 | Reserved | | | |
| 8 | Reserved | | | |
| 9 | Reserved | | | |
| 10 | Reserved | | | |
| 11 | Reserved | | | |
| 12 | Reserved | | | |
| 13 | Reserved | | | |
| 14 | Reserved | | | |
| 15 | Reserved | | | |
| 16 | Reserved | | | |

Table 8 {SSB SCS, RMSI SCS} = {240, 120}kHz

| Configuration Index | Multiplexing Pattern | CORESET BW in PRB | Number of Symbols for CORESET | Frequency Offset in PRB of RMSI CORESET numerology |
|---|---|---|---|---|
| 1 | Pattern 1 | 48 | 1 | 0 |
| 2 | Pattern 1 | 48 | 1 | 8 |
| 3 | Pattern 1 | 48 | 2 | 0 |
| 4 | Pattern 1 | 48 | 2 | 8 |
| 5 | Pattern 2 | 24 | 1 | [-42] if PRG grid not aligned and [-41] if PRG grid aligned |
| 6 | Pattern 2 | 24 | 1 | [25] |
| 7 | Pattern 2 | 24 | [2] | [-42] if PRG grid not aligned and [-41] if PRG grid aligned |
| 8 | Pattern 2 | 24 | [2] | [25] |
| 9 | Pattern 2 | [48] | 1 | [-42] if PRG grid not aligned and [-41] if PRG grid aligned |
| 10 | Pattern 2 | [48] | 1 | [49] |
| 11 | Pattern 2 | [48] | [2] | [-42] if PRG grid not aligned and [-41] if PRG grid aligned |
| 12 | Pattern 2 | [48] | [2] | [49] |
| 13 | Reserved | | | |
| 14 | Reserved | | | |
| 15 | Reserved | | | |
| 16 | Reserved | | | |

Note: Configurations 9, 10, 11, and 12 are supported only when carrier bandwidth is larger than 100MHz

Draft LS to RAN4 on RMSI bandwidth assumptions – Da Ren (CATT),
**R1-1721726 [draft] LS on NR RMSI CORESET bandwidth CATT**
**Decision:** The document is endorsed and final LS is approved in R1-1721727.

**R1-1721725 Summary of Offline Discussion on RMSI CATT**
**Decision:** The document is noted.

Working assumption:

- RMSI CORESET starting OFDM symbol and RMSI monitoring window timing Tables

Table 1 For Pattern 1 and sub6 GHz

| Configuration Index | Group offset X (msec) | Number of search space sets per slot N | M | Starting OFDM symbol index (note: l is CORESET duration) |
|---|---|---|---|---|
| 1 | 0 | 1 | 1 | 0 |
| 2 | 0 | 2 | 1 | {0, l} |
| 3 | 2 | 1 | 1 | 0 |
| 4 | 2 | 2 | 1 | {0, l} |
| 5 | 5 | 1 | 1 | 0 |
| 6 | 5 | 2 | 1 | {0, l} |
| 7 | 7 | 1 | 1 | 0 |
| 8 | 7 | 2 | 1 | {0, l} |
| 9 | 0 | 1 | 2 | 0 |
| 10 | 5 | 1 | 2 | 0 |
| 11 | 0 | 1 | 1 | 1 |
| 12 | 0 | 1 | 1 | 2 |
| 13 | 2 | 1 | 1 | 1 |
| 14 | 2 | 1 | 1 | 2 |
| 15 | 5 | 1 | 1 | 1 |
| 16 | 5 | 1 | 1 | 2 |

**Table 2 For Pattern 1 and sub6 GHz**

| Configuration Index | Group offset X (msec) | Number of search space sets per slot N | M | Starting OFDM symbol index (note: l is CORESET duration) |
|---|---|---|---|---|
| 1 | 0 | 1 | 1 | 0 |
| 2 | 0 | 2 | 1 | {0, 7} |
| 3 | 2.5 | 1 | 1 | 0 |
| 4 | 2.5 | 2 | 1 | {0, 7} |
| 5 | 5 | 1 | 1 | 0 |
| 6 | 5 | 2 | 1 | {0, 7} |
| 7 | 0 | 2 | 1 | {0, l} |
| 8 | 2.5 | 2 | 1 | {0, l} |
| 9 | 5 | 2 | 1 | {0, l} |
| 10 | 7.5 | 1 | 1 | 0 |
| 11 | 7.5 | 2 | 1 | {0, 7} |
| 12 | 7.5 | 2 | 1 | {0, l} |
| 13 | 0 | 1 | 2 | 0 |
| 14 | 5 | 1 | 2 | 0 |
| 15 | Reserved | | | |
| 16 | Reserved | | | |

**Table 3 For Pattern 2, and the combination of SS SCS = 120 kHz and RMSI CORESET SCS = 60 kHz**

| Configuration Index | RMSI CORESET monitoring window timing (SFN and slot number) | Starting OFDM symbol index (note: l is CORESET duration, i is SSB index, k = 0, 1, … 15) |
|---|---|---|
| 1 | The SFN of the RMSI CORESET monitoring window is the same as the corresponding SSB.<br>The slot number is the same as the one for the corresponding SSB. | 0, 1, 6, 7<br>for i = 4k, 4k+1, 4k+2, 4k+3 |
| 2 | Reserved | |
| 3 | Reserved | |
| 4 | Reserved | |
| 5 | Reserved | |
| 6 | Reserved | |
| 7 | Reserved | |
| 8 | Reserved | |
| 9 | Reserved | |
| 10 | Reserved | |
| 11 | Reserved | |
| 12 | Reserved | |
| 13 | Reserved | |
| 14 | Reserved | |
| 15 | Reserved | |
| 16 | Reserved | |

**Table 4 For Pattern 2, and the combination of SS SCS = 240 kHz and RMSI CORESET SCS = 120 kHz**

| Configuration Index | RMSI CORESET monitoring window timing (SFN and slot number) | Starting OFDM symbol index (note: l is CORESET duration, i is SSB index, k = 0, 1, … 15) |
|---|---|---|
| 1 | The SFN of the RMSI CORESET monitoring window is the same as the corresponding SSB.<br>The slot number is the same or one smaller than the one for the corresponding SSB according to the right entry. | 0, 1, 2 in the same slot as the SSB is mapped for i = 8k, 8k+1, 8k+2;<br>3,12,13,0,1 in in the previous slot where the SSB is mapped for 8k+3, 8k+4,8k+5,8k+6,8k+7 |
| 2 | Reserved | |
| 3 | Reserved | |
| 4 | Reserved | |
| 5 | Reserved | |
| 6 | Reserved | |
| 7 | Reserved | |
| 8 | Reserved | |
| 9 | Reserved | |
| 10 | Reserved | |
| 11 | Reserved | |
| 12 | Reserved | |
| 13 | Reserved | |
| 14 | Reserved | |
| 15 | Reserved | |
| 16 | Reserved | |

**Table 5 For Pattern 3, and the combination of SS SCS = 120 kHz and RMSI CORESET SCS = 120 kHz**

| Configuration Index | RMSI CORESET monitoring window timing (SFN and slot number) | Starting OFDM symbol index (note: l is CORESET duration, i is SSB index, k = 0, 1, … 15) |
|---|---|---|
| 1 | The SFN of the RMSI CORESET monitoring window is the same as the corresponding SSB.<br>The slot number is the same as the one for the corresponding SSB. | 4, 8, 2, 6<br>for i = 4k, 4k+1, 4k+2, 4k+3 |
| 2 | Reserved | |
| 3 | Reserved | |
| 4 | Reserved | |
| 5 | Reserved | |
| 6 | Reserved | |
| 7 | Reserved | |
| 8 | Reserved | |
| 9 | Reserved | |
| 10 | Reserved | |
| 11 | Reserved | |
| 12 | Reserved | |
| 13 | Reserved | |
| 14 | Reserved | |
| 15 | Reserved | |
| 16 | Reserved | |

Working assumption:

- When the SS/PBCH blocks and corresponding RMSI search space sets occur for pattern 1 NR supports the configuration where the RMSI CORESET monitoring window associated with the SS/PBCH block SSB_*i* in a burst set is defined as follows:
  - The RMSI CORESET monitoring window duration with RMSI numerology is 2 slots;
  - The first slot index of the monitoring window of SSB_i
    - The first slot index S with RMSI numerology for a monitoring window of SSB_*i*, with respect to the SFN boundary, is determined by
      - S = mod(X*$n$ + $f(i)$, number of slots per frame in RMSI numerology)
  - SFN index:
    - When floor((X*$n$ + $f(i)$)/(number of slots per frame)) = 0, the SFN to carry the RMSI monitoring window is determined by mod(SFN,2)=0

    - When floor((X*$n$ + $f(i)$)/(number of slots per frame)) = 1, the SFN to carry the RMSI monitoring window is determined by mod(SFN-1,2)=0
    - Note that this is an update of the previous agreements: mod(SFN,2)=0 applies to all the CORESETs
  - Here:
    - $n$ = (RMSI SCS)/(15 kHz)
    - X can be configured as {0, 2, 5, 7} when SSB SCS is 15kHz or 30kHz; and configured as {0, 2.5, 5, 7.5} when SSB SCS is 120kHz or 240kHz for pattern 1
    - $f(i)$ = floor($i*M$)
      - M equals 1/2, if N=2 and X belongs to {0,2,5,7}
      - M = 1, if N=1 and X belongs to {0,2,5,7}
      - M = 2, if N=1 and X belongs to {0,5}
      - $i$ is the SSB index of SSB_$i$
    - N is the number of search space sets per slot, which can be configured as {1, 2}
  - The starting symbol index R for the RMSI CORESET monitoring window is determined as follows
    - when N = 1, R = 0, $l$={1,2,3}, where $l$ is the CORESET duration
    - when N = 2, R is obtained with one of the following options, which will be selected in different use cases:
      - R={0,$l$} for sub6GHz where $l$={1,[2],[3]} is the CORESET duration
        - If SSB index is even, 0; if odd, $l$
      - R={0,7} & {0,$l$} for over6GHz
        - If SSB index is even, 0; if odd, 7
    - At least for the 30kHz SSB SCS/15kHz RMSI SCS LTE-NR coexistence case, R = 1, or 2 should be supported
  - The number of RMSI search space sets to monitor is at most one per SSB within duration of 14 symbols with RMSI numerology.

R1-1719342 Remaining details of RMSI ZTE, Sanechips
R1-1719372 RMSI Delivery Huawei, HiSilicon
R1-1719558 Further discussion on RMSI transmission MediaTek Inc.
R1-1719622 Remaining details on Remaining minimum system information AT&T
R1-1719742 Discussion on remaining issues of RMSI delivery Lenovo, Motorola Mobility
R1-1719758 Discussion on Remaining Minimum System Information vivo
R1-1719827 Association between SS blocks and the corresponding RMSI(s) in wideband operation Spreadtrum Communications
R1-1719894 RMSI delivery and CORESET configurationLG Electronics
R1-1720059 Remaining details of RMSI Intel Corporation
R1-1720170 On Remaining details on RMSI CATT
R1-1720274 Remaining details on RMSI Samsung
R1-1720376 Remaining details on remaining minimum system information delivery Potevio
R1-1720453 Remaining details on remaining minimum system information Sony
R1-1720582 Discussion on FDM based RMSI CORESET Design CMCC
R1-1720600 Discussion on remaining details for RMSI delivery in PBCH Xiaomi Technology
R1-1720623 On Remaining Details of System Information Delivery InterDigital, Inc.
R1-1720649 Remaining system information delivery considerationQualcomm Incorporated
R1-1720791 Remaining details on Remaining minimum system information delivery NTT DOCOMO, INC.
R1-1720836 Discussion on the RMSI delivery OPPO
R1-1720863 Remaining details on remaining minimum system information FiberHome
R1-1721362 On Remaining System Information Delivery Nokia, Nokia Shanghai Bell
R1-1721364 Remaining details on Remaining minimum system information Ericsson
R1-1721532 Summary on Frequency Offset Indication for TDM Scenario where SS BW and RMSI BW are Confined within Minimum Carrier Bandwidth Samsung
R1-1721533 Summary on Frequency Offset Indication for TDM Scenario where SS BW and RMSI BW are Confined within UE Minimum Bandwidth Samsung
R1-1721628 Offline Summary on Frequency Offset Indication for TDM Scenario where SS BW and RMSI BW are Confined within Minimum Carrier Bandwidth Samsung
R1-1721629 Offline Summary on Frequency Offset Indication for TDM Scenario where SS BW and RMSI BW are Confined within UE Minimum Bandwidth Samsung
R1-1721709 Summary of offline discussion on RMSI CORESET configuration Samsung

#### *7.1.2.3 Remaining details on other system information delivery*

**R1-1721450 Summary on A.I. 7.1.2.3: Remaining details on other system information delivery Samsung** (R1-1721412)

**Decision:** The document is noted. Discuss further offline regarding OSI CORESET vs. RMSI CORESET, relation/configuration vs. search space, parameters to be decided in RAN1 vs. RAN2 particularly w.r.t. SI window configuration parameters.

Agreement: On-demand SI request procedure and any related configuration are up to RAN2

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**Wednesday**
**R1-1721534 Summary on A.I. 7.1.2.3: Remaining details on other system Samsung**
**Decision:** The document is noted.

Agreements: The agreements from RAN1#90b are updated as follows:

- The following parameters for broadcast OSI are explicitly signaled in the corresponding RMSI.
  - SI monitoring window configuration, e.g., time offset, duration, and periodicity
    - It is up to RAN2 how to configure the SI window.
  - PDCCH configuration which gives search space configuration includes monitoring occasions within the SI monitoring window
    - PDCCH configuration is common for all SIs in Rel-15
- For broadcast OSI CORESET configuration, reuse the same configuration for RMSI CORESET as indicated in PBCH

For paging,

- The following parameters for paging are explicitly signaled in the corresponding OSI/RMSI.
  - It is up to RAN2 where the paging configuration is provided
  - Paging occasion configuration, e.g., time offset, duration, periodicity
    - [It is up to RAN2 how to configure the paging occasion.]
  - PDCCH configuration which gives search space configuration including monitoring occasions within the paging occasion.
- For paging CORESET configuration, reuse the same configuration for RMSI CORESET as indicated in PBCH.

R1-1719343 OSI Delivery ZTE, Sanechips
R1-1719559 Further discussion on OSI delivery MediaTek Inc.
R1-1719623 Remaining details on other system information delivery AT&T
R1-1719743 Disucussion on remaing issues of OSI delivery Lenovo, Motorola Mobility
Late submission
R1-1719761 Remaining details on other system information delivery vivo
R1-1719895 Other system information delivery LG Electronics
R1-1720171 OSI delivery CATT
R1-1720275 Remaining details on OSI delivery Samsung
R1-1720650 Other system information delivery consideration Qualcomm Incorporated
R1-1720792 Remaining details on other system information delivery NTT DOCOMO, INC.
R1-1720837 Discussion on the OSI delivery OPPO
R1-1720882 On Other System Information Delivery Nokia, Nokia Shanghai Bell
R1-1720938 Remaining details on other system information delivery Ericsson

### 7.1.3 Remaining details on Paging design

**R1-1721356 Offline summary for AI 7.1.3 on Paging Huawei, HiSilicon**
**Decision:** The document is noted.

Agreements:

- UE may assume QCL between SS Blocks, Paging DCIs and Paging Messages.
  - UE is not required to soft combine multiple Paging DCIs within one PO.

Agreement:

- NR supports sending of short paging messages e.g. *systemInfoModification, cmas-Indication, and etws-Indication* if supported in NR, in the Paging DCI.

**Wednesday**
**R1-1721535 Offline summary for AI 7.1.3 on Paging Huawei**
**Decision:** The document is noted.

Conclusion:

- No additional paging mechanism is supported in Rel-15

**Friday**
**R1-1721687** **Offline summary for AI 7.1.3 on Paging** **Huawei**
**Decision:** The document is noted.

R1-1719344 Paging design ZTE, Sanechips
R1-1719373 Finalization of NR Paging Huawei, HiSilicon
R1-1719560 Discussion on paging design MediaTek Inc.
R1-1719624 Remaining details on Paging designAT&T
R1-1719686 Reduced overhead paging design Sequans Communications
R1-1719704 Discussion on paging design for NR PANASONIC R&D Center Germany
R1-1719705 NR Paging Overhead Reduction TCL Communication
R1-1719753 On NR paging NEC
R1-1719759 Remaining details on NR paging design vivo
R1-1719896 Paging design in NR LG Electronics
R1-1720001 On NR paging design Guangdong OPPO Mobile Telecom
R1-1720172 NR Paging Channel CATT
R1-1720276 Remaining details on paging designSamsung
R1-1720549 Overhead reduction techniques for NR paging based on beam sweepingInterDigital, Inc.
R1-1720583 Discussion on Paging Occasion Design for NR CMCC
R1-1721350 Paging design consideration Qualcomm Incorporated
Revision of R1-1720651
R1-1720793 Remaining details on Paging designNTT DOCOMO, INC.
R1-1720883 Paging in NR Nokia, Nokia Shanghai Bell
R1-1720921 NR paging design Motorola Mobility, Lenovo
R1-1720939 Remaining details on Paging designEricsson

### 7.1.4 Remaining details on Physical random access channel and random access procedure

#### *7.1.4.1 Remaining details on PRACH formats*

**R1-1721471** **Summary of PRACH Remaining details on PRACH formats** **Convida Wireless** (R1-1721389)
**Decision:** The document is noted.

Agreements**:**
- Using 9 bits in the RRC for the RACH configuration.
  - 8 bits to indicate the *prach-ConfigIndex*
  - 1 bit to indicate prach-Msg1SubcarrierSpacing
    - Range of values: {15, 30} or {60, 120} kHz
    - Note: For above 6GHz 1 bit is used to indicate the SCS for Msg1, for below 6GHz 1- bit to indicate the SCS for Msg1 (applicable for the short sequence, for the long sequence it is given by the format)
- Different tables for FDD and TDD
- No need to indicate sequence length
- prach-ConfigIndex:
  - Range of values: {0,1,..,255}
- prach-Msg1SubcarrierSpacing
  - Range of values: 0, 1
    - For below 6GHz the values indicate 15kHz or 30kHz
    - For above 6GHz the values indicate 60kHz or 120kHz

Agreements:
- For format 2, introduce a configurable offset with a value chosen from [0,[6]] symbols based on 15kHz SCS
- No configurable offset for other formats based on long sequences
- prach-StartingSymbolIndex for short sequence
  - Range of values: {0, 2}
- prach-EndSymbolIndex for short sequence
  - Range of values: {[11], 13}
- (Working assumption) handling of the above 3 parameters is to be included in the configurable table instead of a separate configuration

Agreements:

- Configuration period:
  - Range of values: {10, 20, 40, 80, 160} ms
    - Note that handling of the above is to be included in the configurable table instead of a separate configuration

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**Wednesday session**

**R1-1721509** **Summary of PRACH Remaining details on PRACH formats** **Convida Wireless**

**Decision:** The document is noted.

Agreements: For PRACH preamble formats based on the short sequence length, NR supports the following formats:

- For Rel15, format A0 is not supported for SCS = 15/30/60/120kHz
- Format A
  - A1, A2, A3
  - Note: for only format A case, consider leaving a blank symbol at the end of the RACH transmission
- Format B
  - B4, B1
- Format A in combination with format B
  - A1/B1, A2/B2, A3/B3
- For format C
  - C0 and C2

Note: Only one format is configured by the gNB

- Send LS to RAN4 to check format A1/A2/A3 for 120kHz and format C0 for 120kHz. [Intel] R1-1721561

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**Thursday**

**R1-1721561** **[Draft] LS on PRACH with ON-OFF time mask** **Intel**

**Decision:** The document is noted. Further revised in R1-1721622**,** which is endorsed by removing "B1" entry in the table. Final LS is approved in R1-1721630.

**R1-1721573** **Summary of Remaining details on PRACH formats** **Convida Wireless**

**Decision:** The document is noted.

Agreement:

- NR support consecutive mapping of RACH resources within a RACH slot

Agreements: The PRACH configuration tables uses the following columns for the parameters with related parameter values

- PRACH Configuration number
  - Values: 0-255
- Preamble Format
  - Long sequence: 0-3
  - Short sequence: A1, A2, A3, A1/B1, A2/B2, A3/B3, B1, B4, C0, C2
- Configuration period
  - Values {1,2,4,8,16} (10ms*Nperiod)
- SFN mod Config. period
- For below 6GHz, subframe numbering is used
  - Granularity is 1ms, based on 15kHz SCS
  - For short sequence length and SCS = 30kHz, the number of RACH slots in a subframe can be 1 or 2
    - When there is only one RACH slot the second RACH slot is used
  - For short sequence length and SCS = 15kHz, the number of RACH slots in a subframe is be 1
- RACH slot number is used for above 6GHz
  - 0.25ms granularity based on SCS = 60kHz
  - For the 120kHz SCS the number of RACH slots in 0.25ms can be 1 or 2
    - When there is only one RACH slot the second RACH slot is used
  - For the 60kHz SCS the number of RACH slots in 0.25ms is 1
- Start symbol Index (in Msg1 SCS for short sequence and 15kHz for long sequence):
  - Values {0,2} for short sequence
  - Values {0,6} for format 2
  - Always be 0 for format 0,1,3
  - FFS definition of the starting symbol for the unpaired spectrum
- Number of time domain RACH occasions within a RACH slot
  - For preamble format (working assumption), at least the following # of occasions:

- A1: 6
- A2: 3
- A3: 2
- B4: 1
- B1: 6 or 7
- C0: 4
- C2: 2
- A1/B1: 6 or 7
- A2/B2: 3
- A3/B3: 2

- The value is not applicable (N/A) for format 0-3

Companies are encouraged to the check PRACH configuration tables in R1-1721573, aim to endorse at least some of the entries this week

Proposal:
- Semi-static UL/DL configuration is in OSI
  - Symbol index for the unpaired spectrum is also physical symbol index
  - FFS how to handle PRACH transmission colliding with actual transmitted SS/PBCH blocks and RMSI CORESET

Agreements**:**
- For long sequence with length 839, NR adopts the root Zadoff-Chu sequence order (logical to physical root mapping) as in LTE given by 36.211 Table 5.7.2-4
- For short sequence with length 139, NR adopts the root Zadoff-Chu sequence order (logical to physical root mapping) as in LTE given by 36.211 Table 5.7.2-5

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**Friday**
**R1-1721639 Summary of Remaining details on PRACH formats Convida Wireless**
**Decision:** The document is noted. Further revised in R1-1721692.

Agreements:
- For long sequence:
  - At least for table for paired spectrum, for PRACH format 0 and 1 and configuration period 10/20ms only select from LTE table
  - Adding entries for Configuration period of 40ms, 80ms and160ms
- For short sequence, below 6GHz
  - Strive to follow the subframe number as used for the long sequence in order to provide RACH configurations with the same density as for the long sequences

Working assumption:
- At least for table for paired spectrum, format 3 can use the same configuration with format 0 as the same format length (but different PRACH configuration indices)

Agreements:
- NR supports the following table
  - Note: the PRACH config index below needs to be adjusted to allow for additional new entries and to have consecutive indexing for each PRACH format

**RACH configuration table for below 6GHz (format 0 and 1)**

| PRACH Config. Index | Preamble Format | Config. Period | Subframe number | SFN mod Config. period | Start symbol Index | Number of RACH slots within a subframe | Number of RACH occasions within a RACH slot |
|---|---|---|---|---|---|---|---|
| 0 | 0 | 2 | 1 | 1 | N/A | N/A | N/A |
| 1 | 0 | 2 | 4 | 1 | N/A | N/A | N/A |
| 2 | 0 | 2 | 7 | 1 | N/A | N/A | N/A |
| 3 | 0 | 1 | 1 | 0 | N/A | N/A | N/A |
| 4 | 0 | 1 | 4 | 0 | N/A | N/A | N/A |
| 5 | 0 | 1 | 7 | 0 | N/A | N/A | N/A |
| 6 | 0 | 1 | 1,6 | 0 | N/A | N/A | N/A |
| 7 | 0 | 1 | 2,7 | 0 | N/A | N/A | N/A |
| 8 | 0 | 1 | 3,8 | 0 | N/A | N/A | N/A |
| 9 | 0 | 1 | 1,4,7 | 0 | N/A | N/A | N/A |
| 10 | 0 | 1 | 2,5,8 | 0 | N/A | N/A | N/A |
| 11 | 0 | 1 | 3, 6, 9 | 0 | N/A | N/A | N/A |
| 12 | 0 | 1 | 0,2,4,6,8 | 0 | N/A | N/A | N/A |
| 13 | 0 | 1 | 1,3,5,7,9 | 0 | N/A | N/A | N/A |
| 14 | 0 | 1 | *0,1,2,3,4, 5,6,7,8,9* | 0 | N/A | N/A | N/A |
| 15 | 0 | 2 | 9 | 1 | N/A | N/A | N/A |
| 16 | 1 | 2 | 1 | 1 | N/A | N/A | N/A |
| 17 | 1 | 2 | 4 | 1 | N/A | N/A | N/A |
| 18 | 1 | 2 | 7 | 1 | N/A | N/A | N/A |
| 19 | 1 | 1 | 1 | 0 | N/A | N/A | N/A |
| 20 | 1 | 1 | 4 | 0 | N/A | N/A | N/A |
| 21 | 1 | 1 | 7 | 0 | N/A | N/A | N/A |
| 22 | 1 | 1 | 1,6 | 0 | N/A | N/A | N/A |
| 23 | 1 | 1 | 2,7 | 0 | N/A | N/A | N/A |
| 24 | 1 | 1 | 3,8 | 0 | N/A | N/A | N/A |
| 25 | 1 | 1 | 1,4,7 | 0 | N/A | N/A | N/A |
| 26 | 1 | 1 | 2,5,8 | 0 | N/A | N/A | N/A |
| 27 | 1 | 1 | 3,6,9 | 0 | N/A | N/A | N/A |
| 28 | 1 | 2 | 9 | 1 | N/A | N/A | N/A |

Working assumption:

- NR supports the following table
  - Note: the PRACH config index below needs to be adjusted to allow for additional new entries and to have consecutive indexing for each PRACH format

**RACH configuration table for below 6GHz (Format 3)**

| PRACH Config. Index | Preamble Format | Config. Period | Subframe number | SFN mod Config. period | Start symbol Index | Number of RACH slots within a subframe | Number of RACH occasions within a RACH slot |
|---|---|---|---|---|---|---|---|
| X | 3 | 2 | 1 | 1 | N/A | N/A | N/A |
| X+1 | 3 | 2 | 4 | 1 | N/A | N/A | N/A |
| X+2 | 3 | 2 | 7 | 1 | N/A | N/A | N/A |
| X+3 | 3 | 1 | 1 | 0 | N/A | N/A | N/A |
| X+4 | 3 | 1 | 4 | 0 | N/A | N/A | N/A |
| X+5 | 3 | 1 | 7 | 0 | N/A | N/A | N/A |
| X+6 | 3 | 1 | 1,6 | 0 | N/A | N/A | N/A |
| X+7 | 3 | 1 | 2,7 | 0 | N/A | N/A | N/A |
| X+8 | 3 | 1 | 3,8 | 0 | N/A | N/A | N/A |
| X+9 | 3 | 1 | 1,4,7 | 0 | N/A | N/A | N/A |
| X+10 | 3 | 1 | 2,5,8 | 0 | N/A | N/A | N/A |
| X+11 | 3 | 1 | 3, 6, 9 | 0 | N/A | N/A | N/A |
| X+12 | 3 | 1 | 0,2,4,6,8 | 0 | N/A | N/A | N/A |
| X+13 | 3 | 1 | 1,3,5,7,9 | 0 | N/A | N/A | N/A |
| X+14 | 3 | 1 | 0,1,2,3,4, 5,6,7,8,9 | 0 | N/A | N/A | N/A |
| X+15 | 3 | 2 | 9 | 1 | N/A | N/A | N/A |

Working assumption:

- NR supports the following table for paired spectrum
  - Note: the PRACH config index below needs to be adjusted to allow for additional new entries and to have consecutive indexing for each PRACH format

**Table 3: RACH configuration table for below 6GHz (Format 2)**

| PRACH Config. Index | Preamble Format | Config. period | Subframe number | SFN mod Config. period | Start symbol Index | Number of RACH slots within a subframe | Number of RACH occasions within a RACH slot |
|---|---|---|---|---|---|---|---|
| Y | 2 | 4 | 1 | 0 | 0 | N/A | N/A |
| Y+1 | 2 | 2 | 1 | 0 | 0 | N/A | N/A |
| Y+2 | 2 | 2 | 5 | 0 | 0 | N/A | N/A |
| Y+3 | 2 | 1 | 1 | 0 | 0 | N/A | N/A |
| Y+4 | 2 | 1 | 5 | 0 | 0 | N/A | N/A |

Working assumption:

- If the Semi-static UL/DL configuration is in RMSI, only PRACH occasions within the UL part is transmitted
  - UE assumes that RACH occasions configured in RMSI are not collided with DL transmission
    - Introducing start symbol(s) larger than 2 for a limited number of entries in the Configuration table.
- If the Semi-static UL/DL configuration is in OSI
  - Symbol index for the unpaired spectrum is also physical symbol index
  - UE assume that RACH occasions configured in RMSI are not collided with DL transmission
    - Introducing start symbol(s) larger than 2 for a limited number of entries in the Configuration table.

R1-1719345 PRACH Resource Configuration ZTE, Sanechips
R1-1719375 Remaining issues in RACH formatsHuawei, HiSilicon
R1-1719897 Discussion on PRACH preamble format details LG Electronics
R1-1720005 Remaining details on PRACH formats Nokia, Nokia Shanghai Bell
R1-1720061 Remaining details of PRACH formats Intel Corporation
R1-1720173 Further details on NR RACH format CATT
R1-1720224 Remaining details on PRACH formats ETRI
R1-1720277 Remaining details on PRACH formats Samsung
R1-1720584 Discussion on RACH configuration CMCC
R1-1720624 On Remaining Details of PRACH Formats and Designs InterDigital, Inc.
R1-1720652 Remaining details on PRACH formats Qualcomm Incorporated

R1-1721044 Remaining details on PRACH formats NTT DOCOMO, INC.
Revision of R1-1720794
R1-1720940 Remaining details on NR-RACH formats and configurations Ericsson

#### *7.1.4.2 Remaining details on RACH procedure*

**R1-1721498 Summary of Remaining Details on RACH Procedure Qualcomm**
**Decision:** The document is noted.

Working assumption:
- When multiple SS block are associated with one RACH transmission occasion, the preamble indices for CBRA for each SS block are mapped consecutively

Proposals:
- NR down-selects from following options:
  - Alt 1: Preamble indices for CBRA and CFRA are mapped consecutively for one SSB in one RACH transmission occasion.
    - Note: UE knows the association of CBRA and CFRA for one SSB from RMSI
    - Supported by: ZTE, Ericsson, Samsung, Intel, Fujitsu, CATT, Sanechips, DOCOMO
  - Alt 2: For many to one mapping, preamble indices for CBRA and CFRA are not mapped consecutively for one SSB in one RACH transmission occasion
    - Note: UE does not know the association of CFRA for one SSB from RMSI
    - Supported by: Huawei, Qualcomm, HiSilicon, Sharp, LGE, Mediatek,

Agreements**:**
- For ZC type RACH preamble sequence, RACH preamble indices within one RACH transmission occasion are in the order of:
  - Increasing cyclic shifts of a root sequence with logical root index and then
  - Increasing logical root index

Agreements**:**
- NR, at least, supports following mapping from actually transmitted SS blocks to RACH occasion/preamble index.
  - In the order of increasing preamble indices in single RACH occasion and then
  - In the order of increasing the number of frequency multiplexed RACH occasions and then
  - In the order of increasing the number of time multiplexed RACH occasions within a RACH slot
  - In the order of increasing the number of RACH slots
- When multiple FDMed RACH occasions are configured, at least support one configuration where all FDMed RACH occasions get mapped to the same SSB, where different SSBs are associated with different RACH occasions in time domain
- FFS: when multiple FDMed RACH occasions are configured, support one configuration where all FDMed RACH occasions get mapped to one set of SSBs

Agreements**:**
- Support the following for the already agreed parameters.
  - RSRP-ThresholdSSBlock
    - Same as possible RSRP range of values
  - RSRP-ThresholdSUL
    - Same as possible RSRP range of values
  - RACHReceiviedTargetPower
    - 6 bits
    - Details values FFS

Agreements:
- Confirm the following working assumption:
    - (Working assumption) For the timing advance in RAR, its granularity depends on:
      - Subcarrier spacing of the first uplink transmission after RAR
        - Supported by: Ericsson, CATT, Mediatek, ZTE, Sanechips, Huawei, Hisilicon, Qualcomm, LGE, Docomo

**Granularity of [12] bits TA command**

| Subcarrier Spacing (kHz) of the first uplink transmission after RAR | Unit |
|---|---|
| 15 | 16*64 Ts |
| 30 | 8*64 Ts |
| 60 | 4*64 Ts |
| 120 | 2*64 Ts |
| Note: $T_s = 1/(64 * 30.72 * 10^6)$ seconds. | |

Agreements:
- Confirm the following working assumption:
  - Maximum size of TA command for RAR is 12 (as a working assumption) bits.

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**Wednesday**
**R1-1721553 Summary of Remaining Details on RACH Procedure Qualcomm Inc.**
**Decision:** The document is noted.

**Agreements:**
- Support separate configuration of the number of PRACH transmission occasions FDMed in one time instance.
  - Size of value range is 2 bits.
- From UE perspective, all available FDMed PRACH transmissions occasions for initial access are configured within the initial active uplink BWP.
- Initial Active UL BWP's(s) frequency position
  - Up to RAN4 to decide
  - FFS default value
- Relative frequency offset of Msg1
  - Note: This defines the offset of lowest PRACH transmission occasion in frequency domain with respective to PRB 0 of initial active UL BWP(s)
  - Value: {0,1,…,Bandwidth of initial active UL BWP in terms of PRBs – Bandwidth of the RACH occasion in terms of PRBs}
- The FDMed RACH transmission occasions are consecutive in frequency domain.
  - Note: Bandwidth of RACH transmission occasion is an integer number of PRBs including the guard tones.
  - FFS indexing of FDMed RACH transmissions occasions
- RAR window is defined in terms of slot length with respect to Msg2 SCS.
  - Note: Exact duration of RAR window is decided in RAN2
- RSRPThreshold-CSI-RS
  - Size of the value range is same as that of RSRPThreshold-SSB
- ra-PreambleIndexConfig
  - Value range: {0,1,…,63}

**R1-1721585 Summary of Remaining Details on RACH Procedure Qualcomm**
**Decision:** The document is noted.

**Agreements:**
- Preamble indices for CBRA and CFRA are mapped consecutively for one SSB in one RACH transmission occasion.
  - Association of CFRA preambles with SSBs can be reconfigured through UE-specific RRC signaling.
  - Note: this does not preclude the gNB to possibly configure that the number of CFRA preambles per RO is smaller than the number of actually transmitted SSBs configured in RMSI

**Agreements:**
- gNB configures in RMSI the following:
  - Number of CBRA preambles per SSB per RACH transmission occasion
  - Number of SSBs per RACH occasion
- Number of CBRA preambles per SSB per RACH transmission occasion
  - Maximum size for the range of values: 4 bits
- Number of SSBs per RACH occasion
  - Maximum size for the range of values: 3 bits

Conclusion:

- Prach-configDedicated
    - Note: This is configured for handover purposes.
    - Up to RAN2

Agreement:

- NR supports RMSI to indicate PDCCH configuration which gives search space configuration for RACH procedure (before RRC connection setup is complete)

Agreement:

- No default value for Initial Active UL BWP's(s) bandwidth

Agreement:

- For the parameter defining association between CSI-RS and PRACH CFRA in handover, the value range and the actual values are up to RAN2

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**Thursday**

**R1-1721623 Summary of Remaining Details on RACH Procedure Qualcomm Inc**

**Decision:** The document is noted.

Agreements:

- UE is not expected to monitor more than one Msg2/Msg3/Msg4 search space in one slot.
    - Starting symbol of Msg2/Msg3/Msg4 search space is the same in every slot.

Agreement:

- Confirm the following working assumption.
    - (working assumption) Bit field length of RAPID is 6 bits.

Agreement:

- The preambles contained within each RACH transmission occasion are indexed from 0 to 63, which is also used for RAPID.

Agreement:

- For every time period, the first actually transmitted SSB in a SSB burst set is mapped to the first PRACH occasion
    - FFS the time period (note: there is no additional RRC impact)

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**Friday**

**R1-1721689 Summary of Remaining Details on RACH Procedure Qualcomm Inc**

**Decision:** The document is noted.

Agreements:

- UE adjusts its power setting for Msg. 3 using the transmit power control command in Msg2 and the transmit power of the latest PRACH preamble
- The size of UL grant in RAR for Msg3 is left to control channel session (Scheduling/HARQ agenda item)

Agreements:

- Minimum time gap between Msg2 and Msg3 if Msg2 and Msg3 have the same SCS
    - Duration of N1 + duration of N2 + L2 + TA
        - N1 refers to the value determined in control session with front loaded plus additional DMRS and UE capability #1
        - N2 also refers to the value determined in control session with UE capability #1
        - TA is equal to the maximum timing advance value that the 12 bit TA command can provide with respect to the SCS of Msg3
        - L2 refers to the MAC processing latency and it does not depend on subcarrier spacing
            - L2=500us as a working assumption
        - Note: If Msg2 and Msg3 have different SCS, value of N1 and N2 will refer to the ones determined in control session.

Draft LS to inform RAN4 about TA granularity -

**R1-1721720** **[Draft] LS reply to RAN4 on UE timing advance adjustment step size** **Qualcomm**
**Decision:** The document is endorsed and final LS is approved in R1-1721722.

R1-1719346 Remaining details of RACH procedure ZTE, Sanechips
R1-1719501 Remaining issues in RACH Procedure Huawei, HiSilicon
R1-1719569 Remaining details on RACH procedure MediaTek Inc.
R1-1719617 Remaining details on RA procedureFujitsu
R1-1719625 Remaining details on RACH procedure and configuration AT&T
R1-1719898 RACH Procedure LG Electronics
R1-1719985 Discussion on Remaining Issues of Random Access Procedure Guangdong OPPO Mobile Telecom
R1-1720006 Remaining details on PRACH procedure Nokia, Nokia Shanghai Bell
R1-1720018 Reduced RA for paged UEs Sequans Communications
R1-1720062 Remaining details of RACH procedures Intel Corporation
R1-1720174 Further details on NR 4-step RA Procedure CATT
R1-1720278 Remaining details on PRACH procedure Samsung
R1-1720454 Considerations on Beam Reporting in RACH Procedure Sony
R1-1720550 RACH configuration of Multiple Msg1 transmissions before the end of a monitored RAR window InterDigital, Inc.
R1-1720611 Remaining issue on RACH preambles in NR Sharp
R1-1720653 Remaining details on RACH procedure Qualcomm Incorporated
R1-1720771 Remaining details on RACH procedure ITRI
R1-1720795 Remaining details on RACH procedure NTT DOCOMO, INC.
R1-1720922 Remaining details on RACH configuration Motorola Mobility, Lenovo
R1-1720941 Remaining details on RACH procedure Ericsson
R1-1721425 BWP and random access Ericsson

### 7.1.5 Mobility procedure

#### *7.1.5.1 Remaining details on measurement for mobility management*

*Including both SS block and CSI-RS related aspects*

**R1-1721407** **Summary of remaining issues on NR RRM** **Samsung**
**Decision:** The document is noted.

Agreements: When a set of slots for RSSI time-domain measurement resource can be explicitly configured per frequency carrier for a UE in RRC_CONNECTED mode:

- Slots in the RSSI measurement resource are configured by a bitmap with each bit corresponding to each slot of the slots within the SMTC window duration
  - Here, the slots are determined based on the SSB numerology
- OFDM symbol level configuration for the configured slots:
  - Configurable with a limited set of ending symbols; the set of symbols in a slot is from symbol 0 to the ending symbol
    - No more than 4 values for the end symbol

Agreements:

- For intra frequency measurements, SMTC window duration, timing offset and SMTC periodicity are signalled in either RMSI or OSI for IDLE mode, and RRC for CONNECTED mode
  - For IDLE mode, RAN2 will decide the signalling container between RMSI and OSI
- For inter frequency measurements, SMTC window duration, timing offset and SMTC periodicity are signalled per frequency, in either RMSI or OSI by the serving cell for IDLE mode, and RRC for CONNECTED mode
  - For IDLE mode, RAN2 will decide the signalling container between RMSI and OSI
- SMTC window duration:
  - Both for inter-/intra- frequency measurements, the candidate values are {1,2,3,4,5} msec
- SMTC window timing offset:
  - SMTC window timing reference for the timing offset is SFN#0 of the serving cell.
    - Note: For IDLE mode, the serving cell here implies the cell UE is camped on.
  - For intra-frequency measurements, the candidate values are {0, 1, …, SMTC periodicity -1} ms
  - For inter-frequency measurements, the candidate values are {0, 1, …, SMTC periodicity -1} ms.
- SMTC periodicity:
  - Both for inter-/intra-frequency measurements, the candidate values are {5, 10, 20, 40, 80, 160} msec

Agreements:

- No QCL indication for multiple SSBs in WB carrier for mobility purpose
  - Note that indication for other purposes, e.g., BM is out of scope of the above

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**Wednesday session**

**R1-1721547** **Summary of remaining issues on NR RRM** **Samsung**

**Decision:** The document is noted.

Agreements:

- For each CSI-RS resource, at most one associated SSB can be configured
- If associated SSBs are configured for CSI-RS, maximum N1=96 number of CSI-RS resources can be configured per frequency layer
  - M>=1 number of CSI-RS resources per associated SSB can be configured
- If associated SSBs are not configured for CSI-RS, maximum N2>=1 number of CSI-RS resources can be configured per frequency layer
  - In this case, UE may assume that the carrier is synchronized with the serving cell.
  - FFS UE is not required to perform measurement based on CSI-RS if the corresponding cell ID is not detected

Agreements:

- Support only single port CSI-RS resources for mobility purpose.
- Remove the indication of number of ports from the RRC parameter list.

Conclusion:

- Multiple SSB based RRM measurement for a WB carrier is not supported in R15

**R1-1721587** **Summary of remaining Issues on NR RRM** **Samsung**

**Decision:** The document is noted.

Agreements:

- For carriers with SSB,
  - Transmission BW is removed from the RRC parameter set.
  - Agree on the following table for the CSI-RS configuration parameters:

| Parameter Name | Description | Candidate values | Commonality of the configured value(s) across multiple resources |
|---|---|---|---|
| Cell_ID | Physical Cell ID for CSI-RS | 0, 1, …, 1007 | Common value is assigned across all the resources configured for a cell |
| slotConfig | Contains periodicity and slot offset for periodic/semi-persistent CSI-RS<br>FFS slot offset details (no additional RRC impact) | Periodicity: {5, 10, 20, 40} msec<br>Offset: 0, 1, …, P-1 slots, where periodicity P is in terms of slots in the CSI-RS numerology | Configured per resource |
| Sequence-Generation | Sequence generation parameter for CSI-RS, i.e., scrambling ID | 0-1023 | Configured per resource |
| Common-PRB-Grid-offset | Information to define common PRB grid for CSI-RS sequence generation<br>Corresponds to an offset (in terms of number of subcarriers in CSI-RS numerology) between PRB 0 for common PRB indexing and a reference location (i.e., corresponds to RRC parameter DL-BWP-loc defined for BWP)<br>– the reference location is the lowest PRB of the cell-defining SSB | [0,1,2, …, >276*4] | A common value is assigned across all the resources configured for per cell |
| Measurement-BW | Allowed measurement BW for CSI-RS | BW size: {24, 48, 96, 192, 268} PRBs in CSI-RS numerology<br>Starting PRB index: {0, 1, …, [251](=274-24+1)]} PRBs with respect to PRB0 in CSI-RS numerology | A common set of values are assigned across all the resources configured per cell |
| Carrier-info | Provides frequency location information for inter-frequency measurement | Absolute frequency value, RAN2 to fill in, if not provided elsewhere | A common value is assigned across all the resources configured for a frequency carrier |
| RE-Mapping-Pattern | RE mapping pattern for a CSI-RS resource | Adopt the parameter values agreed in BM | Configured per resource |
| Density | Frequency domain density for the 1-port CSI-RS | {1,3} | A common value is assigned across all the resources configured per cell |
| Numerology | Numerology for CSI-RS | {15,30,60} for sub6GHz<br>{60,120,240} for over6GHz | A common value is assigned across all the resources configured per frequency carrier |
| Associated-SSB | For each CSI-RS resource, at most one associated SSB can be configured<br>Note: If the associated-SSB is signaled, UE is not required to monitor CSI-RS resource(s) when the UE cannot detect the associated SSB | {0, 1, …, L-1} | Configured per resource<br>This field is optional per frequency layer |
| QCLed-SSB | The CSI-RS resource is either QCL'ed not QCL'ed with the associated SSB in spatial parameters | {yes, no} | Configured per resource<br>This field is conditionally indicated if associated-SSB is configured |

Agreement:

- Up to RAN2 to indicate to the UE the associated SS block on a carrier for different carrier(s) without SSB

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**Thursday**
**R1-1721631 Summary of remaining Issues on NR RRM Samsung**
**Decision:** The document is noted.

Agreements:

- SS-RSRP is applicable for:
  - RRC_IDLE intra-frequency,
  - RRC_IDLE inter-frequency,
  - RRC_INACTIVE intra-frequency,
  - RRC_INACTIVE inter-frequency,
  - RRC_CONNECTED intra-frequency,
  - RRC_CONNECTED inter-frequency
- CSI-RSRP is applicable for:
  - RRC_CONNECTED intra-frequency

    - RRC_CONNECTED inter-frequency

Agreement:
- If receiver diversity is in use by the UE, the reported *measurement quantity* (i.e., SS-RSRP, CSI-RSRP, SS-RSSI, CSI-RSSI, SS-SINR, CSI-SINR) value shall not be lower than the corresponding *measurement quantity* of any of the individual receiver branches.

Proposal:
- For default RSSI time-domain measurement resource:
    - Alt 1: Any OFDM symbols within the set of slots within the SMTC window, where the slot timing is defined in the same way as the SMTC window timing reference is determined
    - Alt 2: Union of OFDM symbols {0, 1} and OFDM symbols before a detected SSB in each half slot containing the detected SSB, where the slot timing is defined according to the detected SSBs

Agreement:
- In Rel-15, IMR for SSS based RS-SINR is the RS used for RSRP measurement
    - Up to UE implementation to use SSS only or SSS + PBCH DMRS

Agreement:
- In Rel-15, IMR for CSI-RS based RS-SINR for RRM is CSI-RS REs used for the RSRP measurement

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**Friday**
**R1-1721724 Summary of remaining Issues on NR RRM Samsung**
**Decision:** The document is noted.

Agreements:
- In Rel-15, different measurement BW for CSI-RSSI than for CSI-RSRP is not supported
- In Rel-15, there is no consensus to support different measurement BW for SS-RSSI than for SS-RSRP

Agreements:
- NR supports:

| | |
|---|---|
| **Definition** | The observed SFN and frame timing difference (SFTD) between an E-UTRA PCell and an NR PSCell is defined as comprising the following two components;<br>- SFN offset = ($SFN_{PCell}$ - $SFN_{PSCell}$) mod 1024, where $SFN_{PCell}$ is the SFN of a E-UTRA PCell radio frame and $SFN_{PSCell}$ is the SFN of the NR PSCell radio frame of which the UE receives the start closest in time to the time when it receives the start of the PCell radio frame.<br>- Frame boundary offset = $\lfloor (T_{FrameBoundaryPCell} - T_{FrameBoundaryPSCell})/5 \rfloor$, where $T_{FrameBoundaryPCell}$ is the time when the UE receives the start of a radio frame from the PCell, $T_{FrameBoundaryPSCell}$ is the time when the UE receives the start of the radio frame, from the PSCell, that is closest in time to the radio frame received from the PCell. The unit of ($T_{FrameBoundaryPCell}$ - $T_{FrameBoundaryPSCell}$) is Ts. |
| **Applicable for** | RRC_CONNECTED intra-frequency |

R1-1719347 Remaining details of RRM measurements ZTE, Sanechips
R1-1719377 Remaining details on NR RRM Huawei, HiSilicon
R1-1719549 Discussion on Measurement for Mobility Management MediaTek Inc.
R1-1719626 Remaining details of measurement configuration for mobility management AT&T
R1-1719689 Discussion on the association between the SMTC and the measurement object Spreadtrum Communications
R1-1719762 Remaining issues for RRM vivo
R1-1719899 Remaining Details on L3 measurement and mobility management LG Electronics
R1-1719995 Remaining details on NR RRM measurement Guangdong OPPO Mobile Telecom
R1-1720063 Measurements for RRM Intel Corporation
R1-1720175 Mobility Management based on SS block and CSI-RS measurements CATT
R1-1720279 Remaining details on NR mobility Samsung
R1-1720455 RRM Measurements for UE supporting Wideband CC Sony
R1-1720585 Remaining details on measurement for mobility management CMCC
R1-1720654 Remaining details on measurement for mobility management Qualcomm Incorporated
R1-1720796 Remaining details on measurement for mobility management NTT DOCOMO, INC.
R1-1721363 Measurements for mobility management Nokia, Nokia Shanghai Bell (Revision of R1-1720884)

R1-1720923 SS/PBCH block based measurement in wideband carrier Motorola Mobility, Lenovo
R1-1720942 Remaining details on measurement for mobility management Ericsson

#### *7.1.5.2 Remaining details Radio link monitoring for mobility management*

**R1-1721374 Summary of Monday offline discussion for NR Radio Link Monitoring Intel Corp.**
**Decision:** The document is noted.

Agreements:
- NR supports different maximum number of configured RLM-RS for different frequency ranges
- No need to support RLM capability signalling regarding # of RLM-RS for any frequency range.

Working assumption:
- 2 port CSI-RS is not supported for RLM purposes

Concurrently supporting only a single RLM-RS type or both RLM-RS types
- Alt.1: NR supports configurability of different RLM-RS types to UE for each RLM-RS: Huawei, HiSilicon, Nokia, NSB, Ericsson, AT&T
  - Also supported by Intel, LGE, Fujitsu
  - Objected by OPPO (due to complexity of Alt.1), Qualcomm, MediaTek
- Alt.2: NR configures a single RLM-RS type only for RLM: Vivo, OPPO, CATT, Qualcomm, NTT Docomo, Mediatek
  - Also supported by Intel
  - Fujitsu (Alt.2 can be considered as sub-set of Alt.1 – Alt.1 could be considered in the future)
  - Objected by Huawei, HiSilicon, Nokia, NSB, Ericsson, AT&T

Agreement:
- NR support configurability of different RLM-RS types to UE for each RLM-RS

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**Wednesday session**
**R1-1721375 Summary of Tuesday offline discussion for NR Radio Link Monitoring Intel Corp.**
**Decision:** The document is noted.

Agreements:
- For value of X:
  - For below 3GHz: X = 2
  - For above 3GHz and below 6GHz: X = 4
  - For above 6GHz: X = [8]

**R1-1721376 Summary of Wednesday offline discussion for NR Radio Link Monitoring Intel Corp.**
**Decision:** The document is noted.

Agreements:
- RLM-SSB: value range is 0, 1, …, 63
- RLM-CSI-RS-timeConfig:
  - Periodicity, P: {5ms, 10ms, 20ms, 40ms}
  - Slot offset: {0, …, Ps-1} slots
  - Where Ps is number of slots within period P in the CSI-RS numerology
- RLM-CSI-RS-FreqBand
  - Adopt the parameter values agreed in BM with following exception:
    - Minimum number of PRB is 24.

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**Thursday session**
**R1-1721377 Summary of Thursday offline discussion for NR Radio Link Monitoring Intel Corp.**
**Decision:** The document is noted.

Agreements:
- In Rel-15, no explicit resources are defined and indicated to the UE for Interference and noise Measurement Resource (IMR) for RLM, and it is up to UE implementation on how interference and noise measurement can be performed.

- It is understood that the UE may perform interference measurements on any resource (excluding SS/PBCH resource) with a known signal, i.e., a known reference signal, a transmission the UE can decode, or a resource element the UE knows is empty

Conclusion:
- RLM measurement evaluation period for RLM is up to RAN4.
- No further discussion necessary in RAN1.

Conclusion:
- RAN1 re-confirms "UE assumes same antenna port between hypothetical PDCCH and RLM-RS"

Companies are encouraged to the table in Section 2.6 & 2.7 of R1-1721377

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**Friday**

Agreements:
- At least the following parameters CSI-RS configuration fields are not applicable to RLM-CSI-RS
  - (working assumption) CDMType (cd-pattern)
  - CSI-IM-RE-pattern
  - CSI-IM-Resource
  - CSI-IM-ResourceId
  - CSI-IM-timeConfig
  - CSI-IM-FreqBand
  - CSI-IM-ResourceMapping
  - FFS QCL-Info-CSI-RS
- The above has no RRC impact

Agreements:
- UE is not required to perform RLM measurements outside the active DL BWP
  - Note: RAN4 is discussing RLM requirements and need for measurement gaps.
- LS to RAN4 regarding the above agreements without the note (**R1-1721694**) – Daewon (Intel)
  - The LS is approved by removing the bullet in yellow. Final LS is approved in R1-1721721.

R1-1721369 Summary of Discussion for NR Radio Link Monitoring Intel Corp.
R1-1719348 Remaining details of RLMZTE, Sanechips
R1-1719376 Remaining details on Radio link monitoring in NR Huawei, HiSilicon
R1-1719550 Discussion on Radio Link Monitoring MediaTek Inc.
R1-1719627 Remaining details of Radio Link Monitoring procedure and RS configuration AT&T
R1-1719760 Remaining issues for RLM vivo
R1-1719900 Discussion on Radio Link Monitoring in NR LG Electronics
R1-1719996 Remaining details on NR radio link monitoring Guangdong OPPO Mobile Telecom
R1-1720064 NR Radio link monitoring design Intel Corporation
R1-1720176 NR Radio Link Monitoring CATT
R1-1720280 Remaining details on Radio link monitoring Samsung
R1-1720655 Radio link monitoring consideration Qualcomm Incorporated
R1-1720797 Remaining details on Radio link monitoring for mobility management NTT DOCOMO, INC.
R1-1720885 Radio Link Monitoring in NR Nokia, Nokia Shanghai Bell
R1-1720943 Remaining details Radio link monitoring Ericsson

### 7.1.6 Other

R1-1719378 Capacity shortfall solution for agreed NR PRACH formats Huawei, HiSilicon
R1-1719379 Remaining issues on initial DL/UL active bandwidth part Huawei, HiSilicon
R1-1719831 Remaining issues on PRACH for SUL Huawei, HiSilicon
R1-1720944 Synchronization using non-cell-defining signals Ericsson
R1-1720945 Remaining details on NR-RACH capacity Ericsson
R1-1720946 On intra-frequency frequency gaps Ericsson
R1-1720947 Two different TA sizes for RAR and saving of a byte Ericsson
R1-1720948 Analysis of CP latency on non-slot based scheduling of PDCCH for RAR Ericsson
R1-1720949 Multiple Preamble Transmissions for contention-free random access Ericsson
R1-1720950 On EN-DC STTD measurement capability Ericsson
R1-1720951 Inter-RAT measurement capabilities in NR Ericsson

## *7.2 MIMO*

**R1-1721657 Chairman's notes of AI 7.2 NR MIMO Ad-Hoc chair (Samsung)**
The document was presented by Younsun Kim from Samsung.
**Decision:** The document is endorsed, content incorporated below.

R1-1719328 Reply LS CSI-RS patterns and densities RAN4, Nokia

**R1-1721648 List of MAC CE parameters for MIMO NTT DOCOMO**
**Decision:** The document is further revised and endorsed in R1-1721661.
**R1-1721662 [Draft] LS on MAC CE parameters for NR MIMO NTT DOCOMO**
**Decision:** The document is endorsed and final LS is approved in R1-1721663.
MCC: To include the attachment to the LS – missing in the zipped file.

Send an LS to RAN2 to inform them of the modifications to RRC and MAC CE after Thursday (Nov 30). For email approval. – Qualcomm (Sundar) by Dec 6th.

### 7.2.1 Remaining details on Multi-antenna scheme

*Physical control channel related issues are to be discussed in the agenda item for scheduling/HARQ aspects.*

R1-1719628 On Data Scrambling for NR PDSCH and PUSCH AT&T

#### *7.2.1.1 Remaining details on codeword mapping*

R1-1721468 Summary of Open Issues on Layer Mapping Samsung

**R1-1721599 WF on RE mapping for DFT-SOFDM with intra-slot frequency hopping MediaTek, Ericsson, Lenovo, Motorola Mobility, Samsung, Qualcomm, CATT, Nokia, NSB, ETRI, KT Corporation, WILUS Inc, Acorn Technologies, Intel, Panasonic**

Agreement:
- Confirm the working assumption and DFT-SOFDM for multiple code blocks with intra-slot frequency hopping follows the same design, i.e.
- The RE mapping is performed with the following order:
  - Frequency-first mapping followed by time and sub-slot: the modulated symbols are first mapped across sub-carriers, then across DFT-SOFDM symbols within a sub-slot, then across sub-slots (occupying different sets of PRBs)

Agreement:
- Gold-31 sequence same as LTE is used for PDSCH/PUSCH data scrambling
- At least the following parameters are used for data scrambling initialization:
  - nRNTI
  - CW index: 1 bit
  - Scrambling ID or N_ID (RRC configured with the default setting as P_Cell ID): X bits

Agreement:
For data scrambling:
- The value of X is 10
- $c_{\text{init}}$ is defined as $c_{\text{init}} = n_{\text{RNTI}} \cdot 2^{15} + q \cdot 2^{14} + N_{ID}$

R1-1719901 Discussion on codeword mapping LG Electronics
R1-1720065 Remaining details on CW to MIMO layer mapping Intel Corporation
R1-1720732 On CW mapping and data scrambling Ericsson
R1-1719430 Remaining details of codeword mapping in NR Huawei, HiSilicon
R1-1719526 Remaining details on codeword mapping ZTE, Sanechips
R1-1719561 Remaining details on codeword mapping MediaTek Inc.
R1-1719629 On Frequency hopping for NR PUSCH AT&T
R1-1719733 Remaining details of codeword mapping for DFT-s-OFDM Lenovo, Motorola Mobility
Late submission
R1-1719763 Remaining issues on codeword mapping vivo

R1-1720177 On remaining details of codeword mapping CATT
R1-1720281 Finalizing Layer Mapping Samsung
R1-1720456 Remaining CW-to-layer mapping issue Sony
R1-1720656 Remaining issues on CW-to-layer mapping Qualcomm Incorporated
R1-1720798 Remaining details on CW mapping NTT DOCOMO, INC.

#### *7.2.1.2 Remaining details on codebook based transmission for UL*

**R1-1721435 Offline Discussion on Codebook based transmission for ULIntel**

Agreement
For uplink codebook subset restriction based on RRC signaling, support 3 states to define the TPMI for coherent transmission, partial coherent transmission and non-coherent transmission

- Definition of three states: One state to indicate coherent, partial coherent, and non-coherent transmission, one state to indicate partial coherent, and non-coherent, one state to indicate non-coherent transmission
    - Only one state can be configured among the three states
- For a UE reporting its capability of partial coherent transmission, it shall not expect the gNB to configure the coherent transmission state.
- For a UE reporting its capability of non-coherent transmission, it shall not expect the gNB to configure the coherent or partial coherent transmission state.
- The size of the DCI field for TPMI is determined by the selected state
- TRI restriction (max transmit rank) is part of TPMI size reduction
    - FFS: Whether TRI and TPMI are jointly or separately encoded

Agreement:
Support to use RRC signaling to explicitly select between codebook based transmission and non-codebook based transmission

- FFS on definition of UE capability for non-codebook based transmission

**R1-1721568 WF on remaining issues on SRS field LG Electronics, Intel Corporation**

Agreement:
For codebook-based UL, UE can only be configured with one SRS resource set.

- Only one SRS resource is selected within the set via the SRI field in UL grant.
- The SRI field in UL grant is independently encoded from at least TPMI in the same UL grant.
    - The bitwidth of SRI field in UL grant is determined by N = ceil(log2(# of SRS resources in the set)).
- Note: This SRS resource set can be reused for UL BM as well, or another separated SRS resource set for UL BM can be configured to the UE, according to gNB implementation.

Agreement:
Maximum number of SRS resources that can be configured for codebook based uplink transmission is 2

**R1-1721600 Way Forward on NR 4 Port UL MIMO Codebook For CP-OFDM Ericsson, Samsung, LGE, AT&T, KDDI, British Telecom, NEC, Qualcomm, Bouygues Telecom, IITH, CEWiT, IITM, Tejas Networks, Sprint, Deutsche Telekom, Orange, Verizon**
Also supported by Sharp and KT

Agreement:

| # Precoders | Number of layers $\upsilon = 1$ | | | | | | | | Minimum Coherence Capability |
|---|---|---|---|---|---|---|---|---|---|
| 16 | **NR Rel15 DL codebook with CodeBookMode=1, but with $O_1$=2** | | | | | | | | Fully Coherent |
| 8 | $\frac{1}{2}\begin{bmatrix}1\\0\\1\\0\end{bmatrix}$ | $\frac{1}{2}\begin{bmatrix}1\\0\\-1\\0\end{bmatrix}$ | $\frac{1}{2}\begin{bmatrix}1\\0\\j\\0\end{bmatrix}$ | $\frac{1}{2}\begin{bmatrix}1\\0\\-j\\0\end{bmatrix}$ | $\frac{1}{2}\begin{bmatrix}0\\1\\0\\1\end{bmatrix}$ | $\frac{1}{2}\begin{bmatrix}0\\1\\0\\-1\end{bmatrix}$ | $\frac{1}{2}\begin{bmatrix}0\\1\\0\\j\end{bmatrix}$ | $\frac{1}{2}\begin{bmatrix}0\\1\\0\\-j\end{bmatrix}$ | Partially Coherent |
| 4 | $\frac{1}{2}\begin{bmatrix}1\\0\\0\\0\end{bmatrix}$ | $\frac{1}{2}\begin{bmatrix}0\\1\\0\\0\end{bmatrix}$ | $\frac{1}{2}\begin{bmatrix}0\\0\\1\\0\end{bmatrix}$ | $\frac{1}{2}\begin{bmatrix}0\\0\\0\\1\end{bmatrix}$ | | | | | Non-Coherent |

Agreement:

| # Precoders | Number of layers $\upsilon$=2 | | | | | | Minimum Coherence Capability |
|---|---|---|---|---|---|---|---|
| 8 | NR Rel15 4 port DL codebook with CodeBookMode=1, but with $O_1$=2 and $i_{1,3}$=0 | | | | | | Fully Coherent |
| 8 | $\frac{1}{2}\begin{bmatrix}1&0\\0&1\\1&0\\0&-j\end{bmatrix}$ | $\frac{1}{2}\begin{bmatrix}1&0\\0&1\\1&0\\0&j\end{bmatrix}$ | $\frac{1}{2}\begin{bmatrix}1&0\\0&1\\-j&0\\0&1\end{bmatrix}$ | $\frac{1}{2}\begin{bmatrix}1&0\\0&1\\-j&0\\0&-1\end{bmatrix}$ | | | Partially Coherent |
| | $\frac{1}{2}\begin{bmatrix}1&0\\0&1\\-1&0\\0&-j\end{bmatrix}$ | $\frac{1}{2}\begin{bmatrix}1&0\\0&1\\-1&0\\0&j\end{bmatrix}$ | $\frac{1}{2}\begin{bmatrix}1&0\\0&1\\j&0\\0&1\end{bmatrix}$ | $\frac{1}{2}\begin{bmatrix}1&0\\0&1\\j&0\\0&-1\end{bmatrix}$ | | | (8 TPMIs from Rel-10 with ports 2&3 swapped) |
| 6 | $\frac{1}{2}\begin{bmatrix}1&0\\0&1\\0&0\\0&0\end{bmatrix}$ | $\frac{1}{2}\begin{bmatrix}1&0\\0&0\\0&1\\0&0\end{bmatrix}$ | $\frac{1}{2}\begin{bmatrix}1&0\\0&0\\0&0\\0&1\end{bmatrix}$ | $\frac{1}{2}\begin{bmatrix}0&0\\1&0\\0&1\\0&0\end{bmatrix}$ | $\frac{1}{2}\begin{bmatrix}0&0\\1&0\\0&0\\0&1\end{bmatrix}$ | $\frac{1}{2}\begin{bmatrix}0&0\\0&0\\1&0\\0&1\end{bmatrix}$ | Non-Coherent |

Agreement:

| # Precoders | Number of layers $\upsilon$=3 | | | | Minimum Coherence Capability |
|---|---|---|---|---|---|
| 4 | **NR Rel15 4 port codebook with CodeBookMode=1-2, but with $O_1$=2; $i_{1,1} \in \{0,2\}$; $i_{1,3} = 0$;** | | | | Fully Coherent |
| 2 | $\frac{1}{2}\begin{bmatrix}1&0&0\\0&1&0\\1&0&0\\0&0&1\end{bmatrix}$ | $\frac{1}{2}\begin{bmatrix}1&0&0\\0&1&0\\-1&0&0\\0&0&1\end{bmatrix}$ | | | Partially Coherent (2 TPMIs from Rel-10) |
| 1 | $\frac{1}{2}\begin{bmatrix}1&0&0\\0&1&0\\0&0&1\\0&0&0\end{bmatrix}$ | | | | Non-Coherent |

Agreement:

| # Precoders | Number of layers $\upsilon$=4 | | Minimum Coherence Capability |
|---|---|---|---|
| 2 | NR Rel15 4 port codebook with CodeBookMode=1-2, but with O1=2; $i_{1,1} = 0$; $i_{1,3} = 0$ | | Fully Coherent |
| 2 | $\frac{1}{2\sqrt{2}}\begin{bmatrix}1 & 1 & 0 & 0\\ 0 & 0 & 1 & 1\\ 1 & -1 & 0 & 0\\ 0 & 0 & 1 & -1\end{bmatrix}$ | $\frac{1}{2\sqrt{2}}\begin{bmatrix}1 & 1 & 0 & 0\\ 0 & 0 & 1 & 1\\ j & -j & 0 & 0\\ 0 & 0 & j & -j\end{bmatrix}$ | Partially Coherent |
| 1 | $\frac{1}{2}\begin{bmatrix}1 & 0 & 0 & 0\\ 0 & 1 & 0 & 0\\ 0 & 0 & 1 & 0\\ 0 & 0 & 0 & 1\end{bmatrix}$ | | Non-Coherent (TPMI from Rel-10) |

**R1-1721598 WF on 4Tx UL Codebook For CP-OFDM MediaTek, ZTE, Sanechips, Intel, AT&T, Huawei, HiSilicon, NTT DoCoMo, Lenovo, Motorola Mobility**

R1-1719433 Remaining details for codebook based transmission for UL MIMO Huawei, HiSilicon
R1-1719527 Remaining details on codebook based UL transmission ZTE, Sanechips
R1-1719562 Codebook based transmission for UL MediaTek Inc.
R1-1719630 Remaining details on codebook based transmission for UL-MIMO AT&T
R1-1719737 Discussion of codebook based UL transmission Lenovo, Motorola Mobility
Late submission
R1-1719764 Remaining issues on codebook based UL transmission vivo
R1-1719964 Remaining issues on UL codebook design Guangdong OPPO Mobile Telecom
R1-1720066 Remaining issues on codebook based UL transmission Intel Corporation
R1-1720178 Discussion on remaining details of codebook based UL transmission CATT
R1-1720625 TPMI for Codebook-based UL Transmission InterDigital, Inc.
R1-1720657 Remaining details on codebook based UL transmission Qualcomm Incorporated
R1-1720799 Uplink codebook design NTT DOCOMO, INC.
R1-1720886 UL Codebook Based Transmission and Codebook Design Nokia, Nokia Shanghai Bell
R1-1721379 Discussion on codebook based transmission for UL LG Electronics
R1-1721399 Codebook-Based UL Transmission Samsung

#### 7.2.1.3 Remaining details on non-codebook based transmission for UL

**R1-1721400 Summary of issues on UL non-codebook based transmission Nokia, Nokia Shanghai Bell**

Agreement: For non-codebook based UL transmission, the UE can only be configured for one SRS resource set with the following details:

- The UE can be configured to simultaneously transmit up to X SRS resources
    - X is part of UE capability signalling
- The SRS resources transmitted simultaneously occupy the same RBs

Agreement: SRI is associated with the most recent SRS transmission

**Conclusion:**
No explicit specification support of frequency selective precoding for non-codebook based transmission in Rel-15 for completion by Dec

Agreement: For the association between CSI-RS and an SRS for non-codebook based uplink transmission, the CSI-RS resource is associated to a SRS resource set.

Email discussion SRS resource indication for non-codebook based uplink transmission and TPMI/SRI/TRI indication for codebook based uplink transmission – Intel (Yushu) by Dec 6

**R1-1721575 WF on SRS Resource Configurations Vivo**
Also supported by Intel

Agreement:

- Support to use RRC signalling to explicitly differentiate between SRS resources sets for beam management and SRS resource set for codebook/non-codebook based UL transmission;
- For SRS resources sets for UL beam management, only one resource in each of multiple SRS sets can be transmitted at a given time instant
  - The SRS resources in different SRS resource sets can be transmitted simultaneously

Agreement: Maximum number of SRS resources that can be configured for non-codebook based uplink transmission is 4

Agreement: The AP-SRS(s) is transmitted X symbols after AP-CSI-RS. X is fixed for all UE (FFS X values)

- X is defined per SCS

R1-1719431 Remaining details of non-codebook based transmission for UL MIMO Huawei, HiSilicon
R1-1719528 Remaining details on non-codebook based UL transmission ZTE, Sanechips
R1-1719563 Non-codebook based transmission MediaTek Inc.
R1-1719738 Discussion of non-codebook based UL transmission Lenovo, Motorola Mobility
Late submission
R1-1719765 Remaining issues on non-codebook based UL transmission vivo
R1-1719903 Discussion on non-codebook based transmission for UL LG Electronics
R1-1719965 Remaining issues on uplink non-codebook transmission Guangdong OPPO Mobile Telecom
R1-1720067 Remaining issues on non-codebook based UL transmission Intel Corporation
R1-1720179 Discussion on remaining details of non-codebook based transmission for UL CATT
R1-1720283 Discussion on Non-Codebook-Based UL Transmission Samsung
R1-1720658 Remaining details on non-codebook based UL transmission Qualcomm Incorporated
R1-1720800 Remaining details on non-codebook based transmission for uplink NTT DOCOMO, INC.
R1-1720887 Non-codebook based UL-MIMO transmission Nokia, Nokia Shanghai Bell
R1-1721037 Non-codebook based UL MIMO remaining details Ericsson
R1-1721586 WF on remaining issues on SRS field LG Electronics, Intel Corporation

### 7.2.1.4 Remaining details on PRB bundling for DL

**R1-1721420 Summary of Remaining Details on PRB Bundling for DL Vivo**

Agreement: The PRB bundling size of 1 is not supported.

**R1-1721576 Implicit Rule for PRB Bundling InterDigital, LG, Ericsson, Qualcomm, Samsung, ZTE, Sanechips, CATT, Convida Wireless, Sharp, IITH, CeWIT, IITM, TEJAS Networks, Panasonic, KDDI**

Agreement

- When the DCI bit field indicated “1” and two candidate values are configured
  - PRG size is determined based on the minimum # of contiguous scheduled PRBs
    - If configured candidates = (2, Case-2)
      - PRG = 2, if minimum No. of contiguous scheduled PRBs < BWP/2
      - PRG = Case-2, otherwise
    - If configured candidates = (4, Case-2)
      - PRG = 4, if minimum No. of contiguous scheduled PRBs < BWP/2
      - PRG = Case-2, otherwise
  - The UE is not expected to be configured with (2, 4) for implicit determination for DCI bit field “1”.
- Note: Per agreement from #90b meeting, “When a UE is configured with RBG=2, the UE is not expected to be configured with PRG=4”.

Agreement: UE is not expected to be indicated “scheduled BW” for PRB bundling with non-consecutive RB scheduling

R1-1720284 Remaining details for DL PRB bundling Samsung
R1-1720659 Discussion on PRB bundling for DL Qualcomm Incorporated
R1-1720740 PRB bundling for DL Ericsson
R1-1719432 Remaining details on PRB bundling size for DL data precoding Huawei, HiSilicon
R1-1719529 Remaining details on PRB bundling for DL ZTE, Sanechips
R1-1719582 On remaining details of PRB bundling: orphan RB consideration MediaTek Inc.
R1-1719766 Remaining issues on PRB bundling for DL vivo

R1-1719904 Discussion on PRB bundling LG Electronics
R1-1720068 On PRB bundling for DL Intel Corporation
R1-1720180 PRB bundling for DL transmission CATT
R1-1720626 Details on PRG size determination InterDigital, Inc.
R1-1720888 On remaining issues on PRB bundling Nokia, Nokia Shanghai Bell

#### *7.2.1.5 Other*

R1-1719530 On Transmission Setting ZTE, Sanechips
R1-1719816 Enabling multiple NR-PDCCH for multiple TRP transmission Huawei, HiSilicon
R1-1719817 Differential Rank Indication for Multi-subband UL MIMO Huawei, HiSilicon
R1-1719963 Control of UE beamforming in RRC_CONNECTED ASUSTEK COMPUTER (SHANGHAI)
R1-1719966 Discussion on UL single Tx port transmission Guangdong OPPO Mobile Telecom
R1-1720285 Simulation results for 4-Tx UL Codebook Samsung
R1-1720286 Continuous precoding for NR DMRS in time domain Samsung
R1-1720287 Discussions on UE assistance/reporting for NR Samsung
R1-1720627 On PDSCH rate matching for NR InterDigital, Inc.
R1-1720716 Codebook based transmission with multiple SRI Ericsson
R1-1720717 UL MIMO Signaling Details Ericsson
R1-1720971 Antenna Selection UL Transmission Ericsson
R1-1720972 Uplink Transmission on Non-homogeneous Arrays Ericsson

### 7.2.2 Remaining details on CSI acquisition and beam management

#### *7.2.2.1 Remaining details on CSI measurement*

**R1-1721371 Summary of remaining issues on CSI measurement ZTE, Sanechips**

Agreement

- Nmax=6
  - Including both CMR and/or NZP/ZP CSI-RS based IMR
- Each trigger state is associated one or multiple ReportConfigs where each ReportConfig is linked to one or two or three P/SP/AP CSI-RS resource setting(s)
  - When one resource setting is configured, the resource setting is for channel measurement for beam management.
  - When two resource settings are configured, the first one resource setting is for channel measurement and the 2nd one is for interference measurement (for ZP or NZP).
  - When three resource settings are configured, the first one resource setting is for channel measurement, the 2nd one is for ZP based interference measurement and the 3rd one is for NZP based interference measurement.
  - If a resource setting linked to a ReportConfig has multiple aperiodic resource sets and only a subset of the aperiodic resource sets is associated with the trigger state, a bitmap (with the bitwidth $N_{bit}$ =number of resource sets in a resource setting. Number of one(s) in the bitmap $N_{one}$ = 1 for CSI acquisition) is RRC configured per trigger state per resource setting to select CSI-IM/NZP CSI-RS resource set(s) from the resource setting.
    - FFS on $N_{one}$ for multiple TRP cases
    - FFS: 1<= $N_{one}$ <=$N_{onemax}$ (FFS) for beam management
- Support CSI-RS configuration (including aperiodic triggering) with or without report at least for P3 BM, and for the case of non-codebook based UL transmission (FFS for TRS). This can be achieved by configuring "No report" in reportQuantity in ReportConfig.

Agreement
For channel measurement, Non-PMI-PortIndication is contained in report setting

- UE is configured with higher layer parameter Non-PMI-PortIndication contained in a ReportConfig, where R ports are indicated for rank R and each CSI-RS resource in the CSI resource setting linked to the ReportConfig in a MeasLinkConfig, based on the order of the associated NZP-CSI-RS-ResourceConfigID in the linked CSI resource setting linked for channel measurement.
- Port index indication is independent for different ranks

Agreement
Confirm the following working assumption

- For ZP CSI-RS based IMR, support (2,2) and (4,1) which are configurable by RRC signaling

**R1-1721546 RRC parameters for CSI measurement ZTE, Sanechips**

Agreement
The numerical values in the table below are agreed. The name of the parameters and description is left up to the editor with the understanding that the behaviour is unchanged.

| Sub-Feature Group | Parameter | To be added or updated | Description | Comments |
|---|---|---|---|---|
| CSI & Beam Management Framework | reportTrigger | Updated | Contains Sc trigger states for dynamically selecting one or more aperiodic reporting configurations and/or triggering one or more aperiodic CSI-RS resource sets for channel and/or interference measurement. (Max Sc=128) | Contained in MeasConfig |
| CSI & Beam Management Framework | N_states_bit | Updated | Number of DCI bits for report trigger states. N_states_bit={0,1,2,3,4,5,6} | Contained in ReportConfig |
| CSI & Beam Management Framework | ReportConfigIDList | Added | A list of ReportConfigIDs per report trigger state (max number of ReportConfigIDs = 16) | Contained in reportTrigger |
| CSI & Beam Management Framework | ResourceSetBitmap | Added | bitmap with the bitwidth $N_{bit}$ =number of resource sets (max number $N_{bit}$ = 16) in a linked resource setting per report trigger state. Number of one(s) in the bitmap $N_{one}$ = 1 for CSI acquisition and beam management | Contained in reportTrigger |

**R1-1721634 Summary of remaining issues on CSI measurement ZTE, Sanechips**

Agreement Port index indications are configured in the order of layer ordering.

Agreement: UE is not expected to be indicated with CMR subset and IMR subset with overlapping resources

**R1-1721529 NZP CSI-RS for interference measurement Huawei, HiSilicon, Ericsson, Tejas Network, III, Deutsche Telekom, IITH, KDDI, Softbank, CEWiT, IITM, China Unicom, Spreadtrum, Qualcomm, Intel, ZTE, Sanechips, OPPO, Sharp**
**Also supported by Samsung**

Agreement: Support UE CSI acquisition where:
- On a NZP CSI-RS resource for channel measurement, UE assumes
  - Each port corresponds to a PDSCH transmission layer if no PMI or RI is reported
- On a NZP CSI-RS resource for interference measurement, UE assumes
  - Each port corresponds to an interference transmission layer
- On REs of CMR and ZP/NZP-based IMR, UE assumes
  - Other interference signal may present (ex: other cell interference)
- UE performs accumulation of interference estimated on the following
  - All interference layers on NZP IMR(s) taking into account the associated Pc power boosting; and
  - Other interference signal on REs of CMR/IMR
  - Notes: this does not mandate specific UE implementation

Agreement: UE assumes the same spatial QCL assumption for ZP/NZP-CSI-RS based IMR resource as the one configured for NZP CSI-RS resource for CM.

Agreement: Activation and deactivation of semi-persistent CSI-IM is done with the same MAC CE message as that activates/deactivates semi-persistent CSI-RS

R1-1719424 Channel and interference measurement for CSI acquisition Huawei, HiSilicon

R1-1720660 Remaining details on CSI measurement Qualcomm Incorporated
R1-1720733 On remaining details of CSI measurement Ericsson
R1-1719531 Remaining details on CSI measurement ZTE, Sanechips
R1-1719631 Remaining details on CSI measurement AT&T
R1-1719767 Remaining details on CSI measurement vivo
R1-1719905 Discussion on CSI measurement LG Electronics
R1-1720069 Remaining issues on interference measurement for CSI Intel Corporation
R1-1720288 Remaining details on CSI measurements Samsung
R1-1720457 Considerations on interference measurement Sony
R1-1720801 Views on CSI measurement for NR NTT DOCOMO, INC.

#### *7.2.2.2 Remaining details on CSI reporting*

**R1-1721451 Summary of views on CSI reporting Ericsson**

Agreement:
- A CSI report setting is associated with a single DL BWP and contains the following DL BWP-specific information:
    - One CSI reporting band
- The associated DL BWP information is configured per Resource Setting
    - All linked Resource Settings of a CSI Report Setting have the same BWP

Agreement: A periodic or semi-persistent CSI report, associated with a DL BWP, scheduled for reporting in slot $n$ is reported only if the associated DL BWP was the active DL BWP in the time location of the CSI reference resource (slot $n_{CQI,REF} = n - n_{CQI,REF,offset}$) for the CSI report

Agreement For aperiodic CSI report triggering, a single set of CSI triggering states are RRC configures, wherein the CSI triggering states can be associated with either candidate DL BWP. A UE is not expected to be triggered with a CSI report for a non-active DL BWP

Agreement A set of SP-CSI report settings for PUSCH are RRC configured and CSI request field in DCI scrambled with SP-CSI C-RNTI activates one of the SP-CSI reports

Agreement
- SP CSI reporting on PUCCH is activated by MAC CE
    - One of the SP CSI Report Setting for PUCCH is selected by the same MAC CE
- Each SP CSI Report Setting for PUCCH is configured in RRC with the PUCCH resource used for transmitting the CSI report

Agreement
- Introduce new possible values in the report quantity parameter in Report Setting to indicate presence of strongest layer indicator (LI) in the CSI report

**R1-1721527 WF on CSI timing offset for PUSCH LG Electronics, Ericsson, InterDigital, Samsung**

Agreement
- Restrictions on CSI periodicity as a function of SCS is not supported in RAN1 specification
    - Minimum CSI periodicity is part of UE capability signaling
- Grant RAN2 prerogative to add additional CSI reporting periodicities (> 5 ms) for purpose of aligning with DRX cycles, if needed

Send an LS to RAN2 – Sebastian (Ericsson)

**R1-1721678 [Draft LS] LS on CSI reporting periodicities for NR Ericsson**
Decision: The document is endorsed and final LS is approved in R1-1721682.

Agreement:
- L1-RSRP and resource indicators for beam management are mapped to the first CSI Part when reported on long PUCCH or PUSCH

Agreement:

- For priority rules for CSI collision, the following definition is used: “Two CSI reports are said to collide if the time occupancy of the physical channels scheduled to carry the CSI reports overlap in at least one OFDM symbol and are transmitted on the same carrier”

**R1-1721525** **WF on CQI calculation LG Electronics, Huawei, HiSilicon, CATT, Spreadtrum, Nokia, NSB, vivo, ZTE, KT Corporation, ITRI, Samsung, OPPO, NEC**

**R1-1721672** **Offline notes CSI reporting Ericsson**

Agreement:
- Refine subband sizes as follows:

| Carrier bandwidth part (PRBs) | Subband Size (PRBs) |
|---|---|
| < 24 | N/A |
| 24 – 72 | 4,8 |
| 73 – 144 | 8,16 |
| 145 – 275 | 16,32 |

Working assumption:
- For partial CSI part 2 omission procedure at least when CSI is multiplexed with UL-SCH on PUSCH:
  - CSI part 2 information bits are not omitted if UCI code rate is below threshold $c_T$
  - Lower priority information bits are omitted until CSI Part 2 UCI code rate is below $c_T$
    - For threshold code rate $c_T = \frac{c_{MCS}}{\beta_{offset}^{CSI-2}}$, where $c_{MCS}$ is the target code rate for PUSCH given from the MCS field and $\beta_{offset}^{CSI-2}$ is the associated beta_offset for CSI part 2:
  - Note: The number of PUSCH REs for UCI with CSI Part 2 is given by $\beta_{offset}^{CSI-2}$ and PUSCH resource allocation according to UL control and maximum UCI payload size
  - Note: Working assumption assuming LTE type UCI on PUSCH resource allocation is supported

R1-1721677 WF on CSI timing offset for PUSCH LG Electronics, Ericsson
Email discussion until Dec 6 - Ericsson (Sebastian)

R1-1719906 Discussions on CSI reporting LG Electronics
R1-1720734 On remaining details of CSI reporting Ericsson
R1-1720628 Remaining issues on CSI reporting InterDigital, Inc.
R1-1719425 Remaining issues for CSI reporting Huawei, HiSilicon
R1-1719532 Remaining details on CSI reporting ZTE, Sanechips
R1-1719564 Remaining details for CSI reporting MediaTek Inc.
R1-1719696 Remaining issues on CSI feedback Spreadtrum Communications
R1-1719768 Remaining details on CSI reporting vivo
R1-1720070 Remaining issues on CSI reporting Intel Corporation
R1-1720181 Remaining details on CSI reporting CATT
R1-1720289 CSI Reporting and UCI Multiplexing Samsung
R1-1720612 Remaining issues on CSI reporting Sharp, APT
R1-1720661 Remaining details on CSI reporting Qualcomm Incorporated
R1-1720802 Remaining issues on CSI reporting NTT DOCOMO, INC.
R1-1720866 Remaining details on CSI reporting FiberHome
Late submission
R1-1720889 Remaining details on CSI reporting Nokia, Nokia Shanghai Bell

#### 7.2.2.3 Remaining details on beam measurement and reporting

*Including Beam Indication, UL beam management*

**R1-1721396** **Summary of Beam Mgmt open issues Qualcomm**

Agreement:
Mechanism to indication of source QCL for a resource:
- P-CSI-RS – through RRC configuration
  - FFS: If the spatial QCL can be configured through a reference to a configured TCI state
- SP-CSI-RS – configuring the resource(s) through RRC, activation/deactivation through MAC-CE;
  - The QCL for SP- CSI-RS is indicated in the same MAC-CE message that activates the SP- CSI-RS.
  - The QCL is provided through an association with one of the M candidate TCI states

- AP-CSI-RS –
  - Through DCI (AP-CSI-report-triggering state indication)
    - For each AP-CSI-RS resource associated with each triggering state, QCL configuration is provided through an association with one of the M candidate TCI states by RRC
      - FFS: Value of M
    - FFS: TCI association on NZP-CSI-RS/ZP-CSI-RS based IMR

Agreement:
PUCCH beam indication is introduced by RRC signalling
- Introduce one RRC parameter: PUCCH-Spatial-relation-info
  - Information associating an SSB ID or, a CRI, or a SRI
  - This is per PUCCH resource configuration

Agreement:
For the number of TCI states and mapping to DCI bits, N is 3 bits.
- Note: The number of TCI states supported by a UE depends on its capability

Agreement:
- The state Is-TCI-Present is configured on a per-CORESET basis
- For beam management with beam indication, on all CORESETs configured with Is-TCI-Present=false, the TCI state used for PDCCH is reused for PDSCH reception

Agreement:
- A candidate set of DL RSs are configured using RRC mechanism
  - Each state of M TCI states is RRC configured with a downlink RS set used as a QCL reference, and MAC-CE is used to select up to 2^N TCI states out of M for PDSCH QCL indication
    - The same set of M TCI states are reused for CORESET
    - K TCI states are configured per CORESET
    - When K>1, MAC CE can indicate which one TCI state to use for control channel QCL indication
    - When K=1, no additional MAC CE signaling is necessary

**R1-1721571** **Summary of Beam Mgmt.** **Qualcomm**

**R1-1721640** **Summary of Beam Mgmt** **Qualcomm**

Agreement:
- When the scheduling offset is <=k, the PDSCH uses QCL assumption that is based on a default TCI state (e.g. the first state of the 2^N states used for PDSCH QCL indication)

Agreement:
Differential RSRP is computed with reference to the strongest reported RSRP
- Step size: 2dB

Agreement: Computation of L1-RSRP as a linear average of each port's RSRP for the 2-port CSI-RS for beam mgmt.

Agreement: Between initial RRC configuration and MAC CE activation of TCI states, the UE may assume that both PDCCH and PDSCH DMRS are spatially QCL-ed with the SSB determined during initial access

Agreement:
- For the beam management use case, support configuration of up to S=16 CSI-RS resources sets per resource setting, and Ks=1~64 CSI-RS resources per resource set
  - The total number of CSI-RS resources in all sets cannot be more than 128
- Note: One set is selected out of S sets in the CSI trigger states

**R1-1721696** **Summary of Beam Mgmt** **Qualcomm**

Agreement:
- When the scheduling offset is <=k, and the PDSCH uses QCL assumption that is based on a default TCI state
  - The default TCI state corresponds to the TCI state used for control channel QCL indication for the lowest CORESET ID in that slot

Agreement:

- Aperiodic CSI-RS triggering offset X is configurable. X is defined in units of slots.
    - FFS: Per resource or per resource set – email discussion Qualcomm (Sundar)

Agreement:

- Modify the RRC parameter PUCCH-Spatial-relation-info as list.
    - Each entry can be SSB ID or, a CRI, or a SRI
    - One or multiple SpatialRelationInfo IE(s) is included in the list.
- Introduce MAC-CE signalling to provide spatial relation information for a PUCCH resource to one of the entries in PUCCH-Spatial-relation-info
- If PUCCH-Spatial-relation-info includes one SpatialRelationInfo IE, UE applies the configured SpatialRelationInfo and no MAC-CE is used.
- MAC-CE Impact:

| | | | | |
|---|---|---|---|---|
| TS38.214 | | Indication of spatial relation for PUCCH | Provides the spatial relation for a PUCCH resource | PUCCH resource ID \| Bitmap of size [8] (Bitmap activates one of the [8] entries within the RRC parameter *PUCCH-Spatial-relation-info)* |

- RRC modification:

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| PUCCH-SpatialRelationInfo | New | PUCCH-SpatialRelationInfo | List of configurations of the spatial relation between reference RS and PUCCH. Reference RS can be SSB/CSI-RS/SRS. SSB Index, NZP-CSI-RS-ResourceConfigId, or SRS-ResourceConfigId | | UE-Specific | | 38.331 | |

R1-1720182 Remaining details on beam management CATT
R1-1720803 Views on NR beam management NTT DOCOMO, INC.
R1-1719565 Further details on Beam management MediaTek Inc.

R1-1719422 Beam measurement, reporting and indication Huawei, HiSilicon
R1-1719533 Discussion on beam management ZTE, Sanechips
R1-1719632 Remaining details on beam measurement and reporting AT&T
R1-1719690 Remaining issues on beam reporting Spreadtrum Communications
R1-1719734 Discussion of beam measurement and reporting Lenovo, Motorola Mobility
Late submission
R1-1719769 Remaining details on beam measurement and reporting vivo
R1-1719907 Discussion on DL/UL beam management LG Electronics
R1-1719987 Discussion on Remaining Issues of Beam Management Guangdong OPPO Mobile Telecom
R1-1720071 Remaining issues on Beam Management Intel Corporation
R1-1720117 Discussion on Beam Measurement and Reporting Apple Inc.
R1-1720290 On Beam Management, Measurement and Reporting Samsung
R1-1720573 Discussions on beam reporting NEC
R1-1720586 Discussion on remaining issues for beam management CMCC
R1-1720630 Remaining issues on beam management InterDigital, Inc.
R1-1720662 Beam management for NR Qualcomm Incorporated
R1-1721366 Remaining details of beam management Ericsson (rev of R1-1720730)
R1-1720890 Beam Indication, Measurements and Reporting Nokia, Nokia Shanghai Bell

#### *7.2.2.4 Remaining details on mechanism to recover from beam failure*

**R1-1721494 Summary for Remaing issues on Beam Failure Recovery MediaTek Inc.**

Agreement

**Table 1 Beam-failure-recovery-request-RACH-Resource configuration**

| RRC parameter | | Value range | Note/description |
|---|---|---|---|
| RootSequenceIndex-BFR | | {0,1,…,137} | Short sequence only |
| ZeroCorrelationZoneConfig-BFR | | {0,1,..,15} | Determine cyclic shift. Value range same as IA session |
| PreambleInitialReceivedTargetPower-BFR | | FFS | Value range same as IA session |
| ra-PreambleIndexConfig-BFR | | FFS | Value range same as IA session |
| PreambleTransMax-BFR | | FFS | Value range same as IA session |
| powerRampingStep-BFR | | FFS | |
| CandidateBeamThreshold | | | One threshold for CSIRS |
| Candidate-Beam-RS-List | | | A list of RS indices. The entry of each list can be a SSB index or a CSI-RS resource index |
| PRACH-resource-dedicated-BFR | | | The following fields are defined for each candidate beam RS |
| | Candidate-Beam-RS | {SSB index or CSI-RS ID} | RS index that is associated with the following PRACH resource<br>Note: if the candidate-beam-RS-List includes both CSIRS resource indexes and SSB indexes, AND only SSB indexes are associated with PRACH resources, NR standard should specify a rule that the UE should Monitor both CSI-RS and SSB for New Beam Identification. |
| | ra-PreambleIndex-BFR | FFS | Preamble index used to select one from a sequence pool |
| | prach-FreqOffset-BFR | FFS | FDM'ed to other PRACH resources.<br>Value range same as IA session |
| | masks for RACH resources and/or SSBs | FFS | Time domain mask.<br>Value range same as IA session |

**Table 2 Other RRC parameters related to beam failure recovery**

| RRC parameter (UE-specific parameters) | Value range | Note/description |
|---|---|---|
| ResponseWindowSize-BFR | FFS | Time duration for monitoring gNB response in Beam-Failure-Recovery-Response-CORESET after BFRQ. Similar to *ra-ResponseWindowSize* |
| Beam-failure-recovery-Timer | FFS | Details on UE behaviour related to the timer is FFS |
| NrOfBeamFailureInstance | FFS | Consecutive number of beam failure instances for declaring beam failure |
| Beam-Failure-Recovery-Response-CORESET | FFS | |

**R1-1721524 LS to RAN1 on beam recovery failure RAN2, Nokia**

**R1-1721549 Offline Summary for Remaing issues on Beam Failure Recovery MediaTek Inc.**

Agreement:
For a UE, only periodic CSI-RS or SSB which is spatially QCL'ed with PDCCH DMRS is used for beam failure detection
- Support explicit configuration for the periodic CSI-RS for beam failure detection
    - If this configuration is not made, the default mode is the following:
        - UE expects at least one of periodic CSI-RS or SSB is spatially QCL'ed to PDCCH DMRS

Agreement:
The measurement metric for candidate beam selection is L1-RSRP
- An RRC parameter is introduced to configure the threshold value for L1-RSRP based on CSI-RS
    - Another threshold can be implicitly derived for L1-RSRP based on SSB

**R1-1721645 Offline summary on remaining issues on Beam Failure Recovery MediaTek Inc.**

Agreement
The BLER used for beam failure recovery reuses RLM default BLER threshold for RLM out-of-sync declaration

Agreement
The starting point of the observation window of gNB response to beam failure recovery request transmission is 4 slots

**R1-1721670 WF for BFR Candidate Beam Selection Huawei, HiSilicon, Mediatek, LGE, Intel, NEC, Lenovo, Motorola Mobility, Spreadtrum, ATT, Fujitsu, Ericsson**
Also supported by DOCOMO

**Rl-1721615 WF on new beam identification for beam failure recovery LG Electronics, InterDigital, Huawei, HiSilicon, AT&T**

**R1-1721673 WF for handling partial beam failure NTT DOCOMO, Intel, Huawei, NEC, Spreadtrum, MediaTek, China Telecom, AT&T**

**Conclusion**
Draft LS to RAN2 to notify RAN2 impact of beam failure recovery with the following aspects (MediaTek)
- Mechanism for beam failure declaration
- Trigger condition beam failure recovery request transmission
- Non-contention PRACH resources are used for beam failure recovery request transmission
- Mechanism to decide successful/unsuccessful recovery from beam failure

**R1-1721699 Offline discussion summary on remaining issues on Beam Failure Recovery MediaTek**
For email approval by Dec 6th – MediaTek (Weidong)
**R1-1721700 [DRAFT] LS to RAN2 on Beam Failure Recovery MediaTek**
The LS is for email approval by Dec 6th – MediaTek (Weidong)

R1-1719633 Remaining details on mechanisms to recover from beam failure AT&T
R1-1721056 Further details on beam failure recovery MediaTek Inc. (rev of R1-1719566)
R1-1720663 Beam recovery procedures Qualcomm Incorporated
R1-1719423 Remaining details on beam failure recovery Huawei, HiSilicon
R1-1719534 Discussion on beam recovery ZTE, Sanechips
R1-1719619 Discussion on beam failure recovery Fujitsu
R1-1719695 Remaining issues on UE initiated beam failure recovery Spreadtrum Communications
R1-1719735 Discussion of beam failure recovery Lenovo, Motorola Mobility
Late submission
R1-1719770 Remaining details on mechanism to recover from beam failure vivo
R1-1719908 Discussion on beam failure recovery LG Electronics
R1-1719988 Discussion on Beam Recovery Mechanism Guangdong OPPO Mobile Telecom
R1-1720072 Remaining issues on beam failure recovery Intel Corporation
R1-1720183 Remaining issues on DL beam failure recovery CATT
R1-1720291 Beam failure recovery Samsung
R1-1720567 Remaining Issues for Beam Failure Recovery Procedure ASUSTEK COMPUTER (SHANGHAI)
R1-1720574 On partial beam failure recovery NEC
R1-1720587 Discontinuous beam recovery mechanism CMCC
R1-1720613 Discussion on mechanisms for beam failure recovery Sharp
R1-1720631 Remaining issues on beam recovery InterDigital, Inc.
R1-1720737 Remaining details of beam recovery Ericsson
R1-1720804 Remaining issues on beam recovery NTT DOCOMO, INC.
R1-1720891 Beam Recovery in NR Nokia, Nokia Shanghai Bell
R1-1721523 WF on handling partial beam failure NTT DOCOMO, Samsung, MediaTek, AT&T, ZTE, Intel, Huawei

#### *7.2.2.5 Remaining details on CQI and MCS*

**R1-1721478 Summary of CQI and MCS table AT&T**

Working Assumption: Reuse the LTE CQI table for maximum modulation order of 256 QAM for eMBB

**Table 1 - 4-bit CQI Table for 256 - QAM**

| CQI index | modulation | code rate x 1024 | efficiency |
|---|---|---|---|
| 0 | out of range | | |
| 1 | QPSK | 78 | 0.1523 |
| 2 | QPSK | 193 | 0.3770 |
| 3 | QPSK | 449 | 0.8770 |
| 4 | 16QAM | 378 | 1.4766 |
| 5 | 16QAM | 490 | 1.9141 |
| 6 | 16QAM | 616 | 2.4063 |
| 7 | 64QAM | 466 | 2.7305 |
| 8 | 64QAM | 567 | 3.3223 |
| 9 | 64QAM | 666 | 3.9023 |
| 10 | 64QAM | 772 | 4.5234 |
| 11 | 64QAM | 873 | 5.1152 |
| 12 | 256QAM | 711 | 5.5547 |
| 13 | 256QAM | 797 | 6.2266 |
| 14 | 256QAM | 885 | 6.9141 |
| 15 | 256QAM | 948 | 7.4063 |

Working Assumption: Reuse the LTE MCS table for PDSCH for modulation schemes up to 64 QAM and 256 QAM with code rate changed to [x 1024] as shown in Tables 2 and 3

- These tables apply for eMBB

**Table 2 - Modulation and code rate table for PDSCH with max modulation order 64QAM with code rate [x1024]**

| MCS Index $I_{MCS}$ | Modulation Order $Q_m$ | Code rate $R$ × 1024 | Spectral efficiency |
|---|---|---|---|
| 0 | 2 | 120 | 0.2344 |
| 1 | 2 | 157 | 0.3066 |
| 2 | 2 | 193 | 0.3770 |
| 3 | 2 | 251 | 0.4902 |
| 4 | 2 | 308 | 0.6016 |
| 5 | 2 | 379 | 0.7402 |
| 6 | 2 | 449 | 0.8770 |
| 7 | 2 | 526 | 1.0273 |
| 8 | 2 | 602 | 1.1758 |
| 9 | 2 | 679 | 1.3262 |
| 10 | 4 | 340 | 1.3281 |
| 11 | 4 | 378 | 1.4766 |
| 12 | 4 | 434 | 1.6953 |
| 13 | 4 | 490 | 1.9141 |
| 14 | 4 | 553 | 2.1602 |
| 15 | 4 | 616 | 2.4063 |
| 16 | 4 | 658 | 2.5703 |
| 17 | 6 | 438 | 2.5664 |
| 18 | 6 | 466 | 2.7305 |
| 19 | 6 | 517 | 3.0293 |
| 20 | 6 | 567 | 3.3223 |
| 21 | 6 | 616 | 3.6094 |
| 22 | 6 | 666 | 3.9023 |
| 23 | 6 | 719 | 4.2129 |
| 24 | 6 | 772 | 4.5234 |
| 25 | 6 | 822 | 4.8164 |
| 26 | 6 | 873 | 5.1152 |
| 27 | 6 | 910 | 5.3320 |

| | | | |
|---|---|---|---|
| 28 | 6 | 948 | 5.5547 |
| 29 | 2 | reserved | |
| 30 | 4 | | |
| 31 | 6 | | |

**Table 3 - Modulation and code rate table for PDSCH with max modulation order 256 QAM with code rate [x1024]**

| MCS | Mod | Code rate × 1024 | Spectral efficiency |
|---|---|---|---|
| 0 | 2 | 120 | 0.2344 |
| 1 | 2 | 193 | 0.3770 |
| 2 | 2 | 308 | 0.6016 |
| 3 | 2 | 449 | 0.8770 |
| 4 | 2 | 602 | 1.1758 |
| 5 | 4 | 378 | 1.4766 |
| 6 | 4 | 434 | 1.6953 |
| 7 | 4 | 490 | 1.9141 |
| 8 | 4 | 553 | 2.1602 |
| 9 | 4 | 616 | 2.4063 |
| 10 | 4 | 658 | 2.5703 |
| 11 | 6 | 466 | 2.7305 |
| 12 | 6 | 517 | 3.0293 |
| 13 | 6 | 567 | 3.3223 |
| 14 | 6 | 616 | 3.6094 |
| 15 | 6 | 666 | 3.9023 |
| 16 | 6 | 719 | 4.2129 |
| 17 | 6 | 772 | 4.5234 |
| 18 | 6 | 822 | 4.8164 |
| 19 | 6 | 873 | 5.1152 |
| 20 | 8 | 682.5 | 5.3320 |
| 21 | 8 | 711 | 5.5547 |
| 22 | 8 | 754 | 5.8906 |
| 23 | 8 | 797 | 6.2266 |
| 24 | 8 | 841 | 6.5703 |
| 25 | 8 | 885 | 6.9141 |
| 26 | 8 | 916.5 | 7.1602 |
| 27 | 8 | 948 | 7.4063 |
| 28 | 2 | reserved | |
| 29 | 4 | | |
| 30 | 6 | | |
| 31 | 8 | | |

Working Assumption: For PUSCH with CP-OFDM, reuse the PDSCH MCS tables (for both 64-QAM and 256-QAM).

- This applies for eMBB

Working Assumption:For PUSCH with transform precoding, the MCS table supporting up to 256-QAM, does not need to support pi/2-BPSK modulation. Use the same table as that of CP-OFDM for 256 QAM

- This applies for eMBB

**Proposal 5**
For PUSCH with transform precoding, same MCS table as that of CP-OFDM is used with the first 2 entries are replaced with Pi/2 BPSK modulation with the same two lowest SEs as in Table 4
Email discussion for MCS table for DFT-s-OFDM with 64QAM by Dec 6th - AT&T(Sai)

Agreement: UE can assume the following for CSI computation for eMBB:

- Control symbols equal to 2 OFDM symbols
- Number of PDSCH symbols is equal to 12

- BWP PDSCH numerology
- UE assumes the same BW as the BW that it reports CQI for
- RV equal to 0
- Configured DMRS including type and symbol
    - The number of front loaded DMRS symbols assumed to be same as the maximum front-loaded symbols configured by RRC
    - The number of additional DMRS symbols assumed to be same as the additional symbols configured by RRC
- Assume TDM of DMRS and PDSCH

Agreement: In NR, when a UE is configured to report subband CQI, use the same scheme as LTE for eMBB:
- The bitwidth of subband CQI is 2
- Subband CQI is defined as differential CQI relative to 4-bit wideband CQI
- Mapping subband differential CQI value to offset level:

| Subband differential CQI value | Offset level |
|---|---|
| 0 | 0 |
| 1 | 1 |
| 2 | ≥2 |
| 3 | ≤-1 |

R1-1719535 On CQI and MCS ZTE, Sanechips
R1-1719584 CQI reporting for multiple services in NR MediaTek Inc.
R1-1719634 Remaining issues of CQI and MCS tables AT&T
R1-1719771 Remaining issues on CQI and MCS vivo
R1-1719909 Discussion on CQI and MCS tables LG Electronics
R1-1720073 CQI/MCS for NR Intel Corporation
R1-1720292 CQI Definition Samsung
R1-1720664 Remaining details on MCS Qualcomm Incorporated
R1-1721433 Remaining details of CQI and MCS design Huawei, HiSilicon (rev of R1-1719429)
R1-1721445 CQI Tables and MCS Tables for NR Ericsson (rev of R1-1719595)
R1-1721594 WF on subband CQI Samsung, Ericsson, CATT, Interdigital, Huawei, HiSilicon, LG Electronics, MediaTek, NTT DOCOMO, AT&T

#### 7.2.2.6 Other

R1-1719426 Remaining issues for CSI framework Huawei, HiSilicon
R1-1719427 Signaling design for CSI reporting Huawei, HiSilicon
R1-1719428 Remaining issues for codebook subset restriction Huawei, HiSilicon
R1-1719536 Enhancements on CSI framework ZTE, Sanechips
R1-1719537 Details and evaluation results on beam reporting ZTE, Sanechips
R1-1719538 Details and evaluation results on beam indication ZTE, Sanechips
R1-1719806 Further details on beam indication Huawei, HiSilicon
R1-1719807 Beam management for PUCCH Huawei, HiSilicon
R1-1719808 Design of PRACH-based Beam Failure Recovery Huawei, HiSilicon
R1-1719809 Design of PUCCH-based Beam Failure Recovery Huawei, HiSilicon
R1-1719810 Considerations on timing advance design in NR Huawei, HiSilicon
R1-1719811 Multi-beam transmission for DL control channel Huawei, HiSilicon
R1-1719812 Robust transmission for UL control Huawei, HiSilicon
R1-1719813 On aperiodic CSI-RS triggering Huawei, HiSilicon
R1-1719815 CSI acquisition details for NCJT Huawei, HiSilicon
R1-1719819 Further enhancements on codebook design Huawei, HiSilicon
R1-1720293 CSI Acquisition and Beam Management Framework Samsung
R1-1720294 CSI Reporting for Reciprocity Operation Samsung
R1-1720295 Discussion on CSI-RS Resource Allocation Samsung
R1-1720296 Port selection codebook for beamformed CSI-RS Samsung
R1-1720297 Extension of Type I multi-panel codebook Samsung
R1-1720298 Differential reporting of Type II CSI Samsung
R1-1720299 On higher rank Type II CSI Samsung
R1-1720300 Remaining details on subband CSI reporting Samsung
R1-1720301 Remaining details on UE group based beam reporting Samsung
R1-1720302 Remaing details on PDSCH beam indication Samsung
R1-1720304 Discussion on beam indication for UL transmission Samsung

R1-1720305 Discussion on cross-carrier beam management Samsung
R1-1720306 CSI Feedback Overhead Reduction Samsung
R1-1720307 Discussion on joint CLI measurement and beam management Samsung
R1-1720308 Details on configuration of presence of TCI in DCI Samsung
R1-1720458 Considerations on CSI framework Sony
R1-1720665 Remaining details on CSI framework Qualcomm Incorporated
R1-1720718 NR CSI Computation Capability Ericsson
R1-1720719 Multi-cell beam recovery Ericsson
R1-1720720 Beam management in C-DRX Ericsson
R1-1720721 Performance of beam management without beam indication Ericsson
R1-1720723 On CSI subband size Ericsson
R1-1720724 Performance impact of inactive antenna ports Ericsson
R1-1720743 Signaling overhead analysis for CSI framework Ericsson
R1-1720746 On semi-persistent CSI reporting on PUSCHEricsson
R1-1720747 Frequency parameterization for Type II CSI codebook Ericsson
R1-1720805 Performance investigation on beam reporting NTT DOCOMO, INC.
R1-1720806 Remaining details on BM and CSI framework NTT DOCOMO, INC.
R1-1720833 Beam management parameters MediaTek Inc.
R1-1720924 Discussion on higher rank Type II codebook and feedback overhead reduction Motorola Mobility, Lenovo
R1-1720973 Details of CSI feedback for Transparent PDSCH TxDEricsson
R1-1720974 CSI feedback for multi-TRP Ericsson
R1-1720975 On multi-panel codebook extension Ericsson
R1-1720976 CQI tables for URLLC Ericsson
R1-1720977 On MCS table for URLLC Ericsson
R1-1720978 On size of the CSI request field in DCI Ericsson
R1-1721367 Beam management without beam indication Ericsson
R1-1721373 Details of UL beam management ZTE, Sanechips

### 7.2.3 Remaining details on Reference signals and QCL

*Highest priority in NR MIMO agenda items*

#### *7.2.3.1 Remaining details on Multiplexing of different types of RSs*

**R1-1721388 Summary of remaining issues for RS multiplexing Huawei, HiSilicon**

Agreement: Only support TDM between SRS and PUSCH/UL DMRS/UL PTRS/Long PUCCH in Rel-15 from UE perspective.

**R1-1721635 Summary of RS multiplexing remaining issues Huawei, HiSilicon**

Agreement: UE does not expect any DMRS RE to collide with SSB REs on the 4 symbols occupied by SSB

**R1-1721636 WF on multiplexing between CSI-RS and CORESET/SSB Samsung, Ericsson, ZTE/Sanechips, vivo**

Agreement:

- A CSI-RS resource can be configured on RBs outside PBCH RBs in the symbols containing SS block from UE perspective.
- Above applies for the case where SS block and CSI-RS are spatially QCL-ed
- Note: CSI-RS BW discussion should be taken into account. If beam management is agreed, the requirement on minimum BW for CSI acquisition and beam management may be different.
- Above applies at least for the case where the same subcarrier spacing is used for SS block and CSI-RS
- Above applies for the cases: CSI-RS only used for beam management

R1-1719437 Multiplexing RSs and other signals Huawei, HiSilicon
R1-1719540 Remaining details on RS Multiplexing ZTE, Sanechips
R1-1719635 Remaining details on Multiplexing of different types of RSs AT&T
R1-1719691 Remaining issues on RS multiplexing Spreadtrum Communications
R1-1719772 Remaining details on multiplexing of different types of RSs vivo
R1-1719910 On multiplexing of different types of RSs LG Electronics
R1-1720074 On multiplexing of DM-RS and SS block Intel Corporation
R1-1720184 Remaining details on RS multiplexing CATT
R1-1720309 Remaining details on DL/UL RS multiplexing Samsung

R1-1720588 Discussion on multiplexing of different types of RSs CMCC
R1-1720666 On multiplexing of different types of RSs Qualcomm Incorporated
R1-1720738 On multiplexing of RS types Ericsson
R1-1721653 WF on multiplexing between CSI-RS and CORSET/SSB Samsung
R1-1721713 Summary of RS multiplexing further remaining issues Huawei, HiSilicon

#### *7.2.3.2 Remaining details on CSI-RS*

**R1-1721443 Summary of remaining issues on CSI-RS Huawei, HiSilicon**

Agreement: Support reusing the allowed CSI-RS-to-PDSCH power offset values in LTE for NR.

Agreement:
- Support including the OFDM symbol index within a slot in the formula for c_init.
- Support including slot index within a radio frame in the formula for c_init.

**R1-1721501 Summary of CSI-RS offline Huawei, HiSilicon**

Agreement: Length-31 Gold sequence is used for CSI-RS
- Same polynomial as in LTE
- QPSK sequence modulation is used
- N_c and c_init are to be discussed separately

**R1-1721492 WF on CSI-RS sequence LG Electronics, Qualcomm, Samsung, Nokia, Nokia Shanghai Bell, ZTE, Sanechips, Mitsubishi Electric, AT&T, Intel Corporation**

Agreement: For NR CSI-RS sequence,
- CSI-RS scrambling ID has a length of 10 bits
- There is no default value for the scrambling ID

Agreement: Introduce the following RRC parameter for CSI-RS:

| | | |
|---|---|---|
| CC/BWP-Info | Indication of which CC/BWP the configured CSI-RS is located in<br>This parameter belongs within a CSI-RS resource configuration or in a BWP configuration (up to editor) | FFS |

Agreement: Introduce the following RRC parameter for CSI-RS:
- Comb offset for D=1/2
  - 1 bit to indicate between odd and even RBs

Agreement: UE rate matches PDSCH around ZP-CSI-RS

**R1-1721569 Summary of CSI-RS offline Huawei, HiSilicon**

Agreement

| | | |
|---|---|---|
| CSI-RS-ResourceMapping | Include parameters to capture OFDM symbol location(s) in a slot and subcarrier occupancy in a PRB of the CSI-RS resource<br>FFS: how to configure CSI-RS in different slots for fine time/frequency tracking | Starting subcarrier:<br>For 1 port CSI-RS, there is no restriction<br>For Y=2, is constrained to be one among even subcarriers, in the given PRB (indexed from 0)<br>For Y=4, is constrained to be one among subcarriers 0, 4, 8, in the given PRB (indexed from 0)<br>Symbol location:<br>{0,1,2,3,4,5,6,7,8,9,10,11,12,13}, where 2 is supported only when DL-DMRS-typeA-pos equals 3<br>- UE is not expected to receive CSI-RS and DMRS on overlapping REs<br>- Only uniform RE pattern across all symbols for CSI-RS resource is supported |
| CDMType | Includes parameters to capture CDM value (1, 2, 4, or 8), CDM pattern (freq only, time and freq, time only) | Agreed CDM types for different X and N<br>{No CDM} for X = 1 and N = 1<br>{FD-CDM2} for X = 2 and N = 1 |

| | | |
|---|---|---|
| | | {FD-CDM2} for X = 4 and N = 1<br>{FD-CDM2} for X = 8 and N = 1<br>{FD-CDM2, CDM4 (FD2,TD2)} for X = 8 and N = 2<br>{FD-CDM2} for X = 12 and N = 1<br>{CDM4 (FD2,TD2)} for X = 12 and N = 2<br>{FD-CDM2, CDM4 (FD2,TD2)} for X = 16 and N = 2<br>{FD-CDM2, CDM4 (FD2, TD2), CDM8 (FD2, TD4)} for X = 24 and N = 4<br>{FD-CDM2, CDM4 (FD2, TD2), CDM8 (FD2, TD4)} for X = 32 and N = 4 |
| CSI-RS-FreqBand | Includes parameters to enable configuration of wideband and partial band CSI-RS | Combined indication methods from [90b-NR-19]<br>Starting RB index and number of spanned RBs in the units of 4<br>- Minimum CSI-RS BW is min(24RBs, BWP for data) |
| Pc_SS | Power offset of NZP CSI-RS RE to SS RE<br>Note: This parameter is optional | New parameter<br>2 bits in the range of [-3, 6] with step size of 3dB |
| ZP-CSI-RS-ResourceMapping | Include parameters to capture OFDM symbol and subcarrier occupancy of the ZP CSI-RS resource within a slot | A list of NZP-CSI-RS resource mapping(s) by explicit configuration of time and frequency domain information |
| ZP-CSI-RS-timeConfig | Contains periodicity and slot offset for periodic ZP-CSI-RS | Same as NZP-CSI-RS |
| ZP-CSI-RS-FreqBand | Includes parameters to enable configuration of wideband and partial band ZP-CSI-RS | Same as NZP-CSI-RS |
| Aperiodic-ZP-CSI-RS-Resource-List | Contains list of ZP-CSI-RS resource IDs for aperiodic triggering | |
| CC-Info | Indication of which CC the configured CSI-RS is located in.<br>This parameter belongs within a CSI-RS resource configuration or in a CC configuration (up to editor) | How to capture this in the specification is up to the editor.<br>This parameter applies to both NZP-CSI-RS and ZP-CSI-RS. |
| BWP-Info | Indication of which BWP the configured CSI-RS is located in.<br>This parameter belongs within a CSI-RS resource setting configuration | How to capture this in the specification is up to the editor.<br>This parameter applies to both NZP-CSI-RS and ZP-CSI-RS. |

Agreement: Introduce parameter PC-PDCCH which has a fixed value of 0dB and indicates the power offset of PDCCH and CSI-RS

**R1-1721592** **WF on ZP CSI-RS** **LG Electronics, Ericsson, CATT, Samsung**

Agreement
In addition to agreed RRC parameters for ZP-CSI-RS, following RRC parameters are added for ZP CSI-RS configuration.

| | | |
|---|---|---|
| ZP-CSI-RS-Density | Density of ZP CSI-RS resource in frequency domain = RE pattern existence per PRB (1 PRB = 12 subcarriers and 1 sym) | Same as NZP CSI-RS resources |
| ZP-CSI-RS-ResourceConfigId | ZP-CSI-RS resource configuration ID | 0 .. ZP-CSI-RS-ResourceMax - 1 |
| ResourceConfigType | Time domain behavior of resource configuration | aperiodic or periodic |

Agreement:
- Support mapping CSI-RS sequence to the resource grid at RE-level granularity
- Same sequence for all CSI-RS ports on one symbol within a CSI-RS resource

Agreement:
- Support assigning CSI-RS port index across CDM groups first in frequency domain and then in time domain

**R1-1721597** **WF on CSI-RS sequence initialization** **LG Electronics, Qualcomm, ZTE, Sanechips, Mediatek, NEC, Sony, Vivo, CATT, Sharp, KT**

Agreement: For NR CSI-RS sequence initialization,
- Similar to LTE, the sequence initialization values should be different for all OFDM symbols within a frame (10ms)
  - $c_{init} = \left(2^{10} \times \left((14n_s + l + 1)(2N_{ID} + 1)\right) + N_{ID}\right) mod\ 2^{31}$, where $n_s$ denotes slot index within a radio frame, and $l$ is OFDM symbol index within a slot and $N_{ID} \in \{0,1,\dots,2^{10}-1\}$ is UE specifically configured scrambling ID

Agreement:
- For Rel-15, the number of APs configured for one NZP CSI-RS resource (P) is equal to number of APs configured for CSI acquisition and reporting, i.e., N1*N2*2 = P (analogous to LTE)

Email discussion aperiodic ZP-CSI-RS until Dec 6th - Huawei (Xi)

R1-1719438 Remaining details on CSI-RS design in NR Huawei, HiSilicon
R1-1719439 Summary of email discussion on CSI-RS open issues Huawei, HiSilicon
R1-1719541 On CSI-RS for CSI acquisition and beam management ZTE, Sanechips
R1-1719636 Remaining issues on CSI-RS AT&T
R1-1719773 Discussion on CSI-RS vivo
R1-1721421 On CSI-RS design LG Electronics (rev of R1-1719911)
R1-1720075 Remaining details on CSI-RS Intel Corporation
R1-1720185 Remaining details on CSI-RS CATT
R1-1720310 Remaining details on CSI-RS Samsung
R1-1720667 Remaining details on CSI-RS Qualcomm Incorporated
R1-1720735 Remaining details on CSI-RS design Ericsson
R1-1720807 Remaining details on CSI-RS design NTT DOCOMO, INC.
R1-1720894 Remaining issues on CSI-RS design Nokia, Nokia Shanghai Bell
R1-1721595 WF on 4 port CSI-RS ZTE, Sanechips
R1-1721650 Summary of remaining issues on CSI-RS Huawei, HiSilicon

#### 7.2.3.3 Remaining details on DMRS

*Including remaining details of pi/2-BPSK for PUSCH*

**R1-1721409** **Final Issues for Rel-15 PDSCH/PUSCH's DM-RS Qualcomm**

Agreement: The PDSCH (PUSCH)/DMRS EPRE ratio is defined per transmitted layer from UE perspective and is computed as

$$\frac{PDSCH\ (PUSCH)\ EPRE}{DMRS\ EPRE}\ (dB) = -10 \cdot log_{10}(\#CDM\ groups\ without\ data)$$

That is:
- 0 and -3 dB for DMRS config-1, when one and zero CDM group(s) have data respectively
- 0, -3 and -4.77 dB for DMRS config-2, when two or one or zero CDM group(s) have data respectively
  - Note: -3dB maybe removed depending on the decision on DMRS port table

Agreement: For PUSCH with a hop, support also the first DMRS of the 1st hop to be located on 3rd or 4th symbol of the slot.

Agreement: For DFT-S-OFDM, reuse the DMRS configurations of NCP for ECP
- Note: c_init is for a separate discussion

Agreement: For DL and UL slot-based transmission/scheduling, when the maximum number of front-load DMRS is semi-statically configured to be 2 and the UE is dynamically scheduled with 1-symbol front-load DMRS, then the allowable number of additional DMRS is 1.

Agreement: For 2/4/7-symbol non-slot-based scheduling, the supported configuration types in non-slot-based scheduling DMRS for unicast PDSCH after RRC configuration is(are)
- Both configuration type 1 and type 2

Agreement For 2/4/7-symbol non-slot-based scheduling, for the number of symbols of front-load DMRS

- For 2/4 symbol non-slot based scheduling, only 1-symbol front-load DMRS can be transmitted for a UE
- For 7 symbol non-slot based scheduling, either 1-symbol and 2-symbol front-load DMRS can be transmitted for a UE

Agreement: The same length-31 Gold sequence with LTE is used for CP-OFDM DMRS for PDSCH/PUSCH

**R1-1721505 Offline Discussion on DM-RS Qualcomm**

Agreement: No consensus on introducing new RRC parameter(s) to enable DMRS port table restriction or subset selection for DCI overhead reduction.

- Note: implicit DMRS port table restriction, or subset selection can still be further discussed (e.g., through existing RRC parameters)

Agreement: For DFT-S-OFDM DMRS sequence design, at least for modulation > BPSK, and a sequence length > X, reuse Rel-14 LTE DMRS comb-2 ZC sequence design and associated RRC signalling.

- The value of X, the CGS sequences (except the 12-length that is already agreed), and decision on modulation = BPSK will be decided later this week.
- Note: The CGS sequence order including 12-length can be further discussed

Agreement: Number of semi-statically configured scrambling IDs for the DMRS of DL or UL:

- Two scrambling IDs can be configured per DL/UL

**R1-1721520 WF on DMRS Scrambling IDs Huawei, HiSilicon, China Unicom, Ericsson, vivo, NEC, Deutsche Telekom, Sharp, InterDigital, MediaTek, Spreadtrum, Lenovo, Motorola Mobility, CATT, III**

Agreement: In the DMRS sequence initialization for downlink and uplink CP-OFDM,

- Support UE specific configured scrambling ID with 16 bits
- Uplink and downlink can be configured separately
- The default value for the scrambling ID is physical cell ID and 6 known bits (ex: fixed as '000000')

Supported by AT&T

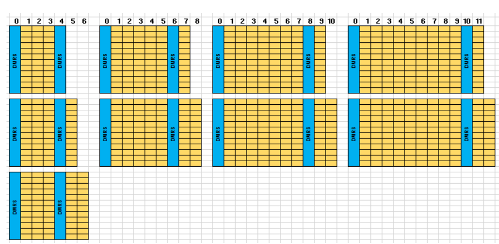
**R1-1721539 WF on DMRS Scrambling ID Qualcomm, Samsung, ZTE, Sanechips, Nokia, NSB, LGE, Intel**

**R1-1721641 Final Issues for Rel-15 PDSCH/PUSCH's DM-RS Qualcomm**

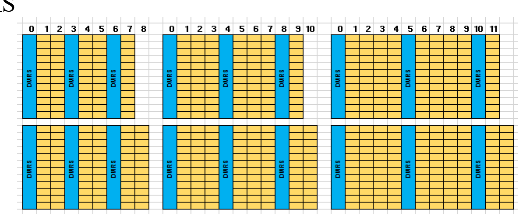
Agreement: For slot-based transmission, the front-load DMRS of PUSCH is located to the first symbol with respect to the scheduled data when the PUSCH starts from the Xth symbol (X starts from 1) in the slot with X>1.

Agreement: For the PUSCH without a hop, when the first symbol of the front-load DMRS is located in the first OFDM symbol with respect to the scheduled data, the additional DMRS can be located as follows (orange colour symbols contain PUSCH):

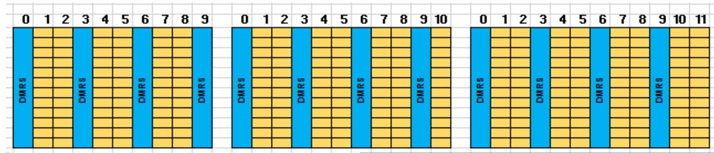
- One additional 1-symbol DMRS



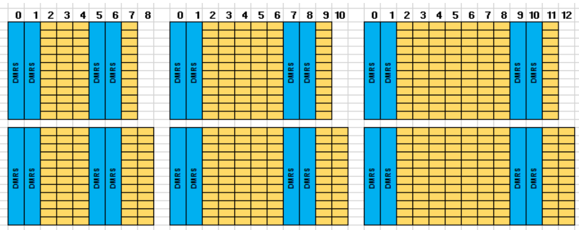
- Two additional 1-symbol DMRS



- Three additional 1-symbol DMRS



- One additional 2-symbol DMRS



Agreement
- For DMRS configuration type1, DMRS port indexing for two-symbol DMRS with CP-OFDM, DMRS port indexing in CDM group is {0,1,4,5}, {2,3,6,7}.
- For DMRS configuration type2, DMRS port indexing for two-symbol DMRS with CP-OFDM, DMRS port indexing in CDM group is {0,1,6,7}, {2,3,8,9}, {4,5,10,11}
- Note: This will be confirmed after the DMRS table for the 2-symbol is concluded
- Note: Same as endorsed R1-1720850 38.211 spec

Agreement
- Presence of co-scheduled downlink DMRS ports within the assigned downlink DMRS CDM group is not supported
- Note: This applies at least for single TRP scenario

**R1-1721686 Final Issues for Rel-15 PDSCH/PUSCH's DM-RS Qualcomm**

Agreement: Confirm working assumption of using configuration type 1 for slot-based broadcast/multicast PDSCH and extend this DMRS type to
- slot-based unicast PDSCH before RRC configuration and slot-based unicast PUSCH before RRC configuration (CP-OFDM and DFT-S-OFDM)
  - For slot-based broadcast/multicast PDSCH and unicast PDSCH/PUSCH before RRC configuration, use two additional 1-symbol DMRS, with location of additional DMRS indicated in PDCCH following the agreed DMRS locations for unicast PDSCH/PUSCH after RRC configuration.
- 2/4/7-symbol non-slot-based scheduling for multicast/broadcast PDSCH and unicast PDSCH before RRC configuration.
  - For 2/4-symbol non-slot-based scheduling, the one-symbol front-load DMRS is used for broadcast/multicast PDSCH and unicast PDSCH/PUSCH before RRC configuration.
  - For 7-symbol non-slot-based scheduling, one-symbol front-load DMRS plus one additional DMRS symbol on the 5th symbol if it is part of the scheduling unit with respect to the front-load is used for broadcast/multicast PDSCH and unicast PDSCH/PUSCH before RRC configuration.
- Broadcast/multicast PDSCH and PDSCH before RRC configuration is happening, for both slot and 4/7-symbol non-slot-based, with DMRS port 0 using SU-MIMO and no PDSCH FDMed on the DMRS symbol. For 2 symbol non-slot based, there is only FDM.
- PUSCH before RRC configuration is happening, for both slot and non-slot-based, with DMRS port 0 using SU-MIMO and no PUSCH FDMed on the DMRS symbol.

Agreement: For CP-OFDM DL/UL DMRS sequence initialization,
- the sequence initialization values should be different for all OFDM symbols within a frame (10ms) and at least the following parameters are used:
  - Dynamically signalled $n_{SCID}$ (with value 0 or 1) which is associated with choosing one of the two UE specifically configured scrambling IDs.
  - slot index $n_s$ and OFDM symbol index within a slot ($l$)

$$c_{init} = \left(2^{17} \cdot (14n_s + l + 1)\left(2N_{ID}^{(n_{SCID})} + 1\right) + 2N_{ID}^{(n_{SCID})} + n_{SCID}\right) mod 2^{31}$$

Working Assumption: For DMRS sequence of PDSCH/PUSCH CP-OFDM:
- for PDSCH carrying RMSI, the DMRS sequence generation
  - uses the lowest PRB of CORESET signalled in the PBCH

- for PDSCH/PUSCH before RRC configuration, and for PDSCH/PUSCH after RRC configuration, the DMRS sequence generation
  - uses the lowest subcarrier of the reference PRB [point A] (i.e. PRB0 in previous agreements)
    - Note: this implements the previous agreement "resource specific w.r.t to a wideband CC from network perspective".

Agreement: For pi/2 BPSK sequence, use the same ZC and CGS sequence with the remaining modulations

- FFS whether "Pi/2 BPSK based DFT precoded DMRS for Pi/2 BPSK modulation for DFT-s-OFDM based NR PUSCH" in NR after the Rel-15 Dec. specifications

Agreement:
For the PDSCH/PUSCH DMRS port table for DMRS config type 1 and 2, support at least the rows shown in the tables below.
For DL and config-1,

- For the indeces {6,9,10,11,30} in 1-CW table, and all indeces in 2-CW table, the UE can assume that all the remaining orthogonal antenna ports are not associated with transmission of PDSCH to another UE

For DL and config-2,

- For the indeces {2, 10, 23} in 1-CW table, and all indeces in 2-CW tablethe UE can assume that all the remaining orthogonal antenna ports are not associated with transmission of PDSCH to another UE

For DFT-s-OFDM: DMRS tables of Config-1, 1 symbol and 2 symbols, rank1
Note: The 3rd column ("Number of CDM group(s) without PDSCH/PUSCH")

- Gets values of "1", "2", "3" which correspond to CDM group 0, {0,1}, {0,1,2} respectively
- is used to signal
  - in DL the "potential presence of co-scheduled downlink DMRS CDM groups for rate matching" according the agreements
  - in UL "Uplink DMRS CDM groups for rate matching" according the agreements

Note: Additional row/columns can be included (e.g., n_SCID, PTRS subcarrier index, reserved rows, additional port-pairing options etc), depending on corresponding agreements.
Note: For UL, joint encoding of DMRS port table and SRI/TRI/TPMI for DCI overhead reduction is not precluded.
Note: Final indexing and tabulation is up to the editors.
Entries of max 1-symbol tables for both Config-1 and Config-2 are agreed. Max 2-symbol tables are examples for further discussions.

**Max 1-symbol FL, Config-1, (1-CW)**

| Index | DMRS port ID (+1000) | # CDM group(s) without data |
|---|---|---|
| 0 | 0 | 1 |
| 1 | 0 | 2 |
| 2 | 1 | 1 |
| 3 | 1 | 2 |
| 4 | 2 | 2 |
| 5 | 3 | 2 |
| 6 | 0,1 | 1 |
| 7 | 0,1 | 2 |
| 8 | 2,3 | 2 |
| 9 | 0,2 | 2 |
| 10 | 0,1,2 | 2 |
| 11 | 0,1,2,3 | 2 |
| 12-15 | reserved | reserved |

**Max 2-symbol FL, Config-1, (1-CW)**

| Index | DMRS port ID (+1000) | # CDM group(s) without data | Front-load symbol |
|---|---|---|---|
| 0 | 0 | 1 | 1 |
| 1 | 0 | 2 | 1 |
| 2 | 1 | 1 | 1 |
| 3 | 1 | 2 | 1 |
| 4 | 2 | 2 | 1 |
| 5 | 3 | 2 | 1 |
| 6 | 0,1 | 1 | 1 |
| 7 | 0,1 | 2 | 1 |
| 8 | 2,3 | 2 | 1 |
| 9 | 0,2 | 2 | 1 |
| 10 | 0,1,2 | 2 | 1 |
| 11 | 0,1,2,3 | 2 | 1 |
| 12 | 0 | 2 | 2 |
| 13 | 1 | 2 | 2 |
| 14 | 2 | 2 | 2 |
| 15 | 3 | 2 | 2 |
| 16 | 4 | 2 | 2 |
| 17 | 5 | 2 | 2 |
| 18 | 6 | 2 | 2 |
| 19 | 7 | 2 | 2 |
| 20 | 0,1 | 2 | 2 |
| 21 | 2,3 | 2 | 2 |
| 22 | 4,5 | 2 | 2 |
| 23 | 6,7 | 2 | 2 |
| 24 | 0,4 | 2 | 2 |
| 25 | 2,6 | 2 | 2 |
| 26 | 0,1,4 | 2 | 2 |
| 27 | 2,3,6 | 2 | 2 |
| 28 | 0,1,4,5 | 2 | 2 |
| 29 | 2,3,6,7 | 2 | 2 |
| 30 | 0,4,2,6 | 2 | 2 |
| 31 | reserved | reserved | reserved |

**Max 2-symbol FL, Config-1, (2-CW)**

| Index | DMRS port ID (+1000) | # CDM group(s) without data | Front-load symbol |
|---|---|---|---|
| | 0,1,2,4,6 | 2 | 2 |
| | 0,1,2,3,4,6 | 2 | 2 |
| | 0,1,2,3,4,5,6 | 2 | 2 |
| | 0,1,2,3,4,5,6,7 | 2 | 2 |

**Max 1-symbol, Config-2, (1-CW)**

| Index | DMRS port ID (+1000) | # CDM group(s) without data |
|---|---|---|
| 0 | 0 | 1 |
| 1 | 1 | 1 |
| 2 | 0,1 | 1 |
| 3 | 0 | 2 |
| 4 | 1 | 2 |
| 5 | 2 | 2 |
| 6 | 3 | 2 |
| 7 | 0,1 | 2 |
| 8 | 2,3 | 2 |
| 9 | 0-2 | 2 |
| 10 | 0-3 | 2 |
| 11 | 0 | 3 |
| 12 | 1 | 3 |
| 13 | 2 | 3 |
| 14 | 3 | 3 |
| 15 | 4 | 3 |
| 16 | 5 | 3 |
| 17 | 0,1 | 3 |
| 18 | 2,3 | 3 |
| 19 | 4,5 | 3 |
| 20 | 0-2 | 3 |
| 21 | 3-5 | 3 |
| 22 | 0-3 | 3 |
| 23 | 0,2 | 2 |
| 24-31 | reserved | reserved |

**Max 1-symbol, Config-2, (2-CW)**

| Index | DMRS port ID (+1000) | # CDM group(s) without data | Front-load symbol |
|---|---|---|---|
| | 0,1,2,3,4 | 3 | 1 |
| | 0,1,2,3,4,5 | 3 | 1 |

**Max 2-symbol, Config-2, (1-CW)**

| Index | DMRS port ID (+1000) | # CDM group(s) without data | Front-load symbol |
|---|---|---|---|
| 0 | 0 | 1 | 1 |
| 1 | 1 | 1 | 1 |
| 2 | 0,1 | 1 | 1 |
| 3 | 0 | 2 | 1 |
| 4 | 1 | 2 | 1 |
| 5 | 2 | 2 | 1 |
| 6 | 3 | 2 | 1 |
| 7 | 0,1 | 2 | 1 |
| 8 | 2,3 | 2 | 1 |
| 9 | 0-2 | 2 | 1 |
| 10 | 0-3 | 2 | 1 |
| 11 | 0 | 3 | 1 |
| 12 | 1 | 3 | 1 |
| 13 | 2 | 3 | 1 |
| 14 | 3 | 3 | 1 |
| 15 | 4 | 3 | 1 |
| 16 | 5 | 3 | 1 |
| 17 | 0,1 | 3 | 1 |
| 18 | 2,3 | 3 | 1 |
| 19 | 4,5 | 3 | 1 |
| 20 | 0-2 | 3 | 1 |
| 21 | 3-5 | 3 | 1 |
| 22 | 0-3 | 3 | 1 |
| 23 | 0,2 | 2 | 1 |
| 24 | 0 | 3 | 2 |
| 25 | 1 | 3 | 2 |
| 26 | 2 | 3 | 2 |
| 27 | 3 | 3 | 2 |
| 28 | 4 | 3 | 2 |
| 29 | 5 | 3 | 2 |
| 30 | 6 | 3 | 2 |
| 31 | 7 | 3 | 2 |
| 32 | 8 | 3 | 2 |
| 33 | 9 | 3 | 2 |
| 34 | 10 | 3 | 2 |
| 35 | 11 | 3 | 2 |
| 36 | 0,1 | 3 | 2 |
| 37 | 2,3 | 3 | 2 |
| 38 | 4,5 | 3 | 2 |
| 39 | 6,7 | 3 | 2 |
| 40 | 8,9 | 3 | 2 |
| 41 | 10,11 | 3 | 2 |
| 42 | 0,1,6 | 3 | 2 |
| 43 | 2,3,8 | 3 | 2 |
| 44 | 4,5,10 | 3 | 2 |
| 45 | 0,1,6,7 | 3 | 2 |
| 46 | 2,3,8,9 | 3 | 2 |
| 47 | 4,5,10,11 | 3 | 2 |
| 48 | 0 | 1 | 2 |
| 49 | 1 | 1 | 2 |
| 50 | 6 | 1 | 2 |
| 51 | 7 | 1 | 2 |
| 52 | 0,1 | 1 | 2 |
| 53 | 6,7 | 1 | 2 |
| 54 | 0,1 | 2 | 2 |
| 55 | 2,3 | 2 | 2 |
| 56 | 6,7 | 2 | 2 |
| 57 | 8,9 | 2 | 2 |
| 58-63 | reserved | reserved | reserved |

**Max 2-symbol front-load, Config-2, (2-CW)**

| Index | DMRS port ID (+1000) | # CDM group(s) without data | Front-load symbol |
|---|---|---|---|
| | 0,1,2,3,4 | 3 | 1 |
| | 0,1,2,3,4,5 | 3 | 1 |
| | 0,1,2,3,4,5 | 3 | 2 |
| | 0,1,2,3,4,5,6 | 3 | 2 |
| | 0,1,2,3,4,5,6,8 | 3 | 2 |
| | 0,1,2,3,6 | 2 | 2 |
| | 0,1,2,3,6,8 | 2 | 2 |
| | 0,1,2,3,6,7,8 | 2 | 2 |
| | 0,1,2,3,6,7,8,9 | 2 | 2 |

Email discussion on the following DMRS aspects until Dec 6th – Qualcomm (Alex)

- Remaining details on 2 symbol DMRS table
- Additional DMRS location of PUSCH with hopping
- Non-slot based collision of DMRS with CORESET
- Length 6, 18, 24, and 30 CGS sequences
- Sequence order for length 12 CGS sequences
- DMRS location for PDSCH/PUSCH smaller than the current specified durations
- Remaining details on DMRS table for DFT-s-OFDM
- DMRS and PTRS overlapping issue (R1-1721715)

R1- 1721686 should be used as starting point for discussion.

R1-1719444 Design of DL/UL DMRS for data transmission Huawei, HiSilicon
R1-1721393 Views on DL DMRS designs Mitsubishi Electric Co. (rev of R1-1719518)
R1-1719542 Remaining details on DL DMRS and UL DMRS ZTE, Sanechips
R1-1719580 On remaining details of downlink DMRS MediaTek Inc.
R1-1719637 Remaining details on DM-RS AT&T
R1-1719692 Remaining issues on DMRS Spreadtrum Communications
R1-1719703 On remaining details of NR DMRS Panasonic
R1-1719736 Remaining issues on DMRS Lenovo, Motorola Mobility
Late submission
R1-1719774 Remaining details on DMRS design vivo
R1-1719912 On DMRS designLG Electronics
R1-1720076 On the remaining details of DM-RSIntel Corporation
R1-1720186 Discussion on remaining details of DMRS design CATT
R1-1720228 Remaining issues on DMRS design ETRI
R1-1720311 Remaining details on DMRS Samsung
R1-1720493 DMRS design aspects and results for pi/2 BPSK with PA model IITH
R1-1720575 Remaining issues on DMRS configurations NEC
R1-1720633 Remaining issues on DM-RS InterDigital, Inc.
R1-1721432 Remaining details on DMRS Qualcomm Incorporated (rev of R1-1720668)
R1-1720736 Remaining details on DMRS design Ericsson
R1-1720765 Remaining details on DMRS for NR ITL
R1-1720808 Remaining details on DM-RS NTT DOCOMO, INC.
R1-1720895 On remaining issues of DM-RS for NR physical data channels Nokia, Nokia Shanghai Bell
R1-1720965 On remaining details of DMRS design KT Corp.
R1-1721410 Further Offline discussion on NR DM-RS Qualcomm
R1-1721493 WF on beam management ZTE
R1-1721540 WF on DMRS for Pi/2 BPSK based PUSCH Qualcomm
R1-1721565 WF on Length-6 and Length-24 CG sequences for DFT-s-OFDM Qualcomm
R1-1721715 WF on relation between DMRS and PTRS LG Electronics, Ericsson, Qualcomm, ZTE, Sanechips, NEC, KT Corp., Spreadtrum, OPPO, Panasonic, vivo, NTT Docomo, CATT

#### *7.2.3.4 Remaining details on PT-RS*

**R1-1721441 Summary of PTRS open issues Ericsson**

Agreement:

- The RE-level offset is implicitly associated with the index of the DMRS port that is associated with the PTRS port. Work offline on the details for a WF
- The RRC parameter "*PTRS-RE-offset*" indicates a PTRS subcarrier within the subset of subcarriers used by a DMRS port. Work offline on the details for a WF.

Agreement: Reuse the PTRS design of NCP for ECP

**R1-1721537 Wednesday morning summary of PTRS Ericsson**

Agreement:
- If UE has reported capability of supporting full-coherent UL transmission, UE expects the number of UL PTRS ports to be configured as one
- For non-codebook based UL transmission,
  - A new RRC parameter *UL-PTRS-SRS-mapping-non-CB* indicates the PTRS port index for each configured SRS resource/resource set, where there are at most *UL-PTRS-ports* port indices
  - When indicating SRI in DCI and when the PTRS port index associated with different SRIs are the same, the corresponding UL DMRS ports share the indicated UL PTRS port
  - FFS: whether the UL PTRS port index is associated to each SRS resource or resource set
- For partial-coherent and non-coherent codebook based UL transmission, the higher -layer parameter *UL-PTRS-ports* indicates the maximum number of PTRS ports.
  - The actual number of UL PTRS port(s) to transmit is determined based on TPMI and/or TRI.

**R1-1721506 WF on PT-RS for Non-Slot-Based Transmission NTT DOCOMO, Ericsson, InterDigital, LGE, Nokia, NEC, Samsung, Sharp, vivo, ZTE, Sanechips**

**R1-1721487 WF on pre-DFT PT-RS pattern for DFTsOFDM Mitsubishi Electric, Ericsson, Nokia, NSB, IITH, IITM, CeWit, Tejas Networks, Reliance Jio, AT&T, Sharp, Interdigital, DoCoMo, LGE, CATT**

Agreement: For chunk-based pre-DFT PTRS insertion for DFTsOFDM with X chunks and K>1 support the following
- For chunk size K=4, support X=8 (value of Y set to 8 in the agreed table, for very large allocated bands)
- PT-RS sequence r(m) of length XxK is generated for the first OFDM symbol in the slot that contains PTRS and inserted in the m-th position (where minimum value of m is 0 and maximum m value is M-1) before M-size transform precoding
  - For a given slot, one single XxK sequence r(m) is generated for the first DFTsOFDM symbol containing PTRS in the slot and repeated for every DFTsOFDM symbol containing PTRS in the slot
  - BPSK sequence $r'(n) = (1-2c(n))+j(1-2c(n))$ is generated where the pseudo random sequence c(n) is initialized with already existing UE-specific parameter
    - Note: The scrambling ID for PTRS for DFTsOFDM is removed from the RRC list
    - FFS until later this week the exact parameter to use (e.g. the same $n_{RS}^{ID}$ as the associated UL DFTsOFDM DMRS/SRS, c_init from DL/UL DMRS, etc)
  - Pi/2 modulation dependent on the pre-DFT position m of the PTRS sample is applied to obtain r(m)=1/sqrt(2)* exp(jmpi/2)*$ß_{PUSCH}$*r''(n), where m is the n-th index in the symbol indicating a PT-RS position, n=0…XK-1, and $ß_{PUSCH}$ boosts the PT-RS to the outermost PUSCH constellation points

**R1-1721514 WF on subcarrier selection for PTRS Ericsson, ZTE, Sanechips, NEC, LGE, Spreadtrum**

Agreement: Introduce RRC parameter "*PTRS-RE-offset*" consisting of 2bits for indication of a PTRS subcarrier within the subset of subcarriers used by the associated DMRS port

Agreement
- The first table is for DMRS configuration type 1 and second table is for DMRS configuration type 2
- Note: It is up to the editor to capture this agreement in the specification

| PTRS-RE-offset by RRC | Sub-carrier index for PT-RS | | | |
|---|---|---|---|---|
| | DMRS port 1000 | DMRS port 1001 | DMRS port 1002 | DMRSport 1003 |
| 00 | 0 | 2 | 1 | 3 |
| 01 | 2 | 4 | 3 | 5 |
| 10 | 6 | 8 | 7 | 9 |
| 11 | 8 | 10 | 9 | 11 |

| PTRS-RE-offset by RRC | Sub-carrier index for PT-RS | | | | | |
|---|---|---|---|---|---|---|
| | DMRS port 1000 | DMRSport 1001 | DMRSport 1002 | DMRSport 1003 | DMRSport 1004 | DMRSport 1005 |
| 00 | 0 | 1 | 2 | 3 | 4 | 5 |
| 01 | 1 | 6 | 3 | 8 | 5 | 10 |
| 10 | 6 | 7 | 8 | 9 | 10 | 11 |
| 11 | 7 | 0 | 9 | 2 | 11 | 4 |

- It is up to the editor how to capture this agreement

**R1-1721536** **WF on UE Capability Report for PT-RS Samsung, ZTE, Sanechips, vivo, Intel, NEC, LG, IITH, CEWiT, IITM, Tejas Neworks, Spreadtrum, Huawei, HiSilicon**

**R1-1721517** **WF on PT-RS power boosting LG Electronics, Intel, ZTE, Sanechips, Spreadtrum, Huawei, HiSilicon, InterDigital, Nokia, Shanghai-bell-Nokia, Samsung**

Agreement:
- RRC parameter is introduced to configure the PDSCH to PTRS EPRE ratio per PTRS port
  - Two bits
  - If PDSCH to PTRS EPRE ratio per PTRS port is not configured for downlink, this parameter is set to the default value
    - FFS: Default value
- RRC parameters are introduced to configure the UL PTRS power boosting factor per PTRS port
  - Two bits
  - Applicable only for CP-OFDM
  - Note: The symbols with or without PTRS have the same power

**R1-1721516** **WF on Placement for PTRS for DFT-s-OFDM Huawei, HiSilicon, Spreadtrum, Intel, NEC, ZTE, Sanechips, vivo, Ericsson, Qualcomm, Samsung, LG Electronics, CATT, IITH, CEWiT, IITM, Tejas Networks**
Note: Companies are encouraged to study potential performance issues related to the tail chunk PT-RS for DFT-s-OFDM for K=4

**R1-1721637** **Thursday evening summary of PTRS Ericsson**

Agreement: For CP-OFDM in DL and UL and unless configured by higher layer parameters, the RE-level offset is implicitly associated with the index of the DMRS port that is associated with the PTRS port as follows

| DMRS port for DMRS config Type 1 | 1000 | 1001 | 1002 | 1003 |
|---|---|---|---|---|
| RE-level offset | 0 | 2 | 1 | 3 |

| DMRS port for DMRS Type 2 | 1000 | 1001 | 1002 | 1003 | 1004 | 1005 |
|---|---|---|---|---|---|---|
| RE-level offset | 0 | 1 | 2 | 3 | 4 | 5 |

- It is up to the editor how to capture this agreement

Agreement: For UL CP-OFDM with intra-slot frequency hopping,
- in each hop,
- on the subcarrier S where PTRS is mapped,
- the PTRS symbols in the hop are obtained by repeating the first front-loaded DMRS symbol on subcarrier S in the hop
- where the DMRS symbol is taken before applying FD-OCC

Slides 5 and 6 in R1-1721637 are agreed with the specific values in the table as working assumption.

**R1-1721530** **WF on PT-RS RB offset InterDigital, Huawei, HiSilicon, Samsung, vivo, Intel, ZTE, Sanechips, Spreadtrum, LGE, NEC, Ericsson**

Agreement: PTRS RB-level offset:
- $k_{\mathrm{ref}}^{\mathrm{RB}} = 0$ for DL broadcast-type traffic, if PTRS is supported
- $k_{\mathrm{ref}}^{\mathrm{RB}} = \mathrm{mod}(\mathrm{C}_{\mathrm{RNTI}}, k_{\mathrm{max}}^{\mathrm{RB}})$ for DL and UL UE-specific data
  - Where $k_{\mathrm{max}}^{\mathrm{RB}} = \begin{cases} K_{\mathrm{PTRS}}, & \text{if } \mathrm{mod}(N_{\mathrm{RB}}, K_{\mathrm{PTRS}}) = 0 \\ \mathrm{mod}(N_{\mathrm{RB}}, K_{\mathrm{PTRS}}), & \text{otherwise} \end{cases}$
  - N_RB is the number of scheduled resource blocks

**R1-1721618** **Status of offline discussion on remaining issues on PTRS for DFTSOFDM Mitsubishi Electric**

Agreement: For chunk size K=2, support the following insertion pattern

- The samples in DFT domain are divided in X intervals, and the chunks are located in the middle of each interval (n=floor(M/(2X))-1))

Agreement: The pseudo random sequence used as PTRS BPSK sequence has X*K samples and is generated by the same length-31 Gold sequence generator used for other RSs in NR, initialized with the same c_init formula as for PDSCH DMRS but using the UE specific parameter nDMRS-CSH-Identity-Transform-precoding as the scrambling ID.

- Note: The nDMRS-CSH-Identity-Transform-precoding is a UE specific parameter used for ZC DMRS sequence generation
- Note: Time index l in c_init formula for PDSCH DMRS (if any) is set to the time index of the first DFTsOFDM symbol containing PTRS in the slot and is used for all symbols in a slot which carry PTRS

Working Assumption
OCC is applied onto the BPSK sequence before pi/2 modulation as r''(n)=w(n)r'(n), where w(n) is the X times repetition of a length K OCC which is determined based on C-RNTI mod K

- OCC is drawn from a Hadamard matrix of order K

**R1-1721660 WF on relation between DMRS and PTRS LG Electronics, Ericsson, Qualcomm, ZTE, Sanechips, NEC, KT Corp., Spreadtrum, OPPO**

**R1-1721626 WF on PTRS Huawei, HiSilicon, ZTE, Sanechips, Spreadtrum, vivo, Intel, NEC, ASTRI, NTT DOCOMO**

Agreement
For the case where two DL DMRS port groups are transmitted, where each DMRS port group is associated to one PTRS port and one CW respectively, the time density of the PTRS port corresponding to the CW with lower MCS should be set as the same as that of the PTRS port corresponding to CW with higher MCS when two PTRS ports are active

Email discussion on PTRS - Huawei (Xi) until Dec 6th, 2017

Agreement:

- The number of DL PTRS ports is higher layer configured per TCI state for PDSCH transmission in the higher layer parameter *DL-PT-RS-ports*
- If the number of DL PTRS ports associated to the TCI in DCI is 2, the number of PTRS ports is 2, and the each PT-RS is associated with the corresponding DMRS port group, and UE does not expect to be scheduled with one DMRS port group and such TCI state
- If the number of DL PTRS ports associated to the TCI in DCI is 1, the number of PTRS port is 1, the phase tracking association follow the previous agreements
    - If one PTRS port is transmitted and the scheduled DMRS ports are from two DMRS port groups, UE may utilize the PTRS port for phase tracking for PDSCH layers corresponding to DMRS ports in the two DMRS port groups (i.e., the PTRS port is shared among the two DMRS port groups)
- For 2-symbol non-slot scheduling, PTRS is not transmitted/received if the time domain density is smaller than 1 when configured present
- For 4-symbol non-slot scheduling, PTRS is not transmitted/received if the time domain density is equal to ¼ when configured present
- If the last $N$ MCS entries are reserved (no coding rate or modulation order or TBS is given), where $N$ is 3 for MCS table with up to 64QAM and $N$ is 4 for MCS table with up to 256QAM, support the following
    - For adaptive retransmissions, when the scheduled MCS > $V$, where $V = 28$ for MCS table with up to 64QAM and $V = 27$ for MCS table with up to 256QAM, the time-density of PTRS is determined based on the MCS of initial transmission, which is smaller than or equal to $V$

Agreement

- A DL PTRS port and the DL DMRS port(s) within the associated DL DMRS port group are QCLed w.r.t {delay spread, Doppler spread, Doppler shift, average delay, spatial Rx parameters}
- If one DL PTRS port is transmitted for two scheduled DL DMRS port groups, the PTRS port and the DMRS port(s) which are not in the associated DMRS port group are QCLed w.r.t. {Doppler spread, Doppler shift} and FFS: spatial QCL parameters

**R1-1721664 WF on UL PTRS Port Indication vivo, NEC, Spreadtrum, ZTE, Sanechips, Intel, Huawei, HiSilicon**

Agreement:
- For non-codebook based UL transmission, the UL PTRS port index is associated to each SRS resource.
- For partial-coherent and non-coherent codebook based UL transmission, if the higher -layer parameter *UL-PTRS-ports* is 2, the actual UL PTRS port(s) and the associated transmission layer(s) are derived from indicated TPMI with the following rule:
  - SRS port 0 and 2 in indicated TPMI share PTRS port 0,
  - SRS port 1 and 3 in indicated TPMI share PTRS port 1.
  - UL PTRS port 0 is associated with the UL layer x of layers which are transmitted with SRS port 0 and SRS port 2 in indicated TPMI;
  - UL PTRS port 1 is associated with the UL layer y of layers which are transmitted with SRS port 1 and SRS port 3 in indicated TPMI;
  - Up to 2-bit indicator is used in uplink grant where bit 1 is used for x and bit 2 is used for y

R1-1721484 WF on PTRS port indication ZTE, Sanechips, Samsung, NEC, vivo, Intel, Huawei, HiSilicon, ASTRI, Spreadtrum, LG Electronics, DOCOMO, InterDigital
R1-1719440 Remaining issues of PTRSHuawei, HiSilicon
R1-1719517 Remaining details on PTRS for DFTsOFDMMitsubishi Electric RCE
R1-1719543 Remaining details on PT-RS ZTE, Sanechips
R1-1719693 Remaining issues on PT-RS Spreadtrum Communications
R1-1719775 Discussion on the remaining details on PT-RS vivo
R1-1719913 On PT-RS design LG Electronics
R1-1720077 Remaining details on PT-RS Intel Corporation
R1-1720187 Remaining details on PT-RS CATT
R1-1720312 Remaining details on PT-RS Samsung
R1-1720370 PT-RS design Panasonic
R1-1720576 Remaining issues on PTRS configurations NEC
R1-1720589 Discussion on remaining issues on PT-RS CMCC
R1-1720634 Remaining issues on PTRS InterDigital, Inc.
R1-1720669 PTRS considerations Qualcomm Incorporated
R1-1720741 Remaining details on PTRS design Ericsson
R1-1721358 Remaining details on PT-RS NTT DOCOMO, INC. (rev of R1-1720809)
R1-1720896 On remaining details of PT-RS design Nokia, Nokia Shanghai Bell

#### 7.2.3.5 Remaining details on SRS

*Including SRS carrier based switching*

**R1-1721353 Summary of SRS Sony**

Agreement:
$n_{ID}^{RS}$ used for group and sequence hopping is configured per SRS resource using SRS-SequenceId in a UE specific manner

**R1-1721455 WF on SRS bandwidth configuration Samsung, Huawei, ZTE, Ericsson, Intel**

Agreement
The rows of (18,19,22,29 and 62) in agreed table on SRS bandwidth configuration should be modified as follows:

| | $B_{SRS}=0$ | | $B_{SRS}=1$ | | $B_{SRS}=2$ | | $B_{SRS}=3$ | |
|---|---|---|---|---|---|---|---|---|
| $C_{SRS}$ | $m_{SRS,0}$ | $N_0$ | $m_{SRS,1}$ | $N_1$ | $m_{SRS,2}$ | $N_2$ | $m_{SRS,3}$ | $N_3$ |
| 18 | 72 | 1 | 24 | 3 | 12 | 2 | 4 | 3 |
| 19 | 72 | 1 | 36 | 2 | 12 | 3 | 4 | 3 |
| 22 | 88 | 1 | 44 | 2 | 4 | 11 | 4 | 1 |
| 29 | 120 | 1 | 24 | 5 | 12 | 2 | 4 | 3 |
| 62 | 272 | 1 | 68 | 4 | 4 | 17 | 4 | 1 |

**R1-1721460 Summary of SRS Sony**

Agreement:
Support 1, 2, 5, 10, 20, 40, 80, 160, 320, 640, 1280, 2560 slots periodicity for all SCS in NR

**Example**

| SRS Configuration Index $I_{SRS}$ | SRS Periodicity $T_{SRS}$ (slots) | SRS Slot Offset $T_{offset}$ |
|---|---|---|
| 0-1 | 2 | $I_{SRS}$ |
| 2-6 | 5 | $I_{SRS}$ – 2 |
| 7-16 | 10 | $I_{SRS}$ – 7 |
| 17-36 | 20 | $I_{SRS}$ – 17 |
| 37-76 | 40 | $I_{SRS}$ – 37 |
| 77-156 | 80 | $I_{SRS}$ – 77 |
| 157-316 | 160 | $I_{SRS}$ – 157 |
| 317-636 | 320 | $I_{SRS}$ – 317 |
| 637-1276 | 640 | $I_{SRS}$ – 637 |
| 1277-2556 | 1280 | $I_{SRS}$ – 1277 |
| 2517-5076 | 2560 | $I_{SRS}$ – 2517 |
| 5077 | 1 | 0 |
| 5078-8191 | Reserved | Reserved |

Agreement: SRS frequency hopping formula Fb is the same as in LTE

Agreement: Bit width of SRS sequence ID for initializing group and sequence hopping is the same as the bit width of the scrambling ID for CSI-RS (10 bits).

Agreement: Semi-persistent SRS resource set is activated/deactivated by MAC CE

R1-1721683 **Summary of SRS** **Sony**

Agreement: For semi-persistent SRS,
- A semi-persistent SRS resource set is activated/deactivated by MAC CE

Agreement
For aperiodic SRS,
- Aperiodic SRS resource(s) are always triggered on a per set basis by DCI.
- A code-point of the SRS request field in DCI can be mapped to one or more SRS resource sets.

Agreement: Both downlink and uplink DCIs contain an SRS request field

Agreement: Group common DCI can be used to trigger aperiodic SRS resource set.

Agreement: SRS request field in DCI to trigger transmission of SRS resource set: 2bits

Agreement: Default value of SRS-SequenceId in SRS-ResourceConfig is as follows:
- Similar to CSI-RS sequence, there is no default value for SRS-SequenceId

Agreement: Length-31 Gold sequence same as LTE is used for SRS group and SRS sequence hopping

Agreement: $n_{SRS}$ counts the number of UE-specific SRS transmission within an N symbol SRS resource and this value should be a function of $N \in \{1,2,4\}$ and SRS symbol repetition factor $r \in \{1,2,4\}$ where $r \leq N$
- Note: $n_{SRS}$ counts a number of symbol level with repetition and accumulated across slot for periodic and semi-persistent SRS. $n_{SRS}$ counts a number of symbol level with repetition accumulated within a slot for aperiodic SRS.

Agreement: For group hopping and sequence hopping
- 30 sequence groups with 1 or 2 root-sequences per group
  - If group hopping is enabled, sequence hopping ON = 0
  - If sequence hopping is enabled, group hopping is disabled

Agreement: NR supports SRS functionality for group hopping and sequence hopping (similar to LTE) where the function is given as follows:

- Alt1 symbol level without considering repetition
  - Note: PUSCH and PUCCH group hopping pattern are different than the SRS group hopping pattern depending on agreements.

$$f_{\mathrm{gh}}(l', n_{\mathrm{s}}) = \begin{cases} 0 & \text{if group hopping off} \\ \left(\sum_{i=0}^{7} c\left(8g(l', n_s)\right) + i) \cdot 2^i\right) \bmod 30 & \text{if group hopping on} \end{cases}$$

$$g(l', n_s) = l' + n_{\mathrm{s}} \times N_{srs\_sym}$$

R1-1719441 Remaining details of SRS design Huawei, HiSilicon
R1-1719519 Views on SRS designs Mitsubishi Electric Co.
R1-1719544 Remaining details on SRS ZTE, Sanechips
R1-1719776 Remaining details on SRS design vivo
R1-1719914 On SRS design LG Electronics
R1-1719967 Further discussion on SRS design for NR Guangdong OPPO Mobile Telecom
R1-1720078 Discussion on SRS for NR Intel Corporation
R1-1720188 Discussion on remaining details of SRS design CATT
R1-1720223 Remaining details on SRS design for NR ETRI
R1-1720313 Remaining details on SRS Samsung
R1-1720459 Considerations on SRS design Sony
R1-1720670 Remaining details on SRS Qualcomm Incorporated
R1-1721384 Remaining details on SRS design Ericsson (rev of R1-1720744)
R1-1720810 Discussions on NR SRS Design NTT DOCOMO, INC.
R1-1720897 Remaining details on SRS design in NR Nokia, Nokia Shanghai Bell
R1-1721577 WF on the default value for SRS-SequenceId Mitsubishi Electric, SONY, LG Electronics
R1-1721621 WF on group hopping and sequence hoppingLG Electronics, Mitsubishi, Qualcomm, KT Corp.

#### *7.2.3.6 Remaining details on TRS*

**R1-1721419 Summary of TRS remaining details MediaTek**

Agreement:
TRS is configured as a CSI-RS resource set. The common values among the NZP CSI-RS resources in the CSI-RS resource set configured for TRS is up to RAN2 for reducing signalling overhead
- Description of TRS parameters in the specification should comply with the agreements made on TRS so far
- Include an RRC parameter in the CSI-RS resource set to indicate that it can be used for time/frequency tracking

Note: It is up to 38.211, 38.214 spec editors to capture this in the specifications

Agreement:
- Measurement restriction is not supported for TRS

**R1-1721508 Summary of potential RRC impact to TRS MediaTek Inc.**

**Conclusion:**
The dedicated signalling to indicate beam change on TRS is not supported in Rel-15.

**R1-1721701 WF on Aperiodic TRS Qualcomm, Ericsson**

Agreement:
- For above-6GHz, the TRS periodicity = 10ms, 20ms, 40ms and 80ms are supported

Working Assumption
- For above-6GHz, the following configurations are supported
  - Same configuration as below-6GHz: X=2 and N=2+2
  - For X=1, use the same OFDM symbols as X=2 case within a slot
  - FFS on the applied scenario of X=1 and X=2

Agreement:
- The following TRS symbol positions are supported

- Symbol 4 and 8
- Symbol 5 and 9
- Symbol 6 and 10
- Note 1: The symbol index starts from 0
- Note 2: TRS in each slot of a TRS burst has the same symbol position

R1-1719442 Remaining details for CSI-RS for fine time and frequency tracking Huawei, HiSilicon
R1-1719545 Remaining details on TRS ZTE, Sanechips
R1-1719581 On remaining details of TRS MediaTek Inc.
R1-1719639 Remaining details on TRS AT&T
R1-1719777 Discussion on TRS vivo
R1-1719915 Discussion on fine time/frequency tracking of channel LG Electronics
R1-1720079 Remaining Details on TRS Intel Corporation
R1-1720314 Remaining details on TRS Samsung
R1-1720671 Remaining issues on TRS Qualcomm Incorporated
R1-1720745 Remaining details on TRS Ericsson
R1-1720811 Remaining details on TRS NTT DOCOMO, INC.
R1-1721430 Remaining details of TRS design Nokia, Nokia Shanghai Bell

#### *7.2.3.7 Remaining details on QCL*

**R1-1721429 Summary of QCL Nokia, Nokia Shanghai Bell**

**R1-1721563 Summary of offline discussions on QCL Nokia, Nokia Shanghai Bell**

Agreement:
RS combinations holding QCL assumptions after RRC for above 6 GHz, for one CC:

- SSB → TRS w.r.t average delay, Doppler shift, spatial RX parameters
- TRS → CSI-RS for BM w.r.t. average delay, Doppler shift, delay spread, Doppler spread estimation
- TRS → CSI-RS for CSI w.r.t. average delay, Doppler shift, delay spread, Doppler spread estimation
- TRS → DMRS for PDCCH w.r.t. average delay, Doppler shift, delay spread, Doppler spread estimation
- TRS → DMRS for PDSCH w.r.t. average delay, Doppler shift, delay spread, Doppler spread estimation
- SSB → CSI-RS for BM w.r.t. average delay, Doppler shift, spatial RX parameters
- SSB → CSI-RS for CSI w.r.t., spatial RX parameters
- SSB → DMRS for PDCCH (before TRS is configured) w.r.t. average delay, Doppler shift, delay spread, Doppler spread, spatial RX parameters
- SSB → DMRS for PDSCH (before TRS is configured) w.r.t. average delay, Doppler shift, delay spread, Doppler spread, spatial RX parameters.
- CSI-RS for BM → DMRS for PDCCH w.r.t., spatial RX parameters.
- CSI-RS for BM → DMRS for PDSCH w.r.t., spatial RX parameters
- CSI-RS for CSI → DMRS for PDSCH w.r.t. average delay, Doppler shift, delay spread, Doppler spread, spatial RX parameters; Note: QCL parameters may not be derived directly from CSI-RS for CSI
- CSI-RS for BM → CSI-RS for TRS/BM/CSI w.r.t. spatial RX parameters

Agreement:

- QCL types A: Doppler shift, Doppler spread, average delay, delay spread
- QCL types B: Doppler shift, Doppler spread
- QCL types C: average delay, Doppler shift
- QCL types D: Spatial Rx

| QCL linkage for below 6GHz before RRC | signalling |
| --- | --- |
| SSB → DMRS for PDSCH w.r.t Doppler shift, Doppler spread, average delay, delay spread, spatial RX parameters (spatial RX parameters are used only for above 6GHz) | |
| SSB → DMRS for PDCCH w.r.t Doppler shift, Doppler spread, average delay, delay spread, spatial RX parameters (spatial RX parameters are used only for above 6GHz) | |

| QCL linkage for below 6GHz after RRC | signalling |
|---|---|
| SSB → TRS: Doppler shift, average delay | QCL type: C |
| TRS → CSI-RS for CSI acquisition: *Doppler shift, Doppler spread, average delay, delay spread* | QCL type: A |
| TRS → DMRS: *Doppler shift, Doppler spread, average delay, delay spread* | QCL type: A |
| TRS → CSI-RS for CSI acquisition: *Doppler shift, Doppler spread* | QCL type: B |
| CSI-RS → DMRS: *Doppler shift, Doppler spread, average delay, delay spread* | QCL type: A |

| QCL linkage for above 6GHz after RRC | signalling |
|---|---|
| SSB → TRS w.r.t average delay, Doppler shift, spatial RX parameters | QCL type: C + D |
| TRS → CSI-RS for BM w.r.t. average delay, Doppler shift, delay spread, Doppler spread estimation | QCL type: A |
| TRS → CSI-RS for CSI w.r.t. average delay, Doppler shift, delay spread, Doppler spread estimation | QCL type: A |
| TRS → DMRS for PDCCH w.r.t. average delay, Doppler shift, delay spread, Doppler spread estimation | QCL type: A |
| TRS → DMRS for PDSCH w.r.t. average delay, Doppler shift, delay spread, Doppler spread estimation | QCL type: A |
| SSB → CSI-RS for BM w.r.t. average delay, Doppler shift, spatial RX parameters | QCL type: C+D |
| SSB → CSI-RS for CSI w.r.t, spatial RX parameters | QCL type: D |
| SSB → DMRS for PDCCH (before TRS is configured) w.r.t. average delay, Doppler shift, delay spread, Doppler spread, spatial RX parameters | QCL type: A+D |
| SSB → DMRS for PDSCH (before TRS is configured) w.r.t. average delay, Doppler shift, delay spread, Doppler spread, spatial RX parameters | QCL type: A+D |
| CSI-RS for BM → DMRS for PDCCH w.r.t. spatial RX parameters | QCL type: D |
| CSI-RS for BM → DMRS for PDSCH w.r.t., spatial RX parameters | QCL type: D |
| CSI-RS for CSI → DMRS for PDSCH w.r.t. average delay, Doppler shift, delay spread, Doppler spread, spatial RX parameters; Note: QCL parameters may not be derived directly from CSI-RS for CSI | QCL type: A+D |
| CSI-RS for BM → CSI-RS for TRS/BM/CSI w.r.t. spatial RX parameters | QCL type: D |

- If the QCL target RS is periodic CSI-RS or TRS,
  - QCL-Info IE is placed in *CSI-RS-Resource-Config* and refers to the *TCI-State index*
- TCI-State structure for one RS set is either:
  - DL Reference RS1| QCL_type1, DL Reference RS2| QCL_type2
    - Note that there is no overlap of QCL_type1 and QCL_type2
  - DL Reference RS1| QCL_type1
  - Note that QCL_type1 and QCL_type2 are selected from {QCL types A, QCL types B, QCL types C, QCL types D}
  - Note that if DL Reference RS1 and DL Reference RS2 are the same, both QCL types apply

R1-1719443 Remaining details of QCL assumptions Huawei, HiSilicon
R1-1719546 Remaining details on QCLZTE, Sanechips
R1-1719778 Remaining issues on QCL vivo
R1-1719916 Discussion on QCL for NR LG Electronics
R1-1719990 Discussion on Remaining Issues of QCL Guangdong OPPO Mobile Telecom
R1-1720080 On remaining details of QCL for NR Intel Corporation
R1-1720189 On QCL for NR CATT
R1-1720315 Remaining details on QCLSamsung
R1-1720672 Remaining details on QCLQualcomm Incorporated
R1-1720742 Remaining details on QCLEricsson
R1-1720899 Remaining details on QCLNokia, Nokia Shanghai Bell

#### 7.2.3.8 Other

R1-1719445 Signaling of DMRS ports for SU/MU-MIMO Huawei, HiSilicon
R1-1719446 Remaining details on SRS switching among CCs Huawei, HiSilicon
R1-1719821 Remaining details of SRS antenna switching Huawei, HiSilicon
R1-1719822 Considerations on UE-specific RS Sequence Design Huawei, HiSilicon
R1-1719823 Evaluation results of DMRS design for DL/UL data channel Huawei, HiSilicon
R1-1719824 Remaining issues on supporting Common UL/DL DMRS design Huawei, HiSilicon
R1-1719825 Remaining details for reference signals for ECP Huawei, HiSilicon
R1-1719826 DMRS design for URLLC Huawei, HiSilicon
R1-1720316 Discussions on data scrambling Samsung
R1-1720317 PTRS design for 40 GHz and higher frequency bands Samsung

R1-1720318 Evaluations on pre-DFT PTRS insertion Samsung
R1-1720635 Design of UL DMRS sequence for data transmission Huawei, HiSilicon
R1-1720673 Evaluation of DMRS design Qualcomm Incorporated
R1-1720674 Summary of email discussion [90b-NR-20] on the DMRS of 2-4-7-symbol for non-slot based scheduling Qualcomm Incorporated
R1-1720725 Further evaluations on PTRS Ericsson
R1-1721383 Sequence initialization for DMRS and CSI-RS Ericsson (rev of R1-1720726)
R1-1720727 Further details on CSI-RS Design Ericsson
R1-1720728 Further evaluations on DMRS Ericsson
R1-1720729 CM evaluations of DMRS for pi/2-BPSK Ericsson
R1-1720979 TRS Frequency synchronization evaluations Ericsson
R1-1720980 TRS Throughput evaluations Ericsson
R1-1720981 TRS above-6 GHz evaluations Ericsson
R1-1720982 On Frequency synchronization requirements Ericsson
R1-1720983 On RS related rate matching for DL and UL Ericsson
R1-1721385 Discussion on SRS frequency hopping in NR Ericsson (rev of R1-1720984)
R1-1720985 On DMRS power boosting and power imbalance Ericsson
R1-1720988 On multiplexing of CSI-RS and PDCCH Ericsson

### 7.2.4 Other

*Including MIMO calibration*

R1-1719814 DL multi-TRP/panel/beam operation in R15 Huawei, HiSilicon
R1-1719818 UL multi-TRP/panel/beam operation in R15 Huawei, HiSilicon
R1-1720230 Calibration results for Phase 2 NR MIMO link level simulation ETRI

## *7.3 Remaining Details on Scheduling/HARQ aspects*

### 7.3.1 Remaining details on physical downlink control channel

#### *7.3.1.1 Remaining details on PDCCH structure*

**R1-1721413 Offline summary for AI 7.3.1.1 Remaining details on PDCCH structure NTT DOCOMO**
**Decision:** The document is noted.

Agreements:
- For each CORESET configured by PBCH, physical cell ID is used for DMRS sequence initialization
- Working assumption: For each CORESET configured by RMSI, it can be configured with a configurable ID for DMRS sequence initialization via RMSI (if not configured, physical cell ID is used for DMRS sequence initialization)
  - Working assumption: The value range of the configurable ID is the same as that for physical cell ID
- For each CORESET configured by UE-specific RRC signalling, a UE is configured with a configurable ID for DMRS sequence initialization
  - Working assumption: The value range of the configurable ID is the same as that for physical cell ID in Rel-15

Huawei commented that it should be understood the above stays as working assumption because MIMO delegates are still discussing the topic.

**R1-1720081 Remaining details on PDCCH structure Intel Corporation**
**Decision:** The document is noted.

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**Wednesday session**
**R1-1721511 Offline for PDCCH structure NTT DOCOMO**

Agreements:
- No new RRC parameter is necessary to identify the reference point for DMRS generation for the given CORESET.
- For a CORESET configured by UE-specific RRC signaling, a configurable ID for cyclic shift of the interleaving unit.
  - The value range of the configurable ID is {0 - 274}.
- For a CORESET configured by PBCH/RMSI, physical cell ID is used for the cyclic shift of the interleaving unit.

---

**Friday**
Agreement: The same length-31 Gold sequence with LTE is used for scrambling PDCCH and DMRS for PDCCH.

Agreement: Reference point for DMRS generation for PDCCH is,
- PRB 0 of common PRB indexing for UE-specific CORESET
- PRB 0 of the initial active DL BWP for CORESET configured by PBCH/RMSI

R1-1719386 On NR-PDCCH structure Huawei, HiSilicon
R1-1719489 Remaining issues on NR PDCCH structure ZTE, Sanechips
R1-1719553 Remaining issues on PDCCH structure MediaTek Inc.
R1-1719640 Remaining details on PDCCH structure AT&T
R1-1719780 Remaining details on NR-PDCCH structure vivo
R1-1719917 Remaining details on PDCCH strucutre LG Electronics
R1-1719982 Remaining issues on PDCCH structure Guangdong OPPO Mobile Telecom
R1-1720190 Remaining details of PDCCH structure CATT
R1-1720319 Remaining Issues on PDCCH Structure Samsung
R1-1720506 Remaining details on PDCCH structure Nokia, Nokia Shanghai Bell
R1-1720590 DMRS Sequence Design for NR PDCCH CMCC
R1-1720636 On frequency-first REG bundling for multi-symbol CORESETs InterDigital, Inc.
R1-1721375 Remaining issues on PDCCH structure Qualcomm Incorporated (Revision of R1-1720675)
R1-1720752 Consideration on DM RS of PDCCH for MU MIMO CATR
R1-1720992 On NR-PDCCH Structure Ericsson

#### *7.3.1.2 Remaining details on Search space*

**R1-1721414 Offline summary for AI 7.3.1.2 Remaining details on search space NTT DOCOMO**
**Decision:** The document is noted.

Agreement: RRC parameter "*CORESET-start-symb*" is deleted from the RRC parameter list.

Agreements:
- (Working assumption) For NR PDCCH associated with the CORESET(s) configured by PBCH, AL=16 is not supported.
- For NR PDCCH associated with the CORESET(s) configured by RMSI or UE-specific RRC signaling, AL=16 is supported
  - Note: additional complexity, if any, for NR PDCCH channel estimation is to be discussed separately
  - Discuss further offline whether or not AL=16 is associated with wideband RS only

FFS
- In Rel.15, for initial access and fallback, UE monitors common search space in the PCell (PSCell) only
- In Rel.15,
  – A UE is not required to perform re-runing for monitoring CSS
  – A UE is expected to monitor CSS (if configured) of a given numerology in the activated BWP

---

**Wedneday session**
**R1-1721512 Offline for Search space NTT DOCOMO**

Agreement:
- CORESET configured by RMSI is confined within the initial active DL BWP

Agreements:
- For a CORESET configured by UE-specific RRC signaling, DL BWP-specific RB indexing + RB-offset are used to configure frequency-domain resource.
  - The length of the bit-map is Floor((N_RB – (ceil(BWP_start/6)*6-BWP_start))/6)
    - CORESET starting RB is ceil(BWP_start/6)*6
- For a CORESET configured by PBCH/RMSI, RB indexing is for the initial DL BWP.

Agreements:
- C-SS in each DL BWP of the PCell/PScell
  - On C-SS, $Y_{p,kp}$= 0.
  - In Rel.15,
    - For scheduling RMSI, OSI, Paging, UE monitors common search space in the PCell only
    - In addition, for random access and fall back, UE monitors common search space in the PCell and PSCell only

        - Working assumption: The UE is not expected to be configured without C-SS on the PCell (PSCell) in the active DL BWP or to be configured without PRACH configuration in the UL active BWP
    - Working assumption: In Rel.15,
        - A UE is expected to monitor C-SS (if configured) in the activated BWP
        - Full functionalities of C-SS (scheduling RMSI, OSI, Paging, random access, etc) are supported by the C-SS configured by UE-specific RRC signaling.
        - All RRC parameters defined for UE-SS are also defined for C-SS that is configured by UE-specific RRC signaling.

Agreements:
- C-SS (at least for SFI/PI if configured) in a Scell:
    - On C-SS, $Y_{p,kp}$= 0.
    - Working assumption: All RRC parameters defined for UE-SS are also defined for C-SS that is configured by UE-specific RRC signaling.

Agreements:
- Introduce a linkage between search space set and CORESET via an index to the CORESET configuration
    - CORESET is removed from the search space configuration
- In Rel-15, the max no. of CORESETs configurable for a BWP in a cell for a UE is [3]
- In Rel-15, the max no. of search space sets configurable for a BWP in a cell for a UE is [10]

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**Thursday session**

Proposals:
- The maximum number of CCEs for PDCCH channel estimation is specified.
    - The number of CCEs for PDCCH channel estimation refers to the union of the sets of CCEs for PDCCH candidates.
        - Note: the overlapped CCEs associated with different CORESETs are counted separately.
        - Strive for not having specific UE capability to report the maximum number of CCEs for PDCCH channel estimation.
        - Note: CCEs in the wideband RS CORESET are counted in the same way as CCEs in the narrowband RS CORESET.
- FFS: whether/how to handle the variation on the actual number of CCEs for PDCCH channel estimation and BDs over time

Proposals:
- For unicast, classify the UE behavior as follows:
    - 1: PDCCH monitoring within the first 1-3 symbols of a slot
        - Both PDSCH mapping type A and type B are allowed
            - Note: PUSCH mapping is up to MIMO decision
    - 2: Otherwise
        - Only PDSCH mapping type B is allowed.
            - Note: PUSCH mapping is up to MIMO decision

Agreements:
- Scrambling for PDCCH (after channel coding) is supported.
    - No additional RRC parameter is necessary.
    - Re-use the ID for DMRS initialization.

Conclusion:
- It is clarified that $M_{p,max}^{L}$ is the maximum of "configured" number of PDCCH candidates for the given aggregation level $L$ across all serving cells scheduled by the search space.

---

**Friday**

Agreement:
- UE is not expected to receive PDSCH type A in the same slot if the PDCCH monitoring is after the first two or three symbols of a slot
    - Note: PUSCH mapping is up to MIMO decision

Agreements:

- For information, the following cases are clarified:
  - Case 1: PDCCH monitoring periodicity of 14 or more symbols
    - Case 1-1: PDCCH monitoring on up to three OFDM symbols at the beginning of a slot
    - Case 1-2: PDCCH monitoring on any span of up to 3 consecutive OFDM symbols of a slot
      - For a given UE, all search space configurations are within the same span of 3 consecutive OFDM symbols in the slot
  - Case 2: PDCCH monitoring periodicity of less than 14 symbols
    - Note: this includes the PDCCH monitoring of up to three OFDM symbols at the beginning of a slot
- The numbers in bracket in the following table can be further adjusted but not to be increased
- X<=16, Y<=8
  - FFS whether or not to have case 2', where the values of X and/or Y can be smaller than case 2

| Max no. of PDCCH BDs per slot | SCS | | | |
|---|---|---|---|---|
| | 15kHz | 30kHz | 60kHz | 120kHz |
| Case 1-1 | 44 | 36 | 22 | 20 |
| Case 1-2 | [44] | | | - |
| Case 2 | [44+X] | [36+Y] | [22+Y] | [20] |

Working assumption:

- For PDCCH monitoring for receiving RMSI, the number of PDCCH candidates are following:
  - 4 candidates for AL = 4
  - 2 candidates for AL = 8
- DCI size for RMSI scheduling and DCI size for OSI scheduling are the same
  - FFS: Paging and fallback

Conclusion:

- RAN1 common understanding is that the PDCCH channel estimation complexity is not negligible at least in some cases.
  - FFS: Possible solutions to resolve the channel estimation complexity issue together with the impact on PDCCH blocking probability
  - Opt.1: Define the limits of "*the number of CCEs for PDCCH channel estimation which refers to the union of the sets of CCEs for PDCCH candidates*"
    - Note: the overlapped CCEs associated with different CORESETs are counted separately.
    - FFS: CCEs for the same precoder-granularity are counted as one channel estimation
    - FFS: whether/how to handle the variation on the actual number of CCEs for PDCCH channel estimation and BDs over time
    - Application of overbooking is considered
    - Strive for not having specific UE capability to report the maximum number of CCEs for PDCCH channel estimation.
    - Study the solutions considering the cases 1-1, 1-2, 2, and 2'.
  - Opt.2: Modify the hashing function
  - Opt.3: Increase the size of the precoder granularity

R1-1719387 CORESET configuration and search space design Huawei, HiSilicon
R1-1719554 Remaining issues on search space MediaTek Inc.
R1-1719641 Remaining details on Search space AT&T
R1-1721054 NR PDCCH search space and number of BDs/CCEs per slot ZTE, Sanechips (Revision of R1-1719669)
R1-1719699 Remaining details on search space Spreadtrum Communications
R1-1719781 Remaining details on NR-PDCCH search space vivo
R1-1719918 Remaining details on search space LG Electronics
R1-1719983 Remaining issues on Search space Guangdong OPPO Mobile Telecom
R1-1720082 PDCCH CORESETs and search spaces Intel Corporation
R1-1720191 Further discussion on NR PDCCH search space CATT
R1-1720320 Remaining Issues on Search Space Design Samsung
R1-1720494 Configuration of CORESET and search space design Panasonic
R1-1720507 Remaining details on search space Nokia, Nokia Shanghai Bell
R1-1720591 Discussion on aggregation level 16 for NR PDCCH CMCC
R1-1720676 Remaining issues on control resource set and search space Qualcomm Incorporated
R1-1720812 Remaining details on search space NTT DOCOMO, INC.
R1-1720993 On Remaining Issues of Search Space and Blind Decoding Ericsson

#### *7.3.1.3 Remaining details on group-common PDCCH*

R1-1721402 **Email discussion summary for SFI** **Qualcomm**
**Decision:** The document is noted.

Proposals from summary:
- For the cell-specific higher layer signalling on semi-static DL/UL assignment, support one or two DL-unknown-UL segments within each period of the semi-static DL/UL assignment.
- When two segments are configured within a period, z1 is the length in slots for the first segment, and z2 is the length in slots of the second segment
  - z1+z2 equal the length of the semi-static DL/UL assignment period
- When two segments are configured within a period, separate {x1, x2, y1, y2} are configured for each segment

Proposals:
- For the cell-specific higher layer signalling on semi-static DL/UL assignment, support up to K=2 DL-unknown-UL segments within each period of the semi-static DL/UL assignment.
- When K>1 segments are configured within a period, z_k is the length in slots for the k'th segment
  - z_k is one of the lengths supported for single DL-unknown-UL segment perioid
- When K>1 segments are configured within a period, separate {x1, x2, y1, y2} are configured for each segment

---

**Wednesday**

Agreements:
- A reference SCS is signaled together with cell-specific DL/UL assignment link configured period in ms and configurated pattern (x1,x2,y1,y2) is slots/symbols
  - For Rel 15, the same reference SCS is applied to UE-specific DL/UL assignment link configured period in ms and configurated pattern (x3,x4,y3,y4) is slots/symbols
- For GC-PDCCH monitoring, the period is GC-PDCCH SCS dependent
  - For 15KHz SCS (slots based on 15kHz): 1,2,5,10,20
  - For 30KHz SCS (slots based on 30kHz): 1, 2, 4, 5, 10, 20
  - For 60KHz SCS(slots based on 60kHz): 1, 2, 4, 5, 8, 10, 20
  - For 120KHz SCS(slots based on 120kHz): 1, 2, 4, 5, 10, 20

R1-1721538 **[Draft] LS on NR TDD UL/DL configurations and support of HPUE** **Softbank, Sprint**
**Decision:** The document is endorsed, and final LS is approved in R1-1721560.

Agreements:
- For the cell-specific RRC configuration of the semi-static DL/UL assignment,
  - Add additional periodicity 0.625ms (for 120KHz SCS only), 1.25ms (for >=60KHz SCS), and 2.5ms (for >=30KHz SCS)
  - Also support 2 concatenated DL-unknown-UL periodicity
    - Add 1 bit in semi-static DL/UL assignment to indicate if the second periodicity is included
    - The two periodicities form X ms + Y ms total periodicity, where X, and Y are from {0.5, 0.625, 1, 1.25, 2, 2.5, 5, 10} ms
      - When two perodicities are included, the corresponding parameters are independently configured.
      - Note: it will be discussed to preclude some combinations (no additional higher-layer impact)

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**Friday**
R1-1721674 **Offline discussion summary for SFI** **Qualcomm**
**Decision:** The document is noted.

Agreements:
- On SSB transmission
  - SSB transmission can happen in semi-static DL
  - SSB transmission can happen in semi-static unknown
    - Symbols configured to transmit SSB cannot be overwritten to UL

Agreements:
- The reception of DL one-slot UE-specific data not semi-statically configured by RRC and measurement related signals not semi-statically configured by RRC cannot be overriden by "unknown" in dynamic SFI

  - FFS the case of DL multi-slot UE-specific data not semi-statically configured by RRC

Agreement:

- In a UE PDCCH monitoring occasion, if dynamic SFI "unknown" is received (not overwritten) for at least one symbol configured for UE PDCCH, the UE is not expected to monitor the PDCCH

Working assumption:

- For the SFI table, capture the following:
  - For information only:
    - Include entries with all D, all U and all unknown (X)
    - For the slot format with single switching point
      - For short consecutive DL, consider up to 3 DL symbols
      - For short consecutive UL, consider up to 2 UL symbols
      - For short consecutive unknown, consider up to 3 unknown symbols
      - With DL and unknown:
        - DL dominant: X starts in symbol 11, 12, 13 or 14 and ends in symbol 14
        - Unknown dominant: X starts in symbol 2, 3, or 4 and ends in symbol 14
      - With unknown and UL
        - Unknown dominant: X starts in symbol 1 and ends in symbol 12 or 13
        - UL dominant: X starts in symbol 1 and ends in symbol 1, 2, 3, 4, 5, 6
      - With DL, unknown and UL:
        - DL dominant: X in symbol {13}, {12, 13}, {11,12,13}, {12}, {11, 12}, {10,11,12}
        - Unknown dominant: X starts in symbol 2, 3, or 4 and ends in symbol 12 or 13
        - UL dominant: X in symbol {2}, {3}, {4}, {2,3}, {3,4}, {4,5}, {2,3,4}, {3,4,5}, {4,5,6}
        - Additional to match LTE special subframe patterns: 9-4-1, 6-6-2, 6-2-6
        - Special case: 1-3 D in the beginning and 3 U in the end
    - For the slot format with two switching points
      - Consider symmetric two half slots
        - For short consecutive DL, consider up to 2 DL symbols
        - For short consecutive UL, consider up to 1 UL symbols
        - For short consecutive unknown, consider up to 2 unknown symbols
  - Additional entries can still be discussed and introduced in Rel-15
  - The indexing may be further adjusted

| | ***1*** | ***2*** | ***3*** | ***4*** | ***5*** | ***6*** | ***7*** | ***8*** | ***9*** | ***10*** | ***11*** | ***12*** | ***13*** | ***14*** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | D | D | D | D | D | D | D | D | D | D | D | D | D | D |
| 1 | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| 2 | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 3 | D | D | D | D | D | D | D | D | D | D | D | D | D | X |
| 4 | D | D | D | D | D | D | D | D | D | D | D | D | X | X |
| 5 | D | D | D | D | D | D | D | D | D | D | D | X | X | X |
| 6 | D | D | D | D | D | D | D | D | D | D | X | X | X | X |
| 7 | D | D | D | D | D | D | D | D | D | X | X | X | X | X |
| 8 | X | X | X | X | X | X | X | X | X | X | X | X | X | U |
| 9 | X | X | X | X | X | X | X | X | X | X | X | X | U | U |
| 10 | X | U | U | U | U | U | U | U | U | U | U | U | U | U |
| 11 | X | X | U | U | U | U | U | U | U | U | U | U | U | U |
| 12 | X | X | X | U | U | U | U | U | U | U | U | U | U | U |
| 13 | X | X | X | X | U | U | U | U | U | U | U | U | U | U |
| 14 | X | X | X | X | X | U | U | U | U | U | U | U | U | U |
| 15 | X | X | X | X | X | X | U | U | U | U | U | U | U | U |
| 16 | D | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 17 | D | D | X | X | X | X | X | X | X | X | X | X | X | X |
| 18 | D | D | D | X | X | X | X | X | X | X | X | X | X | X |
| 19 | D | X | X | X | X | X | X | X | X | X | X | X | X | U |
| 20 | D | D | X | X | X | X | X | X | X | X | X | X | X | U |
| 21 | D | D | D | X | X | X | X | X | X | X | X | X | X | U |
| 22 | D | X | X | X | X | X | X | X | X | X | X | X | U | U |
| 23 | D | D | X | X | X | X | X | X | X | X | X | X | U | U |
| 24 | D | D | D | X | X | X | X | X | X | X | X | X | U | U |
| 25 | D | X | X | X | X | X | X | X | X | X | X | U | U | U |
| 26 | D | D | X | X | X | X | X | X | X | X | X | U | U | U |
| 27 | D | D | D | X | X | X | X | X | X | X | X | U | U | U |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 28 | D | D | D | D | D | D | D | D | D | D | D | D | X | U |
| 29 | D | D | D | D | D | D | D | D | D | D | D | X | X | U |
| 30 | D | D | D | D | D | D | D | D | D | D | X | X | X | U |
| 31 | D | D | D | D | D | D | D | D | D | D | D | X | U | U |
| 32 | D | D | D | D | D | D | D | D | D | D | X | X | U | U |
| 33 | D | D | D | D | D | D | D | D | D | X | X | X | U | U |
| 34 | D | X | U | U | U | U | U | U | U | U | U | U | U | U |
| 35 | D | D | X | U | U | U | U | U | U | U | U | U | U | U |
| 36 | D | D | D | X | U | U | U | U | U | U | U | U | U | U |
| 37 | D | X | X | U | U | U | U | U | U | U | U | U | U | U |
| 38 | D | D | X | X | U | U | U | U | U | U | U | U | U | U |
| 39 | D | D | D | X | X | U | U | U | U | U | U | U | U | U |
| 40 | D | X | X | X | U | U | U | U | U | U | U | U | U | U |
| 41 | D | D | X | X | X | U | U | U | U | U | U | U | U | U |
| 42 | D | D | D | X | X | X | U | U | U | U | U | U | U | U |
| 43 | D | D | D | D | D | D | D | D | D | X | X | X | X | U |
| 44 | D | D | D | D | D | D | X | X | X | X | X | X | U | U |
| 45 | D | D | D | D | D | D | X | X | U | U | U | U | U | U |
| 46 | D | D | D | D | D | D | X | D | D | D | D | D | D | X |
| 47 | D | D | D | D | D | X | X | D | D | D | D | D | X | X |
| 48 | D | D | X | X | X | X | X | D | D | X | X | X | X | X |
| 49 | D | X | X | X | X | X | X | D | X | X | X | X | X | X |
| 50 | X | U | U | U | U | U | U | X | U | U | U | U | U | U |
| 51 | X | X | U | U | U | U | U | X | X | U | U | U | U | U |
| 52 | X | X | X | U | U | U | U | X | X | X | U | U | U | U |
| 53 | X | X | X | X | U | U | U | X | X | X | X | U | U | U |
| 54 | D | D | D | D | D | X | U | D | D | D | D | D | X | U |
| 55 | D | D | X | U | U | U | U | D | D | X | U | U | U | U |
| 56 | D | X | U | U | U | U | U | D | X | U | U | U | U | U |
| 57 | D | D | D | D | X | X | U | D | D | D | D | X | X | U |
| 58 | D | D | X | X | U | U | U | D | D | X | X | U | U | U |
| 59 | D | X | X | U | U | U | U | D | X | X | U | U | U | U |
| 60 | D | X | X | X | X | X | U | D | X | X | X | X | X | U |
| 61 | D | D | X | X | X | X | U | D | D | X | X | X | X | U |
| 62-255 | Reserved | | | | | | | | | | | | | |

R1-1721702 **Offline discussion summary for SFI** **Qualcomm**
**Decision:** The document is noted.

Agreements:

- Transmission direction implied by cell-specific RRC configuration cannot be overwritten by dynamic SFI to the other direction
- Transmission direction implied by cell-specific RRC configuration for SCell/PSCell delivered in UE-specific manner cannot be overwritten by dynamic SFI to the other direction
- For DCI granted multi-slot transmission (PDSCH/PUSCH/PUCCH) vs semi-static DL/UL assignment
  - If semi-static DL/UL assignment configuration of a slot has no direction confliction with scheduled PDSCH/PUSCH/PUCCH assigned symbols, the PDSCH/PUSCH/PUCCH in that slot can be transmitted
  - If semi-static DL/UL assignment configuration of a slot has direction confliction with scheduled PDSCH/PUSCH/PUCCH assigned symbols, the PDSCH/PUSCH/PUCCH transmission in that slot is cancelled
- Transmisson direction implied by UE-specific RRC configuration is treated together as "measurement"
  - Currently already include: Measurement related signals semi-statically configured by UE-specific RRC (eg. periodic/semi-persistent CSI-RS for CSI report, periodic CSI report, periodic/semi-persistent SRS) where a DL or UL direction will be assumed
  - This includes UE-specific RRC PRACH configuration per each BWP, type 1 grant free UL transmission, type 2 grant free UL transmission
    - For type 2 UL transmission without grant, only the transmission at the first activated resource is treated as "UE-specific data"
  - FFS: Configured resources for RRM for neighbor cell measurement
- Configured PDCCH monitoring under semi-static "unknown" (if not overwritten) is performed

Working assumption:

- For FDD SFI support, use multi-slot SFI configuration to achieve FDD SFI support
  - The SFI for one FDD slot is configured with 2 entries in multi-slot configuration
    - Even slot is for DL BWP, and odd slot is for UL BWP
  - Same mechanism can be applied to SUL case

Agreements:

- NR does not support the following:
  - Transmission of UL UE-specific data and measurement related signals not semi-statically configured by RRC is overriden by "unknown" in dynamic SFI
- For DCI granted multi-slot transmission (PDSCH/PUSCH/PUCCH) vs dynamic SFI, when there is no semi-static DL/UL assignment or the semi-static DL/UL assignment indicates unknown
  - Follow scheduled multi-slot transmission

Agreements:

- In Rel-15, on coding of any PDCCH (including GC-PDCCH)
  - The coding has at least 12 bits before CRC
    - If the payload size is 11 bits or less, zero-padding to 12 bits

Agreements:

- On the indicated effective range of the dynamic SFI, the earliest slot the SFI can be applied is the same slot
- FFS: The DL cancellation and UL cancellation action time

R1-1719388 Remaining details of group-common PDCCH Huawei, HiSilicon
R1-1721045 Remaining issues on GC-PDCCH MediaTek Inc. (Revision of R1-1719555)
R1-1719642 Remaining details on group-common PDCCH AT&T
R1-1719670 Remaining details on group-common PDCCH ZTE, Sanechips
R1-1719782 Remaining details on group-common PDCCH vivo
R1-1719919 Discussion on group common PDCCH LG Electronics
R1-1719984 Remaining issues on GC-PDCCH Guangdong OPPO Mobile Telecom
R1-1720083 Remaining aspects of Group common PDCCH and SFI Intel Corporation
R1-1720118 Slot Format Indicator in Group-common PDCCH Apple Inc.
R1-1720192 On semi-static and dynamic signaling of SFI CATT
R1-1720321 Remaining Issues on UE-Group Common PDCCH Samsung
R1-1720460 On remaining details on group-common PDCCH Sony
R1-1720495 Remaining details on group-common PDCCH Panasonic
R1-1720508 On the remaining aspects of group-common PDCCH in NR Nokia, Nokia Shanghai Bell
R1-1720592 Discussion on remaining issues on Semi-static DL/UL assignment CMCC
R1-1720614 Group common PDCCH for NR Sharp
R1-1720637 On configuration of GC-PDCCH for dynamic SFI InterDigital, Inc.
R1-1720677 Remaining issues on slot format indication Qualcomm Incorporated
R1-1720751 Discussion on the remaining details of SFI design CATR
R1-1720773 On the remaining issues of group common PDCCH Xiaomi Technology
R1-1721053 UL restriction for High Power UE with dynamic TDD SoftBank Corp. (Revision of R1-1720774)
R1-1720813 Remaining details on group-common PDCCH NTT DOCOMO, INC.
R1-1720855 Discussion on GC PDCCH ASUSTEK COMPUTER (SHANGHAI)
R1-1720864 Discussion on UE behaviour related to group-common PDCCH FiberHome
Late submission
R1-1720874 Remaining issues on group-common PDCCH for NR WILUS Inc.
R1-1720925 On group-common PDCCH Motorola Mobility, Lenovo
R1-1720994 On Group-Common PDCCH Ericsson

#### *7.3.1.4 DCI contents and formats*

**R1-1721426 Summary of e-mail discussion on 90b-NR-25, DCI content Ericsson (rev of R1-1720852)**
**Decision:** The document is noted.

**R1-1721355 Summary of 7.3.1.4 (DCI contents and formats) Ericsson**
**Decision:** The document is noted.

Agreement:

- No concensus in RAN1#91 on how to support A-CSI on short PUCCH in Rel-15.
  - Thus, A-CSI on short PUCCH is not part of RAN1 specification for completion by Dec. 2017.

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**Thursday session**
**R1-1721642 Outcome of offline discussion on DCI content Ericsson**

Working assumption:

- For DL DCI,
  - The column "'Conf.?" indicates whether the field is present only if a certain feature is configured ("C") or always present
    - Note: if the field is configured to be present, the bitwidth for the field may or may not depend on the configuration (to be further discussed)
  - The column "Fallb.?" indicates whether the field is included in the fallback DCI or not (in the excel sheet the fallback format is listed in a separate tab)
  - Note: The column "Bits" is intended to define the bitwidth for the non-fallback DCI. For the case when the field is indicated as present in the fallback DCI, the bitwidth of the field in the fallback DCI may be the same or less that that of the non-fallback DCI (to be further discussed)
  - Note: there may be zero or more padding bits (to be further discussed)
  - Note: the table below is NOT intended to revert any previous agreements

| Field | Bits | Conf? | Fallb? | Description |
|---|---|---|---|---|
| Header | 1? | | F | At least to distinguish UL and DL with the same DCI size<br>FFS if more bits are needed |
| Carrier indicator | 0 or 3 | C | | |
| BWP indicator | 0, 1, 2 | C | | |
| Frequency-domain PDSCH resources | | [C] | F | VRBs, indicated using type 0 or type 1 resource allocation including the header bit to indicate resource allocation type in case of dynamic type0/1 selection for non-fallback<br><br>Fallback DCI only supports resource allocation type 1<br>**FFS the bitwidth is further dependent on BWP size** |
| Time-domain PDSCH resources | Up to 4 | **[C]** | F | Index into an RRC-configured table providing the set of OFDM symbols used for PDSCH transmission, the start slot, and the PDSCH mapping type<br><br>Note: not fully configurable entries for fallback DCI |
| VRB-to-PRB mapping | 1 | [C] | F | Flag to control VRB-to-PRB mapping (block interleaved or non-block interleaved). Only present/relevant for resource allocation type 1 |
| Reserved resource set on/off | 0, 1,2 | C | | Indicate whether reserved resources should be excluded form the PDSCH allocation. 1 bit per set, max 2 bits<br>FFS if partially needed in fallback |
| Bundling size indicator | 0, 1 | C | | Select from two RRC configured bundling sizes for PDSCH<br>FFS if partially needed in fallback |
| Modulation and coding scheme | 5 | | F | MCS |
| New data indicator | 1 | | F | |
| Redundancy version | 2 | | F | |
| Modulation and coding scheme, second CW | 5 | C | | |
| New data indicator, second CW | 1 | C | | |
| Redundancy version, second CW | 2 | C | | |
| HARQ process number | 3 or 4 | | F | HARQ process number, 3 or 4 bits (8 or 16 processes)<br>FFS: if configurable bit size (at least for non-fallback) or fixed |
| CBGFI | 0 or 1 | C | | CBG flush indication. Consists of 1 bit if CBG retransmission configured. |
| CBGTI | Up to 8 | C | | Indicates the CBG(s) (re)transmitted. Consists of N bits bitmap if CBG is configured. |
| TPC command for PUCCH | 2 | | F | Note: Check number of TPC bits with TPC session. |
| ARI (ACK/NAK Resource Index) | 2 | | F | FFS: size in case of fallback DCI? |
| HARQ timing indicator | 3 | | F | To indicate the timing (slot number) of the ACK relative to the PDSCH reception (K1)<br>Note: not fully configurable entries for fallback DCI |
| Downlink Assignment Index | | | | DAI (counter DAI and total DAI)<br>Note: Check outcome from HARQ codebook session. |
| Antenna port(s) | Up to [5]? | | | Antenna ports used (scheduled and co-scheduled) and the number of layers<br>FFS if (partially) needed in fallback |
| TCI (Transmission Configuration Indication) | 3 | | | 3 bits, fixed. Provides beam indication to indicate QCL assumption between DL RS antenna port(s) and DMRS antenna port(s) of DL data channel at least w.r.t. spatial QCL parameter<br>FFS if (partially) needed in fallback |

Working assumption:

- For UL DCI
  - The column "'Conf.?" indicates whether the field is present only if a certain feature is configured ("C") or always present
    - Note: if the field is configured to be present, the bitwidth for the field may or may not depend on the configuration (to be further discussed)
  - The column "Fallb.?" indicates whether the field is included in the fallback DCI or not (in the excel sheet the fallback format is listed in a separate tab)
  - Note: The column "Bits" is intended to define the bitwidth for the non-fallback DCI. For the case when the field is indicated as present in the fallback DCI, the bitwidth of the field in the fallback DCI may be the same or less that that of the non-fallback DCI (to be further discussed)
  - Note: there may be zero or more padding bits (to be further discussed)
  - Note: the table below is NOT intended to revert any previous agreements

| Field | Bits | Conf? | Fallb? | Description |
|---|---|---|---|---|
| Header | 1? | | F | At least to distinguish UL and DL with the same DCI size<br>FFS if more bits are needed |
| Carrier indicator | 0 or 3 | C | | |
| UL/SUL indicator | 1 | C | | To differentiate between UL and SUL |
| BWP indicator | 0, 1, 2 | C | | |
| Frequency-domain PUSCH resources | | [C] | F | VRBs, indicated using type 0 or type 1 resource allocation including the header bit to indicate resource allocation type in case of dynamic type0/1 selection for non-fallback<br><br>Fallback DCI only supports resource allocation type 1<br>**FFS the bitwidth is further dependent on BWP size** |
| Time-domain PUSCH resources | Up to 4 | [C] | F | Index into an RRC-configured table providing the set of OFDM symbols used for PUSCH transmission, the start slot, and the PUSCH mapping type<br><br>Note: not fully configurable entries for fallback DCI |
| VRB-to-PRB mapping | 1 | [C] | F? | Flag to control VRB-to-PRB mapping (block interleaved or non-block interleaved). Only present/relevant for resource allocation type 1<br><br>FFS if present in fallback and how to handle the relation to the FH flag |
| FH flag | 1 | [C] | F | To control uplink frequency hopping. Some resource allocation filed bits are interpreted differently in case of hopping.<br><br>Open issue: are interleaved VRB-to-PRB mapping and frequency hopping independently controlled or can the two fields be merged? |
| Modulation and coding scheme | 5 | | F | MCS |
| New data indicator | 1 | | F | |
| Redundancy version | 2 | | F | |
| HARQ process number | 3 or 4 | | F | HARQ process number, 3 or 4 bits |
| DAI | | | | Uplink DAI<br>Note: Check outcome from HARQ codebook session. |
| CBGTI | Up to 8 | C | | Indicates the CBG(s) (re)transmitted. Consists of N bits bitmap if CBG is configured. |
| TPC command for PUSCH | 2 | | F | |
| TRI/TPMI | [4] | C | | TPMI, and Transmission rank indicator (FFS: separate fields or jointly encoded) .<br><br>FFS: TPMI and antenna port fields not simultanosuly present.<br><br>FFS if (partially) present in fallback |
| SRI | | C | | The SRI field in UL grant is independently encoded from at least TPMI in the same UL grant.<br>The bitwidth of SRI field in UL grant is determined by N = ceil(log2(# of SRS resources in the set)).<br><br>FFS if (partially) present in fallback |
| Antenna ports | [5?] | C | | Antenna ports (scheduled and uplink DMRS CDM groups for rate matching), FFS on scrambling identity<br>FFS if (partially) present in fallback |
| DMRS-PTRS association | 2 | C | | To cover "For UL codebook-based transmission, when one PTRS port is configured, support gNB to indicate to UE in the UL grant which DMRS port is associated with the PTRS port". Not yet decided whether it will be a spearate field or integrated in some other fields.<br>FFS if (partially) present in fallback |
| SRS request | 4 | C | | To trigger an SRS transmission in the uplink.<br>Note: unclear if additional bits are needed in case of SUL operation |
| CSI request | 0–6 | C | | CSI measurement request and CSI report trigger for CSI on PUSCH |

R1-1719389 DCI contents and formats in NR Huawei, HiSilicon
R1-1719490 About DCI contents ZTE, Sanechips
R1-1719643 On DCI contents and formats AT&T
R1-1719783 DCI contents and design vivo
R1-1719920 Remaining issues on DCI contents and formats LG Electronics
R1-1719969 Considerations on DCI formats and DCI contents Guangdong OPPO Mobile Telecom
R1-1720193 Discussion on NR DCI formats CATT
R1-1720322 DCI Contents and Formats Samsung
R1-1720323 Aperiodic CSI reporting on PUCCH Samsung

R1-1720496 Discussion on DCI formats Panasonic
R1-1720509 On DCI formats in NR Nokia, Nokia Shanghai Bell
R1-1720593 Discussion on NR DCI format design CMCC
R1-1720678 Discussion on DCI related issues Qualcomm Incorporated
R1-1720814 DCI contents and formats NTT DOCOMO, INC.
R1-1720970 On DCI triggering of aperiodic CSI reports on short PUCCH Ericsson
R1-1721604 Discussion on DCI content Ericsson

#### 7.3.1.5 Other

R1-1719390 Dynamic and semi-static DL/UL resource partition Huawei, HiSilicon
R1-1719405 UE procedure of PDCCH monitoring for URLLC Huawei, HiSilicon
R1-1719406 PDCCH reliability for URLLC Huawei, HiSilicon
R1-1719408 DCI design for URLLC Huawei, HiSilicon
R1-1719671 Supporting Multi-beam in NR-PDCCH ZTE, Sanechips
R1-1719784 Discussion on ultra-reliable design for PDCCH vivo
R1-1719832 Designs for UE power saving Huawei, HiSilicon
R1-1719970 PDCCH for URLLC Guangdong OPPO Mobile Telecom
R1-1720084 Ultra-reliability for NR PDCCH Intel Corporation
R1-1720231 PDCCH design for multi-beam operation ETRI
R1-1720324 On UE Power Savings Samsung
R1-1720325 PDCCH Design for URLLC Samsung
R1-1720510 On the usage of PDCCH DMRS as a complementary synchronization signal in DL Nokia, Nokia Shanghai Bell
R1-1720552 Considerations for ultra-reliable DCI transmission InterDigital, Inc.
R1-1720603 Resource multiplexing between PDCCH and PDSCH Huawei, HiSilicon
R1-1720709 Advance Grant Indication for UE Power Saving Qualcomm Incorporated
R1-1720754 Consideration on physical downlink control channel for URLLC CATR
R1-1720995 On Compact DCI for URLLC Ericsson
R1-1720996 On a Wake-up Signal for Active Mode UEs Ericsson
R1-1720997 On PDCCH for Ultra-Reliable Transmission Ericsson
R1-1720998 On the Performance Evaluation of PDCCH for Ultra-Reliable Transmission Ericsson

### 7.3.2 Remaining details on physical uplink control channel

Agreements:
- Define the following value ranges for the RRC parameters listed below:

| RRC parameters | Value range |
|---|---|
| PUCCH-F2-maximum-coderate | {[0.08, 0.15, 0.25, 0.35, 0.45, 0.60, 0.80]} |
| PUCCH-F3-maximum-coderate | {[0.08, 0.15, 0.25, 0.35, 0.45, 0.60, 0.80]} |
| PUCCH-F4-maximum-coderate | {[0.08, 0.15, 0.25, 0.35, 0.45, 0.60, 0.80]} |
| SR-resource | PUCCH-resource-config-PF0, PUCCH-resource-config-PF1 |
| CSIResourceConfig<br>(for the case of >2 bits) | PUCCH-resource-config-PF2, PUCCH-resource-config-PF3, PUCCH-resource-config-PF4 |

**Friday**

Agreements:
- When the transmission of HARQ-ACK bits with PUCCH format 2 or 3 or 4 coincides with a SR opportunity, a bit presenting the state of the SR being absent or present, is appended to the end of HARQ-ACK bits to form the UCI bits.
  - FFS: How to distinguish which SR configuration is prioritized for transmission in case of multiple SR configurations in the same occasion.
  - Note: when two transmissions coincide, it means they have same starting symbol and duration.
  - FFS when PUCCH transmission of SR and HARQ-ACK bits partially overlap in time

Agreements:
- For PUCCH format 2, 3 and 4, the LTE PN sequence generator used for scrambling of the encoded bits is initialized based on the scrambling ID for PUSCH
  - FFS: Formula modified from that used for PUSCH

Agreements:

- For PUCCH formats 0, 1, 3 & 4, slot-level base sequence hopping as in LTE is reused
  - FFS details especially regarding slot indexing considering the difference between NR and LTE
  - Slot-level base sequence hopping for PUCCH format 3 and 4 is a function at least based on a configurable ID, similarly as agreed for PUCCH format 0 and 1.
    - Note that: the configurable ID is already agreed for PUCCH base sequence hopping
  - FFS: whether and how to support symbol-level base sequence hopping

Agreements:
- For PUCCH format 3 & PUCCH format 4, symbol-level cyclic shift hopping as in LTE is reused
  - FFS details especially regarding symbol indexing and slot indexing considering the difference between NR and LTE
  - Symbol-level cyclic shift hopping is a function at least based on a configurable ID
    - Note that the configurable ID that is already agreed for PUCCH base sequence hopping is reused.

#### 7.3.2.1 PUCCH structure in short-duration

R1-1721448 Summary of Contributions on PUCCH Structure for Short Duration Ericsson (rev of R1-1721395)

**Thursday**
**R1-1721614 Summary of Contributions on PUCCH Structure for Short Duration Ericsson**
**Decision:** The document is noted.

**Friday**

Agreement:
- The mapping of ACK and NACK to cyclic shifts is based on the index of initial cyclic shift and a fixed mapping pattern as given in Table 1 and Table 2 below corresponding to 1 and 2 bits HARQ-ACK, respectively.

Table 1: Mapping pattern for 1-bit HARQ-ACK

| HARQ-ACK | NACK | ACK |
|---|---|---|
| Cyclic shift | $C_{inital}$ | $(C_{inital}+6)\bmod 12$ |

Table 2: Mapping pattern for 2-bit HARQ-ACK

| HARQ-ACK | NACK, NACK | NACK, ACK | ACK, ACK | ACK, NACK |
|---|---|---|---|---|
| Cyclic shift | $C_{inital}$ | $(C_{inital}+3)\bmod 12$ | $(C_{inital}+6)\bmod 12$ | $(C_{inital}+9)\bmod 12$ |

Agreement:
- The number of PRBs used to transmit a PUCCH Format 2 or 3 or 4 is determined by the total number of UCI bits and the configured max coding rate for PUCCH Format 2 or 3 or 4, upper bounded by the configured number of PRBs.

##### 7.3.2.1.1 Short-PUCCH for UCI of up to 2 bits

*Focus on short-PUCCH on a OFDM symbol.*

**Friday:**
RAN1 Chair: decision must be made now, spin a coin might be the solution. Show of hands between alt.1 and 2:
- **Alt 1:** For simultaneous transmission of 1 or 2 bits HARQ-ACK and SR using PUCCH format 0:
  - In case of negative SR, the same PUCCH resources as for HARQ-ACK only transmission are used.
  - In case of positive SR, HARQ-ACK are transmitted on the PRB configured for semi-static configured SR.
    - The mapping of ACK and NACK to cyclic shifts is based on the index of cyclic shift of the semi-static configured resource for the SR ($CS_{sr}$) and a fixed mapping pattern as given in Table 1 and Table 2 below corresponding to 1 and 2 bits HARQ-ACK, respectively.

Table 1: Mapping pattern for 1-bit HARQ-ACK and positive SR

| HARQ-ACK | NACK | ACK |
|---|---|---|
| Cyclic shift | $CS_{sr}$ | $(CS_{sr}+6)$ mod 12 |

Table 2: Mapping pattern for 2-bit HARQ-ACK and positive SR

| HARQ-ACK | NACK, NACK | NACK, ACK | ACK, ACK | ACK, NACK |
|---|---|---|---|---|

| Cyclic shift | $CS_{sr}$ | $(CS_{sr}+3)$ mod 12 | $(CS_{sr}+6)$ mod 12 | $(CS_{sr}+9)$ mod 12 |
|---|---|---|---|---|

- Note: Maximum 3 SR per PRB can be configured with semi-static SR simultaneously.
- One PRB can support simultaneous transmission of 2-bit HARQ-ACK with SR only for 3 UE.
  - Supportive companies: Huawei, HiSilicon, Spread Comm.,WILUS, OPPO, Intel, CATT, InterDigital, LG , ZTE, Sanechip, Ericsson
  - Objection: NTT DOCOMO, Nokia, NSB, Samsung, MediaTek, Qualcomm, vivo

- **Alt 2:** For simultaneous transmission of 1 or 2 bits HARQ-ACK and SR using PUCCH format 0:
  - In case of negative SR, the same PUCCH resources as for HARQ-ACK only transmission are used.
  - In case of positive SR, HARQ-ACK are transmitted on the PRB for HARQ-ACK only transmission.
    - The mapping of ACK and NACK to cyclic shifts is based on the index of initial cyclic shift of the HARQ-ACK only ($CS_{initial}$) and a fixed mapping pattern as given in Table 1 and Table 2 below corresponding to 1 and 2 bits HARQ-ACK, respectively.

Table 1: Mapping pattern for 1-bit HARQ-ACK and positive SR

| HARQ-ACK | NACK | ACK |
|---|---|---|
| Cyclic shift | $(CS_{intitial}+3)$mod12 | $(CS_{intitial}+9)$mod12 |

Table 2: Mapping pattern for 2-bit HARQ-ACK and positive SR

| HARQ-ACK | NACK, NACK | NACK, ACK | ACK, ACK | ACK, NACK |
|---|---|---|---|---|
| Cyclic shift | $(CS_{intitial}+1)$mod12 | $(CS_{intitial}+4)$mod12 | $(CS_{intitial}+7)$mod12 | $(CS_{intitial}+10)$mod12 |

- Note: Maximum 12 SR per PRB can be configured with semi-static SR simultaneously.
- One PRB can support simultaneous transmission of 2-bit HARQ-ACK with SR only for one UE.
  - The four remaining resources can be used for other purposes (e.g. 1-bit A/N with SR or 2-bit A/N only)
    - Supportive companies: Samsung, MediaTek, Qualcomm, NTT DOCOMO, Nokia, NSB, Panasonic, vivo, Sharp, APT, Softbank, NEC
    - Objection: LG, ZTE, CATT, Intel

**R1-1719391 Short PUCCH for UCI of up to 2 bits Huawei, HiSilicon**
**R1-1720447 Discussion on 1-symbol short-PUCCH for UCI of up to 2 bits Panasonic Corporation**

Conclusion: Above alternative 2 is agreed.

R1-1719570 Discussion on short-PUCCH for UCI of up to 2 bits MediaTek Inc.
R1-1719672 Short PUCCH issues for up to 2 bits UCI ZTE, Sanechips
R1-1719700 Remaining details on short-PUCCH for UCI of up to 2 bits Spreadtrum Communications
R1-1719785 Remaining issues on short-PUCCH for UCI of up to 2 bits vivo
R1-1719921 Remaining aspects of short PUCCH for UCI of up to 2 bits LG Electronics
R1-1719991 Short-PUCCH for UCI of up to 2 bits Guangdong OPPO Mobile Telecom
R1-1720007 Remaining details of short PUCCH for UCI up to 2 bits Nokia, Nokia Shanghai Bell
R1-1720085 Short PUCCH for UCI of up to 2 bits Intel Corporation
R1-1720194 On short PUCCH format for up to two UCI bits CATT
R1-1720326 Remaining Issues for Short PUCCH with UCI of 1 or 2 Bits Samsung
R1-1720638 On HARQ-ACK and SR multiplexing on Short-PUCCH InterDigital, Inc.
R1-1720679 Channelization of 1-symbol short PUCCH with 1 or 2 bits payload Qualcomm Incorporated
R1-1720815 Short-PUCCH for UCI of up to 2 bits NTT DOCOMO, INC.
R1-1720875 Remaining issues on Short PUCCH for UCI of up to 2 bits WILUS Inc.
R1-1720905 Remaining details of short PUCCH for UCI up to 2 bits Sequans Communications
R1-1720999 On the Design of 1-Symbol PUCCH for up to 2 bits Ericsson
R1-1721562 WF on sequence re-ordering for length-12 CGS ZTE, Sanechips, Huawei, HiSilicon

#### 7.3.2.1.2 Short-PUCCH for UCI of more than 2 bits

*Focus on short-PUCCH on a OFDM symbol.*

Agreements:

- For simultaneous transmission of HARQ-ACK/SR and CSI report with PUCCH Format 2
  - The HARQ-ACK/SR and CSI bits are jointly encoded.

- The number of CSI bits from the CSI report that can be appended to the HARQ-ACK/SR bits is determined such that the UCI bits appended by CRC are encoded with a code rate that does not exceed the maximum configured code rate for PUCCH Format 2.
  - If the coding rate exceeds the maximum configured code rate for PUCCH Format 2, the UE drops the CSI bits using the same priority rules for CSI omission as for CSI on PUSCH.

Agreement:
- For PUCCH format 2, the PN sequence for DMRS reuses that for CP-OFDM PUSCH DMRS.

R1-1719392 Short PUCCH for UCI of more than 2 bits Huawei, HiSilicon
R1-1719786 Remaining issues on Short-PUCCH for UCI of more than 2 bits vivo
R1-1719922 Remaining aspects of short PUCCH for UCI of more than 2 bits LG Electronics
R1-1719992 Short-PUCCH for UCI of more than 2 bits Guangdong OPPO Mobile Telecom
R1-1720008 On remaining details of short PUCCH for UCI of more than 2 bits Nokia, Nokia Shanghai Bell
R1-1720086 Short PUCCH for UCI of more than 2 bits Intel Corporation
R1-1720195 On short PUCCH format for more than two UCI bits CATT
R1-1720327 Remaining Issues for Short PUCCH with UCI of more than 2 Bits Samsung
R1-1720680 Channelization of 1-symbol short PUCCH with more than 2 bits payload Qualcomm Incorporated
R1-1721000 On the Design of 1-Symnol PUCCH for more than 2 bits Ericsson

#### 7.3.2.1.3 Support of short-PUCCH over 2 OFDM symbols

R1-1719393 Short PUCCH over 2 OFDM symbols Huawei, HiSilicon
R1-1719787 Support of short-PUCCH over 2 OFDM symbols vivo
R1-1719923 Remaining aspects of short PUCCH over 2 OFDM symbols LG Electronics
R1-1720009 On remaining aspects of 2-symbol short PUCCH design Nokia, Nokia Shanghai Bell
R1-1720087 2-symbol NR PUCCH Intel Corporation
R1-1720196 Other aspects of 2-symbol short PUCCH CATT
R1-1720328 Remaining Issues for Short PUCCH over 2 OFDM symbols Samsung
R1-1720681 Channelization of 2-symbol short PUCCH Qualcomm Incorporated
R1-1721001 On the Design of 2-Symbols PUCCH Ericsson

### *7.3.2.2 PUCCH structure in long-duration*

**R1-1721380 Review Summary for AI 7.3.2.2 PUCCH structure in long-duration Huawei, HiSilicon**
**Decision:** The document is noted.

Agreement:
- Simultaneous transmission of HARQ-ACK bits (with/without SR) and CSI feedback with PUCCH Format 3 or 4 is supported by RRC configuration.

Agreements:
- For PUCCH format 0 & PUCCH format 1, symbol-level cyclic shift hopping as in LTE is reused
  - FFS details especially regarding symbol indexing and slot indexing considering the difference between NR and LTE
  - Symbol-level cyclic shift hopping is a function at least based on a configurable ID
    - Note that: the configurable ID is already agreed for PUCCH base sequence hopping

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**Thursday session (from offline)**

Agreements:
- For length-6 and length-7 OCC code, the following DFT-based orthogonal code should be used.

**The orthogonal sequences $w_i(m) = e^{j2\pi\varphi(m)/N_{SF}}$ for PUCCH format 1.**

| $N_{SF}$ | $\varphi$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | i=0 | i=1 | i=2 | i=3 | i=4 | i=5 | i=6 |
| 6 | [0 0 0 0 0 0] | [0 1 2 3 4 5] | [0 2 4 0 2 4] | [0 3 0 3 0 3] | [0 4 2 0 4 2] | [0 5 4 3 2 1] | |
| 7 | [0 0 0 0 0 0 0] | [0 1 2 3 4 5 6] | [0 2 4 6 1 3 5] | [0 3 6 2 5 1 4] | [0 4 1 5 2 6 3] | [0 5 3 1 6 4 2] | [0 6 5 4 3 2 1] |

Agreement:

- The same length-12 CGSs as used for DMRS of PUCCH format 1 is used as the base sequences for UCI of PUCCH format 1.

Agreements:

- For long PUCCH for UCI of more than 2 bits, the value of X is 4, which means
  - When FH is enabled and the number of symbol of each hop is more than 4, the number of DMRS symbols of each hop is configured between 1 and 2.
  - When FH is disabled and the number of symbol of long PUCCH is more than 9 which is (2X+1), the number of DMRS symbols of long PUCCH is configured between 2 and 4.

Agreement: The OCCs for PUCCH format 4 are supported as shown in the following table.

| $i$ | $w_i$ | |
|---|---|---|
| | $N_{SF,m'}^{PUCCH,4} = 2$ | $N_{SF,m'}^{PUCCH,4} = 4$ |
| 0 | $[+1\ +1\ +1\ +1\ +1\ +1\ +1\ +1\ +1\ +1\ +1\ +1]$ | $[+1\ +1\ +1\ +1\ +1\ +1\ +1\ +1\ +1\ +1\ +1\ +1]$ |
| 1 | $[+1\ +1\ +1\ +1\ +1\ +1\ -1\ -1\ -1\ -1\ -1\ -1]$ | $[+1+1+1-j-j-j-1-1-1+j+j+j]$ |
| 2 | - | $[+1\ +1\ +1\ -1\ -1\ -1\ +1\ +1\ +1\ -1\ -1\ -1]$ |
| 3 | - | $[+1+1+1+j+j+j-1-1-1-j-j-j]$ |

Agreements:

- For long PUCCH over multiple slot
  - The starting symbol of long PUCCH in the starting slot is indicated by PUCCH resource allocation
  - The starting symbol of long PUCCH in subsequent slots is the same as the starting position in the starting slot.

Proposals:

- The long PUCCH over multiple slots shall be transmitted over the N available consecutive slots
  - FFS The UE shall not transmit long PUCCH on those slots not containing enough uplink symbols as indicated by PUCCH resource allocation if UE determines this based on dynamic SFI
  - The UE shall defer the transmission of long PUCCH on those slots not containing enough uplink symbols as indicated by PUCCH resource allocation to the next available slot
    - Note: such information whether the # of uplinks symbols is enough or not is based on indication in RMSI or UE-specific configuration
    - Note: N is the configured time duration for the long PUCCH

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**Friday**

Proposals:

- If a UE is expected to transmit the long PUCCH over K slots with duration of N symbol in each slot, the UE is expected to do the following
  - If the UE receives the semi-static UL/DL configuration, the UE is expected to transmit the long PUCCH over K subsequent UL slots as configured that contain UL symbols >= N
  - Otherwise
    - if the UE does not receive any semi-static UL/DL configuration, and the UE detects a dynamic SFI, the UE is expected to transmit long PUCCH over K subsequent UL slots as indicated that contain UL symbols >= N
  - Otherwise
    - if the UE neither receives any semi-static UL/DL configuration, nor detects any dynamic SFI, the UE is expected to transmit long PUCCH over K consecutive slots.
  - For paired spectrum, the UE is expected to transmit the long PUCCH over K consecutive slots in UL.

Email discussion/approval till 12/6 – Hua (Huawei)

Agreement: The number of symbol in the first hop is floor(N/2), the number of symbol in the 2nd hop is ceil(N/2)

Agreements:

- For a long PUCCH with frequency hopping enabled and there is 1 DMRS symbol in a hop of N symbols,
  - If N is an even number, the DMRS symbol is located at symbol index (N/2-1)
- For a long PUCCH with frequency hopping disabled and there is 1 DMRS symbol in long PUCCH of N symbols,
  - If N is an even number, the DMRS symbol is located at symbol index (N/2-1)
- The starting index is from 0

#### 7.3.2.2.1 Long-PUCCH for UCI of up to 2 bits

*Focus on long-PUCCH within a slot.*

Agreements:

- For simultaneous transmission of SR and HARQ-ACK using Format 1, it is done similarly to LTE PUCCH Format 1a/1b.
  - In case of negative SR, PUCCH Format 1 is transmitted using the resource for HARQ-ACK.
  - In case of positive SR, PUCCH Format 1 is transmitted using the resource for SR.

Agreement: Confirm work assumption:

- For long-PUCCH for UCI of up to 2 bits, if frequency hopping is enabled, the OCC multiplexing capacity for 7-symbol long PUCCH is 1, and for 11-symbol long PUCCH is 2.

R1-1719394 Long PUCCH for UCI of up to 2 bits Huawei, HiSilicon
R1-1719644 On Long PUCCH for UCI up to 2 bits AT&T
R1-1719673 On long-PUCCH for up to 2 bits ZTE, Sanechips
R1-1719788 Long-PUCCH for UCI of up to 2 bits vivo
R1-1719924 Remaining aspects of long PUCCH for UCI of up to 2 bits LG Electronics
R1-1720010 Remaining details of Long PUCCH with small UCI payload Nokia, Nokia Shanghai Bell
R1-1720088 Long PUCCH for up to 2 UCI bits Intel Corporation
R1-1720197 On long PUCCH format for up to 2 UCI bits CATT
R1-1720329 Remaining Issues for Long PUCCH for UCI of 1 or 2 Bits Samsung
R1-1720448 Frequency-hopping details of long-PUCCH Panasonic Corporation
R1-1720502 Sequences for Long PUCCH for UCI up to 2 bits IITH
R1-1720682 Long PUCCH design with 1 or 2 bits UCI payload Qualcomm Incorporated
R1-1720816 Long-PUCCH for UCI of up to 2 bits NTT DOCOMO, INC.
R1-1721002 On the Design of Long PUCCH for up to 2 bits Ericsson

#### 7.3.2.2.2 Long-PUCCH for UCI of more than 2 bits

*Focus on long-PUCCH within a slot.*

Agreements:

- For simultaneous transmission of HARQ-ACK/SR and CSI report with PUCCH Format 3 or 4
  - The HARQ-ACK/SR and CSI Part 1 bits are jointly encoded. CSI Part 2 bits are separately encoded.
  - The HARQ-ACK/SR and Part I of CSI reports are jointly encoded with the configured maximum code rate of the PUCCH Format 3 or 4.
    - The remaining resources (if any) in the configured PRB are used for encoding of the CSI Part 2 report. Some or all of the CSI Part 2 bits can be dropped using the same priority rules for CSI omission as for CSI on PUSCH.

Agreement:

- For PUCCH format 4, the DMRS sequence is a CGS with length-12 and is mapped contiguously to all REs in one resource block.

Working assumption:

- In case of transmission of sub-band CSI report on PUCCH format 3 or 4 with/without HARQ-ACK, the output of 2 encoders form N1 and N2 modulated symbols are mapped to the OFDM symbols without DMRS in the configured PRBs are the following:

  - N1 modulated symbols carry HARQ-ACK bits and/or CSI Part 1 and N2 modulated symbols (if present) carry CSI Part 2.
  - The mapping starts with N1 modulated symbol and continues with N2 modulated symbols if present.
  - The allocation is done in the frequency-first, time-second manner, and around the DMRS symbols.
  - The index of the symbols with N1 modulated symbols, with the corresponding number of N1 modulated symbols are determined based on the following:
    - The number of the OFDM symbols with N1 modulated symbols around each DMRS are the same if possible.
    - The OFDM symbols fully mapped with N1 modulated symbols are maximized.
    - The OFDM symbols partially mapped with N1 modulated symbols contain the same number of N1 modulated symbols if possible.
  - The remaining resources in the configured PRBs are used for mapping of N2 modulated symbols.
  - The mapping of N1 and N2 modulated symbols starts with the earliest corresponding OFDM symbols.

R1-1719395 Long-PUCCH for UCI of more than 2 bits Huawei, HiSilicon
R1-1719571 Discussion on separate UCI encoding for long-PUCCH MediaTek Inc.
R1-1719645 Remaining issues on long PUCCH with more than 2 bits AT&T
R1-1719674 On long-PUCCH for more than 2 bits ZTE, Sanechips
R1-1719748 Remaining issues on long PUCCH design for UCI of more than 2 bits Lenovo, Motorola Mobility
Late submission
R1-1719789 Long-PUCCH for UCI of more than 2 bits vivo
R1-1719925 Remaining aspects of long PUCCH for UCI of more than 2 bits LG Electronics
R1-1721475 On the remaining details of long PUCCH for UCI more than 2 bits Nokia, Nokia Shanghai Bell (R1-1720011)
R1-1720089 Long PUCCH for more than 2 UCI bits Intel Corporation
R1-1720198 On design of long PUCCH formats for more than 2 UCI bits CATT
R1-1720330 Remaining Issues for Long PUCCH for UCI of more than 2 Bits Samsung
R1-1720615 DMRS for NR long PUCCH for more than 2 bits Sharp
R1-1720639 On pi/2 BPSK modulation for long PUCCH InterDigital, Inc.
R1-1721386 Long PUCCH design with more than 2 bits UCI payload Qualcomm Incorporated (R1-1720683)
R1-1720753 Consideration on long PUCCH for UCI of more than 2 bits CATR
R1-1720817 Long-PUCCH for UCI of more than 2 bits NTT DOCOMO, INC.
R1-1721003 On the Design of Long PUCCH for more than 2 bits Ericsson

#### 7.3.2.2.3 Support of long-PUCCH over multiple slots

Agreements:

- For long PUCCH over multiple slots
  - The number of slots configured for a long PUCCH over multiple slot are (1, 2, 4, 8)
  - Inter-slot hopping is performed on every slot
  - For intra-slot hopping or inter-slot hopping, the 1st hop and 2nd hop are performed on the frequency resources indicated by PUCCH resource allocations

R1-1719396 Support of long-PUCCH over multiple slots Huawei, HiSilicon
R1-1719572 Discussion on support of long-PUCCH over multiple slots MediaTek Inc.
R1-1719646 On Frequency hopping of long PUCCH over multiple slots AT&T
R1-1719675 Support of long-PUCCH over multiple slots ZTE, Sanechips
R1-1719790 Support of long-PUCCH over multiple slots vivo
R1-1719926 Remaining aspects of long PUCCH over multiple slots LG Electronics
R1-1720003 On support of long-PUCCH over multiple slots Guangdong OPPO Mobile Telecom
R1-1720012 Long PUCCH over multiple slots Nokia, Nokia Shanghai Bell
R1-1720090 Long PUCCH over multiple slots Intel Corporation
R1-1720199 Design of multi-slot PUCCH transmission CATT
R1-1720225 Support of long-PUCCH over multiple slots ETRI
R1-1720331 Remaining Issues for Multi-Slot Long PUCCH Transmission Samsung
R1-1720449 Discussion on support of long-PUCCH over multiple slots Panasonic Corporation
R1-1720616 NR long PUCCH over multiple slots Sharp, APT
R1-1720684 Long PUCCH over multiple slots Qualcomm Incorporated
R1-1720818 Support of long-PUCCH over multiple slots NTT DOCOMO, INC.
R1-1721004 On Support of Long PUCCH Over Multiple Slots Ericsson

#### 7.3.2.3 UCI multiplexing

*For both PUSCH with CP-OFDM waveform and PUSCH with DFT-s-OFDM waveform*

Agreement:

- For fallback DCI in common search space, the presence (if present) of DAI is not configurable
    - FFS discussion whether DAI should be present or not and if present, the number of DAI bits

Agreement:

- No dedicated higher-layer configuration is necessary for the presence of DAI in the non-fallback DCI
    - Note: the presence of DAI in the non-fallback DCI may depend on some other parameters, to be further discussed

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**Thursday session (from offline)**

Agreements:

- If frequency hopping for PUSCH is enabled, the N1 modulation symbols of HARQ-ACK are partitioned into HARQ-ACK part A and HARQ-ACK part B, where part A has floor(N1/2) and part B has ceiling(N1/2) modulation symbols. HARQ-ACK part A is mapped to the first hop. HARQ-ACK part B is mapped to the second hop.
- If frequency hopping for PUSCH is enabled, the N2 modulation symbols of CSI part 1 are partitioned into CSI part 1A and CSI part 1B, where part 1A has floor(N2/2) and part 1B has ceiling(N2/2) modulation symbols. CSI part 1A is mapped to the first hop. CSI part 1B is mapped to the second hop.
- If frequency hopping for PUSCH is enabled, the N3 modulation symbols of CSI part 2 are partitioned into CSI part 2A and CSI part 2B, where part 2A has floor(N3/2) and part 2B has ceiling(N3/2) modulation symbols. CSI part 2A is mapped to the first hop. CSI part 2B is mapped to the second hop.

Agreements:

- Detail UCI mapping rule on PUSCH is as follows:
    - Map HARQ-ACK to REs around DMRS symbol(s)
    - If PUSCH punctured by HARQ-ACK,
        - Map CSI part 1 starting after certain amount of reserved HARQ-ACK REs.
            - FFS reserved HARQ-ACK REs
            - PUSCH can be mapped to reserved REs
    - If PUSCH rate matched by HARQ-ACK,
        - map HARQ-ACK first, followed by CSI part1.
    - FFS: how to map CSI part 2, e.g.,
        - Map CSI part 2 after CSI part 1
        - Map CSI part 2 after UL_SCH

Agreement: In Rel-15, both HARQ-ACK and CSI are mapped to all layers of the TB on PUSCH.

Proposal:

- For aperiodic CSI on PUSCH triggered by an UL grant without UL-SCH data, the modulation order for PUSCH is handled the same way as the case when PUSCH is with UL-SCH data

Proposal:

- Down-select one from the follow 2 alternatives to dynamically indicate Beta_offset
    - Alt1: 2 bits in the non-fallback DCI to indicate one out of 4 sets of Beta_offset values
    - Alt2: Implicit method to select one set of Beta_offset values based on other parameters signaled in DCI, e.g., MCS and/or rank of PUSCH

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**Friday:**

Agreement:

- For semi-static HARQ-ACK codebook, 1 bit UL DAI field is included in UL grant.

Working assumption:

- bits UL DAI is not included in fallback DCI in common search space for UL grant

Agreements:

- For dynamic HARQ-ACK codebook, for UCI piggyback on PUSCH, use DAI_counter in DL assignment and UL DAI in UL grant. HARQ-ACK codebook size is determined by UL DAI and DAI_counter.
  - In case of single HARQ-ACK codebook, the single UL DAI field of 2 bits is included in UL grant.
  - In case of two HARQ-ACK sub-codebooks (1 for CBG based HARQ-ACK and 1 for TB based HARQ-ACK) two UL DAI fields each of two bits are included in UL grant.
- Note: in CA, DAI_total is included in the DL assignment.

Agreement:

- The modulation order of UCI follows the modulation order of UL-SCH.
  - Note: modulation order for HARQ-ACK follow the agreement in channel coding session, if any.

Agreements:

- For UCI on PUSCH with UL-SCH, the amount of resources used for HARQ-ACK is calculated based on the following equation.

$$Q' = \left\lceil \frac{O \cdot M_{sc}^{PUSCH} \cdot N_{symb}^{PUSCH} \cdot \beta_{offset}^{HARQ-ACK}}{\sum_{r=0}^{C-1} K_r} \right\rceil$$

where $O$ is the number of ACK/NACK bits, $M_{\mathrm{sc}}^{\mathrm{PUSCH}}$ is the scheduled bandwidth for PUSCH transmission in the current PUSCH transmission period for the transport block, expressed as a number of subcarriers. $C$ , and $K_r$ are obtained from the PDCCH scheduling the PUSCH transmission. $N_{\mathrm{symb}}^{\mathrm{PUSCH}}$ is the number of OFDM symbols in the PUSCH transmission duration excluding DMRS. REs occupied by PTRS are also excluded.

- FFS: if an upper bound on the number of symbols for HARQ-ACK resource is needed

Working assumption:

- For UCI on PUSCH without UL-SCH, the amount of resources used for HARQ-ACK is calculated based on the following equation.

$$Q' = \min\left\{ \left\lceil \frac{O \cdot M_{sc}^{PUSCH} \cdot N_{symb}^{PUSCH} \cdot \beta_{offset}^{PUSCH}}{O_{CSI}} \right\rceil, M_{sc}^{PUSCH} \cdot N_{symb}^{PUSCH} \right\}$$

where $O$ is the number of ACK/NACK bits, $O_{CSI}$ is number of bits for CSI part 1. $\beta_{offset}^{PUSCH} = \beta_{offset}^{HARQ-ACK} / \beta_{offset}^{CSI-part1}$ . $M_{\mathrm{sc}}^{\mathrm{PUSCH}}$ is the scheduled bandwidth for PUSCH transmission in the current PUSCH transmission period for the transport block, expressed as a number of subcarriers. $N_{\mathrm{symb}}^{\mathrm{PUSCH}}$ is the number of OFDM symbols in the PUSCH transmission duration excluding DMRS. REs occupied by PTRS are also excluded.

- FFS: if an upper bound on the number of symbols for HARQ-ACK resource is needed
- FFS: if set $O_{CSI}$ to the number of bits for CSI part 1 assuming rank 1.
- 2 bits in the non-fallback DCI to indicate one out of 4 sets of Beta_offset values

Agreements:

- For UCI on PUSCH with UL-SCH, the amount of resources used for CSI part 1 is calculated based on the following equation.

$$Q' = \min\left( \left\lceil \frac{(O+L) \cdot M_{sc}^{PUSCH} \cdot N_{symb}^{PUSCH} \cdot \beta_{offset}^{PUSCH}}{\sum_{r=0}^{C-1} K_r} \right\rceil, M_{sc}^{PUSCH} \cdot N_{symb}^{PUSCH} - \frac{Q_{HARQ-ACK}}{Q_m} \right)$$

where $O$ is the number of bits for CSI part 1, $L$ is the number of CRC bits. $\beta_{offset}^{PUSCH} = \beta_{offset}^{CSI-part1}$ for CSI part 1. $M_{\mathrm{sc}}^{\mathrm{PUSCH}}$ is the scheduled bandwidth for PUSCH transmission in the current PUSCH transmission period for the transport block, expressed as a number of subcarriers. $C$ , and $K_r$ are obtained from the PDCCH scheduling the PUSCH transmission. $N_{\mathrm{symb}}^{\mathrm{PUSCH}}$ is the number of OFDM symbols in the PUSCH transmission duration excluding DMRS. REs occupied by PTRS are also excluded.

- FFS: any additional modification of above formula for specific services

Working assumption:

- For UCI on PUSCH with UL-SCH, the amount of resources used for CSI part 2 is calculated based on the following equation.

$$Q' = \min\left( \left\lceil \frac{(O+L)\cdot M_{sc}^{PUSCH}\cdot N_{symb}^{PUSCH}\cdot \beta_{offset}^{PUSCH}}{\sum_{r=0}^{C-1} K_r} \right\rceil, M_{sc}^{PUSCH}\cdot N_{symb}^{PUSCH} - \frac{Q_{HARQ-ACK}}{Q_m} - \frac{Q_{CSI-part1}}{Q_m} \right)$$

where $O$ is the number of bits for CSI part 2, $L$ is the number of CRC bits. $\beta_{offset}^{PUSCH} = \beta_{offset}^{CSI-part\,2}$ for CSI part 2. $M_{\mathrm{sc}}^{\mathrm{PUSCH}}$ is the scheduled bandwidth for PUSCH transmission in the current PUSCH transmission period for the transport block, expressed as a number of subcarriers. $C$ , and $K_r$ are obtained from the PDCCH scheduling the PUSCH transmission. $N_{\mathrm{symb}}^{\mathrm{PUSCH}}$ is the number of OFDM symbols in the PUSCH transmission duration excluding DMRS. REs occupied by PTRS are also excluded.

- FFS: any additional modification of above formula for specific services
- FFS: any additional modification of the above formula in case of HARQ-ACK puncture CSI-part2

Agreements:

- Modulated HARQ-ACK symbols are mapped starting on the first available non-DMRS symbol after the first DMRS symbol(s), regardless of number of DMRS symbols in PUSCH transmission.
- Modulated CSI part 1 symbols are mapped starting on the first available non-DMRS symbol, regardless of number of DMRS symbols in PUSCH transmission.
  - CSI part 1 is not mapped on the reserved HARQ-ACK REs in case of HARQ-ACK puncturing PUSCH
  - CSI part 1 is not mapped on the HARQ-ACK REs in case of HARQ-ACK rate-matching PUSCH.
- Modulated CSI part 2 symbols are mapped starting on the first available non-DMRS symbol, regardless of number of DMRS symbols in PUSCH transmission.
  - CSI part 2 can be mapped on the reserved HARQ-ACK REs in case of HARQ-ACK puncturing PUSCH.
  - CSI part 2 is not mapped on the HARQ-ACK REs in case of HARQ-ACK rate-matching PUSCH.
  - CSI part 2 is not mapped on the CSI part 1 REs.

Working assumption:

- UCI mapping in frequency domain follows the rules below:
  - Given a UCI type, on i-th OFDM symbol, modulated UCI symbols are mapped to REs in a distributed manner with distance d determined as following:
    - d =1, if the number of unmapped modulated symbols for that UCI at the beginning of OFDM symbol i is larger or equal to the number of available REs in this OFDM symbol.
    - d = floor(number available REs on i-th OFDM symbol/the number of unmapped modulated symbols for that UCI at the beginning of OFDM symbol i)

Agreement:

- For aperiodic CSI on PUSCH triggered by an UL grant without UL-SCH data, the modulation order for PUSCH is handled the same way as the case when PUSCH is with UL-SCH data

R1-1719397 On UCI multiplexing Huawei, HiSilicon
R1-1719573 Discussion on UCI on PUSCH MediaTek Inc.
R1-1719676 UCI multiplexing on PUSCH ZTE, Sanechips
R1-1719791 On UCI multiplexing vivo
R1-1719927 UCI on PUSCH and UL channel multiplexing for NR LG Electronics
R1-1720013 On multiplexing of UCI Nokia, Nokia Shanghai Bell
R1-1720091 UCI multiplexing on PUSCH Intel Corporation
R1-1720200 Multiplexing of UCI and UL data on PUSCH CATT
R1-1720332 Remaining Issues for UCI Multiplexing in PUSCH Samsung
R1-1720450 Discussion on UCI multiplexing Panasonic Corporation
R1-1721387 Multiplexing of PUCCH and PUSCH Qualcomm Incorporated (rev of R1-1720685)
R1-1720750 UCI transmission on PUSCH in NR CATR
R1-1720772 Discussion on RE mapping for UCI multiplexing Xiaomi Technology
R1-1720819 UCI multiplexing NTT DOCOMO, INC.
R1-1721005 On UCI on PUSCH Ericsson

#### *7.3.2.4 Resource allocation for PUCCH*

**R1-1721360** **Summary of RAN1#91 Tdocs on PUCCH resource allocation** **OPPO**
**Decision:** The document is noted.

Agreements:
- UE determines one PUCCH resource set from one or more (up to K=4) configured PUCCH resource sets based on the UCI payload size (not including CRC).
  - PUCCH resource set i for UCI payload size is in the range of {$N_i$, …, $N_{i+1}$-1} bits (i=0, …, K-1)
    - $N_0$=1, $N_1$=3
    - For i=2, …, K-1, $N_i$ is UE-specifically configured
      - The value is in the range of {4, [256]} with a granularity of [4] bits
    - $N_K$= a max UCI payload size, which may be implicitly or explicitly derived, detailed value is FFS
- Note: For a UCI payload range, a PUCCH resource set can contain resources for short PUCCH and resources for long PUCCH.

Discuss further offline regarding implicit resource allocation related issues

Proposal:
- The starting slot of PUCCH is indicated by a 2-bit field in DCI other than indicated by a PUCCH resource.

Discuss further offline regarding PUCCH resource for initial access

Agreement:
- When frequency hopping is enabled, the frequency resource of the 1st hop and the frequency resource of the 2nd hop are separately configured for a given PUCCH resource.

---

**Wednesday**
**R1-1721559** **Summary of offline discussion on PUCCH resource allocation** **OPPO**

PUCCH resource set and resource identification
Down-select from:
- Option 1: 2-bit ARI jointly with implicit mapping.
  - >4 PUCCH resources can be configured in a resource set.
  - The number of PUCCH resources in a resource set is configured.
    - If larger than 4, implicit mapping in addition to explicit indication is also used.
  - Supported by Qualcomm, Ericsson, OPPO, Lenovo, LG, Panasonic, DOCOMO, MediaTek, vivo, NEC
  - Objected by Samsung, CATT, Nokia, NSB, Intel
- Option 2: 3-bit ARI without implicit mapping.
  - 8 PUCCH resources can be configured in each resource set.
  - Supported by Nokia, vivo, Samsung, CATT
  - Objected by Qualcomm, Ericsson, OPPO, NEC

Agreements:
- 2-bit ARI jointly with implicit mapping for PUCCH resource allocation:
  - >[4] (no more than 8) PUCCH resources can be configured in a resource set.
  - The number of PUCCH resources in a resource set is configured.
    - If larger than [4], implicit mapping in addition to explicit indication is also used.
  - A sub-set within a resource set is indicated by ARI and implicit mapping is used within the sub-set
  - No additional RRC impact is necessary.
    - Otherwise, 3-bit ARI with up to 8 resources per resource set is supported

Agreements:
- Value range of starting symbol in a slot is 0 -13 for PUCCH Format 0 and 2.
  - FFS: Not all values can be configured for a UE.
- The index of initial cyclic shift for DMRS for PUCCH format 3 is 0.
- The index of initial cyclic shift for DMRS for PUCCH format 4 can be 0, 3, 6, 9 which is determined by index of pre-DFT OCC.
  - FFS: the cyclic shift hopping (no RRC impact)
- For 1-PRB, the same set of length-of-12 sequences as in Format 0 are used for DMRS in Format 3 and 4.

Agreements:

Parameters configured in PUCCH resource sets and their value ranges

| | | PUCCH Format 0 | PUCCH Format 1 | PUCCH Format 2 | PUCCH Format 3 | PUCCH Format 4 |
|---|---|---|---|---|---|---|
| Starting symbol | Configurability | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Value range | 0-13 | 0 – 10 | 0-13 | 0 – 10 ~~(FFS: special values for implicit derivation)~~ | 0 – 10 ~~(FFS: special values for implicit derivation)~~ |
| Number of symbols in a slot | Configurability | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Value range | 1, 2 | 4 – 14 ~~(FFS: special values for implicit derivation)~~ | 1, 2 | 4 – 14 (~~(FFS: special values for implicit derivation)~~ | 4 – 14 ~~(FFS: special values for implicit derivation)~~ |
| Index for identifying starting PRB | Configurability | ✓ ~~(FFS if implicit derivation is also used)~~ | ✓ ~~(FFS if implicit derivation is also used)~~ | ✓ | ✓ | ✓ |
| | Value range | 0 - ~~{~~274~~}~~ ~~(FFS: special values for implicit derivation)~~ | 0 - ~~{~~274~~}~~ ~~(FFS: special values for implicit derivation)~~ | 0 - ~~{~~274~~}~~ | 0 - ~~{~~274~~}~~ | 0 - ~~{~~274~~}~~ |
| Number of PRBs | Configurability | N.A. | N.A. | ✓ | ✓ | N.A. |
| | Value range | N.A. (Default is 1) | N.A. (Default is 1) | 1 – ~~{~~16~~}~~ | 1 - 6, 8 - 10, 12, 15, 16 | N.A. (Default is 1) |
| Enabling a frequency hopping | Configurability | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Value range | On/Off (only for 2 symbol) | On/Off | On/Off (only for 2 symbol) | On/Off | On/Off |
| ~~FFS:~~ Frequency resource of 2nd hop if frequency Hopping is enabled | Configurability | ~~FFS~~ ✓ | ~~FFS~~ ✓ | ~~FFS~~ ✓ | ~~FFS~~ ✓ | ~~FFS~~ ✓ |
| | Value range | ~~FFS~~ 0 – 274 | ~~FFS~~ 0 - 274 | ~~FFS~~ 0 - 274 | ~~FFS~~ 0 - 274 | ~~FFS~~ 0 - 274 |
| Index of initial cyclic shift | Configurability | ✓ ~~(FFS if implicit derivation is also used)~~ | ✓ ~~(FFS if implicit derivation is also used)~~ | N.A. | N.A. ~~FFS (for DMRS)~~ | N.A. ~~FFS (for DMRS)~~ |
| | Value range | 0 – 11 | 0 – 11 | N.A. | 0 – 11 | 0 – 11 |
| Index of time-domain OCC | Configurability | N.A. | ✓ ~~(FFS if implicit derivation is also used)~~ | N.A. | N.A. | N.A. |
| | Value range | N.A. | 0 - 6 | N.A. | N.A. | N.A. |
| Length of Pre-DFT OCC | Configurability | N.A. | N.A. | N.A. | N.A. | ✓ |
| | Value range | N.A. | N.A. | N.A. | N.A. | 2, 4 |
| Index of Pre-DFT OCC | Configurability | N.A. | N.A. | N.A. | N.A. | ✓ |
| | Value range | N.A. | N.A. | N.A. | N.A. | 0, 1, 2, 3 |

*Semi-statically-configured parameters ~~and their value ranges~~ for number of slots*

| | | PUCCH Format 0 | PUCCH Format 1 | PUCCH Format 2 | PUCCH Format 3 | PUCCH Format 4 |
|---|---|---|---|---|---|---|
| Number of slots | Configurability | N.A. | Configured | N.A. | Configured | Configured |
| | Value range | N.A. | 1, y1, y2, y3 | N.A. | 1, y1, y2, y3 | 1, y1, y2, y3 |

Agreements:

- For resource allocation for HARQ-ACK before RRC connection setup:
  - Only PUCCH Format 0 and 1 are supported
  - The resource allocation is derived based on a 4-bit parameter in RMSI
    - FFS other details (no additional RRC impact)

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**Friday**

**R1-1721685** **Summary of offline discussion on PUCCH resource allocation** **OPPO**

Agreement:

- For PUCCH resource allocation with fallback DCI,

- The same approach is used as that with normal DCI.

Agreement:

- For resource allocation for HARQ-ACK before RRC connection setup, UE identifies a PUCCH resource from a set of resources derived from RMSI using a similar approach to the case after RRC connection setup.

R1-1719398 Resource allocation for PUCCH HARQ-ACK feedback Huawei, HiSilicon
R1-1719677 NR PUCCH resource allocation ZTE, Sanechips
R1-1719792 On PUCCH resource allocation vivo
R1-1719928 Remaining aspects of PUCCH resource allocation for NR LG Electronics
R1-1719971 Resource allocation for PUCCH Guangdong OPPO Mobile Telecom
R1-1719972 Summary of email discussion [90b-NR-29] on PUCCH resource set Guangdong OPPO Mobile Telecom
R1-1720014 PUCCH Resource Allocation Nokia, Nokia Shanghai Bell
R1-1720092 Resource allocation for PUCCH Intel Corporation
R1-1720201 Further discussion on PUCCH resource allocation CATT
R1-1720227 Resource allocation for PUCCH ETRI
R1-1720333 Resource Allocation for PUCCH Transmissions Samsung
R1-1720380 Resource allocation for NR PUCCH NEC
R1-1720451 Discussion on resource allocation for uplink control channel Panasonic Corporation
R1-1720686 Resource allocation for PUCCH Qualcomm Incorporated
R1-1720820 Resource allocation for PUCCH NTT DOCOMO, INC.
R1-1720926 PUCCH resource allocation Motorola Mobility, Lenovo
R1-1721006 On PUCCH Resource Allocation Ericsson

#### *7.3.2.5 Other*

R1-1719413 Discussion on UCI feedback for URLLC Huawei, HiSilicon
R1-1719834 On CSI feedback in NR Huawei, HiSilicon
R1-1720093 Ultra-reliability for NR PUCCH Intel Corporation
R1-1720226 UCI multiplexing of different usage scenarioETRI
R1-1720334 PUCCH Design for URLLC Samsung
R1-1720335 Performance Results for Long PUCCH Samsung
R1-1720336 Performance Results for UCI and Data Multiplexing Samsung
R1-1720337 Multiplexing PUSCH with Short PUCCH or SRS Samsung
R1-1720338 On timing between DCI indicating active BWP switching and active BWP switching Samsung
R1-1720553 Considerations for ultra-reliable UCI transmission InterDigital, Inc.
R1-1720840 Considerations for UCI for URLLCIII
R1-1721007 On PUCCH Multiplexing from the Same or Different UEs Ericsson
R1-1721008 On Simultaneous Transmission of PUCCH and PUSCH Ericsson
R1-1721009 On Transmit Diversity for PUCCH Ericsson
R1-1721010 On PUCCH for Ultra-Reliable Transmission Ericsson
R1-1721011 On Performance of PUCCH Format 0 for URLLC Use Cases Ericsson
R1-1721012 On Performance of PUCCH Format 2 for URLLC Use Cases Ericsson
R1-1721556 On PUCCH collisions with explicit PUCCH resource allocation Nokia, Nokia Shanghai Bell

### 7.3.3 Remaining details on DL/UL data scheduling and HARQ procedure

#### *7.3.3.1 DL/UL resource allocation*

*Including TBS aspects*

**R1-1721488 Summary of Tuesday offline session on 7.3.3.1 Ericsson**
**Decision:** The document is noted.

Agreement:

- Xoh for TBS determination: configured per UE for a given cell

Agreements:

- For fallback DCI, only a single layer transmission can be scheduled
- For non-fallback DCI, NR supports RRC configuration separately for DL and UL:
  - using resource allocation type 1 only, or,
  - using resource allocation type 0 only, or,

- dynamic switching between resource allocation type 0/1 using a 1 bit flag in the DCI
- Note: in either case, one or more layers transmission can be scheduled

Design of the block-interleaver used for VRB-to-PRB mapping
- NTT DOCOMO, LGE, AT&T: RRC signalling is needed for the block interleaver
- Discuss further

---

**Wednesday**
**R1-1721528 Summary of offline session on 7.3.3.1 part II Ericsson**
**Decision:** The document is noted.

Agreements:
- One table for UL, one table for DL configured by RRC in Rel-15
  - Each table is up to 16 rows
- In the table, each row is configured by RRC with
  - K0 using 2 bits (for DL table), K2 using 3 bits (for UL table)
  - an index (6-bit) into a table/equation in RAN1 specs capturing valid combinations of start symbol and length (jointly encoded)
  - PDSCH mapping type A or B
- The reference point for starting OFDM symbol:
  - No RRC impact (e.g., slot boundary, start of CORESET where the PDCCH was found, or part of the table/equation in RAN1 specs. FFS details)
- Aggregation factor (1, 2, 4, 8 for DL or UL) is semi-statically configured separately (i.e. not part of table)
  - No additional RRC impact how to use the aggregation factor along with the tables

Agreements:
- For downlink and OFDM uplink:
  - Block interleaver (similar to PDCCH) across whole BWP:
    - Interleaving unit configurable between 2 and 4 PRBs
    - The number of rows is harded to 2
    - The number of columns is given by the BWP size and number of rows
    - FFS other details (no additional RRC impact)

---

**Thursday**

Proposal:
- For RBG size, support the following:

| BWP size | Config 1 | Config 2 |
|---|---|---|
| [6]-[32] | 2 | |
| [33]-[100] | 4 | |
| [101]-[200] | 8 | |
| [201] and above | 16 | |

Discuss further offline whether or not there is need to recommend and if so a set of possible BWP sizes in Rel-15 from RAN1 perspective to RAN4

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**Friday**
**R1-1721719 Outcome of offline discussion on 7.3.3.1 Ericsson**
**Decision:** The document is noted.

Working assumption:
- Encode OFDM symbol start and length into the resource index RIV according to

L = length
S=start
if (L-1)<7 then
    RIV=14(L-1)+S
else
    RIV=14(14-L+1)+(14-1-S)

**R1-1721690 Outcome of offline discussion on transport block sizes Ericsson**
**Decision:** The document is noted.

Agreements:

- The set of possible Xoh values are [0 0.5 1 1.5]*12
    - Default value is 0 (for both UL and DL

Working assumption:

- Quantize X to Y according to

| X | Y |
|---|---|
| <=9 | 6 |
| 9<X<=15 | 12 |
| 15<X<=30 | 18 |
| 30<X<=57 | 42 |
| 57<X<=90 | 72 |
| 90<X<=126 | 108 |
| 126<X<=150 | 144 |
| 150<X | 156 |

R1-1721354 Summary of 7.3.3.1 (resource allocation) Ericsson
R1-1721708 Offline discussion on 7.3.3.1 Ericsson
R1-1719381 Resource allocation and TBS Huawei, HiSilicon
R1-1719491 Considerations on resource allocation issues ZTE, Sanechips
R1-1719585 TBS Determination and Flexible Step Quantization Method in NR MediaTek Inc.
R1-1719596 On TBS Determination and DL/UL Resource Allocation Ericsson
R1-1719647 Remaining details on DL/UL resource allocation AT&T
R1-1719793 On DL/UL resource allocation vivo
R1-1719929 Discussion on resource allocation and TBS determination LG Electronics
R1-1719973 Resource allocation for PDSCH/PUSCH Guangdong OPPO Mobile Telecom
R1-1720094 Remaining details on TBS determination and resource allocation Intel Corporation
R1-1721416 On PDSCH and PUSCH resource allocation CATT (rev of R1-1720202)
R1-1720339 DL/UL Resource Allocation Samsung
R1-1720377 Discussion on frequency domain resource allocation Potevio
R1-1720381 Remaining issues of RA schemes and TBS NEC
R1-1720479 On resource allocation for PDSCH and PUSCH in NR Nokia, Nokia Shanghai Bell
R1-1720497 DL/UL resource allocationPanasonic
R1-1720687 DL-UL resource allocation Qualcomm Incorporated
R1-1720821 DL/UL resource allocationNTT DOCOMO, INC.
R1-1720854 Discussion on data scheduling ASUSTEK COMPUTER (SHANGHAI)
R1-1720865 Discussion uplink/downlink resource allocation in NR FiberHome
Late submission

#### 7.3.3.2 DL/UL scheduling and HARQ management

*Including scheduling and HARQ timing taking into account gNB/UE processing time, # HARQ processes, HARQ payload considerations, HARQ multiplexing/bundling, etc.*

**R1-1721515 Summary of DL/UL scheduling and HARQ management Qualcomm**
**Decision:** The document is noted.

Timing indication

- Alt.1: 2+4, slot index dependent
    - Supported by NTT DOCOMO, CMCC, Panasonic, CATT, vivo, NEC, Huawei, HiSilicon, LGE, Fujitsu, Samsung
    - Objected by Qualcomm, Intel, MediaTek, Nokia, NSB, ZTE
- Alt.2: 3+3, not slot index dependent
    - Supported by Nokia, NSB, AT&T, MediaTek, Qualcomm, Intel, Ericsson, OPPO
    - Objected by NTT DOCOMO, Fujitsu, CMCC
- Alt.3: 3+4, not slot index dependent
    - Supported by AT&T, Intel, Qualcomm, MediaTek, ZTE, Ericsson, Nokia, NSB, Fujitsu, OPPO
    - Objected by NTT DOCOMO, CATT, CMCC
- Alt.4: 2+4, FFS slot index dependency
    - Supported by Samsung, ZTE, Panasonic, CATT
    - Objected by Fujitsu, OPPO, NTT DOCOMO, Nokia, NSB

CATT requested clarifying the rules behind the vote – why not allowing more off line as for other cases
RAN1 chair: agreement should be driven by technical reasons – fair decisions are taken at any time – in current case, checking who supports, who objects – decision must be made

Agreements:
- 3-bit are used to indicate K1 slot-timing in DCI
  - RRC configures the set of values to be indexed by these bits to determine K1
    - These values are not slot index dependent
    - Each value is represented by 4-bit (i.e., up to 16 different values)

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**Thursday session**
R1-1721652 **Summary of DL/UL scheduling and HARQ management Qualcomm**
**Decision:** The document is noted.

Agreements:
- The baseline UE processing time capability in NR Release 15 for slot-based scheduling, including CA case with no cross-carrier scheduling and with single numerology for PDCCH, PDSCH, and PUSCH and no UCI multiplexing, is given by Table 2-1 below.
  - FFS whether processing times can be supported also for cross-carrier scheduling

**Table 2-1. UE Processing Time and HARQ Timing (Capability #1)**

| Configuration | HARQ Timing Parameter | Units | 15 KHz SCS | 30 KHz SCS | 60 KHz SCS | 120 KHz SCS |
|---|---|---|---|---|---|---|
| Front-loaded DMRS only | N1 | Symbols | 8 | 10 | 17 | 20 |
| Front-loaded + additional DMRS | N1 | Symbols | 13 | 13 | 20 | 24 |
| Frequency-first RE-mapping | N2[1] | Symbols | 10 | 12 | 23 | 36 |

1. If 1st symbol of PUSCH is data-only or FDM data with DMRS, then add 1 symbol to N2 in table.

Agreements:
In the case of multiplexing HARQ-ACK with uplink data on PUSCH
- N1' the number of OFDM symbols required for UE processing from the end of PDSCH to the earliest possible start of the corresponding ACK/NACK transmission on PUSCH from UE perspective
  - $N1' \geq N1 + d$ where N1 is based on the UE capability for ACK-only
- N2' the number of OFDM symbols required for UE processing from the end of PDCCH containing the UL grant reception to the earliest possible start of the corresponding the same PUSCH transmission from UE perspective
  - $N2' \geq N2 + d$ where N2 is based on the UE capability for sending data-only on PUSCH
- d = [1] symbols
- UE is not expected transmit the HARQ-ACK multiplexed with uplink data if the network set the values of K1 and/or K2 without leaving sufficient time for UE processing
- FFS: how to much time is needed to multiplex CSI reports, depending on outcome from MIMO session.

Proposals:
- UE is not expected to receive anything on a symbol if it is within T us from an UL transmission by that UE on unpaired spectrum for a given serving cell.
  - Note that the exact value(s) of T may not be in RAN1 specification.

Agreement: For the case when RRC connection has not yet been established, the UE processing time should be assumed to be the maximum values among all conditions for all capabilities under the same SCS.

Agreements:
- The maximum number of DL HARQ processes per carrier that can be signalled in DCI is 16.
- The maximum number of UL HARQ processes per carrier that can be signalled in DCI is 16.

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**Friday**
R1-1721703 **Summary of DL/UL scheduling and HARQ management Qualcomm**
**Decision:** The document is noted.

Working assumption:

- The starting point for baseline UE processing time capability in NR Release 15 for non-slot-based scheduling, including CA case with no cross-carrier scheduling and with single numerology for PDCCH, PDSCH, and PUSCH and no UCI multiplexing, is given by Table 7-1 below.
  - FFS whether processing times can be supported also for cross-carrier scheduling
  - FFS whether additional dependence on time-domain allocation length should be given
  - FFS (for N1) regarding front-loaded DMRS location
  - FFS (for N1) processing times in relation to CORESET configuration where UE finds scheduling DCI
  - FFS if there is a second lower latency UE capability for non-slot based scheduling

**Table 7-1. UE Processing Time and HARQ Timing for Non-Slot**

| Configuration | HARQ Timing Parameter | Units | 15 KHz SCS | 30 KHz SCS | 60 KHz SCS | 120 KHz SCS |
|---|---|---|---|---|---|---|
| Front-loaded DMRS only | N1[1] | Symbols | [8] | [10] | [17] | [20] |
| Front-loaded + additional DMRS | N1[1] | Symbols | [13] | [13] | [20] | [24] |
| Frequency-first RE-mapping | N2[2] | Symbols | [10] | [12] | [23] | [36] |

1. *FFS whether additional dependence on time-domain allocation length should be given.*
2. *If 1st symbol of PUSCH is data-only or FDM data with DMRS, then add 1 symbol to N2 in table.*

Agreements:

- In the case of multiplexing HARQ-ACK with uplink data on PUSCH
  - In the case of mixed numerology between the UL and DL, the UE processing times for N1', N2' apply according to the lowest subcarrier spacing between the UL and DL numerologies

Conclusion:

- There is no consensus in RAN1#91 to support in Rel-15 that TB can span multiple slots without repetitions for DL or UL transmissions

R1-1719401 Remaining issues on HARQ Huawei, HiSilicon
R1-1719552 HARQ-ACK & UL Scheduling Timing Relationship MediaTek Inc.
R1-1719614 Discussion on HARQ-ACK codebook and HARQ feedback timing Fujitsu
R1-1719648 Remaining details on DL/UL scheduling and HARQ management AT&T
R1-1719744 On HARQ-ACK multiplexing and bundling Lenovo, Motorola Mobility
Late submission
R1-1719794 Remaining issues on DL/UL scheduling and HARQ vivo
R1-1719930 HARQ process and HARQ-ACK feedback for NR LG Electronics
R1-1719993 Discussion on HARQ-ACK transmission Guangdong OPPO Mobile Telecom
R1-1720095 On DL/UL Scheduling and HARQ management Intel Corporation
R1-1720203 Discussion on HARQ management and HARQ-ACK feedbackCATT
R1-1720340 HARQ Management and Feedback Samsung
R1-1720368 DL/UL scheduling and HARQ timing management ZTE, Sanechips
R1-1720480 On remaining details of HARQ procedure Nokia, Nokia Shanghai Bell
R1-1720498 HARQ-ACK codebook for CBG-based transmission Panasonic
R1-1720554 HARQ-ACK codebook with dynamic timing indication InterDigital, Inc.
R1-1720561 Number of HARQ processes for co-existence with TD-LTE NEC
R1-1720688 DL-UL Scheduling, Processing Time and HARQ management Qualcomm Incorporated
R1-1720712 HARQ ACK multiplexing for NR HTC Corporation
R1-1720749 HARQ-ACK transmission for DL transmission in NRCATR
R1-1720822 DL/UL scheduling and HARQ management NTT DOCOMO, INC.
R1-1720876 Discussion on HARQ-ACK multiplexing and bundling for NR WILUS Inc.
R1-1720913 UE-driven HARQ-ACK bundling for NR Sequans Communications
R1-1721013 On HARQ Management Ericsson

#### *7.3.3.3 CBG-based (re)transmission*

R1-1721423 Summary of the review on CBG based retransmissionLG Electronics
**R1-1721638 Offline discussion summary on CBG based retransmission LG Electronics**

Agreement**:** NR supports separate DCI information fields in DCI for MCS/TBS and CBGTI

Conclusion:
- In Rel-15, there is no consensus to support spatial domain HARQ-ACK bundling when a UE is configured with CBG

R1-1719400 On CBG-based (re)transmission Huawei, HiSilicon
R1-1719492 On CBG-based (re)transmission ZTE, Sanechips
R1-1719615 Discussion on DCI composition for DL CBG based (re-)transmission; Fujitsu
R1-1719649 Remaining details of CBG based transmission AT&T
R1-1719745 Remaining issues on CBG-based (re)transmission Lenovo, Motorola Mobility
Late submission
R1-1719795 Remaining issues on CBG-based (re)transmission vivo
R1-1719931 Remaining aspects of CBG based retransmission for NR LG Electronics
R1-1719994 DCI composition for CBG based retransmission Guangdong OPPO Mobile Telecom
R1-1720096 On remaining aspects of CBG-based (re)transmission Intel Corporation
R1-1720204 Remaining aspects of CBG-based operation CATT
R1-1720341 Remaining Issues on CBG-Based UL/DL Retransmissions Samsung
R1-1720461 Discussion on the DCI composition for CBG retransmission Sony
R1-1720499 CBG-based (re)transmission Panasonic
R1-1720555 On the remaining details of CBG-based (re)transmission InterDigital, Inc.
R1-1720577 Remaining issues on CBG-based (re)transmission China Telecommunications
R1-1720594 Discussion on HARQ-ACK feedback CMCC
R1-1720617 Discussion on CBG-based (re)transmission Sharp, APT
R1-1720689 On remaining issues in CBG-based (re)-transmission Qualcomm Incorporated
R1-1720713 Remaining issues on CBG-based (re)transmission HTC Corporation
R1-1720823 CBG-based (re)transmission NTT DOCOMO, INC.
R1-1720966 On the CBG number and dynamic HARQ codebook KT Corp.
R1-1721014 Remaining issues for CBG based transmissions and retransmissions Ericsson

#### 7.3.3.4 UL data transmission procedure

*Including details for single/multiple SR configurations, aspects related to with and without grants, etc.*

**R1-1721510 Offline summary for AI 7.3.3.4 UL data transmission procedure NTT DOCOMO**
**Decision:** The document is noted.

Agreements:
- Following parameters are configured for SP-CSI on PUSCH by UE-specific RRC signaling
  - semiPersistSchedInterval for SP-CSI reporting on PUSCH
  - Power control parameters P_0 and alpha

From offline
- *Answer to Q3: TBD between following, but if no consensus is made until Tuesday, option 1 is automatically adopted.*
  - *Option 1: RAN1 has not reached consensus on whether to support multiple resource configurations for UL transmission without UL grant for single serving cell. Note that the interaction between resource conguration for UL transmission without UL grant and BWP configuration is under discussion.*
  - *Option 2: RAN1 agreed to support multiple resource configurations for UL transmission without UL grant for single serving cell. Detailed agreements and necessary RRC parameters are listed below.*

Show of hands:
Option 1 supported by Qualcomm, Ericsson, Nokia, NSB, LGE
Option 2 supported by Huawei, HiSilicon, NEC, MediaTek, ZTE, Intel, Sharp, CMCC, vivo, InterDigital, Convida

Agreements:
- Send an LS to RAN2 to inform following:
  - Answer to Q1: RAN1 believes that it is feasible to support DL SPS operation in NR. The NR DL SPS scheme has no significant differences compared with LTE DL SPS scheme.
  - Answer to Q2: RAN1 believes that at least the set of periodicities of DL SPS resource is same as that of LTE DL SPS. RAN1 has not been studied the periodicities shorter than that of LTE range. Note that there is no implication and impacts on any design and decision on uplink data transmission without grant.
  - Answer to Q3: At least for type 1 UL transmission without UL grant:
    - RAN1 agreed to support multiple resource configurations for UL transmission without UL grant for single serving cell.
      - Up to RAN2 to decide whether or not the RNTI is separately configured for the multiple resource configurations

- Following parameters are configured for DL SPS by UE-specific RRC signaling
  - a new RNTI for SPS (e.g. SPS C-RNTI)
  - semiPersistSchedIntervalDL
  - numberOfConfSPS-Processes
  - PUCCH-AN-PersistentList

Prepare the LS reply to RAN2 (NTT DOCOMO), R1-1721519

R1-1721519 **[Draft] Reply LS on SPS and Grant-free NTT DOCOMO**

**Decision:** The document is noted. Final LS is approved in R1-1721574, with following update "RAN1 would like to ask RAN2"

Agreement:

- The possible values of the repetition K are four values and are {1, 2, 4, 8}.

Agreements:

- For PUSCH transmission with UL grant (other than Msg.3) and Type 2 UL transmission without UL grant with intra-slot FH,
  - frequency hopping offset(s) in frequency domain is/are explicitly configured by UE-specific RRC signaling
  - explicit frequency hopping flag is included into DCI format scheduling/activating UL transmission
- If the frequency hopping flag is enabled, the following number of hopping bits are taken from the resource allocation Type 1 indication field:
  - 1 bit: if the active BWP less than X1 PRB
    - To indicate one of two RRC configured offsets
  - 2 bit: if the active BWP is larger or equal than X1
    - To indicated one of four RRC configured offsets
  - The value of X1 is fixed in the spec with a value of [50]

Agreements:

- For Type 1 UL transmission without UL grant with intra-slot FH, a separated frequency hopping offset field from the frequency resource allocation field is explicitly configured by UE-specific RRC signaling.
  - The possible values for frequency hopping offset are the same as that for UL transmission with UL grant.

Agreements**:**

- The hopping offset for Msg3 is indicated in RAR/DCI respectively, along with a separate information field for the hopping flag
  - No RRC impact for frequency hopping applied to Msg.3.
  - The possible values of hopping offsets are fixed in the specificiation

Agreement**:**

- No additional RRC configuration is needed in determining the hopping boundary for PUSCH

Agreement:

- For PUSCH other than Msg.3 over multiple slots, the intra-slot hopping and inter-slot hopping are not enabled at the same time for a given carrier for a UE.

Agreements:

- RRC parameters for Type 1
  - An MCS/TBS value
    - Reuse the MCS table and TBS calculation formula and the configuration as in grant-based case
  - Indication of UL/SUL (same as the grant-based case)

Agreements:

- RRC parameters for Type 2
  - Number of repetitions K
- An MCS/TBS value
  - Reuse the MCS table and TBS calculation formula and the configuration as in grant-based case

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**Thursday session**

R1-1721654 **Remaining issues for 7.3.3.4 NTT DOCOMO**

**Decision:** The document is noted.

Agreement:

- For grant-free UL transmission, the UE is not expected to be configured with the time duration for the transmission of K repetitions larger than the time duration derived by the periodicity P.

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**Friday**

**R1-1721705 Remaining issues for 7.3.3.4 NTT DOCOMO**

**Decision:** The document is noted.

Agreement**:**

- Activation and deactivation signaling for Type 2 UL transmission without UL grant/DL SPS is differentiated by different values of two fields in the DCI.
    - FFS details.

Agreements:

- For UL transmission without UL grant, the HARQ ID associated with the K repetitions of a TB is derived from the following equation:
    - HARQ Process ID = floor (*X / UL-TWG-periodicity)* mod *UL-TWG-numbHARQproc*
        - Where X= (SFN * SlotPerFrame * SymbolPerSlot + Slot_index_In_SF * SymbolPerSlot + Symbol_Index_In_Slot)
        - *X* refers to the symbol index of the first transmission occasion of repetition bundle that takes place.

**R1-1721718 Remaining issues for 7.3.3.4 NTT DOCOMO**

**Decision:** The document is noted.

Proposals:

- For UL transmission without UL grant, the initial transmission of the K repetitions of a TB can start at any configured transmission occasion within a period P, and repetitions end at the last transmission occasion within the period P, when the UE is configured with RV sequence of {0,0,0,0}
    - FFS additionally for {0, 3, 0, 3}
- When the UE is configured with RV sequence of {0,2,3,1}, the initial transmission of the K repetitions of a TB shall start at the first transmission occasion within a period
    - FFS RV sequence of {0,3,0,3}
- (Working assumption) The RV used for initial transmission is determined based on the following:
    - nth transmission occasion within the period is the *MOD (n, 4)*-th RV in the sequence

Email discussion/approval by 12/6 – Lihui (DCM)

R1-1719411 UL data transmission procedure without UL grant Huawei, HiSilicon
R1-1719515 Underlay SR: a complementary solution to overcome the limitations of periodic PUCCH-SR Idaho National Laboratory
R1-1719516 Remaining details of UL transmission without grant ZTE, Sanechips
R1-1719586 On UL data transmission without grant design and configuration MediaTek Inc.
R1-1719618 Discussion on UL data transmission without grant Fujitsu
R1-1719684 Resource Configuration Signaling in Uplink Transmission Without Grant ITRI
R1-1719702 Remaining details on HARQ process in UL transmission without grant Spreadtrum Communications
R1-1719749 On UL transmission procedures to reduce latency and enhance reilability Lenovo, Motorola Mobility Late submission
R1-1719796 On UL data transmission procedure vivo
R1-1719932 Remaining issues on UL data transmission procedure LG Electronics
R1-1720004 On UL data transmission without UL grant Guangdong OPPO Mobile Telecom
R1-1720097 Remaining details of UL data transmission procedures in NR Intel Corporation
R1-1720205 Further details of UL transmission procedures CATT
R1-1720342 Procedures for UL Transmissions Samsung
R1-1720382 Remaining issues on UL transmission without grant NEC
R1-1720462 Discussion on the RV sequence within the repetition for UL transmission without UL grant Sony
R1-1720481 On remaining issues for UL transmission without grant Nokia, Nokia Shanghai Bell
R1-1720500 UL data transmission procedure Panasonic
R1-1720566 Procedure for Reliable UL Transmission in URLLC III
R1-1720580 Remaining issues on UL transmission without grant China Telecommunications
R1-1720618 Transmission Repetition and Slot Aggregation Sharp, APT
R1-1720640 Remaining details of UL transmission without grant InterDigital, Inc.

R1-1720690 UL data transmission procedures Qualcomm Incorporated
R1-1720824 UL data transmission procedure NTT DOCOMO, INC.
R1-1720900 Frequency hopping schemes for NR UL PUSCH NEC
R1-1720906 Remaining details of the UL transmission without grant Sequans Communications
R1-1720989 Supporting of UL Grant-Free and SPS Configured Access Fraunhofer IIS
R1-1720991 Time and Frequency Domain Resource Allocation with K Repetition Fraunhofer IIS
R1-1721015 On UL Data Trandmission Procedures Ericsson

#### *7.3.3.5 Soft-buffer management for NR*

*Including multi-carrier aspects within NR and DC with LTE*

**R1-1721408 Summary for AI 7.3.3.5 Intel Corp.**
**Decision:** The document is noted.

Agreement:
- For uplink, UE-specific configuration of enabling/disabling LBRM is supported.
  - Default value is no LBRM

**Thursday session (from offline)**

Working assumption:
- $TBS_{LBRM}$ for a serving cell is determined according to the following:
  - $X$ is the maximum number of RBs across all configured BWPs for the serving cell
  - $TBS_{LBRM}$ is the transport block size determined from TBS design (Note: full TBS design is pending) using
    - $v$ is the maximum number of layers for the UE for the serving cell
    - $Q_m$ is the maximum modulation order configured for the serving cell
    - Maximum coding rate (Note : obtained from MCS table, e.g. Rmax = 0.935)
    - $\overline{N}'_{RE} = \overline{N}'_{RE,\max}$ (Note: obtained from TBS design)
    - $n_{PRB}$ is given by $RB_{LBRM}$ according to the following:

| X | $RB_{LBRM}$ |
|---|---|
| Less than 33 | 32 |
| 33 to 66 | 66 |
| 67 to 107 | 107 |
| 108 to 133 | 133 |
| 134 to 162 | 162 |
| 163 to 217 | 217 |
| Greater than 217 | 273 |

Note : If the resulting TBS values are too close, then further quantization can be used.
Email discussion about the above bullet till 12/6 – Ajit (Intel)

Agreement: Define $N_{ref}$ per code block of a TB as $N_{ref} = \left\lfloor \frac{TBS_{LBRM}}{C \cdot R_{LBRM}} \right\rfloor$, where C is the number of code blocks for the TB using $TBS_{LBRM}$ of the serving cell.

R1-1719399 Soft buffer management in NR and LTE-NR DC Huawei, HiSilicon
R1-1719493 Considerations for soft-buffer management ZTE, Sanechips
R1-1719574 NR soft buffer design MediaTek Inc.
R1-1719597 DL/UL Transmit Buffer and Soft Buffer Management Ericsson
R1-1719797 On soft-buffer management for NR vivo
R1-1719933 Considerations on soft buffer management for NR LG Electronics
R1-1720098 Soft buffer management for NR Intel Corporation
R1-1720206 Soft buffer management for NR CATT
R1-1720343 Soft Buffer Management Samsung

Late submission
R1-1720482 Limited buffer rate matching application details Nokia, Nokia Shanghai Bell
R1-1720691 Soft-buffer management Qualcomm Incorporated

#### *7.3.3.6 Multiplexing data with different transmission durations*

**R1-1721491 Summary of multiplexing data with different transmission durations vivo**
**Decision:** The document is noted.

Working assumption:
- DCI payload size for preemption indication is configurable by RRC
  - FFS the interaction with DCI payload size for SFI especially in terms of RRC configuration, and potentially other DCI formats

Agreements:
- Within a PUCCH group, UE can be configured to monitor group common PDCCH for pre-emption indication for a Scell on a different serving cell
  - One DCI can contain one or more pre-emption indication field(s) corresponding one or more serving cells
    - Each field (14bits bitmap) for one serving cell
  - RRC configures the PI field location in the DCI format that is applied to that cell

Agreement:
- Supported periodicities for slot level preemption monitoring are
  - 1, 2, TBD1, TBD2 slots

Agreement:
- No concensus to support mini-slot level monitoring periodicity of preemption indication in RAN1#91

Agreement:
- Confirm the following working assumption in RAN1#90bis
  - The frequency region of the reference downlink resource for pre-emption indication is the active DL BWP

Agreement:
- Configuration of UE monitoring of preemption indication is per DL BWP

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**Friday**

Agreements:
- For the bitmap indication, the time-frequency blocks of the reference DL resource determined by {M, N} ({M, N}={14, 1}, {7, 2} ) are indexed in frequency first manner
  - Note: The reference DL resource is partitioned with M time domain parts and N frequency domain parts.
  - Note: Current TS38.213 needs to be updated according to the above agreement.

Agreement:
- When a PI is detected, the time location of the corresponding reference DL resource (RDR) is determined by:
  - The RDR starts at the 1st symbol of the previous CORESET for PI monitoring and ends right before the current CORESET at which the PI is detected.

Agreement:
- The UE is not expected to take into account a PI detected in a BWP for a PDSCH scheduled in a different BWP of the same serving cell.

R1-1721452 Remaining aspects on pre-emption indication for DL multiplexing of URLLC and eMBB Huawei, HiSilicon (rev of R1-1719402)
R1-1719494 Remaining issues for preemption indication ZTE, Sanechips
R1-1719587 Remaining issues on pre-emption indication MediaTek Inc.
R1-1719616 On eMBB and URLLC multiplexing Fujitsu
R1-1719798 Remaining issues on multiplexing of different transmission durations vivo

R1-1719934 Remaining issues on pre-emption indication LG Electronics
R1-1719961 Multiplexing of UL eMBB and URLLC in NR ASUSTEK COMPUTER (SHANGHAI)
R1-1719974 Multiplexing between slot-based and symbol-based transmissions and pre-emption indication Guangdong OPPO Mobile Telecom
R1-1720099 Remaining details of multiplexing of different data channel durations Intel Corporation
R1-1720207 Remaining aspects of pre-emption indicationCATT
R1-1720229 Remaining issues on DL preemption indication ETRI
R1-1720344 Indication of Preempted Resources in DL Samsung
R1-1720463 Remaining issues in Pre-emption Indicator Sony
R1-1720641 On UL multiplexing of data with different transmission durations InterDigital, Inc.
R1-1720692 URLLC DL pre-emption and UL suspension indication channel design Qualcomm Incorporated
R1-1720877 Remaining issues on pre-emption indication and UE behavior WILUS Inc.
R1-1720904 Remaining details of pre-emption indication Sequans Communications
R1-1720927 Multiplexing of uplink channels with different transmission durations Motorola Mobility, Lenovo
R1-1720967 Remaining details on preemption indication KT Corp.
R1-1721016 On Multiplexing Data with Different Transmission Durations Ericsson

#### 7.3.3.7 Other

R1-1721411 Support of 60 kHz subcarrier spacing Huawei, HiSilicon (R1-1719403)
R1-1719404 On supporting ultra reliability in a resource efficient way Huawei, HiSilicon
R1-1719407 PDSCH reliability for URLLC Huawei, HiSilicon
R1-1719409 Discussion on UL multiplexing of eMBB and URLLC Huawei, HiSilicon
R1-1719410 Consideration on subsequent transmission after pre-emption Huawei, HiSilicon
R1-1719412 Link adaption and CSI reporting for URLLC transmission Huawei, HiSilicon
R1-1719414 Discussion on over-the-air time synchronization for URLLC Huawei, HiSilicon
R1-1719588 On repetition scheme for UL transmission without grant MediaTek Inc.
R1-1719589 On use of scrambling for UL transmission without grant MediaTek Inc.
R1-1719678 Ultra-reliable part of URLLC for scheduling/HARQ procedureZTE, Sanechips
R1-1719746 HARQ design for uplink grant-free transmission Lenovo, Motorola Mobility Late submission
R1-1719799 Discussion on scheduling and HARQ for URLLC reliability vivo
R1-1719829 On uplink hopping and DVRB Huawei, HiSilicon
R1-1719830 On data channel scrambling Huawei, HiSilicon
R1-1720232 URLLC based on grant-based Dynamic TDD ETRI
R1-1720345 Flushing Indication of Preempted Resources for TB-based re-transmission Samsung
R1-1720346 Multiplexing Transmissions with Different Durations Samsung
R1-1720347 Scheduling/HARQ Procedures for URLLC Samsung
R1-1720348 Indication of Preempted Resources in UL Samsung
R1-1720492 Early HARQ for URLLC Fraunhofer HHI
R1-1720710 Scheduling data in slots containing SS blocks in multi-beam scenario Qualcomm Incorporated
R1-1720856 Discussion on URLLC transmitted in same or different numerology resources ASUSTEK COMPUTER (SHANGHAI)
R1-1720911 Enhancements for DL preemption Sequans Communications
R1-1721017 On Polled Hybrid-ARQ Acknowledgement Ericsson
R1-1721019 On Transmit Diversity for Ultra-high Reliability Use Cases Ericsson
R1-1721020 On Frequency Hopping for Ultra-reliable Transmission Ericsson
R1-1721021 On supporting reliable HARQ feedback for UL transmission without grant Ericsson
R1-1721022 On Repetition in UL and DL Ericsson
R1-1721023 On HARQ ID for UL transmission without grant Ericsson
R1-1721025 On soft-buffer handling for DL pre-emption Ericsson
R1-1721026 On URLLC downlink system level simulation results Ericsson

### 7.3.4 Other aspects on carrier aggregation and bandwidth parts

#### 7.3.4.1 Other aspects on bandwidth Parts

Conclusion:
- No change on DL/UL BWP pairing for unpaired spectrum in RAN1#90bis and it's up to specification rapporteur's decision on how to simplify the specification text as long as the linking between DL BWP and UL BWP sharing the same center frequency is kept.

Agreement:
- A UE is expected to perform CSI measurement only within its active DL BWP at the time when the measurement occurs

Agreement:

- Semi-static configuration of the set of values of K0, the set of values of K1 and the set of values of K2 for a UE can be BWP-specific
    - Note: there is no BWP-specific default value(s) defined for K0/K1/K2

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**Wednesday session**
**R1-1721504 Summary of Bandwidth Part Operation MediaTek**
**Decision:** The document is noted.

Proposals:

- The transition time(s) of active BWP switching is reported to the network as UE capability from RAN1 perspective and the value range of the transition time(s) is decided by RAN4.
- Send LS to RAN4 to initiate the discussion on the value range of the transition time(s) of active BWP switching for UE capability signaling.
    - It's RAN1's understanding that the value range of the transition time(s) may depend on the frequency range and it's up to RAN4's decision to have single value range of transition time(s) for all frequency bands or not
- ~~Prepare draft LS in R1-1721552 (Pei-kai, MediaTek)~~

Agreements:

- For timer-based active DL BWP (DL/UL BWP pair) switching,
    - Granularity of the timer: 1 ms (subframe) for sub6, 0.5 ms (half-subframe) for mmWave
    - Maximal time length of the timer: approximately 50 ms
    - It's up to RAN2's decision on a set of exact values for the timer initial setting and whether or not to enable/disable the timer (e.g., via a very large timer value)

Proposals:

- For Pcell DL in paired spectrum and Pcell DL & UL in unpaired spectrum, the offset between PRB 0 for common PRB indexing and a reference location is signaled to a UE by dedicated RRC signaling
- For Pcell UL in paired spectrum, the offset between PRB 0 and the reference location is indicated in RMSI and it's also used to determine the frequency location of initial active UL BWP in paired spectrum
- For Pcell DL in paired spectrum and Pcell DL & UL in unpaired spectrum, the offset between the PRB 0 and the lowest PRB of the cell-defining SS block is indicated in number of PRBs using the SCS of the cell-defining SS block
- The range offset values is 0~1200 (PRB), with a granularity of one PRB
- The reference location for Scell, Pcell UL in paired spectrum and SUL is based on ARFCN, respectively

Agreements:

- A UE is RRC signaled with the following for common PRB indexing
    - Offset between a reference location and the lowest subcarrier of the reference PRB [point A] (i.e. PRB0 in previous agreements)
        - For DL in Pcell, the reference location is the lowest subcarrier of the lowest PRB of the cell-defining SSB after floating SSB is resolved
        - For UL in Pcell of paired spectrum, the reference location is the frequency location of the UL indicated in the RMSI, which is based on ARFCN after floating ARFCN is resolved
        - For Scell, the reference location is the frequency location indicated in the SCell configuration, which is based on ARFCN after floating ARFCN is resolved
        - For SUL, the reference location is the frequency location indicated in the SUL configuration, which is based on ARFCN after floating ARFCN is resolved
        - The reference PRB is expressed based on 15KHz SCS for FR1 and 60KHz SCS for FR2
        - The offset in the unit of PRB is indicated based on 15KHz SCS for FR1 and 60KHz SCS for FR2
        - Common PRB with index 0 for all SCSs contains point A
    - Offset between point A and the lowest subcarrier of the lowest usable PRB of a given SCS
        - The offset is indicated in the unit of PRB based on the given SCS
    - $k_0$ for each SCS if $k_0$ is kept in Section 5.3 of TS38.211
    - Channel BW of the carrier configured to the UE
    - Note: the offsets defined above should cover a frequency range larger than R15 defined maximal bandwidth
    - The lowest subcarrier of the lowest PRB of the cell-defining SSB can be set with the granularity of channel raster after floating SSB is resolved
    - From RAN1, RMSI is assumed to be always PRB-aligned with PRB grid. However, the current 4-bit PRB grid offset in PBCH with 15kHz SCS can't ensure the above assumption when RMSI has 30kHz SCS. Therefore, for

FR1, RAN1 agrees to increase from 4-bit PRB grid offset to 5-bit PRB grid offset in PBCH where the 5-bit PRB gird offset in PBCH is in unit of subcarrier based on 15kHz SCS, while for FR2, there is still 4-bit PRB grid offset and RAN1 assumes the 4-bit PRB grid offset in PBCH is in unit of subcarrier based on RMSI numerlogy. Send LS to RAN4 – Zhenfei (Huawei) R1-1721578

- For Pcell DL in paired spectrum and Pcell DL & UL in unpaired spectrum, the above information is signaled to a UE is indicated in RMSI
- For Pcell UL in paired spectrum, the above information is indicated in RMSI and it's also used to determine the frequency location of initial active UL BWP in paired spectrum
- The range of offset values is 0~(275*8-1), which requires 12 bits

Conclusion:

- There is no consensus to introduce BWP with size 0 in Rel-15
- There is no consensus to introduce power saving BWP in Rel-15

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**Thursday**
**R1-1721578** **Draft Reply LS on PRB grid in the NR** **Huawei**
**Decision:** The document is endorsed by removing the paragraph (including the figure) after the agreements. Final LS is approved in R1-1721669.

Agreements:

- The value range of the transition time(s) of active BWP switching are up to RAN4 and it's also up to RAN4 to decide whether the transition time(s) of active BWP switching is reported to the network as dedicated UE capability or not.
  - LS to RAN4 to be prepared in R1-1721667 (JJ, Intel)

Agreements:

- In unpaired spectrum, for timer-based active DL/UL BWP pair switching, a UE restarts the timer to the initial value when the following additional conditions are met
  - It detects a DCI scheduling PUSCH for its current active DL/UL BWP pair
- It's RAN1's understanding that the remaining issues of timer-based active DL BWP (DL/UL BWP pair) switching (e.g. additional timer restarting/expiration conditions, inter-action with RACH procedure and grant-free scheduling) will be discussed in RAN2
- Send an LS to RAN2 – Peter A. (Qualcomm), R1-1721668

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**Friday**
**R1-1721667** **[Draft] LS on RAN1 agreement on bandwidth part transition time** **Intel**
**Decision:** The document is endorsed and final LS is approved in R1-1721712.

**R1-1721668** **Draft LS on BWP timer operation** **Qualcomm**
**Decision:** The document is endorsed and final LS is approved in R1-1721714.

Conclusion:

- It's up to RAN2's decision on any remaining issues regarding to BWP operation interaction with C-DRX
  - It's also up to RAN2's decision whether it's necessary to define default UL BWP in paired spectrum

Agreement:

- Support HARQ retransmission across DL (UL) BWPs when a UE's active DL (UL) BWP is switched

Agreement:

- A UE is not expected to transmit HARQ-ACK if a UE's active UL BWP is switched between the reception of the corresponding DL assignment and the time of HARQ-ACK transmission at least for the paired spectrum

R1-1719380 Remaining issues on bandwidth part Huawei, HiSilicon
R1-1719551 Remaining details on bandwidth part operation in NR MediaTek Inc.
R1-1719650 Remaining details on bandwidth parts AT&T
R1-1719698 Remaining issues on UL/DL BWP configuration Spreadtrum Communications
R1-1719800 Other aspects on bandwidth Parts vivo
R1-1719935 Remaining issues on bandwidth parts LG Electronics
R1-1719975 Remaining issues on bandwidth part configuration and activation Guangdong OPPO Mobile Telecom

R1-1720100 Remaining details for bandwidth parts Intel Corporation
R1-1720208 Further details of BWP operation CATT
R1-1720349 On Bandwidth Part Operation Samsung
R1-1720444 Remaining bandwidth-part issues Ericsson
R1-1720505 Remaining Issues on Bandwidth Part Operation PANASONIC
R1-1720511 On remaining aspects of BWPs Nokia, Nokia Shanghai Bell
R1-1720546 UE Power Saving with BWP of Size Zero Apple Europe Limited
R1-1720556 Details of BWP switching operation InterDigital, Inc.
R1-1720693 Open issues on BWP Qualcomm Incorporated
R1-1720825 Remaing issues on bandwidth parts for NR NTT DOCOMO, INC.
R1-1720930 Design Considerations for BWP in NR Convida Wireless LLC

#### *7.3.4.2 Other aspects on carrier aggregation*

*Including dual connectivity (if any), SUL*

**R1-1721370 Summary on CA AspectsSamsung**
**Decision:** The document is noted.

Agreement:
- NR supports separate configuration of HARQ-ACK spatial bundling for PUSCH and PUCCH

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**Thursday session**
**R1-1721610 Summary on CA AspectsSamsung**
**Decision:** The document is noted.

Agreement:
- For cross-carrier scheduling, NR support UESS sharing in case of same DCI size for DCIs of different carriers on the same scheduling carrier, as an optional feature (additional UE capability for UEs that are capable of cross-carrier scheduling)

Agreements:
- For semi-static HARQ-ACK codebook, support
  - DL association set is determined based on the configured set of HARQ-ACK timings, where the HARQ-ACK payload is ordered based on DL time index
    - There is no DAI in DL grants

Conclusion:
- No consensus to introduce CBG-level DAI in DCI in Rel-15

Agreements:
- Generate 2 HARQ-ACK sub-codebooks (sub-CBs)
  - First sub-CB is for transmissions with TB-based HARQ-ACK, second sub-CB is for transmissions with CBG-based HARQ-ACK
  - The sub-CBs are combined in a single HARQ-ACK codebook (sub-CB for TB-based HARQ-ACK is placed first)
  - No additional reliability enhancements

Conclusion:
- It is understood that different PDCCH monitoring periodicities per PUCCH cell group are supported for same scheduling “type” (i.e. ‘slot-based scheduling’ or “non-slot-based” scheduling)

Conclusion:
- It is understood that parallel PUCCH and PUSCH transmissions on the same cell is deprioritized from the Dec. release, and parallel PUCCH on one cell and PUSCH on a different cell (or UL vs. SUL for the serving cell) within a cell group is also deprioritized in the Dec. release
  - From RAN1 perspective, this entire feature is not supported in Rel-15
  - Note: across cell groups, parallel PUCCH in one group vs. PUSCH in the other goup is supported

R1-1719383 Remaining issues on NR CA and DC including SRS switching Huawei, HiSilicon
R1-1719651 Remaining details on carrier aggregation AT&T
R1-1719747 HARQ-ACK codebook determination for CA Lenovo, Motorola Mobility

Late submission
R1-1719801 Other aspects on carrier aggregation vivo
R1-1719936 Considerations on carrier aggregation for NR LG Electronics
R1-1720101 Remaining aspects of CA operation Intel Corporation
R1-1720209 On remaining aspects of CA operation CATT
R1-1720350 CA Operation Aspects Samsung
R1-1720367 Carrier aggregation for CCs with different TTI lengths ZTE, Sanechips
R1-1720512 On remaining aspects of NR CA/DC Nokia, Nokia Shanghai Bell
R1-1720557 Scell activation/deactivation in NR InterDigital, Inc.
R1-1720562 Discussion on beam information indication for CA and DC MTI
R1-1720694 Open issues on CA Qualcomm Incorporated
R1-1720826 Remaining issues on other aspect of carrier aggregation NTT DOCOMO, INC.
R1-1720968 Considerations on NR CA for SUL KT Corp.
R1-1721027 On Carrier aggregation related aspects Ericsson

### 7.3.5 Remaining details on rate matching aspects for NR DL and UL

*Including PDCCH vs. PDSCH, RS related rate matching/puncturing, considerations for LTE/future compatible related matching/puncturing, etc.*

**R1-1721526 Summary of open issues related to rate-matching in NR Nokia, Nokia Shanghai Bell**
(R1-1721403)
**Decision:** The document is noted.

Agreement:
- The center-subcarrier location (12 bits), bandwidth (3 bits) and MBSFN subframe configuration for a single LTE carrier can be indicated to the NR UE in addition to the $V_{shift}$ and the number of CRS ports for rate-matching around LTE CRS.

Agreements: For the already agreed resource sets for PDSCH rate-matching:
- Up to 4 RB-symbol-level resource sets per cell & an indication to indicate for semi-static or dynamic rate matching per resource set by RRC
- Up to [4] RB-symbol-level resource sets per BWP & an indication to indicate for semi-static or dynamic rate matching per resource set by RRC

Agreements:
- For L1 signalling, NR supports 1 bit turns a group of resource-sets on and off, where 1bit is signalled per each group of resource sets
  - At most 2 groups of resource sets can be configured to a UE. The grouping is configured per BWP

Agreement:
- For PUSCH rate matching, no additional impact on RRC configuration in Rel-15

Agreement:
- Length of bitmap-2 can be up to 2 slots

R1-1719382 Remaining issues on reserved resources and rate-matching Huawei, HiSilicon
R1-1719495 About dynamic resource sharing ZTE, Sanechips
R1-1719652 Remaining details on rate matching aspects for NR DL and UL AT&T
R1-1719694 Discussion on rate matching Spreadtrum Communications
R1-1719937 Remaining issues on rate matching resources LG Electronics
R1-1720210 Details of rate matching for PDSCH and PUSCH CATT
R1-1720351 On Rate Matching Samsung
R1-1720445 Remaining rate-matching issues Ericsson
R1-1720464 Rate matching resources for compatibility with efeMTC / NB-IoT Sony
R1-1720501 Resource reservation for NR DL and UL Panasonic
R1-1720513 On rate-matching in NR Nokia, Nokia Shanghai Bell
R1-1720619 Rate matching configuration/signaling for PDSCH/PUSCH Sharp
R1-1720632 On ZP CSI-RS configuration for NR Intel Corporation
R1-1720695 Rate matching aspects for NR DL and UL Qualcomm Incorporated
R1-1720878 Discussion on L1 indication for dynamic resource sharing WILUS Inc.

### 7.3.6 Other

*Including remaining aspects related to forward compatibility (if any)*

R1-1719828 Bandwidth part activation and adaptation Huawei, HiSilicon
R1-1720697 The necessity of reliable SR design for GFGB UL URLLC transmission Qualcomm Incorporated
R1-1720698 UL URLLC capacity based on URLLC and eMBB dynamic multiplexing Qualcomm Incorporated

## *7.4 Channel coding*

**R1-1721655 Chairman's notes of AI 7.4 Channel coding Ad-hoc chair (Ericsson)**
The document was presented by Havish Koorapaty from Ericsson.
**Decision:** The document is endorsed, content incorporated below.

R1-1721624 Summary of Offline Discussion on channel coding Ericsson

### 7.4.1 Remaining details of LDPC coding

**R1-1721583 Summary of Offline Discussion on LDPC Code Ericsson**

#### *7.4.1.1 Nominal code rate / BG determination*

**R1-1720352 Remaining details on nominal code rate and BG determination Samsung**
R1-1719598 Nominal Code Rate Calculation and Base Graph Determination Ericsson
Revised to R1-1721446
**R1-1720102 Remaining details of LDPC coding Intel Corporation**
**R1-1720867 Nominal code rate and BG determination Nokia, Nokia Shanghai Bell**

**R1-1720760 Base graph determination Huawei, HiSilicon**
R1-1719524 Considerations on BG determination ZTE, Sanechips
Revised to R1-1721440
**R1-1719578 On the issues of BG selection MediaTek Inc.**
Further revised in R1-1721543.
**R1-1720699 TBS and Base-graph Determination Qualcomm Incorporated**
Further revised in R1-1721479.
**R1-1719938 Base graph indication LG Electronics**
**R1-1720642 LDPC Base Graph Determination and Signaling InterDigital, Inc.**

Agreement:
No dedicated DCI bit is used for indication of the base graph.

- Apply restrictions to the MCS set of all retransmissions to ensure that the TBS calculation results in the same BG selection as for the initial transmission
- Note: The TBS determination procedure should provide sufficient flexibility to find the same TBS for a retransmission

Agreement:
The nominal code rate, $R_{nominal}$, is the target code rate indicated in the MCS field.

**R1-1721612 Summary on offline discussion for Rinit Samsung**

Agreement: $R_{init} = R_{nominal}$.

**R1-1721464 WF on Max Code Rate for BG2 Ericsson, Samsung, MediaTek**

Agreement:

- UE can skip decoding with BG2 when the effective code rate is > 0.95
  - Note: Some CBS sizes may not be decodeable above an effective code rate of 0.92
- This proposal can be combined with the existing agreement for BG1:
  - UE can skip decoding when the effective code rate is > 0.95

#### *7.4.1.2 Other*

*Including the possible TB size (note that the determination of TBS for a transmission is handled in 7.3.3.1)*

R1-1719599 Selection of LDPC Shift Size Ericsson
R1-1719601 Maximum Code Rate for BG2 Ericsson
R1-1719602 Bit Selection for Data Channels Ericsson
R1-1719604 Reordering of Code Block Segments for Data Channel Retransmission Ericsson
R1-1719605 Further Enhancement of Systematic Bit Priority Ericsson
R1-1720211 RV sequence consideration for UL grant-free transmission CATT
R1-1720354 Max code rate for BG2-based decoding and the length of rate matching output sequence Samsung
R1-1720700 Remaining Details of LDPC Coding Qualcomm Incorporated
R1-1720761 On BG2 segmentation Huawei, HiSilicon
R1-1721391 LDPC coded bits interleaving and mapping to modulation symbols for HARQ retransmissions Huawei, HiSilicon (R1-1720763)

Agreement:
The length of rate matching output sequence Er, r=0,1,…,C-1, is derived as follows.

- $G' = G/(N_L \cdot Q_m)$
- $\gamma = G' \bmod C'$,
  - $C'$ is the number of scheduled code blocks for the TB
  - $G$ is the total number of bits available for the scheduled transmission of one transport block
  - $Q_m$ is modulation order
  - $N_L$ is the number of layers for transport block

- Set j=0.
- For r=0 to C-1
    If r-th code block is not scheduled,
        $\mathrm{E}_r = 0$
    else,
        If $\mathrm{j} \le \mathrm{C}' - \gamma - 1$,
            $\mathrm{E}_r = \mathrm{N}_L \cdot \mathrm{Q}_m \cdot \lfloor G'/C' \rfloor$
        else,
            $\mathrm{E}_r = \mathrm{N}_L \cdot \mathrm{Q}_m \cdot \lceil G'/C' \rceil$
        End if
        j=j+1
    End if
- End for

TBS determination from intermediate number of info bits and byte-aligned code block size
R1-1721611 On TBS determination formula MediaTek Inc. (R1-1719579)
R1-1720353 Remaining details on TBS determination Samsung
R1-1721603 Remaining details of LDPC coding ZTE, Sanechips (R1-1719525)
R1-1720868 Remaining details of TBS determination Nokia, Nokia Shanghai Bell
R1-1719939 On transport block size for two base graphs LG Electronics
R1-1721390 Discussion on MCS and TBS designs Huawei, HiSilicon (R1-1720762)
R1-1719600 Granularity of LDPC Code Block Sizes Ericsson
R1-1721447 TBS Determination With LDPC Considerations Ericsson (R1-1719603)
R1-1720643 On TB Size Design InterDigital, Inc.
Late submission

Agreement:
CBS is byte-aligned

Agreement:
When the TBS is used by BG2, TBS determination shall ensure that no zero padding is necessary with BG2 segmentation

Agreement:
Given $N_{info}$ (the intermediate number of information bits), the following procedure is used to determine the TBS when a formula is used for TBS determination. FFS: The TBS range where a formula based approach is used.

- Obtain $N'_{info}$
- Choose $K_{CB}$ using: (a) nominal code rate R associated with MCS; (b) $N'_{info}$; $K_{CB}$ = 3840 or 8448
  - $K_{CB}$ = 3840 when (R<=0.25) or $N'_{info}$<=3840-$L_{TB,CRC,temp1}$; otherwise $K_{CB}$=8448
- Decide if code block segmentation is applied using $N'_{info}$ and the chosen $K_{CB}$. If $N'_{info} + L_{TB,CRC,temp2} < K_{cB}$, code block segmentation is not applied; Otherwise, code block segmentation is applied
- If code block segmentation is not applied, C=1, $L_{CB,CRC}$ =0.
- If code block segmentation is applied, $L_{CB,CRC}$ =24. Calculate C, where C is the number of code blocks associated with the selected $K_{CB}$, taking into account TB CRC length

$$C = \lceil (N'_{info} + L_{TB,CRC,temp2})/(K_{cB} - L_{CB,CRC}) \rceil$$

- Calculate TBS using a formula
- $L_{TB,CRC,temp1}$=16 for Method 1A, $L_{TB,CRC,temp1}$=0 for Method 1B
- $L_{TB,CRC,temp2}$=24 for Method 1A, $L_{TB,CRC,temp2}$=0 for Method 1B

Agreement:
If $N_{info}$ <= $N_{info,threshold}$
Use a function of $N_{info}$ to find the closest TBS value in a TBS look-up table that is not less than $N_{info}$;
else
Use a function of $N_{info}$ as the input to the TBS formula to derive the TBS value.
End
$N_{info,threshold}$ = 3824 (bits)

**R1-1721671** **Way Forward on Formula for TBS Determination Qualcomm, Ericsson, Samsung, ZTE, MediaTek, Nokia, NSB**

Agreement:
Adopt the following method for the TBS formula portion of TBS determination:
Obtain N'info as follows: $N'_{info} = 2^n \times round\left(\frac{N_{info} - 24}{2^n}\right)$, where

$$n = \begin{cases} \lfloor \log_2 N_{info} \rfloor - 5 & \text{if } \log_2 N_{info} > 5 \\ 0 & \text{if } \log_2 N_{info} \le 5 \end{cases}$$

1. $K_s = 3840$ is chosen when $(R \le 0.25)$ otherwise, $K_s = 8448$ is chosen.
2. $L_{TB,CRC} = 24$.
3. No segmentation ($L_{CB,CRC} = 0$) when $N'_{info} + L_{TB,CRC} \le K_s$; otherwise, the TB is segmented into more than one CB ($L_{TB,CRC} = 24$). $C = \left\lceil \frac{N'_{info} + L_{TB,CRC}}{K_s - L_{CB,CRC}} \right\rceil$
4. $TBS = 8\,C \left\lceil \frac{N'_{info} + L_{TB,CRC}}{8\,C} \right\rceil - L_{TB,CRC}$.

Agreement:

- Apply quantization to $N_{info}$
  - $N'_{info} = \max(24, 2^n \times floor\left(\frac{N_{info}}{2^n}\right))$,
  - $n = \max(3, \lfloor \log_2 N_{info} \rfloor - 6)$
- Use $N'_{info}$ to find the closest TBS value in a TBS look-up table that is not less than $N'_{info}$

- For the table,
  - Add {Index, TBS} pair, {94, 3824} to the table
  - Remove {1, 16}
  - Note: If and when special sizes are requested, the corresponding entries may be added to the current set of entries or may replace other entries in the table

| index | TBS | index | TBS | index | TBS | index | TBS |
|---|---|---|---|---|---|---|---|
| 1 | 16 | 31 | 320 | 61 | 1256 | 91 | 3496 |
| 2 | 24 | 32 | 336 | 62 | 1288 | 92 | 3624 |
| 3 | 32 | 33 | 352 | 63 | 1320 | 93 | 3752 |
| 4 | 40 | 34 | 368 | 64 | 1352 | 94 | |
| 5 | 48 | 35 | 384 | 65 | 1416 | 95 | |
| 6 | 56 | 36 | 408 | 66 | 1480 | 96 | |
| 7 | 64 | 37 | 432 | 67 | 1544 | 97 | |
| 8 | 72 | 38 | 456 | 68 | 1608 | 98 | |
| 9 | 80 | 39 | 480 | 69 | 1672 | 99 | |
| 10 | 88 | 40 | 504 | 70 | 1736 | 100 | |
| 11 | 96 | 41 | 528 | 71 | 1800 | 101 | |
| 12 | 104 | 42 | 552 | 72 | 1864 | 102 | |
| 13 | 112 | 43 | 576 | 73 | 1928 | 103 | |
| 14 | 120 | 44 | 608 | 74 | 2024 | 104 | |
| 15 | 128 | 45 | 640 | 75 | 2088 | 105 | |
| 16 | 136 | 46 | 672 | 76 | 2152 | 106 | |
| 17 | 144 | 47 | 704 | 77 | 2216 | 107 | |
| 18 | 152 | 48 | 736 | 78 | 2280 | 108 | |
| 19 | 160 | 49 | 768 | 79 | 2408 | 109 | |
| 20 | 168 | 50 | 808 | 80 | 2472 | 110 | |
| 21 | 176 | 51 | 848 | 81 | 2536 | 111 | |
| 22 | 184 | 52 | 888 | 82 | 2600 | 112 | |
| 23 | 192 | 53 | 928 | 83 | 2664 | 113 | |
| 24 | 208 | 54 | 984 | 84 | 2728 | 114 | |
| 25 | 224 | 55 | 1032 | 85 | 2792 | 115 | |
| 26 | 240 | 56 | 1064 | 86 | 2856 | 116 | |
| 27 | 256 | 57 | 1128 | 87 | 2976 | 117 | |
| 28 | 272 | 58 | 1160 | 88 | 3104 | 118 | |
| 29 | 288 | 59 | 1192 | 89 | 3240 | 119 | |
| 30 | 304 | 60 | 1224 | 90 | 3368 | 120 | |

R1-1721463 Further Study of Bit-level Channel Interleaving for LDPC Codes Ericsson
R1-1721486 On TBS quantization CATT
R1-1721499 WF on length of rate matching output sequence Samsung
R1-1721596 Summary on offline discussion for rate matching output sequence Samsung, MediaTek, Qualcomm, Ericsson, Huawei, HiSilicon, LGE, Nokia, ZTE, Interdigital, NTT Docomo
R1-1721625 Offline Discussion of TBS Determination Ericsson
R1-1721679 Way Forward on Table for TBS Determination MediaTek

### 7.4.2 Remaining details of Polar coding

R1-1720103 Remaining details of Polar coding Intel Corporation

**R1-1721584** **Summary of Offline Discussion on Polar Code** **Ericsson**

#### 7.4.2.1 Uplink CRCs

R1-1719521 Study of FAR performance improvement ZTE, Sanechips
R1-1719606 CRC Length and Application for UCI Ericsson
R1-1720355 Remaining details on uplink CRCs Samsung
R1-1720644 CRC Selection for UL Polar Code InterDigital, Inc.
R1-1721427 Considerations for short-length uplink control Qualcomm Incorporated (R1-1720701)
R1-1720756 On nFAR for UL code construction Huawei, HiSilicon
R1-1720827 Uplink CRC and nFAR for Polar codes NTT DOCOMO, INC.

**R1-1721572 Summary of offline discussions on nFAR for uplink polar coding Huawei, HiSilicon**

Agreement: Lcrc = 0 when RM codes are used in the uplink for K in the range, 3<=K<=11 bits

Agreement:
- nFAR = 3 when Polar code with PC bits are used for UCI transmission, for K in the range, 12<=K<=19.
  - The length 6 CRC polynomial is used and $g(D) = D^6 + D^5 + 1$.
- When K>19, the already agreed length 11 CRC polynomial is used

Agreement: The agreed coding scheme for UCI is applicable for UCI payloads up to at least (5/6)*(2048).

#### 7.4.2.2 Details of conditions for UCI segmentation

R1-1721404 Further consideration on Polar code segmentation ZTE, Sanechips (R1-1719522)
R1-1719575 On UCI segmentation design MediaTek Inc.
R1-1719607 Remaining Issues of Polar Code Segmentation for UCI Ericsson
R1-1719940 Joint coding of segmented UCI LG Electronics
R1-1721359 Design details for UCI segmentation CATT (R1-1720212)
R1-1720356 Details of conditions for UCI segmentation Samsung
R1-1720702 UCI Segmentation Qualcomm Incorporated
R1-1720757 On UCI segmentation Huawei, HiSilicon
R1-1720828 Segmentation of Polar codes for UCI NTT DOCOMO, INC.
R1-1720869 Segmentation for large UCI Nokia, Nokia Shanghai Bell

**R1-1721489 Summary of Offline Discussion on Polar Code: Segmentation and Channel Interleaver Ericsson**

Agreement:
- Segmentation is applied when K >= 360 and M >= 1088 where
  - K is UCI payload size without CRC
  - M is the total number of coded bits for the UCI payload

Agreement:
- When segmentation is applied, channel interleaver is applied to each segment individually
- Channel interleaver is applied after rate matching

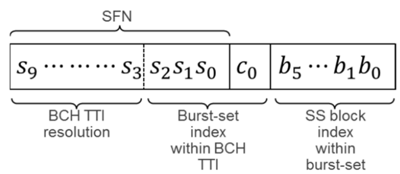
#### 7.4.2.3 Order and mapping of PBCH fields

R1-1719523 Coding scheme for PBCH ZTE, Sanechips
R1-1719576 Design of order and mapping of PBCH fields MediaTek Inc.
R1-1721461 Arrangement of PBCH Fields for Polar Codes Ericsson (R1-1719608)
R1-1719941 Bit mapping of NR PBCH field LG Electronics
R1-1720213 Discussion on order and mapping of PBCH fields CATT
R1-1720357 Remaining details on PBCH polar code construction Samsung
R1-1720645 Ordering of PBCH Fields InterDigital, Inc.
R1-1720703 PBCH Performance and Field Mapping Qualcomm Incorporated
R1-1720758 Order of PBCH fields Huawei, HiSilicon
R1-1720870 PBCH bit mapperNokia, Nokia Shanghai Bell

**R1-1721503 Way Forward on PBCH Bit Mapping Design MediaTek, Huawei, Hisilicon, CATT, Nokia, InterDigital, ITRI, ZTE, CLX, Ericsson, Intel, Docomo, LG**

Agreement:

- The following info bit mapping before 1st PBCH scrambling and CRC encoding is applied to NR PBCH:
  - Let $a_0, a_1, a_2, \ldots, a_{31}$ denote the input bits to 1st PBCH scrambling.
  - Timing related bits, ($s_9, s_8, s_7, s_6, s_5, s_4, s_3, s_2, s_1, s_0, c_0, b_5, b_4, b_3$), are mapped to ($a_{16}, a_{23}, a_{18}, a_{17}, a_8, a_{30}, a_{10}, a_6, a_{24}, a_7, a_0, a_5, a_3, a_2$), respectively.
  - The remaining info bits are mapped to ($a_1, a_4, a_9, a_{11}, a_{12}, a_{13}, a_{14}, a_{15}, a_{19}, a_{20}, a_{21}, a_{22}, a_{25}, a_{26}, a_{27}, a_{28}, a_{29}, a_{31}$).
  - Note: D-CRC interleaving effect is taken into account in the above info bit mapping design.
  - Note: Scrambling will not change the order of the bit mapping




#### 7.4.2.4 Other

Kmax for DCI (Working assumption)

**R1-1719609 Remaining Issues of Polar Code Construction for DCI Ericsson**

Agreement: For encoding of DCI, $K_{max} = 140$

UE-specific scrambling for DCI (Working assumption)

R1-1719577 Probability of monitoring a false DCI MediaTek Inc.
R1-1719610 Further Discussion on Scrambling of DCI Ericsson
R1-1721541 Further Consideration on DCI Loading Coherent Logix (R1-1720748)

Agreement: Confirm the working assumption that there is no additional UE-specific scrambling motivated by channel coding.

Not part of the working assumption for the above

R1-1721428 DCI CRC Initialization and Masking Qualcomm Incorporated (R1-1720704)

Agreement: For DCI, initialize CRC shift register with all-ones (i.e., 24 ones)

PC bits for short UCI (Working assumption)

**R1-1720358 Downlink control channel code construction Samsung**
R1-1721462 Remaining Issues of Polar Code Construction for UCI Ericsson (R1-1719611)

Agreement: Confirm the working assumption that the value of the PC bits is obtained from a length-5 cycle shift register as in R1-1706193

Channel interleaver for UCI (Remaining issues: Max number of coded bits)

R1-1720103 Remaining details of Polar coding Intel Corporation
R1-1719612 Further Discussion on Channel Interleaver for Polar Codes of UCI Ericsson

Agreement: The maximum interleaver size per code block is 8192.

Coding for URLLC

R1-1720759 Channel coding for URLLC Huawei, HiSilicon

Bit positions

R1-1719520 Remaining details of Polar coding ZTE, Sanechips
R1-1719942 Information bit positions for short PUCCH-based reporting LG Electronics
R1-1720829 Polar coding for CSI reporting NTT DOCOMO, INC.
R1-1720871 Discussion on DCI bit mapping Nokia, Nokia Shanghai Bell

Agreement:

- UCI field order is CRI → RI → Padding bits (if present) → PMI → CQI
  - Note: Where any newly defined parameters are placed can be decided purely from a MIMO perspective

R1-1721465 Minimum Mother Polar Code Size Samsung

R1-1721579 WF on UCI mapping for CSI reporting NTT DOCOMO, ZTE, Intel, LGE, MediaTek

## 7.5 NR-LTE co-existence

**R1-1721658 Chairman's notes of AI 7.5 NR-LTE co-existence Ad-Hoc chair (Ericsson)**
The document was presented by Havish Koorapaty from Ericsson.
**Decision:** The document is endorsed, content incorporated below.

**R1-1719415 Remaining issues on scheduling, feedback and power control for SUL Huawei, HiSilicon**
**R1-1719943 Remaing issues on NR LTE coexistence LG Electronics**
**R1-1720106 Remaining issues of NR-LTE coexistence Intel Corporation**

Agreement:
- UL carriers in different PUCCH groups can have different numerologies
- Within a PUCCH group, an UL carrier can use a subcarrier spacing smaller than the subcarrier spacing of the associated DL/UL carrier when the UL carrier is configured in a SUL band as defined in RAN4 specifications

**R1-1719803 Remaining issues on harmonic interference handling vivo**
**R1-1721444 WF on LTE scheduling/HARQ timing for EN-DC UEs Vivo**

Agreement:
Pcmax,c should be separate for UL and SUL of the same cell.

How to configure PUSCH TPC command in group-common PDCCH for UL and SUL of the same cell?

Agreement:
- UL and SUL of the same cell are in the same TAG.
- If UL and SUL have different numerologies, the UE can assume that the granularity of the TA in the MAC CE (i.e. not in the Msg2) is the granularity corresponding to the smaller subcarrier spacing
  - The granularity of the TA in Msg2 is determined according to the numerology of transmitted PRACH

Agreement:
- For mixed numerology case, the UE processing time needed between the end of PDSCH reception (with SCS u1) and start of PUCCH transmission (with SCS u2) is max(T1, T2), where
  - T1 = N1_1 x S1, N1_1 is the processing time in the single numerology with SCS u1 and S1 is the symbol duration of SCS u1;
  - T2 = N1_2 x S2, N1_2 is the processing time in the single numerology with SCS u2 and S2 is the symbol duration of SCS u2;
- For mixed numerology case, the UE processing time needed between the end of PDCCH reception (with SCS u1) and start of PUSCH transmission (with SCS u2) is max(T1, T2), where
  - T1 = N2_1 x S1, N2_1 is the processing time in the single numerology with SCS u1 and S1 is the symbol duration of SCS u1;
  - T2 = N2_2 x S2, N2_2 is the processing time in the single numerology with SCS u2 and S2 is the symbol duration of SCS u2;

Agreement:
If only the PUCCH carrier in a cell with SUL is configured for potential PUSCH transmission, the bit field for non-SUL/SUL indication is not present in the non-fallback DCI.

Agreement:
A separate 1-bit field in DCI is used to indicate UL and SUL of the same cell.
- The bit value of 0 refers to the UL in the cell
- The bit value of 1 refers to the SUL in the cell

Agreement:
If both ULs in a cell are configured for potential PUSCH transmission to a UE, for a given search space, the UE monitors for non-fallback DCI scheduling PUSCH on UL and SUL.

Agreements:

- For a serving cell with SUL and different numerologies on DL/UL and SUL, the unit of time offset k between UL grant and corresponding PUSCH transmission is the slot duration according to the numerology of the scheduled PUSCH transmission.
- For a serving cell with SUL and different numerologies on DL/UL and SUL, the unit of time offset k between PDSCH and corresponding PUCCH transmission is the slot duration according to the numerology of the PUCCH transmission.

Agreement:
DCI field for non-SUL/SUL indication is not present in the fallback DCI and the fallback DCI always schedules PUSCH on the non-SUL

Agreement:
1-bit non-SUL/SUL indication is included in the non-fallback DCI(s) that can trigger A-SRS and SP-SRS activation/deactivation.

Agreement:
1-bit non-SUL/SUL indication is included in the DCI(s) that can trigger PDCCH-ordered PRACH transmission.

**R1-1720359 On LTE-NR Coexistence Samsung**

**R1-1720483 On LTE HARQ ACK feedback in 1Tx EN-DC Nokia, Nokia Shanghai Bell**

**R1-1721693 WF on remaining aspects on SUL operations Huawei, HiSilicon, CMCC, Ericsson, Intel**

Agreement:
If the network scheduling results in PUCCH and PUSCH transmissions for a UE overlapping in time on the non-SUL and SUL, the UE multiplexes UCI on PUSCH if such multiplexing does not put more stringent requirements on processing time compared to the case where UCI is multiplexed on PUSCH when operating on a single carrier.

Agreement:
If both ULs in a cell are configured for potential PUSCH transmission to a UE, the UL non-fallback DCI size for scheduling non-SUL and SUL are adjusted to be the same size via padding

**R1-1721697 WF on UL Fallback DCI in SUL cell CMCC, Huawei, HiSilicon, Ericsson**

Agreement:
If padding bit(s) are present in the UL fallback DCI (in order to size match between the DL and UL fallback DCIs) once the final DCI design detatils are complete, one of the padding bit(s) is used for non-SUL/SUL indication for UEs capable of SUL

- Notes:
  - This agreement overrides the previous agreement that DCI field for non-SUL/SUL indication is not present in the fallback DCI if padding bits are present in the UL fallback DCI after the DCI design is complete
  - This agreement assumes that there is a single UL fallback DCI that is applicable to both the non-SUL and SUL carriers.

R1-1720214 Remaining issues on LTE/NR coexistence CATT
R1-1720219 Some remaining issues with SUL ZTE, Sanechips
R1-1720558 Aspects related to Supplementary Uplink InterDigital, Inc.
R1-1721424 Remaining coex-related issues Ericsson
R1-1721542 WF on the granularity of backhaul signaling to consider LTE LR for single UL Tx and UL DL TDM LG Electronics

### *7.6 UL power control*

**R1-1721656 Chairman's notes of AI 7.6 UL Power control) Ad-Hoc chair (Samsung)**
The document was presented by Younsun Kim from Samsung.
**Decision:** The document is endorsed, content incorporated below.

R1-1720360 Email discussion on SRS power control framework Samsung
R1-1721372 Summary of remaining issues on UL power control for A.I. 7.6 ZTE, Sanechips (rev of R1-1720839)

R1-1719327 LS reply on UE Power Class and Power Control RAN4, Intel
R1-1721035 Impact of power class and P_cmax definition on power control procedures Ericsson

### 7.6.1 Remaining details on NR UL power control – non-CA aspects

*Focus on non-CA aspects*

**R1-1721457 Offline summary of UL power control – non-CA aspects ZTE, Sanechips**

Agreement:
Specification supports SRS PHR reporting for serving cell / uplink where PUSCH is not configured
- SRS virtual PHR reporting is based on one SRS resource configured by the gNB
- SRS PHR reporting is as in LTE type-3
- Send one LS to RAN2 about this agreement

**R1-1721649 [Draft] LS on SRS PHR reporting Huawei**
**Decision:** The document is endorsed and final LS is approved in R1-1721680.

**Conclusion:**
- PHR reporting for PUCCH is not supported.

**Working Assumption:**
$\Delta_{TF,c}(i)$ is defined as in LTE
- Note: Subject to modifications (value of beta, introduction of gamma for DFT-S-OFDM/CP-OFDM) based on availability of future evaluation results. These modifications will only impact RAN1 specifications.

Agreement:
- RRC parameter is introduced to enable or disable $\Delta_{TF,c}(i)$

**R1-1721458 WF on some remaining issues for ULPC LG Electronics, Ericsson, Intel Corporation, Nokia, Nokia Shanghai Bell, Samsung, ZTE, Sanechips**

Agreement:
- For SRS PC, ULPC parameter(s) can only be configured per SRS resource set.

Agreement:
- For PUSCH PC, when SRI field is configured, confirm the agreed expression of "PUSCH beam indication (if present)" is the same as "indication by SRI field in UL grant (if present)", aligning to MIMO agreements at least for grant-based PUSCH.
- FFS: The case where SRI field is not configured

Agreement:
- Only X1_PUSCH=1 DL RS resource can be configured per PL estimate.
- Only X1_PUCCH=1 DL RS resource can be configured per PL estimate.
- Only X1_SRS=1 DL RS resource can be configured per PL estimate.

**R1-1721521 Offline summary of UL power control – non-CA aspects ZTE, Sanechip**

Agreement:
For the serving cell configured with PUSCH, SRS closed loop process in the case the SRS is not tied with PUSCH supports separate h_SRS,c(i)
- Accumulative TPC and absolute TPC are both supported and separately configured from PUSCH
- Accumulative or absolute TPC command is sent on group DCI with TPC-SRS-RNTI

Agreement:
- For a UE configured two ULs in a cell, two TPC bit(s) fields within group common DCI for SRS power control can be configured to the UE, i.e., one for UL and one for SUL;
- For a UE configured two ULs in a cell, two TPC bit(s) fields within group common DCI for PUSCH power control can be configured to the UE, i.e., one for UL and one for SUL;

Agreement:
$P_0$ range for cell-specific component PUSCH, PUCCH, SRS.
- From -126-X to 24dBm
  - With X=76 as working assumption subject to confirmation by RAN4
  - The number of bits used for this parameter, P0 range, is 7 bits with 2dB step size

Agreement:
$P_0$ range for UE-specific component PUSCH, PUCCH, SRS

- The number of bits used for this parameter, is 5 bits with 1dB step size

Working Assumption:
The maximum number of open-loop parameter value sets is 32 per cell for PUSCH.

Agreement:
For PUSCH power control in NR, slot sets are not considered.

Agreement:

- The maximum total number of PL estimates for PUSCH, PUCCH, and SRS that can be configured to a UE is limited to 4 per cell

Agreement
To support the cases that SRS power control is not tied with PUSCH power control on a uplink with PUSCH configured:

- Maximum number of closed loop process for SRS Z0_SRS is 1

**R1-1721502 On UL power sharing for coverage enhancement Orange, NTT Docomo, AT&T, China Telecom, China Unicom, DT, Verizon, Bouygues Telecom, Huawei, ZTE, Ericsson, CATT, OPPO, Vivo, Xiaomi, Apple, HiSilicon**

**R1-1721469 Power split in TDM cases Qualcomm**

**R1-1721555 On UL power sharing for coverage enhancement Orange, NTT Docomo, AT&T, China Telecom, China Unicom, DT, Verizon, Bouygues Telecom, Huawei, ZTE, Ericsson, CATT, OPPO, Vivo, Xiaomi, Apple, HiSilicon**

Agreements:
For LTE/NR NSA operation,

- If this UE supports dual UL operation and also supports single UL operation with Case 1 HARQ timing, RRC signaling can configure a UE to operate in one of the following modes:
  - Dual UL operation
  - Single UL operation with Case 1 HARQ timing
  - Single UL operation with Case 2 HARQ timing
- For UE supporting single UL operation and with Case 1 HARQ timing if UE does not support *power scaling for LTE-NR DC* with P_LTE+P_NR>Pcmax, UE shall support the following two operations:
  - Operation A with Case1: P_LTE + P_NR > Pcmax, in which case the UE assumes that no NR UL transmission takes place in an UL subframe/slot that is designated as LTE UL in the Case 1 reference TDD configuration
  - Operation B with Case1: P_LTE + P_NR <= Pcmax, in which case NR UL can be scheduled in any UL subframe/slot (while the UE behaviour in case of being simultaneously scheduled on LTE and NR uplinks is not specified)
  - The operation A vs operation B configuration is implicitly determined based on P_LTE and P_NR
  - Note that the above agreement does not affect the current status on the optional/mandatory support of *power scaling for LTE-NR DC* with P_LTE + P_NR > Pcmax
  - Note that the above agreement can become obsolete if *power scaling for LTE-NR DC* is mandated to all UEs

Send an LS to RAN4 to inform the above RAN1 agreement, Intel (JJ)

**R1-1721570 [Draft] LS on RAN1 agreement on UL power sharing for LTE/NR NSA operation Intel**
**Decision:** The document is endorsed and final LS is approved in R1-1721606.

Agreement:
Preamble received target power range is from -120-X to YdBm with a step of ZdB

- With X=76 as working assumption subject to confirmation by RAN4
- Once X is finalized, Y and Z can decided in RAN2/RAN4
- Note: The number of bits for the preamble received target power range is 6

Working Assumption:
For delta_F_PUCCH(F) signalling

- The number of bits used for this parameter, is 5 bits

Working Assumption:
The maximum number of open-loop parameter value sets is 8 per cell for PUCCH.

**R1-1721480 WF on Power Control Intel, Nokia, NSB, NEC, Spreadtrum, OPPO, InterDigital, ZTE, Sanechip, Qualcomm, MediaTek, Samsung**
Also supported by Vivo

**R1-1721567 Offline summary of UL power control – non-CA aspects ZTE, Sanechips**

**Conclusion:**
From RAN1 perspective, RAN1 assumes *P*cmax,*c*(*i*) is frequency agnostic in the power control and PHR formula.
Send an LS to RAN4 – Seunghee (Intel)

**R1-1721644 [DRAFT] LS reply on UE Power Control and PHR Calculation Intel**
**Decision:** The document is endorsed and final LS is approved in R1-1721681.

Working Assumption:
For $M_{\text{PUSCH},c}$, $M_{\text{SRS},c}$ in power control formula:

- Expressed in the number of PRBs based on 15 kHz regardless of number of PRBs allocated for PUSCH transmission
  - For example, for 15 kHz SCS, $M_{\text{PUSCH},c} = M$ and for 120 kHz SCS, $M_{\text{PUSCH},c} = 8M$

Agreement:
Mapping of TPC Command Field to absolute and accumulated $\delta_{\text{PUSCH},c}$ , $\delta_{\text{SRS},c}$ , $\delta_{\text{PUCCH},c}$ values

- Support the following tables. i.e., aligned with DCI format 0/3/4 of LTE

| TPC Command Field | Accumulated $\delta_{\text{PUSCH},c}$ [dB] | Absolute $\delta_{\text{PUSCH},c}$ [dB] |
|---|---|---|
| 0 | -1 | -4 |
| 1 | 0 | -1 |
| 2 | 1 | 1 |
| 3 | 3 | 4 |

| TPC Command Field | Accumulated $\delta_{\text{SRS},c}$ [dB] | Absolute $\delta_{\text{SRS},c}$ [dB] |
|---|---|---|
| 0 | -1 | -4 |
| 1 | 0 | -1 |
| 2 | 1 | 1 |
| 3 | 3 | 4 |

| TPC Command Field | Accumulated $\delta_{\text{PUCCH},c}$ [dB] |
|---|---|
| 0 | -1 |
| 1 | 0 |
| 2 | 1 |
| 3 | 3 |

  - Note that additional table(s) can be considered if there is a problem identified for FR2

Agreement
- For PUSCH power control, the updating from '*i-1*' to '*i*' occurs at the beginning of PUSCH transmission
- For PUCCH power control, the updating from '*i-1*' to '*i*' occurs at the beginning of PUCCH transmission
- FFS: For the case of DCI 3/3A
- UE is only expected to make power adjustment only from '*i-1*' to '*i*' for PUSCH, PUCCH

It is up to the editor how to capture the above agreement in the specification.

Email discussion on the SRS power control timing issue until Dec 6 ZTE (Bo)

Agreement
- For PUSCH transmission triggered by uplink grant, K_PUSCH is the time duration between the uplink grant and the start of the PUSCH transmission
- For PUCCH transmission triggered by PDSCH corresponding to downlink assignement, K_PUCCH is the time duration between the downlink assignment and the start of the PUCCH

Agreement
The delta_MCS in PUSCH power control formula applies only to single layer transmissions (i.e., K_s=0 for multi-layer transmissions).

**R1-1721566** **Updated offline summary on PHR** **NTT DOCOMO, ZTE**

Working Assumption
Support Pcmax,c reporting for PHR corresponding to NR PUSCH only transmission for above-6GHz

**R1-1721609** **[Draft] LS reply to RAN4 on P_0 ranges on UL power control** **ZTE**
**R1-1721617** **[Draft] LS reply to RAN4 on P_0 ranges on UL power control** **ZTE**
**Decision:** The document is endorsed and final LS is approved in R1-1721608.

**R1-1721676** **Offline summary of UL power control – non-CA aspects** **ZTE, Sanechips**

Agreement
The following working assumption is confirmed for PC parameter j
- j can be configured for the following aspects
  - for two uplinks of SUL band combination

Agreement
The following working assumption is confirmed
- If N=2 (number of closed loop process) is configured for UE, *l* can be configured for the following aspects
  - for two uplinks of SUL band combination

**Conclusion:**
Delta_PUCCH details are to be finalized during the maintenance phase.

**R1-1721675** **WF on PHR triggering** **Motorola Mobility, Lenovo, Nokia, NTT DOCOMO**

R1-1719434 Remaining details of UL power control design Huawei, HiSilicon
R1-1719488 UL transmission power control Mitsubishi Electric Co.
R1-1719547 On NR power control framework ZTE, Sanechips
R1-1719653 Dynamic power control and its impact on coverage for EN-DCAT&T
R1-1719779 Remaining issues on NR UL power control vivo
R1-1719944 Discussion on UL power control for NR non-CA caseLG Electronics
R1-1719968 Uplink power control for NR Guangdong OPPO Mobile Telecom
R1-1720104 Remaining Details On UL Power Control Framework Intel Corporation
R1-1720361 Remaining Issues on UL Power Control Samsung
R1-1720371 Discussion on NR power control framework Panasonic
R1-1720452 On UL power sharing for coverage enhancement ORANGE
R1-1720595 Discussion on NR UL power control CMCC
R1-1720646 Remaining issues on UL power control for NR HTC Corporation
R1-1720706 Remaining issues on power control for NR Qualcomm Incorporated
R1-1720711 Considerations for UL Power Control Framework InterDigital, Inc.
R1-1720903 Power control on SRS for beam management ASUSTEK COMPUTER (SHANGHAI)
R1-1720915 Discussion on Power Offset for SUL China Telecommunications
R1-1720928 On non-CA NR UL power control Motorola Mobility, Lenovo
R1-1721028 Remaining issues for NR power control framework Ericsson
R1-1721038 Remaining details on NR power control framework Nokia, Nokia Shanghai Bell
R1-1721453 Remaining Aspects of NR Power Control CATT
R1-1721706 WF on Accumulative Closed-Loop TPC Command Qualcomm

### 7.6.2 Remaining details on NR UL power control – CA aspects

*Focus on CA aspects*

R1-1721422 Offline summary of UL power control – CA aspects Samsung
Revised to R1-1721548

Agreement:

- In Case 1, (CCs/uplinks configured for UE have same numerology and overlapping transmissions between different CCs/uplinks with same starting time and same PUSCH/PUCCH transmission duration and one or two PUCCH group(s)), when the UE is power limited due to simultaneous transmission on multiple serving cells,
    - PRACH of PCell > PUCCH/PUSCH with ACK/NACK and/or SR > PUCCH/PUSCH with other UCIs > PUSCH w/o UCI > SRS/PRACH of SCell
        - Within a same priority level, PCell is prioritized over SCell.
        - In case that transmission power exceeds Pcmax, Scaling/dropping is applied to the lowest priority first until the aggregated power is within Pcmax. Exact scaling or dropping is left to UE implementation.
        - Note: different priority of SRS used for carrier switching can be discussed further.

Working Assumption:

- In Case 2, (CCs/uplinks configured for UE have same or different numerologies and partially overlapping transmissions between different CCs/uplinks and same/different transmission duration and one or two PUCCH group(s)), when the UE is power limited due to simultaneous transmission on multiple serving CCs/uplinks,
    - PRACH of PCell > PUCCH/PUSCH with ACK/NACK and/or SR > PUCCH/PUSCH with other UCIs > PUSCH w/o UCI > SRS/PRACH of Scell
        - Within a same priority level, PCell is prioritized over Scell
        - In case that transmission power exceeds Pcmax, Scaling/dropping is applied to the lowest priority first until the aggregated power is within Pcmax.
        - Note: different priority of SRS used for carrier switching can be discussed further
    - Scaling or dropping of the whole or part(s) of a transmission is left to UE implementation.
- Note: If the aggregated transmission power does not exceed Pc_max within any part of a transmission that overlaps with other transmission(s), the transmission is considered as non-power limited case.
- Note: power control with look-ahead is not required at UE.

Agreement:
For PRACH, PUSCH, PUCCH, and SRS, all power control parameters are configured per serving cell/uplink

R1-1719436 Power control for CA Huawei, HiSilicon
R1-1719548 On NR power control for carrier aggregation ZTE, Sanechips
R1-1719945 Discussion on UL power control for NR CA case LG Electronics
R1-1719986 Discussion on UL Power Control for CA Guangdong OPPO Mobile Telecom
R1-1720216 Remaining details of NR power control for CA CATT
R1-1720362 On UL Power Sharing for Multi-Cell Transmissions Samsung
R1-1720559 Power Control for NR CA InterDigital, Inc.
R1-1720707 Power control for NR CA Qualcomm Incorporated
R1-1720831 NR-NR CA power control NTT DOCOMO, INC.
R1-1720929 On CA-related NR UL power control Motorola Mobility, Lenovo
R1-1721029 Power control for Carrier Aggregation Ericsson

### 7.6.3 Other

R1-1719435 Designs on power headroom calculation and reporting Huawei, HiSilicon
R1-1719820 Power control design for SUL and LNC Huawei, HiSilicon
R1-1719989 Discussion on Remaining Issues for LTE-NR Dual Connectivity Guangdong OPPO Mobile Telecom
R1-1720105 Remaining aspects on power sharing between LTE and NR Intel Corporation
R1-1720363 On PHR Requirements and Calculation Samsung
R1-1720560 Power Control for NR DC InterDigital, Inc.
R1-1720832 Remaining details on LTE-NR power sharing NTT DOCOMO, INC.
R1-1721030 Power headroom reporting Ericsson
R1-1721031 Remaining issues of closed loop power control in NR Ericsson
R1-1721032 Remaining issues of PUSCH power control Ericsson
R1-1721033 Remaining issues of PUCCH power control Ericsson
R1-1721034 Remaining issues of SRS power control Ericsson

## *7.7 Aspects related to FDD*

R1-1721368 Summary - Aspects related to FDD ZTE, Sanechips

**R1-1721500 Summary from offline FDD related aspects ZTE**
**Decision:** The document is noted.

Agreements:

- A single SFI table is defined in the specification
- Regarding SFI for FDD
  - For DL slots, the only possible configurable states include DL and unknown in Rel-15
  - For UL slots, the only possible configurable states include UL and unknown in Rel-15

R1-1719496 FDD aspects of NR ZTE, Sanechips
R1-1719946 Design considerations for paired spectrum LG Electronics
R1-1720107 Remaining details on NR FDD Intel Corporation
R1-1720364 FDD Operation Samsung
R1-1720851 On FDD in NR Ericsson

### *7.8 Other*

*Including handling RAN plenary LS in R1-1716676*

**R1-1721659 Chairman's notes of AI 7.8 on NR - Other Ad-hoc chair (Ericsson)**
The document was presented by Havish Koorapaty from Ericsson.
**Decision:** The document is endorsed, content incorporated below.

**R1-1720108 On UE capabilities and peak rates Intel Corporation**
**R1-1720151 On UE categories Ericsson**
**R1-1719833 Discussion on UE category in NR Huawei, HiSilicon**
**R1-1719419 Consideration on self evaluation of peak spectral efficiency and peak data rate for IMT-2020 Huawei, HiSilicon**

**R1-1721580 WF on a peak rate calculation parameter Intel, Qualcomm**

Agreements:
- The data rate for a given number of aggregated carriers in a band or band combination is computed as follows.
  - data rate (in Mbps) $= \sum_{j=1}^{J} \left( v_{Layers}^{(j)} \cdot T_d^{(j)} \cdot R_{\max} \cdot BW^{(j)} \cdot 0.96 \cdot \left(1 - OH^{(j)}\right)\right)$ wherein
    - J is the number of aggregated component carriers in a band or band combination
    - $R_{max}$ is maximum code rate
    - For the j-th CC,
      - $v_{Layers}^{(j)}$ is the maximum number of layers
      - $T_d^{(j)}$ is reference modulation order
        - FFS: Details on how $T_d^{(j)}$ is defined (e.g., per CC or per band or per band combination)
      - $BW^{(j)}$ the amount of spectrum in MHz.
      - $OH^{(j)}$ is the overhead (e.g. 2/14)
        - FFS: Different for Below 6
        - FFS: Different for mmWave UL and DL
    - Notes:
      - 0.96 is a factor reflecting BW occupancy
      - Only one of the UL or SUL carriers (the one with the higher data rate) is counted for a cell operating SUL
- The maximum data rate can be computed as the maximum of the data rates computed using the above formula for each of the supported band or band combinations.
- It is allowed for the UE to report a data rate lower than the computed maximum data rate based on the parameters reported in UE capability signalling.
  - FFS how to achieve this. Possible options:
    - At least one case where $T_d^{(j)}$ is less than the maximum modulation order supported by the UE is allowed in UE capability signaling
    - $T_d^{(j)}$ is defined as the product of Qm(j) and a scaling factor
    - A scaling of the of the computed data rate is possible when signalling UE capabilities.

Agreement: Value for $OH^{(j)}$ is as follows:

- [0.14], for frequency range FR1 for DL
- [0.2], for frequency range FR2 for DL
- [0.14], for frequency range FR1 for UL
- [0.2], for frequency range FR2 for UL

Agreement:

- $T_d^{(j)}$ is defined as
  - $T_d^{(j)} = Q_m^{(j)} \cdot f^{(j)}$, where $f^{(j)}$ is a scaling factor and $Q_m^{(j)}$ is the maximum modulation order. The scaling factor can at least take the values 1 and 0.75.
  - $f^{(j)}$ is signalled per band per band combination

Agreement: The maximum coding rate, $R_{max}$ = 948/1024.

Agreement: Update the previous agreement for data rate computation as follows.

- The approximate data rate for a given number of aggregated carriers in a band or band combination is computed as follows.
  - $\text{data rate (in Mbps)} = \sum_{j=1}^{J}\left(v_{Layers}^{(j)} \cdot Q_m^{(j)} \cdot f^{(j)} \cdot R_{\max} \cdot BW^{(j)} \cdot S_u^j \cdot \left(1 - OH^{(j)}\right)\right)$ wherein
    - J is the number of aggregated component carriers in a band or band combination
    - $R_{max}$ is maximum code rate
    - For the j-th CC,
      - $v_{Layers}^{(j)}$ is the maximum number of layers
      - $Q_m^{(j)}$ is the maximum modulation order
      - $f^{(j)}$ is the scaling factor
        - The scaling factor can at least take the values 1 and 0.75.
        - $f^{(j)}$ is signalled per band and per band per band combination
      - Rmax = 948/1024
      - $BW^{(j)}$ the amount of spectrum in MHz.
      - $S_u^j$ is the spectral utilization and is less than 1 (as defined in [38.101])
      - $OH^{(j)}$ is the overhead and takes the following values
        - [0.14], for frequency range FR1 for DL
        - [0.2], for frequency range FR2 for DL
        - [0.14], for frequency range FR1 for UL
        - [0.2], for frequency range FR2 for UL
    - Note: Only one of the UL or SUL carriers (the one with the higher data rate) is counted for a cell operating SUL
- The approximate maximum data rate can be computed as the maximum of the approximate data rates computed using the above formula for each of the supported band or band combinations.

Email approval for LS to RAN plenary in response to R1-1716676 and LS to RAN2 to inform them of further updates on L1 data rate computation. Decide remaining details, e.g., specific numbers for overhead in the data rate computation formula. (Ericsson: Daniel)

Agreement:
Send an LS to RAN2 to inform them of the agreement on computing data rates. (Ericsson (Daniel), Intel (Ajit))
**Friday:**
**R1-1721717** **Draft LS reply on formula or table for L1 data rate** **Ericsson, Intel**
**Decision:** The document is endorsed and final LS is approved in R1-1721723.

**eV2X evaluation methodology**
**R1-1721545** **Summary of email discussion [90b-NR-02] on eV2X evaluation methodology** **LG Electronics**

**Decision:** The document is noted.
Email discussion on evaluation methodology for eV2X to start Jan. 1st and till next Jan. meeting – Shinpei (NTT DOCOMO)

R1-1719417 General consideration on self evaluation towards IMT-2020 Huawei, HiSilicon
R1-1719418 Consideration on self evaluation of eMBB spectral efficiency for IMT-2020 Huawei, HiSilicon
R1-1719420 Consideration on self evaluation of NR latency and mobility interruption time for IMT-2020 Huawei, HiSilicon
R1-1719421 Consideration on self evaluation of mMTC for IMT-2020 Huawei, HiSilicon
R1-1719567 Considerations on NR unlicensed channel access MediaTek Inc.
R1-1719568 Considerations on NR NoMA operation MediaTek Inc.
R1-1719687 Essential enhancement to rate matching of Reed Muller code Sequans Communications
R1-1719706 Dynamic TDD - SFI Handling and Interference Management TCL Communication
R1-1719804 Measurement results and analysis on UE power consumption vivo
R1-1719805 NR UE power saving vivo
R1-1719835 UE-to-UE measurement for cross-link interference mitigation Huawei, HiSilicon
R1-1719836 Timing alignment on cross-link Huawei, HiSilicon
R1-1719837 UL Power control for cross-link interference mitigation Huawei, HiSilicon
R1-1719838 High level consideration on NR unlicensed band operation Huawei, HiSilicon
R1-1719839 NR Numerology on unlicensed bands Huawei, HiSilicon
R1-1719840 NR Frame structure on unlicensed bands Huawei, HiSilicon
R1-1719841 Coexistence and Channel access for NR unlicensed band operations Huawei, HiSilicon
R1-1719842 NR standalone operation on unlicensed bands Huawei, HiSilicon
R1-1719843 NLOS state due to vehicle blockage for V2X sidelink channel model Huawei, HiSilicon, Spirent Communications, Keysight Technologies, Cohere Technologies
R1-1719844 NTN channel modeling Huawei, HiSilicon
R1-1720015 NR-NTN Channel model: System level evaluations CNES
R1-1720016 NR-NTN Channel model: Fast fading model CNES
R1-1720017 NR-NTN Channel model : justification and definition of HAPS channel model CNES
R1-1720115 Reference scenarios for evaluation for GEO satellite channels HUGHES Network Systems Ltd
R1-1720116 Uplink/Downlink Paring for Ka-band Satellites HUGHES Network Systems Ltd
R1-1720152 Draft LS on UE category data rates Ericsson
R1-1720217 Discussion on Rel-15 NOMA study item CATT
R1-1720221 On the receiver design of grant-free MUSA ZTE, Sanechips
R1-1720222 Link level simulations and preliminary performance comparison of NOMA schemes ZTE, Sanechips
R1-1720365 Consideration on NoMA study Samsung
R1-1720366 DFT-based IGMA scheme Samsung
R1-1720375 NTN NR impacts Timing Advance Fraunhofer IIS
R1-1720474 DRS design for NR unlicensed spectrum Sony
R1-1720475 High level views on NR-U BWP Sony
R1-1720519 NTN NR impacts Cyclic Prefix Fraunhofer IIS
R1-1720520 NR-NTN: Analysis of the applicability of NR numerology to satellite communication THALES
R1-1720521 NTN NR Channel model – Link level evaluations Fraunhofer IIS
R1-1720539 NR-NTN: Description of cell search and synchronization to support the Non-Terrestrial Network deployment scenarios THALES
R1-1720544 NR-NTN: Channel model principles THALES
R1-1720568 LBT Considering Beamforming in Unlicensed Spectrum ASUSTEK COMPUTER (SHANGHAI)
R1-1720578 Discussion on LBTof NR unlicensed band NEC
R1-1720579 Waveform and numerology consideration on NR unlicensed band NEC
R1-1720599 eV2X Phase III Channel Modeling Cohere Technologies
R1-1720602 Considerations on NR-based Access to Unlicensed Spectrum Shenzhen Coolpad Technologies
R1-1720604 Comparison of V2V channels at 60 GHz under LOS and non-LOS due to vehicle blockage Huawei, HiSilicon
R1-1720605 Scenarios and requirements on integrated access and backhaul Huawei, HiSilicon
R1-1720606 Consideration on IAB physical layer enhancement Huawei, HiSilicon
R1-1720607 Discussion on NoMA study for Rel-15 SI Huawei, HiSilicon
R1-1720608 Discussion on LLS evaluation for NoMA Huawei, HiSilicon
R1-1720620 Considerations on Rel-15 NoMA SI CMCC
R1-1720844 Technology Components for Unlicensed Operation Ericsson Japan K.K.
R1-1720845 On Physical Layer Design Policies for Unlicensed Operation of NR Ericsson Japan K.K.
R1-1720846 On NR Operation in the 60 GHz Unlicensed Band Ericsson Japan K.K.
R1-1720847 On Channel Access Mechanisms for NR in Unlicensed Spectrum Ericsson Japan K.K.

R1-1720848 On Autonomous UL Transmissions for NR in Unlicensed Spectrum Ericsson Japan K.K.
R1-1720849 Discussion of Multi-Antenna and Highly Directional Beam-Forming for Operation in Unlicensed Spectrum Ericsson Japan K.K.
R1-1720901 eMBMS for Non Standalone NR Reliance Jio
R1-1720931 On URLLC reliability requirements VODAFONE Group Plc
R1-1720952 IMT-2020 self-evaluation: Mobility evaluations for NR Ericsson
R1-1720953 IMT-2020 self evaluation: On eMBB user experienced data rate Ericsson
R1-1720954 IMT-2020 self evaluation: Radio Network Energy Performance Ericsson
R1-1720955 IMT-2020 self evaluation: mMTC connection density for LTE-MTC and NB-IoT Ericsson
R1-1720956 IMT-2020 self-evaluation calibration mMTC connection density for LTE-MTC and NB-IoT Ericsson
R1-1720957 IMT2020 self evaluation: On eMBB area traffic capacity Ericsson
R1-1720958 IMT-2020 self-evaluation: CP latency in NR Ericsson
R1-1720959 IMT-2020 self-evaluation: UP latency in NR Ericsson
R1-1720961 IMT-2020 self-evaluation: Peak data rate and peak spectrum efficiency evaluations for NR Ericsson
R1-1721036 URLLC for factory automation Ericsson
R1-1721351 UE Capability for Multi-antenna Transmission Ericsson
R1-1721438 Comments on UE feature list for scheduling HARQ, CA/DC, BWP, SUL and power control Ericsson
R1-1721496 NR Features and Capabilities Qualcomm Incorporated

# 8 Closing of the meeting

RAN1 chair thanked the delegates for their hard work, the long sessions through the week definitely represent a lot of efforts and RAN1 should be proud of what has been achieved.
He also recalled the major role played by the feature leads – wearing two hats is a difficult position – thanks for their neutrality, fairness and help making progress and reaching the consensus of the group.
Special thanks were given to the Vice Chairmen and to Kazuaki-san for chairing all the different sessions, as well as to MCC for the support provided.
**First version of NR NSA is done**, he concluded.

MCC post-meeting: The purpose of the ad-hoc meeting in January 2018 is clearly meant to address NR-related topics only associated with the latest approved WI description. It is common understanding that RAN1 mandates this Ad hoc meeting with full decision power for NR WI.
Note NR WID was approved in RP-172834 (rev of RP-172115 (rev of RP-171485)).

Meeting was closed at 17:55.
See you all in 2018.

**Annex A: List of Tdocs at RAN1 #91**

Please see excel file attached to this report

**Annex B: List of CRs agreed at RAN1 #91**

| TS/TR | CR | Rev | Rel | Title | Cat | Vsn | @ Mtg | TD# | Source to WG | Work Item |
|---|---|---|---|---|---|---|---|---|---|---|
| 36.211 | 401 | - | Rel-13 | Correction on scrambling sequence identity for 2+4 PRBs sets in MPDCCH | F | 13.7.1 | R1#91 | R1-1721078 | NEC, Qualcomm, Panasonic | LTE_MTCe2_L1-Core |
| 36.211 | 402 | - | Rel-14 | Correction on scrambling sequence identity for 2+4 PRBs sets in MPDCCH | A | 14.4.0 | R1#91 | R1-1721079 | NEC, Qualcomm, Panasonic | LTE_MTCe2_L1-Core |
| 36.211 | 403 | - | Rel-13 | Correction on resource elements reserved for CRS for PBCH with repetition | F | 13.7.1 | R1#91 | R1-1721081 | NEC | LTE_MTCe2_L1-Core |
| 36.211 | 404 | - | Rel-14 | Correction on resource elements reserved for CRS for PBCH with repetition | A | 14.4.0 | R1#91 | R1-1721082 | NEC | LTE_MTCe2_L1-Core |
| 36.211 | 405 | - | Rel-14 | Introduction of new UE behavior for special subframe configuration 10 | F | 14.4.0 | R1#91 | R1-1721098 | CMCC | LTE_UL_CAP_enh-Core |
| 36.211 | 406 | - | Rel-14 | Correction for PUSCH puncturing in SRS carrier switching | F | 14.4.0 | R1#91 | R1-1721200 | Qualcomm Incorporated, Huawei, HiSilicon | LTE_SRS_switch-Core |
| 36.211 | 407 | - | Rel-14 | Correction on the scale factor for semi-OL rank-1 | F | 14.4.0 | R1#91 | R1-1721261 | Qualcomm Incorporated | LTE_eFDMIMO-Core |
| 36.211 | 408 | - | Rel-13 | UE uplink gap capability signaling description | F | 13.7.1 | R1#91 | R1-1721262 | Nokia, Nokia Shanghai Bell | LTE_MTCe2_L1-Core |
| 36.211 | 409 | - | Rel-14 | UE uplink gap capability signaling description | A | 14.4.0 | R1#91 | R1-1721263 | Nokia, Nokia Shanghai Bell | LTE_MTCe2_L1-Core |
| 36.212 | 268 | - | Rel-15 | Introduction of FeCoMP into 36.212 | B | 14.4.0 | R1#91 | R1-1721061 | Huawei, HiSilicon | feCOMP_LTE-Core |
| 36.212 | 269 | - | Rel-13 | Clarification for DAI for eCA | F | 13.6.0 | R1#91 | R1-1721086 | Qualcomm Incorporated, Huawei, HiSilicon | LTE_CA_enh_b5C-Core |
| 36.212 | 270 | - | Rel-14 | Clarification for DAI for eCA | A | 14.4.0 | R1#91 | R1-1721087 | Qualcomm Incorporated, Huawei, HiSilicon | LTE_CA_enh_b5C-Core |
| 36.212 | 271 | - | Rel-14 | Correction of section references for feMTC | F | 14.4.0 | R1#91 | R1-1721092 | Ericsson | LTE_feMTC-Core |
| 36.212 | 272 | - | Rel-14 | Correction of section reference for eVoLTE | F | 14.4.0 | R1#91 | R1-1721094 | Ericsson | LTE_VoLTE_ViLTE_enh-Core |
| 36.212 | 273 | - | Rel-14 | Correction on deriving number of available symbols for PUSCH | F | 14.4.0 | R1#91 | R1-1721120 | ASUSTeK | LTE_eLAA-Core |
| 36.212 | 274 | - | Rel-12 | Correction on number of SRS symbol for UCI multiplexing | F | 12.8.0 | R1#91 | R1-1721121 | ASUSTeK | LTE_CA-Core, TEI12 |
| 36.212 | 275 | - | Rel-13 | Correction on number of SRS symbol for UCI multiplexing | A | 13.6.0 | R1#91 | R1-1721122 | ASUSTeK | LTE_CA-Core, TEI12 |
| 36.212 | 276 | - | Rel-14 | Correction on number of SRS symbol for UCI multiplexing | A | 14.4.0 | R1#91 | R1-1721123 | ASUSTeK | LTE_CA-Core, TEI12 |
| 36.212 | 277 | - | Rel-14 | Clarification on 2 HARQ process applicability to UE-specific search space | F | 14.4.0 | R1#91 | R1-1721317 | Huawei, HiSilicon | NB_IOTenh-Core |
| 36.213 | 995 | 1 | Rel-15 | Introduction of feCoMP into 36.213 | B | 14.4.0 | R1#91 | R1-1721099 | Motorola Mobility, Lenovo | feCOMP_LTE-Core |

| TS/TR | CR | Rev | Rel | Title | Cat | Vsn | @ Mtg | TD# | Source to WG | Work Item |
|---|---|---|---|---|---|---|---|---|---|---|
| 36.213 | 996 | - | Rel-13 | Typo correction for table 16.5.1.2.1-1 | F | 13.7.0 | R1#91 | R1-1721083 | Qualcomm Incorporated | NB_IOT-Core |
| 36.213 | 997 | - | Rel-14 | Typo correction for table 16.5.1.2.1-1 | A | 14.4.0 | R1#91 | R1-1721084 | Qualcomm Incorporated | NB_IOT-Core |
| 36.213 | 998 | - | Rel-13 | Usage of PUCCH format 3 for with more than 5 CC | F | 13.7.0 | R1#91 | R1-1721088 | Qualcomm Incorporated, Nokia, NSB | LTE_CA_enh_b5C-Core |
| 36.213 | 999 | - | Rel-14 | Usage of PUCCH format 3 for with more than 5 CC | A | 14.4.0 | R1#91 | R1-1721089 | Qualcomm Incorporated, Nokia, NSB | LTE_CA_enh_b5C-Core |
| 36.213 | 1000 | - | Rel-14 | Correction on sidelink index field name in DCI format 5A for V2V in 36.213 | F | 14.4.0 | R1#91 | R1-1721090 | CATT | LTE_V2X-Core |
| 36.213 | 1001 | - | Rel-14 | Correction for modulation determination under larger TBS for random access response grant | F | 14.4.0 | R1#91 | R1-1721091 | Qualcomm Incorporated | LTE_feMTC-Core |
| 36.213 | 1002 | - | Rel-14 | Correction on higher layer parameter for eVoLTE | F | 14.4.0 | R1#91 | R1-1721093 | Huawei | LTE_VoLTE_ViLTE_enh-Core |
| 36.213 | 1003 | - | Rel-14 | Correction for dropping rules in intra-band SRS carrier switching | F | 14.4.0 | R1#91 | R1-1721095 | Qualcomm Incorporated | LTE_SRS_switch-Core |
| 36.213 | 1004 | - | Rel-14 | Change request for UE behaviour under special subframe configuration 10 | F | 14.4.0 | R1#91 | R1-1721097 | CMCC | LTE_UL_CAP_enh-Core |
| 36.213 | 1005 | - | Rel-14 | Correction on the scale factor for semi-OL rank-1 | F | 14.4.0 | R1#91 | R1-1721260 | Qualcomm Incorporated | LTE_eFDMIMO-Core |
| 36.213 | 1008 | - | Rel-14 | Correction of NRS-CRS power offset configuration for NB-IoT | F | 14.4.0 | R1#91 | R1-1721298 | ZTE, Sanechips | NB_IOTenh-Core |
| 36.213 | 1009 | - | Rel-14 | Clarification of carrier indication in DCI format N1 in NB-IoT | F | 14.4.0 | R1#91 | R1-1721300 | Ericsson | NB_IOTenh-Core |
| 36.213 | 1010 | - | Rel-14 | Clarification on 2 HARQ process applicability to UE-specific search space | F | 14.4.0 | R1#91 | R1-1721303 | Huawei, HiSilicon | NB_IOTenh-Core |
| 36.213 | 1011 | - | Rel-14 | Correction of interference in NB-IoT RACH procedure | F | 14.4.0 | R1#91 | R1-1721315 | Huawei, HiSilicon | NB_IOTenh-Core |
| 36.212 | 278 | - | Rel-15 | Introduction of shortened processing time and shortened TTI into 36.212 | B | 14.4.0 | R1#91 | R1-1721327 | Huawei | LTE_sTTIandPT-Core |
| 36.213 | 992 | 1 | Rel-15 | Introduction of shortened processing time and shortened TTI into 36.213, s00-s05 | B | 14.4.0 | R1#91 | R1-1721328 | Motorola Mobility | LTE_sTTIandPT-Core |
| 36.213 | 993 | 1 | Rel-15 | Introduction of shortened processing time and shortened TTI into 36.213, s06-s09 | B | 14.4.0 | R1#91 | R1-1721329 | Motorola Mobility | LTE_sTTIandPT-Core |
| 36.213 | 994 | 1 | Rel-15 | Introduction of shortened processing time and shortened TTI into 36.213, s10-s13 | B | 14.4.0 | R1#91 | R1-1721330 | Motorola Mobility | LTE_sTTIandPT-Core |
| 36.211 | 385 | 4 | Rel-15 | Introduction of shortened processing time and shortened TTI into 36.211, s03-05 | B | 14.4.0 | R1#91 | R1-1721325 | Ericsson | LTE_sTTIandPT-Core |
| 36.211 | 399 | 2 | Rel-15 | Introduction of shortened processing time and shortened TTI into 36.211, s06-08 | B | 14.4.0 | R1#91 | R1-1721326 | Ericsson | LTE_sTTIandPT-Core |

## Annex C-1: List of Outgoing LSs from RAN1 #91

| TDoc # | Title | Source | Release | Related WIs | Reply to | To | Cc | Original LS | Reply in |
|---|---|---|---|---|---|---|---|---|---|
| R1-1721216 | LS on additional agreements for shortened TTI and processing time for LTE | RAN1, Ericsson | Rel-15 | LTE_sTTIandPT-Core | | RAN2 | | | |
| R1-1721241 | LS on wake-up signal | RAN1, HiSilicon | Rel-15 | NB_IOTenh2-Core | | RAN2, RAN4 | | | |
| R1-1721254 | LS on HARQ-ACK feedback for eFeMTC | RAN1, Qualcomm | Rel-15 | LTE_eMTC4-Core | | RAN2 | | | |
| R1-1721255 | Reply LS on early data transmission | RAN1, Huawei | Rel-15 | NB_IOTenh2-Core, LTE_eMTC4-Core | R2-1711977 | RAN2 | | | |
| R1-1721282 | LS on Wake-up signal features for Rel-15 LTE-MTC | RAN1, Ericsson | Rel-15 | LTE_eMTC4-Core | | RAN4 | | | |
| R1-1721283 | LS on PUSCH sub-PRB allocation Rel-15 LTE-MTC | RAN1, Ericsson | Rel-15 | LTE_eMTC4-Core | | RAN2 | | | |
| R1-1721285 | LS on carrier aggregation for V2X | RAN1, LG Electronics | Rel-15 | LTE_eV2X-Core | | RAN4 | | | |
| R1-1721299 | LS on problematic MCS-TBS configurations for PSSCH decoding | RAN1, Huawei | Rel-14 | LTE_V2X-Core | | RAN2 | | | |
| R1-1721302 | Correction of interference in NB-IoT RACH procedure | RAN1, Huawei | Rel-14 | NB_IOTenh-Core | | RAN2 | | | |
| R1-1721310 | LS on RAN1 conclusions and TPs approved in RAN1#91 | RAN1, Ericsson | Rel-15 | FS_LTE_Aerial | | RAN2 | | | |
| R1-1721431 | Reply LS on CR for Reference Signals for MBSFN with 1.25kHz and 7.5khz sub-carrier spacing | RAN1, Intel Corporation | Rel-14 | MBMS_LTE_enh2-Core | R2-1712058 | RAN2 | | | |
| R1-1721557 | LS on NR RMSI TTI | RAN1, CATT | Rel-15 | NR_newRAT-Core | | RAN2 | | | |
| R1-1721560 | LS on NR TDD UL/DL configurations and support of HPUE | RAN1, SoftBank, Sprint | Rel-15 | NR_newRAT-Core | | RAN4 | RAN2 | | |
| R1-1721574 | Reply LS on SPS and Grant-free | RAN1, NTT DOCOMO | Rel-15 | NR_newRAT-Core | R2-1711871 | RAN2 | | | |
| R1-1721606 | LS on RAN1 agreement on UL power sharing for LTE/NR NSA operation | RAN1, Intel Corporation | Rel-15 | NR_newRAT-Core | | RAN2, RAN4 | | | |
| R1-1721608 | LS reply to RAN4 on P_0 ranges on UL power control | RAN1, ZTE | Rel-15 | NR_newRAT-Core | | RAN4 | RAN2 | | |
| R1-1721616 | LS on RRC parameters for NR | RAN1, Ericsson | Rel-15 | NR_newRAT-Core | | RAN2 | | | |
| R1-1721630 | LS on PRACH with ON-OFF time mask | RAN1, Intel Corporation | Rel-15 | NR_newRAT-Core | | RAN4 | | | |
| R1-1721663 | LS on MAC CE parameters for NR MIMO | RAN1, NTT DOCOMO | Rel-15 | NR_newRAT-Core | | RAN2 | | | |
| R1-1721669 | Reply LS on PRB grid in the NR | RAN1, Huawei | Rel-15 | NR_newRAT-Core | R4-1711972 | RAN4 | RAN2, RAN3 | | |
| R1-1721680 | LS on SRS PHR reporting | RAN1, Huawei | Rel-15 | NR_newRAT-Core | | RAN2 | | | |
| R1-1721681 | LS reply on UE Power Control and PHR Calculation | RAN1, Intel Corporation | Rel-15 | NR_newRAT-Core | R4-1711624 | RAN4 | | | |

| TDoc # | Title | Source | Release | Related WIs | Reply to | To | Cc | Original LS | Reply in |
|---|---|---|---|---|---|---|---|---|---|
| R1-1721682 | LS on CSI reporting periodicities for NR | RAN1, Ericsson | Rel-15 | NR_newRAT-Core | | RAN2 | | | |
| R1-1721712 | LS on RAN1 agreement on bandwidth part transition time | RAN1, Intel Corporation | Rel-15 | NR_newRAT-Core | | RAN4 | | | |
| R1-1721714 | LS on BWP timer operation | RAN1, Qualcomm | Rel-15 | NR_newRAT-Core | | RAN2 | | | |
| R1-1721716 | Response LS on required information for NSA on X2 | RAN1, Nokia | Rel-15 | NR_newRAT-Core | R3-174964 | RAN3 | RAN2, RAN4 | | |
| R1-1721721 | LS on RLM in active DL BWP | RAN1, Intel Corporation | Rel-15 | NR_newRAT-Core | | RAN4 | | | |
| R1-1721722 | LS reply to RAN4 on UE timing advance adjustment step size | RAN1, Qualcomm | Rel-15 | NR_newRAT-Core | R4-1709899 | RAN4 | | | |
| R1-1721723 | LS reply on formula or table for L1 data rate | RAN1, Ericsson, Intel | Rel-15 | NR_newRAT-Core | R2-1712026 | RAN2 | | | |
| R1-1721727 | LS on NR RMSI CORESET bandwidth | RAN1, CATT | Rel-15 | NR_newRAT-Core | | RAN4 | | | |
| R1-1721316 | LS on power consumption reduction progress | RAN1, Huawei | Rel-15 | NB_IOTenh2-Core | | RAN | | | |
| R1-1721346 | LS to RAN2 on Beam Failure Recovery | RAN1, MediaTek | Rel-15 | NR_newRAT-Core | | RAN2 | | | |
| R1-1721729 | LS on RAN1 input to 38.300 | RAN1, Nokia | Rel-15 | NR_newRAT-Core | | RAN2 | | | |
| R1-1721731 | LS on RRC parameters for high capacity stationary wireless link and introduction of 1024 QAM for LTE | RAN1, Huawei | Rel-15 | LTE_1024QAM_DL-Core | | RAN2 | | | |
| R1-1721732 | Reply to LS on NR UE Category | RAN1, Ericsson, Intel | Rel-15 | NR_newRAT-Core | RP-172113 | RAN | RAN2, RAN4 | | |
| R1-1721733 | LS reply on formula or table for L1 data rate | RAN1, Ericsson, Intel | Rel-15 | NR_newRAT-Core | R2-1712026 | RAN2 | | | |
| R1-1721734 | LS on updates to RRC parameters related to NR MIMO | RAN1, Qualcomm | Rel-15 | NR_newRAT-Core | | RAN2 | | | |

## Annex C-2: List of Incoming LSs from RAN1 #91

| TDoc # | Title | Source | Release | Related WIs | Reply to | To | Cc | Original LS | Reply in |
|---|---|---|---|---|---|---|---|---|---|
| R1-1719303 | FURTHER INFORMATION RELATED TO DRAFT NEW REPORT FOR IMT-2020 EVALUATION | ITU-R WP5D | | | | RAN, 3GPP ITU-R ad hoc, RAN1, RAN2, RAN4 | | 5D/TEMP/441 | |
| R1-1719304 | Reply LS on FS_REAR study outcome | RAN2, Huawei | Rel-15 | FS_feD2D_IoT_relay_wearable | S2-176446 | SA2 | RAN, RAN1, RAN3, SA3, CT1 | R2-1711861 | |
| R1-1719305 | LS on Early Data Transmission | RAN2, Qualcomm | Rel-15 | LTE_eMTC4-Core, NB_IOTenh2-Core | | RAN1 | | R2-1711977 | |
| R1-1719306 | Response LS on NR Paging Occasion | RAN2, LG Electronics | Rel-15 | NR_newRAT-Core | R1-1716918 | RAN1 | | R2-1712023 | |
| R1-1719307 | LS on formula or table for L1 data rate | RAN2, Ericsson | Rel-15 | NR_newRAT-Core | | RAN1 | | R2-1712026 | |
| R1-1719308 | Reply LS on mixed numerologies FDM operation | RAN2, Intel | Rel-15 | NR_newRAT-Core | R4-1708864 | RAN4 | RAN1 | R2-1712027 | |
| R1-1719309 | LS on UE RF related parameters, capabilities and features for NR | RAN2, NTT DOCOMO | Rel-15 | NR_newRAT-Core | | RAN4, RAN1 | RAN3 | R2-1712028 | |
| R1-1719310 | LS on SSTD measurements for EN-DC | RAN2, NTT DOCOMO | Rel-15 | NR_newRAT-Core | | RAN4 | RAN1 | R2-1712029 | |
| R1-1719311 | LS to RAN1 on the agreements on carrier and resource selection in CA | RAN2, LG Electronics | Rel-15 | LTE_eV2X-Core | | RAN1 | | R2-1712032 | |
| R1-1719312 | LS on RAN2 agreements related to BWP | RAN2, Huawei | Rel-15 | NR_newRAT-Core | | RAN1 | | R2-1712046 | |
| R1-1719313 | LS on NR PBCH content | RAN2, Qualcomm | Rel-15 | NR_newRAT-Core | | RAN1 | | R2-1712056 | |
| R1-1719314 | LS on CR for Reference Signals for MBSFN with 1.25kHz and 7.5khz sub-carrier spacing | RAN2, Qualcomm | Rel-14 | MBMS_LTE_enh2-Core | | RAN1 | | R2-1712058 | |
| R1-1719315 | LS on RAN2 agreements for Rel-15 LAA | RAN2, Ericsson | Rel-15 | LTE_unlic-Core | | RAN1 | | R2-1712059 | |
| R1-1719316 | LS on RA Preamble Power Ramping | RAN2, Samsung | Rel-15 | NR_newRAT-Core | | RAN1 | | R2-1712061 | |
| R1-1719317 | LS on RAN2 agreements related to PHR | RAN2, Samsung | Rel-15 | NR_newRAT-Core | | RAN1, RAN4 | | R2-1712065 | |
| R1-1719318 | LS on system information broadcast for CU/DU split scenario | RAN3, CATT | Rel-15 | NR_newRAT-Core | | RAN2 | RAN1 | R3-174199 | |
| R1-1719319 | Reply LS on NR handover related parameters | RAN4, Intel | Rel-15 | NR_newRAT-Core | R2-1709955 | RAN2 | RAN1 | R4-1710373 | |
| R1-1719320 | LS reply to PRACH BW aspects | RAN4, Samsung | Rel-15 | NR_newRAT-Core | R1-1716814 | RAN1 | | R4-1711136 | |
| R1-1719321 | LS reply on Support for fake gNB | RAN4, Ericsson | Rel-15 | NR_newRAT-Core | S3-171568 | SA3 | RAN1, | R4-1711318 | |

| TDoc # | Title | Source | Release | Related WIs | Reply to | To | Cc | Original LS | Reply in |
|---|---|---|---|---|---|---|---|---|---|
| | detection mechanisms | | | | | | RAN2 | | |
| R1-1719322 | Reply LS to R1-1715304 LS on minimum time for DL-to-UL and UL-to-DL switching on one NB-IoT carrier for TDD NB-IoT UEs | RAN4, Ericsson | Rel-15 | NB_IOTenh2-Core | R1-1715304 | RAN1 | | R4-1711536 | |
| R1-1719323 | LS reply on the Power Splitting across Different TTI Lengths in UL | RAN4, Huawei | Rel-15 | LTE_sTTIandPT-Core | R1-1709244 | RAN1 | | R4-1711597 | |
| R1-1719324 | LS to RAN1 on NR UE transient time for FR1 and FR2 | RAN4, Ericsson | Rel-15 | NR_newRAT-Core | | RAN1 | | R4-1711602 | |
| R1-1719325 | LS on single Tx switched UL | RAN4, Apple | Rel-15 | NR_newRAT-Core | | RAN2 | RAN1, RAN3 | R4-1711610 | |
| R1-1719326 | Reply LS on implication of sTTI operation on UL ON/OFF time mask | RAN4, Qualcomm | Rel-15 | LTE_sTTIandPT-Core | R1-1703581 | RAN1 | | R4-1711615 | |
| R1-1719327 | LS reply on UE Power Class and Power Control | RAN4, Intel | Rel-15 | NR_newRAT-Core | R1-1716743 | RAN1 | | R4-1711624 | |
| R1-1719328 | Reply LS CSI-RS patterns and densities | RAN4, Nokia | Rel-15 | NR_newRAT-Core | R1-1716744 | RAN1 | | R4-1711697 | |
| R1-1719329 | Reply LS on UE capability signalling for sTTI configurations | RAN4, Ericsson | Rel-15 | LTE_sTTIandPT-Core | R1-1714764 | RAN1 | RAN2 | R4-1711726 | |
| R1-1719330 | LS to RAN5 cc RAN1 and RAN2 on UE beamlock function | RAN4, Keysight | Rel-15 | FS_NR_test_methods | | RAN5 | RAN1, RAN2 | R4-1711823 | |
| R1-1719331 | LS reply to subcarrier alignment | RAN4, Huawei | Rel-15 | NR_newRAT-Core | R1-1711839 | RAN1, RAN2 | | R4-1711859 | |
| R1-1719332 | LS reply on NR UE baseband capabilities signalling | RAN4, Intel | Rel-15 | NR_newRAT-Core | R2-1709954 | RAN2 | RAN1 | R4-1711888 | |
| R1-1719333 | Reply LS on measurement accuracy improvement | RAN4, Huawei | Rel-15 | NB_IOTenh2-Core | R1-1709781 | RAN1 | RAN2 | R4-1711893 | |
| R1-1719334 | Reply LS on NR initial access and mobility | RAN4, ZTE | Rel-15 | NR_newRAT-Core | R1-1712002 | RAN1 | | R4-1711938 | |
| R1-1719335 | LS on gaps for SS block measurement in NR | RAN4, Ericsson | Rel-15 | NR_newRAT-Core | | RAN2 | RAN1 | R4-1711940 | |
| R1-1719336 | LS to RAN1 and RAN2 on Definition of synchronous and asynchronous Dual connectivity in Rel-15 LTE-NR combinations | RAN4, Ericsson | Rel-15 | NR_newRAT-Core | | RAN1, RAN2 | | R4-1711965 | |
| R1-1719337 | LS on PRB grid in the NR | RAN4, Nokia | Rel-15 | NR_newRAT-Core | R1-1706756, R1-1715184 | RAN1 | RAN2, RAN3 | R4-1711972 | |
| R1-1719338 | LS on FS_REAR SI conclusion | SA2, Huawei | Rel-15 | FS_REAR | | RAN, RAN1, RAN2, RAN3, SA3, CT1, SA3-LI | | S2-177943 | |
| R1-1719339 | Reply LS to RAN 2 on QCIs for EPC based ULLC | SA2, Vodafone | Rel-15 | NR_newRAT-Core, LTE_HRLLC, LTE_sTTIandPT, EDCE5 | R2-1709976 | RAN2, RAN3, SA1 | RAN1, SA4, CT4 | S2-178150 | |
| R1-1719460 | LS on UE baseband processing | RAN2, NTT | Rel-15 | NR_newRAT-Core | | RAN1, | | R2-1712078 | |

| TDoc # | Title | Source | Release | Related WIs | Reply to | To | Cc | Original LS | Reply in |
|---|---|---|---|---|---|---|---|---|---|
| | capability | DOCOMO | | | | RAN4 | | | |
| R1-1721166 | Follow-up on 3GPP Response LS (R4-164972) | Wi-Fi Alliance, CableLabs, Qualcomm, Ericsson | Rel-13 | LTE_LAA-Core | RP-171558, R4-164972, R4-164704 | RAN | RAN4, RAN1, IEEE 802.11 WG Chair | | |
| R1-1721522 | LS on BWP related agreements | RAN2, LG Electronics | Rel-15 | NR_newRAT-Core | | RAN1 | | R2-1714049 | |
| R1-1721524 | LS to RAN1 on beam recovery failure | RAN2, Nokia | Rel-15 | NR_newRAT-Core | | RAN1 | | R2-1714050 | |
| R1-1721590 | LS to RAN1 on HARQ agreements | RAN1, Samsung | Rel-15 | NR_newRAT-Core | | RAN1 | | R2-1714061 | |
| R1-1721591 | LS to RAN1 on GF/SPS agreements | RAN2, Huawei | Rel-15 | NR_newRAT-Core | | RAN1 | | R2-1714062 | |
| R1-1721602 | LS on required information for NSA on X2 | RAN3, Nokia | Rel-15 | NR_newRAT-Core | | RAN1, RAN2, RAN4 | | R3-174964 | |
| R1-1721633 | Reply LS on Supportable RNTI Length on DCI | RAN2, Ericsson | Rel-15 | NR_newRAT-Core | R1-1719094 | RAN1 | | R2-1714154 | |
| R1-1721643 | Reply LS on Minimum Bandwidth | RAN4, CATT, NTT DOCOMO | Rel-15 | NR_newRAT-Core | R1-1719039 | RAN1 | RAN2 | R4-1714392 | |
| R1-1721666 | LS on VoIP packet sizes and transport blocks | RAN2, Ericsson | Rel-15 | NR_newRAT-Core | | RAN1 | | R2-1714070 | |
| R1-1721691 | LS reply on SSTD measurements for EN-DC | RAN4, Ericsson | Rel-15 | NR_newRAT-Core | R2-1712029 | RAN2, RAN1 | | R4-1714289 | |
| R1-1721695 | LS on cells not broadcasting SIB1 | RAN2, Ericsson | Rel-15 | NR_newRAT-Core | | RAN1 | | R2-1714205 | |

**Annex D: List of Approved updated WIDs**

None

**Annex E:** **List of draft TSs/TRs agreed at RAN1 #91**

| Tdoc Number | Title | Source | Conclusion/Decision |
|---|---|---|---|
| R1-1721046 | TS38.201 v1.1.0 NR; Physical layer general description | NTT DOCOMO | Endorsed – basis for further updates |
| R1-1721047 | TS38.202 v1.1.0 NR; Physical layer services provided by the physical layer | Qualcomm | Endorsed – basis for further updates |
| R1-1721048 | TS38.211 v1.2.0 NR; Physical channels and modulation | Ericsson | Endorsed – basis for further updates |
| R1-1721049 | TS38.212 v1.2.0 NR; Multiplexing and channel coding | Huawei | Endorsed – basis for further updates |
| R1-1721050 | TS38.213 v1.2.0 NR; Physical layer procedures for control | Samsung | Endorsed – basis for further updates |
| R1-1721051 | TS38.214 v1.2.0 NR; Physical layer procedures for data | Nokia | Endorsed – basis for further updates |
| R1-1721052 | TS38.215 v1.2.0 NR; Physical layer measurements | Intel Corporation (UK) Ltd | Endorsed – basis for further updates |
| R1-1721339 | TS38.201 v1.2.0 NR; Physical layer general description | NTT DOCOMO | Endorsed – should go to plenary as v2.0.0 for approval |
| R1-1721340 | TS38.202 v1.2.0 NR; Physical layer services provided by the physical layer | Qualcomm | Endorsed – should go to plenary as v2.0.0 for approval |
| R1-1721341 | TS38.211 v1.3.0 NR; Physical channels and modulation | Ericsson | Endorsed – should go to plenary as v2.0.0 for approval |
| R1-1721342 | TS38.212 v1.2.1 NR; Multiplexing and channel coding | Huawei | Endorsed – should go to plenary as v2.0.0 for approval |
| R1-1721343 | TS38.213 v1.3.0 NR; Physical layer procedures for control | Samsung | Endorsed – should go to plenary as v2.0.0 for approval |
| R1-1721344 | TS38.214 v1.3.0 NR; Physical layer procedures for data | Nokia | Endorsed – should go to plenary as v2.0.0 for approval |
| R1-1721345 | TS38.215 v1.3.0 NR; Physical layer measurements | Intel Corporation (UK) Ltd | Endorsed – should go to plenary as v2.0.0 for approval |

**Annex F: List of actions**

- **Outgoing LS**

[91-LTE-04] – Yubo (Huawei)
Email approval on RRC parameters and the working assumption on number of RRC configurations of MCS table until Dec 7, 2018
**Done: According to Mr Chair's email decision posted on Dec.7th, the list of RRC parameters is endorsed in R1-1721730.**
**LS to RAN2 including the above endorsed list is approved in:**
**R1-1721731 LS on RRC parameters for high capacity stationary wireless link and introduction of 1024 QAM for LTE RAN1, Huawei**

[91-LTE-06] – Matthew (Huawei
**R1-1721281 Draft LS on power consumption reduction progress Huawei**
Email approval (along with the list of agreements as attachment – to be prepared by Yutao, Ericsson) till 12/5
**Done: According to Mr Chair's email decision posted on Dec.7th, final LS is approved in R1-1721316.**
**R1-1721314 RAN1 agreements for Rel-15 Further NB-IoT enhancements Ericsson**

[91-NR-01] – Karri (Nokia)
R1-1721698 Draft RAN1 input to 38.300 Nokia
Email discussion/approval till 12/6
**Done: According to Mr Chair's email decision posted on Dec.8th, the following is endorsed.**
**R1-1721728 Draft RAN1 input to 38.300 Nokia, Nokia Shanghai Bell**
**LS to RAN2 including the above endorsed proposal is approved in:**
**R1-1721729 LS on RAN1 input to 38.300 RAN1, Nokia**

[91-NR-09] – Weidong (MediaTek)
**R1-1721700 [DRAFT] LS to RAN2 on Beam Failure Recovery MediaTek**
LS for email approval by Dec 6th
**Done: According to Mr Chair's email decision posted on Dec.8th, the final LS is approved in:**
**R1-1721346 LS to RAN2 on Beam Failure Recovery RAN1, MediaTek**

[91-NR-19] – Daniel (Ericsson)
Email approval for LS to RAN plenary in response to R1-1716676 and LS to RAN2 to inform them of further updates on L1 data rate computation. Decide remaining details, e.g., specific numbers for overhead in the data rate computation formula till 12/7
**Done: According to Mr Chair's email decision posted on Dec.11th, the final LSs are approved in:**
**R1-1721732 Reply to LS on NR UE Category RAN1, Ericsson, Intel**
**R1-1721733 LS reply on formula or table for L1 data rate RAN1, Ericsson, Intel**

[91-NR-20] – Sundar (Qualcomm)

Send an LS to RAN2 to inform them of the modification to RRC and MAC CE after Thursday (Nov 30). For email approval by Dec 6th.
**Done: According to Mr Chair's email decision posted on Dec.14th, the final LS is approved in:**
**R1-1721734 LS on updates to RRC parameters related to NR MIMO RAN1, Qualcomm**

- **CR approval**

[91-LTE-01] – Zhe (Huawei)
**R1-1721252 Correction of interference in NB-IoT RACH procedure Huawei, HiSilicon**
Email approval until Dec 6, 2017
**Done: According to Mr Chair's email decision posted on Dec.7th, final 36.213 CR is agreed as CR1011, Rel-14, F in R1-1721315.**

[91-LTE-02-xx]
Rapporteur to capture the list of sTTI agreements by 12/2 by email
Draft CRs by spec editors by 12/7, to be endorsed by 12/12 by email
Please use spec# for xx
**Done:**
**R1-1721312 RAN1 decisions for WI Shortened TTI and processing time for LTE (LTE_sTTIandPT) Ericsson**
**R1-1721313 RAN1 decisions for WI Shortened TTI and processing time for LTE (LTE_sTTIandPT) - per topic Ericsson**
**The following set of CRs were agreed:**
**R1-1721325 Introduction of shortened processing time and shortened TTI - 36.211 s03-05 Ericsson Rel-15 CR0385R4, B**
**R1-1721326 Introduction of shortened processing time and shortened TTI - 36.211 s06-08 Ericsson Rel-15 CR0399R2, B**
**R1-1721327 Introduction of shortened processing time and shortened TTI into 36.212 Huawei Rel-15 CR0278, B**
**R1-1721328 Introduction of shortened processing time and shortened TTI into 36.213, s00-s05 Motorola Mobility Rel-15 CR0992R1, B**
**R1-1721329 Introduction of shortened processing time and shortened TTI into 36.213, s06-s09 Motorola Mobility Rel-15 CR0993R1, B**
**R1-1721330 Introduction of shortened processing time and shortened TTI into 36.213, s10-s13 Motorola Mobility Rel-15 CR0994R1, B**

[91-LTE-12] – Matthew (Huawei)
**R1-1721058 Clarification on 2 HARQ process applicability to UE-specific search space Huawei, HiSilicon**
Email approval of the 36.212CR (corresponding 36.213CR already agreed in R1-1721303) until Dec 6, 2017
**Done: According to Mr Chair's email decision posted on Dec.7th, final 36.212 CR is agreed as CR0277, Rel-14, F in R1-1721317.**

- **TS/TR**

[91-NR-02-xx]
NR spec editors to update specs by 12/8, to be commented on and be endorsed by 12/12 by email
Please use spec # for xx
**Done: The following set of TSs were endorsed and should be presented to plenary for approval:**
**R1-1721339 TS38.201 v1.2.0 NR; Physical layer general description NTT DOCOMO**

**R1-1721340** **TS38.202 v1.2.0 NR; Physical layer services provided by the physical layer Qualcomm**
**R1-1721341** **TS38.211 v1.3.0 NR; Physical channels and modulation Ericsson**
**R1-1721342** **TS38.212 v1.2.1 NR; Multiplexing and channel coding Huawei**
**R1-1721343** **TS38.213 v1.3.0 NR; Physical layer procedures for control Samsung**
**R1-1721344** **TS38.214 v1.3.0 NR; Physical layer procedures for data Nokia**
**R1-1721345** **TS38.215 v1.3.0 NR; Physical layer measurements Intel Corporation (UK) Ltd**

- **Miscellaneous**

[91-LTE-03] – Salvatore (Intel)
Email approval until February 8, 2018 on channel access for autonomous UL access.
**Done: According to Mr Chair's email decision posted on Feb.10th, following is agreed:**
**Agreement:**

- **When an AUL UE is allocated to occupy the full channel bandwidth, i.e., all the interlaces, the UE is configured with AUL-specific PUSCH start offset value range for AUL transmission. The randomly generated offset within a specific range is supported for an AUL UE.**
    - **UE can be separately configured with different value ranges for the AUL transmission outside of eNB's obtained MCOT and for the AUL transmission inside of eNB obtained MCOT.**
    - **For AUL transmissions outside of eNB obtained MCOT, an AUL UE can randomly select an offset value from the following set: {16, 25, 34, 43, 52, 61, OS #1}.**
    - **For AUL transmissions inside of eNB obtained MCOT, an AUL UE can randomly select an offset value from the following set: {34, 43, 52, 61, OS #1}.**
- **Note: The specific offset that is randomly selected by the UE is not signaled to the eNB.**

**Agreement:**

- **When an AUL UE is allocated to occupy partial channel bandwidth, i.e., not all the interlaces, the UE is RRC configured with exact AUL-specific PUSCH start offset value for AUL transmission.**
    - **UE can be separately configured with different value offset for the AUL transmission outside of eNB obtained MCOT and for the AUL transmission inside of eNB obtained MCOT.**
    - **The set of values for AUL transmission outside of eNB obtained MCOT and for the AUL transmission inside of eNB obtained MCOT are the same as those defined for AUL UEs configured to occupy the full channel bandwidth.**

[91-LTE-05] – Alberto (Qualcomm)
Email discussion to produce a single proposal for TBS/MCS/CQI tables until February 8, 2018 (Qualcomm: Alberto)
Input to the email discussion should be provided by January 18, 2018
**Done: According to Mr Chair's email decision posted on Feb.14th, following is agreed:**
**Agreements:**

- **5 new MCS entries are introduced (4 + 1 for retransmission)**

- **The removed set of entries from the MCS table are approximately every other entry starting from MCS 5 or 6**
- **Two new entries are added in the CQI table, as follows:**

| CQI index | modulation | code rate x 1024 | efficiency |
|---|---|---|---|
| 14 | 1024QAM | 853 | 8.3321 |
| 15 | 1024QAM | 948 | 9.2578 |

- **The removed CQI entries are entries 5 and 7 from 256QAM table.**
- **The new TBS entries for 100 PRBs, 1 layer are {105528, 110136, 115040, 119816/125808}**
- **For each of the maximum TBS entries above, the complete TBS table is agreed as in the attached .xls (also copied below)**

| NRB | 105528 | 110136 | 115040 | 119816 | 125808 |
|---|---|---|---|---|---|
| 1 | 1064 | 1096 | 1160 | 1192 | 1224 |
| 2 | 2088 | 2216 | 2280 | 2408 | 2472 |
| 3 | 3112 | 3240 | 3496 | 3624 | 3752 |
| 4 | 4264 | 4392 | 4584 | 4776 | 4968 |
| 5 | 5352 | 5544 | 5736 | 5992 | 6200 |
| 6 | 6456 | 6456 | 6968 | 7224 | 7480 |
| 7 | 7480 | 7736 | 7992 | 8504 | 8760 |
| 8 | 8504 | 8760 | 9144 | 9528 | 9912 |
| 9 | 9528 | 9912 | 10296 | 10680 | 11064 |
| 10 | 10680 | 11064 | 11448 | 11832 | 12384 |
| 11 | 11448 | 12216 | 12576 | 12960 | 13536 |
| 12 | 12576 | 12960 | 13536 | 14112 | 14688 |
| 13 | 13536 | 14112 | 14688 | 15840 | 15840 |
| 14 | 14688 | 15264 | 15840 | 16992 | 17568 |
| 15 | 15840 | 16416 | 16992 | 18336 | 18336 |
| 16 | 16992 | 17568 | 18336 | 19080 | 19848 |
| 17 | 17568 | 18336 | 19848 | 20616 | 21384 |
| 18 | 19080 | 19848 | 20616 | 21384 | 22152 |
| 19 | 19848 | 20616 | 22152 | 22920 | 23688 |
| 20 | 21384 | 22152 | 22920 | 23688 | 24496 |
| 21 | 22152 | 22920 | 24496 | 25456 | 26416 |
| 22 | 22920 | 24496 | 25456 | 26416 | 27376 |
| 23 | 24496 | 25456 | 26416 | 27376 | 28336 |
| 24 | 25456 | 26416 | 27376 | 28336 | 29296 |
| 25 | 26416 | 27376 | 28336 | 30576 | 30576 |
| 26 | 27376 | 28336 | 29296 | 31704 | 31704 |
| 27 | 28336 | 29296 | 30576 | 32856 | 32856 |
| 28 | 29296 | 30576 | 31704 | 34008 | 35160 |
| 29 | 30576 | 31704 | 32856 | 35160 | 35160 |
| 30 | 31704 | 32856 | 34008 | 36696 | 36696 |
| 31 | 32856 | 34008 | 35160 | 36696 | 37888 |
| 32 | 34008 | 35160 | 36696 | 37888 | 39232 |
| 33 | 35160 | 36696 | 37888 | 39232 | 40576 |
| 34 | 35160 | 37888 | 39232 | 40576 | 42368 |
| 35 | 36696 | 37888 | 40576 | 42368 | 43816 |
| 36 | 37888 | 39232 | 40576 | 43816 | 43816 |
| 37 | 39232 | 40576 | 42368 | 43816 | 45352 |
| 38 | 40576 | 42368 | 43816 | 45352 | 46888 |
| 39 | 40576 | 42368 | 45352 | 46888 | 48936 |
| 40 | 42368 | 43816 | 45352 | 48936 | 48936 |
| 41 | 43816 | 45352 | 46888 | 48936 | 51024 |
| 42 | 43816 | 46888 | 48936 | 51024 | 52752 |
| 43 | 45352 | 46888 | 48936 | 51024 | 52752 |
| 44 | 46888 | 48936 | 51024 | 52752 | 55056 |

| | | | | | |
|---|---|---|---|---|---|
| 45 | 46888 | 48936 | 51024 | 55056 | 55056 |
| 46 | 48936 | 51024 | 52752 | 55056 | 57336 |
| 47 | 48936 | 51024 | 55056 | 57336 | 57336 |
| 48 | 51024 | 52752 | 55056 | 57336 | 59256 |
| 49 | 51024 | 52752 | 57336 | 59256 | 61664 |
| 50 | 52752 | 55056 | 57336 | 59256 | 61664 |
| 51 | 52752 | 55056 | 59256 | 61664 | 63776 |
| 52 | 55056 | 57336 | 59256 | 61664 | 63776 |
| 53 | 55056 | 57336 | 61664 | 63776 | 66592 |
| 54 | 57336 | 59256 | 61664 | 63776 | 66592 |
| 55 | 57336 | 59256 | 63776 | 66592 | 68808 |
| 56 | 59256 | 61664 | 63776 | 66592 | 68808 |
| 57 | 59256 | 61664 | 66592 | 68808 | 71112 |
| 58 | 61664 | 63776 | 66592 | 68808 | 71112 |
| 59 | 61664 | 63776 | 68808 | 71112 | 73712 |
| 60 | 63776 | 66592 | 68808 | 71112 | 75376 |
| 61 | 63776 | 66592 | 71112 | 73712 | 76208 |
| 62 | 66592 | 68808 | 71112 | 73712 | 76208 |
| 63 | 66592 | 68808 | 73712 | 75376 | 78704 |
| 64 | 66592 | 71112 | 73712 | 76208 | 78704 |
| 65 | 68808 | 71112 | 75376 | 78704 | 81176 |
| 66 | 68808 | 73712 | 76208 | 78704 | 81176 |
| 67 | 71112 | 73712 | 76208 | 81176 | 81176 |
| 68 | 71112 | 75376 | 78704 | 81176 | 84760 |
| 69 | 73712 | 76208 | 78704 | 81176 | 84760 |
| 70 | 73712 | 76208 | 81176 | 84760 | 87936 |
| 71 | 75376 | 78704 | 81176 | 84760 | 87936 |
| 72 | 76208 | 78704 | 81176 | 84760 | 87936 |
| 73 | 76208 | 81176 | 84760 | 87936 | 90816 |
| 74 | 78704 | 81176 | 84760 | 87936 | 90816 |
| 75 | 78704 | 81176 | 84760 | 90816 | 93800 |
| 76 | 81176 | 84760 | 87936 | 90816 | 93800 |
| 77 | 81176 | 84760 | 87936 | 90816 | 93800 |
| 78 | 81176 | 84760 | 90816 | 93800 | 97896 |
| 79 | 84760 | 87936 | 90816 | 93800 | 97896 |
| 80 | 84760 | 87936 | 90816 | 97896 | 97896 |
| 81 | 84760 | 87936 | 93800 | 97896 | 101840 |
| 82 | 87936 | 90816 | 93800 | 97896 | 101840 |
| 83 | 87936 | 90816 | 93800 | 97896 | 101840 |
| 84 | 87936 | 93800 | 97896 | 101840 | 105528 |
| 85 | 90816 | 93800 | 97896 | 101840 | 105528 |
| 86 | 90816 | 93800 | 97896 | 101840 | 107832 |
| 87 | 90816 | 93800 | 101840 | 105528 | 107832 |
| 88 | 93800 | 97896 | 101840 | 105528 | 110136 |
| 89 | 93800 | 97896 | 101840 | 105528 | 110136 |

| | | | | | |
|---|---|---|---|---|---|
| 90 | 93800 | 97896 | 101840 | 107832 | 112608 |
| 91 | 93800 | 97896 | 105528 | 110136 | 112608 |
| 92 | 97896 | 101840 | 105528 | 110136 | 115040 |
| 93 | 97896 | 101840 | 107832 | 112608 | 115040 |
| 94 | 97896 | 101840 | 107832 | 112608 | 115040 |
| 95 | 101840 | 105528 | 110136 | 115040 | 117256 |
| 96 | 101840 | 105528 | 110136 | 115040 | 119816 |
| 97 | 101840 | 105528 | 112608 | 117256 | 119816 |
| 98 | 101840 | 107832 | 112608 | 117256 | 119816 |
| 99 | 105528 | 110136 | 115040 | 119816 | 124464 |
| 100 | 105528 | 110136 | 115040 | 119816 | 125808 |
| 101 | 105528 | 110136 | 117256 | 119816 | 125808 |
| 102 | 107832 | 110136 | 117256 | 124464 | 125808 |
| 103 | 107832 | 112608 | 117256 | 124464 | 128496 |
| 104 | 110136 | 115040 | 119816 | 124464 | 128496 |
| 105 | 110136 | 115040 | 119816 | 125808 | 128496 |
| 106 | 112608 | 115040 | 119816 | 125808 | 133208 |
| 107 | 112608 | 117256 | 124464 | 128496 | 133208 |
| 108 | 115040 | 119816 | 124464 | 128496 | 133208 |
| 109 | 115040 | 119816 | 125808 | 130392 | 133208 |
| 110 | 115040 | 119816 | 125808 | 130392 | 137792 |

[91-LTE-07] – Yubo (Huawei)
Email approval on link level evaluations until January 18, 2018
**Done: According to Mr Chair’s email decision posted on Jan.28th, following is agreed:**
**Agreement: Adopt the following for link level simulation assumptions for LTE URLLC**

| | Urban Macro–URLLC | Indoor Hotspot-eMBB |
|---|---|---|
| Channel model | NLOS: TDL-C in TR 38.901<br>LOS: TDL-E in TR 38.901 | NLOS: TDL-A in TR 38.901<br>LOS: TDL-D in TR 38.901 |
| Delay spread scaling parameter $DS_{desired}$ | LOS: 93ns<br>NLOS: 363ns | LOS: 20ns<br>NLOS: 39ns |
| UE speed | 3km/h, 30km/h | 3km/h |
| Transmission mode for PDSCH | TM2 as baseline. | |
| DL control payload in simulation for PDCCH/SPDCCH | Companies report their assumptions. | |
| UL control payload in simulation for PUCCH/SPUCCH | A single carrier (using a single TTI length in each direction), single codeword for PDSCH is assumed as the baseline | |
| Processing time line | Companies report their assumptions. | |
| SINR range | A range including 5th percentile downlink/uplink SINR in system level simulation | |
| Latency bound | 1ms, 10ms<br>Companies report delay assumptions according to table X | |
| Sub-carrier spacing | 15kHz | |
| TTI length | Subslot (2 or 3 symbols per TTI), slot (7 symbols per TTI, 0.5ms), 1ms TTI (14 symbols per TTI, 1ms)<br>Other values are not precluded (companies report if other value is used) | |
| Number of UEs | 1 UE (other UE numbers are not precluded) | |
| Channel estimation | Practical | |
| Receiver type | MMSE | |

**Table X Latency analysis for URLCC**

| Step | Description | Value |
|---|---|---|
| 1.0 | Scheduling request and scheduling for uplink transmission | |
| 1.1 | Transmitter Processing Delay<br>(eNB for DL; UE for UL) | |
| 1.2 | Frame Alignment | |
| 1.3 | Data channel transmission durationnote | |
| 1.4 | Receiver Processing Delay | |
| 1.5 | HARQ Retransmission | |
| | Total one way delay [ms] | |

**Note: This includes the potential blind/HARQ-less repetitions.**

**Agreement: Use the following in link level simulations**

| | |
|---|---|
| BS TX antenna configuration | 2 TX ports |
| Link adaptation for PDSCH | Disabled as baseline.<br>Companies report if link adaptation is used. |

**Agreement: The derivation of overall data reliability is down-selected between following options:**

- **Option 1: The reliability of each channel are evaluated independently by link level simulation. The overall reliability is computed analytically based on the reliability obtained in link level simulation (companies report their details in analysis).**
- **Option 2: The reliability of the (S)PPDCCH and PDSCH are evaluated jointly by link level simulation, and independently for other channels. The overall reliability is computed analytically based on the reliability obtained in link level simulation (companies report their details in analysis).**

**Agreement: Use the following in link level simulations**

| | |
|---|---|
| BS RX antenna configuration | 2/4 Rx ports |
| UE TX antenna configuration | FFS:<br>1TX port as baseline, 2 TX ports as optional<br>or<br>2 TX ports |
| UE RX antenna configuration | 2RX ports as baseline, 4RX as optional for 700 Mhz.<br>FFS for 2 GHz<br>2 RX ports as baseline, 4 RX ports as optional<br>or<br>4 RX ports |
| Modulation and coding rate | A subset of existing LTE MCS set in Table 7.1.7.1-1 used as baseline.<br>FFS the entries of the subset.<br>The use of other MCSs with lower code rate is not precluded |
| System bandwidth | 20 MHz |
| Resource allocation | Companies report up to 20 MHz |

[91-LTE-08] – Kianoush (Qualcomm)
Email approval on system level evaluations for the Indoor scenario until January 18, 2018
**Done: According to Mr Chair's email decision posted on Jan.28th, following is agreed:**
**Agreement: The TXRUs per TRxP for eNB in the Hotspot scenario is mapped as (Mp, Np, P, Mg, Ng) = (4,4,2,1,1).**

**Agreement: The following parameters and their associated values should be considered in the system-level evaluation of LTE URLLC in an indoor scenario:**

| Parameters | Value | Parameters | Value |
|---|---|---|---|
| Carrier frequency for evaluation | 2 GHz | UE speeds of interest | 100% indoor, 3 km/h |
| BS antenna height | 3 m | Inter-site interference modeling | Explicitly modelled |
| Total transmit power per TRxP | 24 dBm for 20 MHz bandwidth<br>21 dBm for 10 MHz bandwidth | BS noise figure | 5 dB |
| UE power class | 23 dBm | BS antenna element gain | 5 dBi |
| Number of UE antenna elements | 1 Tx/Rx, (M,N,P,Mg,Ng) = (1,1,1,1,1)<br>0° polarization<br>NOTE: For the purpose of Q derivation | UE antenna element gain | 0 dBi |
| UE mobility model | Fixed and identical speed \|v\| of all UEs, randomly and uniformly distributed direction | Thermal noise level | -174 dBm/Hz |
| UE antenna height | 1.5m | Traffic model | Full buffer |
| UL PUCCH power control parameters | P0, subframe-PUCCH = -116<br>P0, slot-SPUCCH = -113<br>P0, subslot-SPUCCH = -108 | Device deployment | 100% indoor<br>Randomly and uniformly distributed over the area |
| Handover margin (dB) | 0 (i.e., the strongest cell is selected) | UL PUSCH power control parameters | α=1.0, P0, PUSCH=-106dBm |
| Beam forming | Ideal | Bandwidth allocation | PUSCH: Equal bandwidth<br>PUCCH: 1 RB (To get a full load SINR for PUCCH, the same mutual interferers as for PUSCH are assumed but on a bandwidth of 1 RB) |
| UT attachment | Based on RSRP (formula (8.1-1) in TR36.873) from port 0 | | |

**Agreement: For the system-level evaluation of LTE URLLC in an indoor scenario, consider the channel model described in 3GPP TR 38.901 (also known as model B in ITU Eval. document).**
**Agreement: The averaged magnitude squared of the channel coefficients over time and frequency should be used as the average path gain for each link.**
**Agreement: Assume a single CC of 20MHz for system-level simulations for the system-level evaluation of LTE URLLC in an indoor scenario.**
**Agreement: Consider a UE noise figure of 9dB.**
**Agreement: The wrap-around is not considered for the evaluation of LTE URLLC in an indoor scenario.**
**Agreement: The UE density is 10 UEs per TRxP, which are uniformly and randomly distributed throughout the geographical area.**
**Agreement: 3 TRxP per site with mechanical tilt of 110 degrees in GCS, and electrical tilt of 90 degrees in LCS.**
**Agreement: The TRxP boresight 30/150/270 degrees.**

**Agreement: The inter-site distance follows the deployment shown in Figure A.2.1-1 in 3GPP TR 38.802.**

[91-LTE-09] – Marten (Ericsson)
Email approval on SINR calibration for the system level evaluations for the macro scenario until January 18, 2018. First input into the discussion should be provided by January 11, 2018
**Done: According to Mr Chair's email decision posted on Jan.20th, following is agreed except for the PUSCH part:**
**R1-1721735 SINR calibration for the link evaluations of URLLC for LTE Ericsson**
**Agreements (Jan.28th):**
**For deriving the Q-value (5th percentile SINR) for PUSCH, the resource allocation scheme adopted shall be down-selected at RAN1#92:**

1) **10 consecutive PRBs are randomly allocated to each UE**
2) **The resource allocation should aim at averaging interference in the network (compared to 1). The method can make use of measured SINR/interference levels, with details left up to each proponent.**

**NOTE: Companies are encouraged to provide Q-value using both approaches as input to RAN1#92, to be able to agree on a final Q-value.**

[91-LTE-10] – Klaus (Nokia)
Email discussion on candidate techniques until January 18, 2018
**Done: Summary of [91-LTE-10] on candidate techniques for LTE URLLC shall be presented at RAN1#92.**

[91-LTE-11] – Timo (Nokia)
Email discussion on Autonomous uplink access control signalling until February 8, 2018.
**Done: According to Mr Chair's email decision posted on Feb.12th, following is agreed:**

- **DMRS Cyclic Shift and Carrier Indicator Field (when present) are valid in the AUL activation DCI**
    - **FFS: TPC**
    - **FFS: what to do with the remaining bits in activation / deactivation DCI**
- **Spatial bundling is not applied in AUL DFI**
- **For TM2, TPMI is included into AUL DFI**
    - **The UE is not expected to receive a TPMI that changes the number of transmission layers**
    - **FFS A-CSI**
- **AUL-DFI is zero-padded to match the size of activation/deactivation DCI**
- **If AUL COT can be shared with the eNodeB, (at least) remaining COT is included into AUL-UCI**
- **AUL is mapped to UCI the same way as CQI/PMI**
    - **FFS starting symbol**
- **A new beta offset parameter is defined for AUL-UCI**

[91-NR-03] – Daewon (Intel)
R1-1721601 **Correcting NR OFDM Symbol Generation Intel**
Email discussion/approval till 12/6

**Done: According to Mr Chair's email decision posted on Dec.8th, the issue of OFDM symbol generation shall be addressed during the CR phase (starting January 2018). In the meantime, companies are encouraged to perform additional analysis so that decision can be made in January.**

[91-NR-04] – Abjorn (Ericsson)
R1-1721684 **WF on RMSI presence flag** **Qualcomm**
Email discussion/approval till 12/6
**Done: According to Mr Chair's email decision posted on Dec.11th, following is agreed:**
**Agreement**:

- **For an SSB on the sync raster, the indication of no associated RMSI is done using reserved value(s) in SSB-subcarrier-offset. If no RMSI present, RMSI-PDCCH-Config is used to signal the next sync raster that UE should search for cell-defining SSB.**

[91-NR-05] – Yushu (Intel)
Email discussion SRS resource indication for non-codebook based uplink transmission and TPMI/SRI/TRI indication for codebook based uplink transmission by Dec 6
**Done: According to Mr Chair's email decision posted on Dec.7th, following is agreed:**
**Agreements:**

- **For non-codebook based UL transmission,**
  - **The rank of UL transmission is derived from SRI field in UL DCI**
    - **Encoding of the DMRS indicator is determined from the derived rank**
  - **SRI field corresponds to a pre-determined combination of SRS resources, which are configured in the SRS resource set for non-CB-based UL**
    - **The bit-width of SRI field in UL grant is ceiling(log2($\left[\sum_{k=1}^{L_{max}} \binom{N}{k}\right]$)), where Lmax is maximum number of supported layers and N is the number of configured SRS resources in the set**

**Agreements:**

- **For codebook based UL transmission,**
  - **The rank of UL transmission is derived from TRI in UL DCI**
    - **Encoding of the DMRS indicator is determined from the derived rank**
    - **Support joint coding of TPMI and TRI**
      - **The TPMI size and TRI size is based on the 3-state TPMI restriction and maximum TRI restriction**
  - **Support up to 1-bit SRI, and its bit-width is determined by number of configured SRS resources in the set**

[91-NR-06] – Sebastian (Ericsson)
R1-1721677 **WF on CSI timing offset for PUSCH** **LG Electronics, Ericsson**
**Done: According to Mr Chair's email decision posted on Dec.8th, following is agreed:**
**Agreements:**

- **Candidates of CSI calculation time Z are defined in Table I.**
  - **Z is defined as the minimum required number of symbols for PDCCH detection/decoding for receiving the CSI reporting triggering DCI, channel estimation, plus CSI calculation-by assuming CSI only PUSCH (no HARQ ACK/NACK) for a given numerology and CSI complexity**

        - Note: the required time for channel estimation refers to the time gap from the last symbol of CSI-RS to the timeline that UE finishes its channel estimation processing
        - For low complexity CSI, one Z value for a given numerology is defined in Table I.
            - FFS: the definition of Low complexity CSI (e.g. WB CSI derived from maximum 2 ports CSIRS with Type I codebook or WB CQI derived from maximum 8 ports CSIRS without PMI)
        - For high complexity CSI, one Z value (FFS multiple values) for a given numerology is defined in Table I.
            - FFS: how many and how to define High complexity CSI

**Table I**

| CSI complexity | Units | 15 KHz SCS | 30 KHz SCS | 60 KHz SCS | 120 KHz SCS |
|---|---|---|---|---|---|
| Low complexity CSI | Symbols | $Z_{1,1}$ | $Z_{1,2}$ | $Z_{1,3}$ | $Z_{1,4}$ |
| High complexity CSI 1 | Symbols | $Z_{2,1}$ | $Z_{2,2}$ | $Z_{2,3}$ | $Z_{2,4}$ |
| High complexity CSI N | Symbols | $Z_{N+1,1}$ | $Z_{N+1,-2}$ | $Z_{N+1,3}$ | $Z_{N+1,4}$ |

- When A-CSI reporting on CSI only PUSCH is triggered in slot n,
    - UE is not required to update the CSI for the A-CSI report in the following cases:
        - Cases are FFS, e.g.
            - if M-L-N < Z for the given CSI complexity and numerology
            - if AP CSI-RS resource is transmitted in slot n and M-O-N < Z for the given CSI complexity and numerology
            - Note:
                - L=the last symbol of PDCCH in slot n
                - M=the starting symbol of the PUSCH
                - N= the TA value in unit of symbols (e.g., TA=1.4 symbol)
                - O= the later symbol between the last symbol of AP CSI-RS resource for CMR and the last symbol of AP CSI-RS resource for IMR
    - FFS: Time locations of the CSI reference resource between Z to 0 symbol(s) before the starting symbol of the PUSCH are not valid
    - FFS: how to relax CSI calculation when multiple A-CSI reportings are triggered at the same time.
- PUSCH timing offset for A-CSI reporting is determined as follows:
    - When PUSCH is scheduled only for a single A-CSI reporting, the DCI field for PUSCH timing offset is defined from Y in the reporting setting
    - When PUSCH is scheduled only for multiple A-CSI reportings, the DCI field for PUSCH timing offset is defined from maximum values among multiple Y in the reporting settings
        - E.g. Y in reporting setting 1 = {1, 2, 3, 6} and Y in reporting setting 2= {2, 3, 4, 5}, then Y becomes {2, 3, 4, 6}
        - Note: Depending on UE capability, CSI relaxation may be applied.
    - FFS: PUSCH timing offset when PUSCH is scheduled for A-CSI reporting and UL data

[91-NR-07] – Sundar (Qualcomm)

For email discussion:

- Aperiodic CSI-RS triggering offset X is configurable. X is defined in units of slots.
  - FFS: Per resource or per resource set

**Done: According to Mr Chair's email decision posted on Dec.7th, following is agreed:**

**Agreement:**

- **Aperiodic CSI-RS triggering offset X is configurable on a per resource set basis in ResourceSetConfig**
  - **Note: The offset X is measured in slots.**
  - **FFS: The case when multiple resource sets are associated with a trigger point.**

[91-NR-08] – Weidong (MediaTek)

R1-1721699 **Offline discussion summary on remaining issues on Beam Failure Recovery MediaTek**

For email approval by Dec 6th

**Done: According to Mr Chair's email decision posted on Dec.8th, following is agreed:**

**Agreements: If the Candidate-Beam-RS-List includes both CSI-RS resource indexes and SSB indexes, AND only SSB indexes are associated with PRACH resources,**

- **UE identifies PRACH resources for CSI-RS resource(s) in the Candidate-Beam-RS-List via spatial QCL indication between SSBs and CSI-RS resources, if UE-identified new beam(s) is associated with CSI-RS resource(s)**
  - **UE sends BFRQ through a PRACH resource associated with the SSB, which is spatially QCLed with the CSI-RS resource.**
- **Note: in case the Candidate-Beam-RS-List includes both CSI-RS resource indexes and SSB indexes, AND only SSB indexes are associated with PRACH resources, a UE is not expected to be configured by Candidate-Beam-RS-List a CSI-RS resource which does not have a spatial QCL association with any of the SSB in the same Candidate-Beam-RS-List.**

**Agreement: If there are multiple beams above the threshold for new beam identification, it is up to UE implementation to select a PRACH resource associated to the SSB/CSI-RS resource satisfying the threshold condition.**

**Agreements: Upon receiving gNB response for beam failure recovery request transmission~~,~~**

- **UE shall monitor CORESET-BFR for dedicated PDCCH reception until one of the following conditions is met:**
  - **Reconfigured by gNB to another CORESET for receiving dedicated PDCCH and activated by MAC-CE a TCI state if the configured CORESET has K>1 configured TCI states**
    - **FFS: if a default TCI state can be assumed for PDCCH after reconfiguration without MAC-CE activation**
  - **Re-indicated by gNB to another TCI state(s) by MAC-CE of CORESET(s) before beam failure**
- **Until the reconfiguration/activation/re-indication of TCI state(s) for PDCCH, UE shall assume DMRS of PDSCH is spatial QCL'ed with DL RS of the UE-identified candidate beam in the beam failure recovery request**
- **After the reconfiguration/activation/re-indication of TCI state(s) for PDCCH, UE is not expected to receive a DCI in CORESET-BFR.**
- **Note: this applies to same carrier case.**

[91-NR-10] – Sai (AT&T)

Email discussion for MCS table for DFT-s-OFDM with 64QAM by Dec 6th

**Done: According to Mr Chair's email decision posted on Dec.7th, following is agreed:**

**Working assumption**

- **For PUSCH with transform precoding, NR supports the following MCS table with up to 64-QAM**
  - **This applies for eMBB**
  - **FFS whether it is UE capability on supporting pi/2 BPSK or not and related reporting**

| MCS Index $I_{MCS}$ | Modulation Order $Q_m$ | Code rate $R$× 1024 | Spectral efficiency |
|---|---|---|---|
| 0 | 1 | 240 | 0.2344 |
| 1 | 1 | 314 | 0.3066 |
| 2 | 2 | 193 | 0.3770 |
| 3 | 2 | 251 | 0.4902 |
| 4 | 2 | 308 | 0.6016 |
| 5 | 2 | 379 | 0.7402 |
| 6 | 2 | 449 | 0.8770 |
| 7 | 2 | 526 | 1.0273 |
| 8 | 2 | 602 | 1.1758 |
| 9 | 2 | 679 | 1.3262 |
| 10 | 4 | 340 | 1.3281 |
| 11 | 4 | 378 | 1.4766 |
| 12 | 4 | 434 | 1.6953 |
| 13 | 4 | 490 | 1.9141 |
| 14 | 4 | 553 | 2.1602 |
| 15 | 4 | 616 | 2.4063 |
| 16 | 4 | 658 | 2.5703 |
| 17 | 6 | 466 | 2.7305 |
| 18 | 6 | 517 | 3.0293 |
| 19 | 6 | 567 | 3.3223 |
| 20 | 6 | 616 | 3.6094 |
| 21 | 6 | 666 | 3.9023 |
| 22 | 6 | 719 | 4.2129 |
| 23 | 6 | 772 | 4.5234 |
| 24 | 6 | 822 | 4.8164 |
| 25 | 6 | 873 | 5.1152 |
| 26 | 6 | 910 | 5.3320 |
| 27 | 6 | 948 | 5.5547 |
| 28 | 1 | reserved | |
| 29 | 2 | | |
| 30 | 4 | | |
| 31 | 6 | | |

[91-NR-11] – Xi (Huawei)
Email discussion aperiodic ZP-CSI-RS until Dec 6th
**Done: According to Mr Chair's email decision posted on Dec.7th, following is agreed:**
**Agreement: NR supports aperiodic ZP-CSI-RS for rate matching, with a separate DCI field for triggering aperiodic ZP-CSI-RS**

[91-NR-12] – Alex (Qualcomm)
Email discussion on the following DMRS aspects until Dec 6th

- Remaining details on 2 symbol DMRS table
- Additional DMRS location of PUSCH with hopping
- Non-slot based collision of DMRS with CORESET
- Length 6, 18, 24, and 30 CGS sequences
- Sequence order for length 12 CGS sequences
- DMRS location for PDSCH/PUSCH smaller than the current specified durations
- Remaining details on DMRS table for DFT-s-OFDM
- DMRS and PTRS overlapping issue (R1-1721715)

R1- 1721686 should be used as starting point for discussion.
**Done: According to Mr Chair's email decision posted on Dec.7th, following is agreed:**
Agreement 1: Discuss further after the Rel-15 Dec. specifications the DMRS locations for PDSCH/PUSCH smaller than the current specified durations.

Agreement 2:

- For the PUSCH with a hop, when one-symbol front-load DMRS is configured in the first symbol of each hop, the one one-symbol additional DMRS can be configured in:
  - 5th symbol with respect to the front-load DMRS in each hop for a hop duration more than 4 symbols (otherwise no additional DMRS)
- For CP-OFDM PUSCH with a hop the same DMRS locations as DFT-S-OFDM PUSCH with a hop are supported.
- For the PUSCH with a hop, when one-symbol front-load DMRS is configured in the third or forth symbol of the 1st hop, the one one-symbol additional DMRS can be configured in
  - 5th symbol with respect to the front-load DMRS in each hop if it is part of the hop (otherwise no additional DMRS)

Agreement 3:
For 2/4/7-symbol non-slot-based scheduling, when the first symbol of PDSCH and reserved resources for CORESET(s) are FDMed and the PDSCH in any of the scheduled OFDM symbols collides with the reserved resources for CORESET(s) in frequency domain:

- the first symbol of front-load DMRS is mapped to the next PDSCH symbol following the configured CORESET(s).
  - For 4-symbol non-slot-based scheduling, UE doesn't expect to receive DMRS beyond the (downselection needed) third symbol OFDM symbol of the non-slot scheduling unit.
  - For 7-symbol non-slot-based scheduling, UE doesn't expect to receive front-load DMRS beyond the forth OFDM symbol of the non-slot scheduling unit.
    - If an one-symbol additional DMRS is configured, it is transmitted on the 5th symbol with respect to the front-load DMRS symbol in the 5th or 6th symbol of the scheduling unit, otherwise it is dropped if it moves to the last, or beyond the last symbol of the scheduling unit.

Agreement 4:

- For DFT-S-OFDM sequences for length-30 use ZC sequence (same as Rel-14 LTE).
- For DFT-S-OFDM sequences for CGS length-24 use:

| Index | Sequence | Index | Sequence |
|---|---|---|---|
| 0 | -1,-3, 3, 1, 1,-3, 1,-3,-3, 1,-3,-1,-1, 3,-3, 3, 3, 3,-3, 1, 3, 3,-3,-3 | 15 | 1, 1,-1,-3,-1, 1, 1,-3, 1,-1, 1,-3, 3,-3,-3, 3,-1,-3, 1, 3,-3, 1,-3,-3 |
| 1 | -1,-3, 3,-1, 3, 1, 3,-1, 1,-3,-1,-3,-1, 1, 3,-3,-1,-3, 3, 3, 3,-3,-3,-3 | 16 | -3, 3,-1, 3,-1, 3, 3, 1, 1,-3, 1, 3,-3, 3,-3,-3,-1, 1, 3,-3,-1,-1,-3,-3 |
| 2 | -3, 3, 1, 3,-1, 1,-3, 1,-3, 1,-1,-3,-1,-3,-3,-3,-3,-1,-1,-1, 1, 1,-3,-3 | 17 | -1,-3,-3, 1,-1,-1,-3, 1, 3,-1,-3,-1,-1,-3, 1, 1, 3, 1,-3,-1,-1, 3,-3,-3 |
| 3 | 3,-1, 3,-1, 1,-3, 1, 1,-3,-3, 3,-3,-1,-1,-1,-1,-1,-3,-3,-1, 1, 1,-3,-3 | 18 | -3, 1,-3, 1,-3, 1, 1, 3, 1,-3,-3,-1, 1, 3,-1,-3, 3, 1,-1,-3,-3,-3,-3,-3 |
| 4 | 1,-3,,3,-1,-3,-1, 3,,3,1,-1,1,1,,3,-3,-1,-3,-3,-3,-1,3,-3,-1,-3, -3 | 19 | 3,-3, 3,-1,-3, 1, 3, 1,-1,-1,-3,-1, 3,-3, 3,-1,-1, 3, 3,-3,-3, 3,-3,-3 |
| 5 | 3,-1, 1,-1, 3,-3, 1, 1, 3,-1,-3, 3, 1,-3, 3,-1,-1,-1,-1, 1,-3,-3,-3,-3 | 20 | -1, 3,-3,-3,-1, 3,-1,-1, 1, 3, 1, 3,-1,-1,-3, 1, 3, 1,-1,-3, 1,-1,-3,-3 |
| 6 | -3, 3,-1, 3, 1,-1,-1,-1, 3, 3, 1, 1, 1, 3, 3, 1,-3,-3,-1, 1,-3, 1, 3,-3 | 21 | -3, 1,-3,-1,-1, 3, 1, 3,-3, 1,-1, 3, 3,-1,-3, 3,-3,-1,-1,-3,-3,-3, 3,-3 |
| 7 | -3,-1, 1,-3,-3, 1, 1,-3, 3,-1,-1,-3, 1, 3, 1,-1,-3,-1,-3, 1,-3,-3,-3,-3 | 22 | -3,-1,-1,-3, 1,-3,-3,-1,-1, 3,-1, 1,-1, 3, 1,-3,-1, 3, 1, 1,-1,-1,-3,-3 |
| 8 | -3, 1,-3, 1,-3,-3, 1,-3, 1,-3,-3,-3,-3,-3, 1,-3,-3, 1, 1,-3, 1, 1,-3,-3 | 23 | -3, 1,-3, 3,-3, 1,-3, 3, 1,-1,-3,-1,-3,-3,-3,-3, 1, 3,-1, 1, 3, 3, 3,-3 |
| 9 | 3,-3,-3,-1, 3, 3,-3,-1, 3, 1, 1, 1, 3,-1, 3,-3,-1, 3,-1, 3, 1,-1,-3,-3 | 24 | -3,-1, 1,-3,-1,-1, 1, 1, 1,3,3,-1,1,-1, 1,-1,-1,-3,-3,-3,3, 1,-1, -3 |
| 10 | -3,-3,-1,-1,-1,-3, 1,-1,-3,-1, 3,-3, 1,-3, 3,-3, 3, 3, 1,-1,-1, 1,-3,-3 | 25 | 3,-3,-1, 1, 3,-1,-1,-3,-1, 3,-1,-3,-1,-3, 3,-1, 3, 1, 1,-3, 3,-3,-3,-3 |
| 11 | -3,-3, 3, 3, 1,-1,-1,-1, 1,-3,-1, 1,-1, 3,-3,-1,-3,-1,-1, 1,-3, 3,-1,-3 | 26 | -3, 1, 3,-1, 1,-1, 3,-3, 3,-1,-3,-1,-3, 3,-1,-1,-1,-3,-1,-1,-3, 3, 3,-3 |
| 12 | -3,-3, 1,-1, 3, 3,-3,-1, 1,-1,-1, 1, 1,-1,-1, 3,-3, 1,-3, 1,-1,-1,-1,-3 | 27 | -3, 3,-1,-3,-1,-1,-1, 3,-1,-1, 3,-3,-1, 3,-3, 3,-3,-1, 3, 1, 1,-1,-3,-3 |
| 13 | -3, 1,-3, 3,-1,-1,-1,-3, 3, 1,-1,-3,-1, 1, 3,-1, 1,-1, 1,-3,-3,-3,-3,-3 | 28 | -3, 1,-1,-3,-3,-1, 1,-3,-1,-3, 1, 1,-1, 1, 1, 3, 3, 3,-1, 1,-1, 1,-1,-3 |
| 14 | -3,-3,-3,-1, 3,-3, 3, 1, 3, 1,-3,-1,-1,-3, 1, 1, 3, 1,-1,-3, 3, 1, 3,-3 | 29 | -1, 3,-1,-1, 3, 3,-1,-1,-1, 3,-1,-3, 1, 3, 1, 1,-3,-3,-3,-1,-3,-1,-3,-3 |

- For DFT-S-OFDM sequences for CGS length-18 use:

| Index | Sequence | Index | Sequence |
|---|---|---|---|
| 0 | 3,-3, 3,-1, 1, 3,-3,-1,-3,-3,-1,-3, 3, 1,-1, 3,-3, 3 | 15 | -3,-3, 3, 3, 3,-1,-1,-3,-1,-1,-1, 3, 1,-3,-3,-1, 3,-1 |
| 1 | 3,-3, 1, 1, 3,-1, 1,-1,-1,-3, 1, 1,-1, 3, 3,-3, 3,-1 | 16 | -3,-1, 3, 3,-1, 3,-1,-3,-1, 1,-1,-3,-1,-1,-1, 3, 3, 1 |
| 2 | -3, 3,-1,-3,-1,-3, 1, 1,-3,-3,-1,-1, 3,-3, 1, 3, 1, 1 | 17 | -3,-1,-3,-1,-3, 1, 3,-3,-1, 3, 3, 3, 1,-1,-3, 3,-1,-3 |
| 3 | 1, 1,-1,-1,-3,-1, 1,-3,-3,-3, 1,-3,-1,-1, 1,-1, 3, 1 | 18 | -3, 3, 1,-1,-1, 3,-3,-1, 1, 1, 1, 1, 1,-1, 3,-1,-3,-1 |
| 4 | 1, 1,-3, 3, 3, 1, 3,-3, 3,-1, 1, 1,-1, 1,-3,-3,-1, 3 | 19 | 3,-1,-3, 1,-3,-3,-3, 3, 3,-1, 1,-3,-1, 3, 1, 1, 3, 3 |
| 5 | -3,-3, 1,-3, 3, 3, 3,-1, 3, 1, 1,-3,-3,-3, 3,-3,-1,-1 | 20 | 3, 3, 3,-3,-1,-3,-1, 3,-1, 1,-1,-3, 1,-3,-3,-1, 3, 3 |
| 6 | -1, 3,-1,-3, 3, 1,-3,-1, 3,-3,-1,-1, 1, 1, 1,-1,-1,-1 | 21 | 3,-1, 3, 1,-3,-3,-1, 1,-3,-3, 3, 3, 3, 1, 3,-3, 3,-3 |
| 7 | -3, 1,-3,-3, 1,-3,-3, 3, 1,-3,-1,-3,-3,-3,-1, 1, 1, 3 | 22 | -3, 1, 1,-3, 1, 1, 3,-3,-1,-3,-1, 3,-3, 3,-1,-1,-1,-3 |
| 8 | 1,-3,-1,-3, 3, 3,-1,-3, 1,-3,-3,-1,-3,-1, 1, 3, 3, 3 | 23 | -3,-1,-1,-3, 1,-3, 3,-1,-1,-3, 3, 3,-3,-1, 3,-1,-1,-1 |
| 9 | -3, 3, 1,-1,-1,-1,-1, 1,-1, 3, 3,-3,-1, 1, 3,-1, 3,-1 | 24 | -3,-3,-3, 1,-3, 3, 1, 1, 3,-3,-3, 1, 3,-1, 3,-3,-3, 3 |
| 10 | -3,-3, 1,-1,-1, 1, 1,-3,-1, 3, 3, 3, 3,-1, 3, 1, 3, 1 | 25 | 1, 1,-3,-3,-3,-3, 1, 3,-3, 3, 3, 1,-3,-1, 3,-1,-3, 1 |
| 11 | -3,-3, 3, 3,-3, 1, 3,-1,-3, 1,-1,-3, 3,-3,-1,-1,-1, 3 | 26 | 3,-1,-1, 1,-3,-1,-3,-1,-3,-3,-1,-3, 1, 1, 1,-3,-3, 3 |
| 12 | -3,-3, 3, 3, 3, 1,-3, 1, 3, 3, 1,-3,-3, 3,-1,-3,-1, 1 | 27 | 3, 1,-3, 1,-3, 3, 3,-1,-3,-3,-1,-3,-3, 3,-3,-1, 1, 3 |
| 13 | -3, 3,-1, 1, 3, 1,-3,-1, 1, 1,-3, 1, 3, 3,-1,-3,-3,-3 | 28 | -1,-3, 1,-3,-3,-3, 1, 1, 3, 3,-3, 3, 3,-3,-1, 3,-3, 1 |
| 14 | -3, 1,-3,-1,-1, 3, 1,-3,-3,-3,-1,-3,-3, 1, 1, 1,-1,-1 | 29 | -3,-1,-3,-3, 1, 1,-1,-3,-1,-3,-1,-1, 3, 3,-1, 3, 1, 3 |

- For DFT-S-OFDM sequences for CGS length-6 use:

| Index | Sequence | Index | Sequence |
|---|---|---|---|
| 0 | -3,-1,3, 3, -1,-3 | 15 | 1, 1, 1, -1,3, -3 |
| 1 | -3,3, -1,-1,3, -3 | 16 | -3,-1,-1,-1,3, -1 |
| 2 | -3,-3,-3,3, 1, -3 | 17 | -3,-3,-1,1, -1,-3 |
| 3 | 1, 1, 1, 3, -1,-3 | 18 | -3,-3,-3,1, -3,-1 |
| 4 | 1, 1, 1, -3,-1,3 | 19 | -3,1, 1, -3,-1,-3 |
| 5 | -3,1, -1,-3,-3,-3 | 20 | -3,3, -3,1, 1, -3 |
| 6 | -3,1, 3, -3,-3,-3 | 21 | -3,1, -3,-3,-3,-1 |
| 7 | -3,-1,1, -3,1, -1 | 22 | 1, 1, -3,3, 1, 3 |
| 8 | -3,-1,-3,1, -3,-3 | 23 | 1, 1, -3,-3,1, -3 |
| 9 | -3,-3,1, -3,3, -3 | 24 | 1, 1, 3, -1,3, 3 |
| 10 | -3,1, 3, 1, -3,-3 | 25 | 1, 1, -3,1, 3, 3 |
| 11 | -3,-1,-3,1, 1, -3 | 26 | 1, 1, -1,-1,3, -1 |
| 12 | 1, 1, 3, -1,-3,3 | 27 | 1, 1, -1,3, -1,-1 |
| 13 | 1, 1, 3, 3, -1,3 | 28 | 1, 1, -1,3, -3,-1 |
| 14 | 1, 1, 1, -3,3, -1 | 29 | 1, 1, -3,1, -1,-1 |

Agreement 5: Discuss further the re-ordering of the CGS for DFT-S-OFDM after the Rel-15 Dec. specifications.

Agreement 6: For a UE is configured with the higher layer parameter PT-RS presence “on” and receiving a PDSCH, it may assume that the following two are not happening concurrently in this PDSCH:

- DMRS ports [1004-1007] or [1006-1011] for config type 1/2 respectively are scheduled for the UE and co-scheduled UE(s) served on the same CDM group(s), and

- PTRS is transmitted to the UE receiving this PDSCH

Agreement 7: For DFT-s-OFDM DMRS tables reuse the entries that correspond to config-1, max 1-symbol and max 2-symbols, rank 1 with data TDMed with DMRS.

Agreement 8: Update the agreement related to the entries of the DMRS port tables in RAN1#91, by including the following max 2-symbol tables.
Discuss further after the Rel-15 Dec. specifications the addition of new entries, e.g., {7,9,11} for config-2 max 2-symbol 1 CW, the {1,5}, {3,7} for config-1 max 1-symbol, 1 CW, {0} SU-MIMO.

**Max 2-symbol FL, Config-1, (1-CW)**

| Index | DMRS port ID (+1000) | # CDM group(s) without data | Front-load symbol |
|---|---|---|---|
| 0 | 0 | 1 | 1 |
| 1 | 0 | 2 | 1 |
| 2 | 1 | 1 | 1 |
| 3 | 1 | 2 | 1 |
| 4 | 2 | 2 | 1 |
| 5 | 3 | 2 | 1 |
| 6 | 0,1 | 1 | 1 |
| 7 | 0,1 | 2 | 1 |
| 8 | 2,3 | 2 | 1 |
| 9 | 0,2 | 2 | 1 |
| 10 | 0,1,2 | 2 | 1 |
| 11 | 0,1,2,3 | 2 | 1 |
| 12 | 0 | 2 | 2 |
| 13 | 1 | 2 | 2 |
| 14 | 2 | 2 | 2 |
| 15 | 3 | 2 | 2 |
| 16 | 4 | 2 | 2 |
| 17 | 5 | 2 | 2 |
| 18 | 6 | 2 | 2 |
| 19 | 7 | 2 | 2 |
| 20 | 0,1 | 2 | 2 |
| 21 | 2,3 | 2 | 2 |
| 22 | 4,5 | 2 | 2 |
| 23 | 6,7 | 2 | 2 |
| 24 | 0,4 | 2 | 2 |
| 25 | 2,6 | 2 | 2 |
| 26 | 0,1,4 | 2 | 2 |
| 27 | 2,3,6 | 2 | 2 |
| 28 | 0,1,4,5 | 2 | 2 |
| 29 | 2,3,6,7 | 2 | 2 |
| 30 | 0,4,2,6 | 2 | 2 |
| 31 | reserved | reserved | reserved |

**Max 2-symbol FL, Config-1, (2-CW)**

| Index | DMRS port ID (+1000) | # CDM group(s) without data | Front-load symbol |
|---|---|---|---|
| | 0,1,2,3,4 | 2 | 2 |
| | 0,1,2,3,4,6 | 2 | 2 |
| | 0,1,2,3,4,5,6 | 2 | 2 |
| | 0,1,2,3,4,5,6,7 | 2 | 2 |

**Max 2-symbol, Config-2, (1-CW)**

| Index | DMRS port ID (+1000) | # CDM group(s) without data | Front-load symbol |
|---|---|---|---|
| 0 | 0 | 1 | 1 |
| 1 | 1 | 1 | 1 |
| 2 | 0,1 | 1 | 1 |
| 3 | 0 | 2 | 1 |
| 4 | 1 | 2 | 1 |
| 5 | 2 | 2 | 1 |
| 6 | 3 | 2 | 1 |
| 7 | 0,1 | 2 | 1 |
| 8 | 2,3 | 2 | 1 |
| 9 | 0-2 | 2 | 1 |
| 10 | 0-3 | 2 | 1 |
| 11 | 0 | 3 | 1 |
| 12 | 1 | 3 | 1 |
| 13 | 2 | 3 | 1 |
| 14 | 3 | 3 | 1 |
| 15 | 4 | 3 | 1 |
| 16 | 5 | 3 | 1 |
| 17 | 0,1 | 3 | 1 |
| 18 | 2,3 | 3 | 1 |
| 19 | 4,5 | 3 | 1 |
| 20 | 0-2 | 3 | 1 |
| 21 | 3-5 | 3 | 1 |
| 22 | 0-3 | 3 | 1 |
| 23 | 0,2 | 2 | 1 |
| 24 | 0 | 3 | 2 |
| 25 | 1 | 3 | 2 |
| 26 | 2 | 3 | 2 |
| 27 | 3 | 3 | 2 |
| 28 | 4 | 3 | 2 |
| 29 | 5 | 3 | 2 |

| | | | |
|---|---|---|---|
| 30 | 6 | 3 | 2 |
| 31 | 7 | 3 | 2 |
| 32 | 8 | 3 | 2 |
| 33 | 9 | 3 | 2 |
| 34 | 10 | 3 | 2 |
| 35 | 11 | 3 | 2 |
| 36 | 0,1 | 3 | 2 |
| 37 | 2,3 | 3 | 2 |
| 38 | 4,5 | 3 | 2 |
| 39 | 6,7 | 3 | 2 |
| 40 | 8,9 | 3 | 2 |
| 41 | 10,11 | 3 | 2 |
| 42 | 0,1,6 | 3 | 2 |
| 43 | 2,3,8 | 3 | 2 |
| 44 | 4,5,10 | 3 | 2 |
| 45 | 0,1,6,7 | 3 | 2 |
| 46 | 2,3,8,9 | 3 | 2 |
| 47 | 4,5,10,11 | 3 | 2 |
| 48 | 0 | 1 | 2 |
| 49 | 1 | 1 | 2 |
| 50 | 6 | 1 | 2 |
| 51 | 7 | 1 | 2 |
| 52 | 0,1 | 1 | 2 |
| 53 | 6,7 | 1 | 2 |
| 54 | 0,1 | 2 | 2 |
| 55 | 2,3 | 2 | 2 |
| 56 | 6,7 | 2 | 2 |
| 57 | 8,9 | 2 | 2 |
| 58-63 | reserved | reserved | reserved |

**Max 2-symbol front-load, Config-2, (2-CW)**

| Index | DMRS port ID (+1000) | # CDM group(s) without data | Front-load symbol |
|---|---|---|---|
| | 0,1,2,3,4 | 3 | 1 |
| | 0,1,2,3,4,5 | 3 | 1 |
| | 0,1,2,3,6 | 2 | 2 |
| | 0,1,2,3,6,8 | 2 | 2 |
| | 0,1,2,3,6,7,8 | 2 | 2 |
| | 0,1,2,3,6,7,8,9 | 2 | 2 |

[91-NR-13] – Xi (Huawei)
Email discussion on PTRS until Dec 6, 2017
**Done: According to Mr Chair's email decision posted on Dec.7th, following is agreed:**
**Agreement:**

- **As UE capability, at a given carrier frequency, for each subcarrier spacing applicable to data channel at this carrier frequency, UE shall report the preferred MCS/BW thresholds based on its phase noise characteristics, assuming the MCS table with the maximum ModOrder as it reported to support**
- **(working assumption) For reporting preferred layer for mapping PTRS using layer indicator (LI), support a LI field separate from other CSI, following the encoding rule of wideband PMI**
- **(working assumption) Before RRC configuration, PTRS is not used**
- **(working assumption) X={10 for MCS table with up to 64QAM, 5 for MCS table with up to 256QAM, corresponding to switch point between QPSK and 16QAM}, Y=3, X_UL=0, Y_UL=1 (for UL CFO tracking)**
- **Do not support in spec that UE may assume the layers corresponding to the scheduled DL DMRS ports in one DL DMRS port group are experiencing the same phase variations at gNB side due to phase noise**

[91-NR-14] – Hua (Huawei)
Proposals:

- If a UE is expected to transmit the long PUCCH over K slots with duration of N symbol in each slot, the UE is expected to do the following
  - If the UE receives the semi-static UL/DL configuration, the UE is expected to transmit the long PUCCH over K subsequent UL slots as configured that contain UL symbols >= N
  - Otherwise
    - if the UE does not receive any semi-static UL/DL configuration, and the UE detects a dynamic SFI, the UE is expected to transmit long PUCCH over K subsequent UL slots as indicated that contain UL symbols >= N
  - Otherwise
    - if the UE neither receives any semi-static UL/DL configuration, nor detects any dynamic SFI, the UE is expected to transmit long PUCCH over K consecutive slots.
  - For paired spectrum, the UE is expected to transmit the long PUCCH over K consecutive slots in UL.

Email discussion/approval till 12/6
**Done: According to Mr Chair's email decision posted on Dec.8th, following is agreed:**
Agreements:
When a UE receives a grant to transmit the long PUCCH over K slots where K is configured by higher layers, with duration of N symbol in each slot indicated by the DCI grant, with transmission starting in slot M, the UE is expected to do the following:

- If the UE receives the semi-static UL/DL configuration, the UE is expected to transmit the long PUCCH on the slot(s), starting from slot M, where the number of consecutive UL (FFS: and/or Unknown) symbols >= N starting at the starting symbol indicated by PUCCH resource allocation. This continues until the UE has transmitted K slot(s) of long PUCCH.
- If the UE does not receive any semi-static UL/DL configuration, the UE is expected to transmit long PUCCH over K consecutive slots, starting from slot M, starting at the starting symbol in each slot indicated by PUCCH resource allocation.

[91-NR-15] – Lihui (NTT DOCOMO)

Proposals:

- For UL transmission without UL grant, the initial transmission of the K repetitions of a TB can start at any configured transmission occasion within a period P, and repetitions end at the last transmission occasion within the period P, when the UE is configured with RV sequence of {0,0,0,0}
    - FFS additionally for {0, 3, 0, 3}
- When the UE is configured with RV sequence of {0,2,3,1}, the initial transmission of the K repetitions of a TB shall start at the first transmission occasion within a period
    - FFS RV sequence of {0,3,0,3}
- (Working assumption) The RV used for initial transmission is determined based on the following:
    - nth transmission occasion within the period is the *MOD (n, 4)*-th RV in the sequence

Email discussion/approval by 12/6

**Done: According to Mr Chair's email decision posted on Dec.7th, following is agreed:**

Agreement:

- For UL transmission without UL grant,
    - The n-th transmission occasion of a K repetitions is associated with the (mod(n-1,4)+1)-th value in the configured RV sequence {RV1, RV2, RV3, RV4}, where n=1, 2, …, K.
    - For RV sequence {0, 2, 3, 1},
        - The initial transmission of a TB shall start at the first transmission occasion of the K repetitions.
    - For RV sequence {0, 3, 0, 3},
        - The initial transmission of a TB can start at any of the transmission occasions of the K repetitions that are associated with RV=0.
    - (working assumption) For RV sequence {0, 0, 0, 0},
        - The initial transmission of a TB can start at any of the transmission occasions of the K repetitions when K=1, 2 or 4;
        - The initial transmission of a TB can start at any of the transmission occasions of the K repetitions, except-the last transmission occasion when K=8.
    - For any RV sequence, repetition end at the last transmission occasion within the period P.
    - Note: The transmission occasion (TO) refers to the time domain resource allocation of one repetition in an aggregation with factor K where the aggregated transmission occasions start in resources configured by the offset and the period.
    - FFS: interaction with SFI

[91-NR-16] – Ajit (Intel)

Further to the conclusion on TBS (see AI 7.3.3.5 - Soft-buffer management for NR), email discussion till 12/6 on the following:

Note: If the resulting TBS values are too close, then further quantization can be used.

**Done: According to Mr Chair's email decision posted on Dec.8th, following is agreed:**

Agreements:

- Confirm the WA on TBS_LBRM determination from RAN1#91 with following updates:
    - No additional quantization of TBS_LBRM
    - Change of X-to-n_PRB (according to Table shown below).

Table: Proposed change in X-to-n_PRB table

| | |
|---|---|
| 108 to ~~133~~ 135 | ~~133~~ 135 |
| ~~134~~ 136 to 162 | 162 |

[91-NR-17] – Bo (ZTE)
Email discussion on the SRS power control timing issue until Dec 6th.
**Done: According to Mr Chair's email decision posted on Dec.7th, following is agreed:**
Agreement:
- For SRS power control with independent SRS closed loop process, i.e., the SRS closed loop process not tied with PUSCH, the updating from 'i-1' to 'i' occurs at the beginning of first SRS resource transmission in the SRS resource set.
- h_SRS,c(i) = fc(i_PUSCH,l)" where updating of fc(i_PUSCH, l) follows that of the corresponding PUSCH power control and the updating of h_SRS,c(i) from 'i-1' to 'i' occurs at the beginning of a SRS resource-transmission and uses the most recent fc(i_PUSCH,l)

[91-NR-18] – Shinpei (NTT DOCOMO)
Email discussion on evaluation methodology for eV2X to start Jan. 1st and till next Jan. meeting
In light of the new RAN plenary guidance, the email discussion is updated as follows:
Email discussion on evaluation methodology for eV2X to start Feb 5th and till next Feb. meeting
**Done: Status to be checked in RAN1#92.**

Additional email discussion on ITU submission following RAN plenary guidance
[IMT-2020-Submission] - Wu Yong (Huawei)
Email discussion on self evaluation towards IMT-2020 submission, to start from Feb. 5th till Feb. meeting
**Done: Status to be checked in RAN1#92.**

**Annex G: List of participants at RAN1 #91**

Please see excel file attached to this report

**Annex H: TSG RAN WG1 meetings in 2018 – 2019**

| TITLE | TYPE | DATES | LOCATION | CTRY |
|---|---|---|---|---|
| 3GPPRAN1-AH-1801 | AH | 22 – 26 Jan 2018 | Vancouver | Canada |
| 3GPPRAN1#92 | WG | 26 Feb – 2 Mar 2018 | Athens | Greece |
| 3GPPRAN1#92bis | WG | 16 – 20 Apr 2018 | Sanya | China |
| 3GPPRAN1#93 | WG | 21 – 25 May 2018 | Busan | Korea |
| 3GPPRAN1#94 | WG | 20 – 24 Aug 2018 | Gothenburg | Sweden |
| 3GPPRAN1#94bis | WG | 8 – 12 Oct 2018 | Chengdu (TBC) | China |
| 3GPPRAN1#95 | WG | 12 – 16 Nov 2018 | TBD | US |

MEETING TYPES

| | | |
|---|---|---|
| AH = Ad Hoc | ST = Startup Meeting | RG = Rapporteurs Group |
| JM = Joint | WG = Working Group | SG = Steering Group |
| PM = Preparatory Meeting | CM = Chairmen's meeting | TG = Task Group |
| RM = Resolution Meeting | OR = Ordinary | XO = Extraordinary |

*End of document*

# APPENDIX C

| TDoc | Title | Source | Contact | Contact ID | Type | For | Abstract | Secretary Remarks | Agenda item sort order | Agenda item | Agenda item description | TDoc sort order within agenda item | TDoc Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R1-1719300 | Draft Agenda of RAN1#91 meeting | RAN1 Chair | Patrick Merias | 52292 | agenda | Approval | | | 1 | 2 | Approval of Agenda | 93000 | approved |
| R1-1719301 | Report of RAN1#90bis meeting | ETSI | Patrick Merias | 52292 | report | Approval | | | 3 | 4 | Approval of Minutes from previous meeting | 93010 | approved |
| R1-1719302 | Some Thoughts for RAN1 Management | RAN1 Chair | Patrick Merias | 52292 | other | Information | | | 3 | 4 | Approval of Minutes from previous meeting | 93020 | revised |
| R1-1719303 | FURTHER INFORMATION RELATED TO DRAFT NEW REPORT FOR IMT-2020 EVALUATION | ITU-R WP5D | Patrick Merias | 52292 | LS in | Information | | In order to reduce meeting time spent on this SI in WGs, the topic is mainly handled in the 3GPP ITU-R ad hoc but this requires that experts contribute there, i.e. interested delegates should subscribe to the email reflector 3GPP_TSG_RAN_AHG1 @list.etsi.o | 4 | 5 | Incoming Liaison Statements | 93030 | treated |
| R1-1719304 | Reply LS on FS_REAR study outcome | RAN2, Huawei | Patrick Merias | 52292 | LS in | | | | 4 | 5 | Incoming Liaison Statements | 93040 | noted |
| R1-1719305 | LS on Early Data Transmission | RAN2, Qualcomm | Patrick Merias | 52292 | LS in | | | | 4 | 5 | Incoming Liaison Statements | 93050 | treated |
| R1-1719306 | Response LS on NR Paging Occasion | RAN2, LG Electronics | Patrick Merias | 52292 | LS in | | | | 4 | 5 | Incoming Liaison Statements | 93060 | treated |
| R1-1719307 | LS on formula or table for L1 data rate | RAN2, Ericsson | Patrick Merias | 52292 | LS in | | | | 4 | 5 | Incoming Liaison Statements | 93070 | treated |
| R1-1719308 | Reply LS on mixed numerologies FDM operation | RAN2, Intel | Patrick Merias | 52292 | LS in | | | | 4 | 5 | Incoming Liaison Statements | 93080 | noted |
| R1-1719309 | LS on UE RF related parameters, capabilities and features for NR | RAN2, NTT DOCOMO | Patrick Merias | 52292 | LS in | | | | 4 | 5 | Incoming Liaison Statements | 93090 | treated |
| R1-1719310 | LS on SSTD measurements for EN-DC | RAN2, NTT DOCOMO | Patrick Merias | 52292 | LS in | | | | 4 | 5 | Incoming Liaison Statements | 93100 | noted |
| R1-1719311 | LS to RAN1 on the agreements on carrier and resource selection in CA | RAN2, LG Electronics | Patrick Merias | 52292 | LS in | | | | 4 | 5 | Incoming Liaison Statements | 93110 | treated |
| R1-1719312 | LS on RAN2 agreements related to BWP | RAN2, Huawei | Patrick Merias | 52292 | LS in | | | | 4 | 5 | Incoming Liaison Statements | 93120 | treated |
| R1-1719313 | LS on NR PBCH content | RAN2, Qualcomm | Patrick Merias | 52292 | LS in | | | | 4 | 5 | Incoming Liaison Statements | 93130 | treated |
| R1-1719314 | LS on CR for Reference Signals for MBSFN with 1.25kHz and 7.5khz sub-carrier spacing | RAN2, Qualcomm | Patrick Merias | 52292 | LS in | | | | 4 | 5 | Incoming Liaison Statements | 93140 | treated |
| R1-1719315 | LS on RAN2 agreements for Rel-15 LAA | RAN2, Ericsson | Patrick Merias | 52292 | LS in | | | | 4 | 5 | Incoming Liaison Statements | 93150 | treated |
| R1-1719316 | LS on RA Preamble Power Ramping | RAN2, Samsung | Patrick Merias | 52292 | LS in | | | | 4 | 5 | Incoming Liaison Statements | 93160 | treated |
| R1-1719317 | LS on RAN2 agreements related to PHR | RAN2, Samsung | Patrick Merias | 52292 | LS in | | | | 4 | 5 | Incoming Liaison Statements | 93170 | treated |
| R1-1719318 | LS on system information broadcast for CU/DU split scenario | RAN3, CATT | Patrick Merias | 52292 | LS in | | | | 4 | 5 | Incoming Liaison Statements | 93180 | noted |
| R1-1719319 | Reply LS on NR handover related parameters | RAN4, Intel | Patrick Merias | 52292 | LS in | | | | 4 | 5 | Incoming Liaison Statements | 93190 | noted |
| R1-1719320 | LS reply to PRACH BW aspects | RAN4, Samsung | Patrick Merias | 52292 | LS in | | | | 4 | 5 | Incoming Liaison Statements | 93200 | treated |
| R1-1719321 | LS reply on Support for fake gNB detection mechanisms | RAN4, Ericsson | Patrick Merias | 52292 | LS in | | | | 4 | 5 | Incoming Liaison Statements | 93210 | noted |
| R1-1719322 | Reply LS to R1-1715304 LS on minimum time for DL-to-UL and UL-to-DL switching on one NB-IoT carrier for TDD NB-IoT UEs | RAN4, Ericsson | Patrick Merias | 52292 | LS in | | | | 4 | 5 | Incoming Liaison Statements | 93220 | treated |
| R1-1719323 | LS reply on the Power Splitting across Different TTI Lengths in UL | RAN4, Huawei | Patrick Merias | 52292 | LS in | | | | 4 | 5 | Incoming Liaison Statements | 93230 | treated |
| R1-1719324 | LS to RAN1 on NR UE transient time for FR1 and FR2 | RAN4, Ericsson | Patrick Merias | 52292 | LS in | | | | 4 | 5 | Incoming Liaison Statements | 93240 | treated |
| R1-1719325 | LS on single Tx switched UL | RAN4, Apple | Patrick Merias | 52292 | LS in | | | | 4 | 5 | Incoming Liaison Statements | 93250 | noted |
| R1-1719326 | Reply LS on implication of sTTI operation on UL ON/OFF time mask | RAN4, Qualcomm | Patrick Merias | 52292 | LS in | | | | 4 | 5 | Incoming Liaison Statements | 93260 | treated |
| R1-1719327 | LS reply on UE Power Class and Power Control | RAN4, Intel | Patrick Merias | 52292 | LS in | | | | 4 | 5 | Incoming Liaison Statements | 93270 | treated |
| R1-1719328 | Reply LS CSI-RS patterns and densities | RAN4, Nokia | Patrick Merias | 52292 | LS in | | | | 4 | 5 | Incoming Liaison Statements | 93280 | treated |
| R1-1719329 | Reply LS on UE capability signalling for sTTI configurations | RAN4, Ericsson | Patrick Merias | 52292 | LS in | | | | 4 | 5 | Incoming Liaison Statements | 93290 | treated |
| R1-1719330 | LS to RAN5 cc RAN1 and RAN2 on UE beamlock function | RAN4, Keysight | Patrick Merias | 52292 | LS in | | | | 4 | 5 | Incoming Liaison Statements | 93300 | noted |
| R1-1719331 | LS reply to subcarrier alignment | RAN4, Huawei | Patrick Merias | 52292 | LS in | | | | 4 | 5 | Incoming Liaison Statements | 93310 | treated |
| R1-1719332 | LS reply on NR UE baseband capabilities signalling | RAN4, Intel | Patrick Merias | 52292 | LS in | | | | 4 | 5 | Incoming Liaison Statements | 93320 | noted |
| R1-1719333 | Reply LS on measurement accuracy improvement | RAN4, Huawei | Patrick Merias | 52292 | LS in | | | | 4 | 5 | Incoming Liaison Statements | 93330 | treated |
| R1-1719334 | Reply LS on NR initial access and mobility | RAN4, ZTE | Patrick Merias | 52292 | LS in | | | | 4 | 5 | Incoming Liaison Statements | 93340 | treated |
| R1-1719335 | LS on gaps for SS block measurement in NR | RAN4, Ericsson | Patrick Merias | 52292 | LS in | | | | 4 | 5 | Incoming Liaison Statements | 93350 | noted |
| R1-1719336 | LS to RAN1 and RAN2 on Definition of synchronous and asynchronous Dual connectivity in Rel-15 LTE-NR combinations | RAN4, Ericsson | Patrick Merias | 52292 | LS in | | | | 4 | 5 | Incoming Liaison Statements | 93360 | treated |
| R1-1719337 | LS on PRB grid in the NR | RAN4, Nokia | Patrick Merias | 52292 | LS in | | | | 4 | 5 | Incoming Liaison Statements | 93370 | treated |
| R1-1719338 | LS on FS_REAR SI conclusion | SA2, Huawei | Patrick Merias | 52292 | LS in | | | | 4 | 5 | Incoming Liaison Statements | 93380 | treated |
| R1-1719339 | Reply LS to RAN 2 on QCIs for EPC based ULLC | SA2, Vodafone | Patrick Merias | 52292 | LS in | | | | 4 | 5 | Incoming Liaison Statements | 93390 | noted |
| R1-1719340 | Remaining details of Synchronization Signal Design | ZTE, Sanechips | Yifei Yuan | 58525 | discussion | | | | 88 | 7.1.1 | Remaining Details on Synchronization signal | 93400 | available |
| R1-1719341 | Remaining details of NR-PBCH Design | ZTE, Sanechips | Yifei Yuan | 58525 | discussion | | | | 90 | 7.1.2.1 | Remaining details on NR-PBCH | 93410 | available |
| R1-1719342 | Remaining details of RMSI | ZTE, Sanechips | Yifei Yuan | 58525 | discussion | | | | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 93420 | available |
| R1-1719343 | OSI Delivery | ZTE, Sanechips | Yifei Yuan | 58525 | discussion | | | | 92 | 7.1.2.3 | Remaining details on other system information delivery | 93430 | available |
| R1-1719344 | Paging design | ZTE, Sanechips | Yifei Yuan | 58525 | discussion | | | | 93 | 7.1.3 | Remaining details on Paging design | 93440 | available |
| R1-1719345 | PRACH Resource Configuration | ZTE, Sanechips | Yifei Yuan | 58525 | discussion | | | | 95 | 7.1.4.1 | Remaining details on PRACH formats | 93450 | available |
| R1-1719346 | Remaining details of RACH procedure | ZTE, Sanechips | Yifei Yuan | 58525 | discussion | | | | 96 | 7.1.4.2 | Remaining details on RACH procedure | 93460 | available |
| R1-1719347 | Remaining details of RRM measurements | ZTE, Sanechips | Yifei Yuan | 58525 | discussion | | | | 98 | 7.1.5.1 | Remaining details on measurement for mobility management | 93470 | available |
| R1-1719348 | Remaining details of RLM | ZTE, Sanechips | Yifei Yuan | 58525 | discussion | | | | 99 | 7.1.5.2 | Remaining details Radio link monitoring for mobility management | 93480 | available |
| R1-1719349 | Reduced system acquisition time for MTC | Ericsson | Johan Bergman | 51222 | discussion | Decision | | | 52 | 6.2.5.1 | Reduced system acquisition time | 93490 | available |
| R1-1719350 | Early data transmission for MTC | Ericsson | Johan Bergman | 51222 | discussion | Decision | | | 53 | 6.2.5.2 | Early data transmission | 93500 | available |
| R1-1719351 | Downlink channel power efficiency for MTC | Ericsson | Johan Bergman | 51222 | discussion | Decision | | | 54 | 6.2.5.3 | Downlink channel power efficiency | 93510 | available |
| R1-1719352 | Uplink HARQ-ACK feedback for MTC | Ericsson | Johan Bergman | 51222 | discussion | Decision | | | 55 | 6.2.5.4 | Uplink HARQ-ACK feedback | 93520 | available |
| R1-1719353 | Increased PDSCH spectral efficiency for MTC | Ericsson | Johan Bergman | 51222 | discussion | Decision | | | 56 | 6.2.5.5 | Increased PDSCH spectral efficiency | 93530 | available |
| R1-1719354 | Increased PUSCH spectral efficiency for MTC | Ericsson | Johan Bergman | 51222 | discussion | Decision | | | 57 | 6.2.5.6 | Increased PUSCH spectral efficiency | 93540 | available |
| R1-1719355 | Wake-up signal functions for NB-IoT | Ericsson | Johan Bergman | 51222 | discussion | Decision | | | 62 | 6.2.6.1.1.1 | Wake-up signal functions | 93550 | available |
| R1-1719356 | Wake-up signal configurations and procedures for NB-IoT | Ericsson | Johan Bergman | 51222 | discussion | Decision | | | 63 | 6.2.6.1.1.2 | Wake-up signal configurations and procedures | 93560 | available |
| R1-1719357 | Detailed design of wake-up signal for NB-IoT | Ericsson | Johan Bergman | 51222 | discussion | Decision | | | 64 | 6.2.6.1.1.3 | Detailed design of wake-up signal | 93570 | available |
| R1-1719358 | Data transmission during random access procedure for NB-IoT | Ericsson | Johan Bergman | 51222 | discussion | Decision | | | 65 | 6.2.6.1.2 | Data transmission during the random access procedure | 93580 | available |
| R1-1719359 | Cell search time reduction for NB-IoT | Ericsson | Johan Bergman | 51222 | discussion | Decision | | | 67 | 6.2.6.2.1 | Cell search | 93590 | available |

| TDoc | Title | Source | Contact | Contact ID | Type | For | Abstract | Secretary Remarks | Agenda item sort order | Agenda item | Agenda item description | TDoc sort order within agenda item | TDoc Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R1-1719360 | System information acquisition time reduction for NB-IoT | Ericsson | Johan Bergman | 51222 | discussion | Decision | | | 68 | 6.2.6.2.2 | System Information | 93600 | available |
| R1-1719361 | DL aspects of TDD for NB-IoT | Ericsson | Johan Bergman | 51222 | discussion | Decision | | | 70 | 6.2.6.3.1 | Downlink aspects | 93610 | available |
| R1-1719362 | UL aspects of TDD for NB-IoT | Ericsson | Johan Bergman | 51222 | discussion | Decision | | | 71 | 6.2.6.3.2 | Uplink aspects | 93620 | available |
| R1-1719363 | DL/UL common aspects of TDD for NB-IoT | Ericsson | Johan Bergman | 51222 | discussion | Decision | | | 72 | 6.2.6.3.3 | Common aspects | 93630 | available |
| R1-1719364 | Physical layer scheduling request for NB-IoT | Ericsson | Johan Bergman | 51222 | discussion | Decision | | | 73 | 6.2.6.4 | Other | 93640 | available |
| R1-1719365 | Semi-persistent scheduling for NB-IoT | Ericsson | Johan Bergman | 51222 | discussion | Decision | | | 73 | 6.2.6.4 | Other | 93650 | available |
| R1-1719366 | Narrowband measurement accuracy improvements for NB-IoT | Ericsson | Johan Bergman | 51222 | discussion | Decision | | | 73 | 6.2.6.4 | Other | 93660 | available |
| R1-1719367 | NPRACH false alarm reduction for NB-IoT | Ericsson | Johan Bergman | 51222 | discussion | Decision | | | 73 | 6.2.6.4 | Other | 93670 | available |
| R1-1719368 | NPRACH range enhancements for NB-IoT | Ericsson | Johan Bergman | 51222 | discussion | Decision | | | 73 | 6.2.6.4 | Other | 93680 | available |
| R1-1719369 | Small-cell support for NB-IoT | Ericsson | Johan Bergman | 51222 | discussion | Decision | | | 73 | 6.2.6.4 | Other | 93690 | available |
| R1-1719370 | Remaining issues on NR SS Blocks | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 88 | 7.1.1 | Remaining Details on Synchronization signal | 93700 | available |
| R1-1719371 | Remaining issues in PBCH | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 90 | 7.1.2.1 | Remaining details on NR-PBCH | 93710 | available |
| R1-1719372 | RMSI Delivery | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 93720 | available |
| R1-1719373 | Finalization of NR Paging | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 93 | 7.1.3 | Remaining details on Paging design | 93730 | available |
| R1-1719374 | Remaining issues in RACH Procedure | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 96 | 7.1.4.2 | Remaining details on RACH procedure | 93740 | revised |
| R1-1719375 | Remaining issues in RACH formats | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 95 | 7.1.4.1 | Remaining details on PRACH formats | 93750 | available |
| R1-1719376 | Remaining details on Radio link monitoring in NR | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 99 | 7.1.5.2 | Remaining details Radio link monitoring for mobility management | 93760 | available |
| R1-1719377 | Remaining details on NR RRM | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 98 | 7.1.5.1 | Remaining details on measurement for mobility management | 93770 | available |
| R1-1719378 | Capacity shortfall solution for agreed NR PRACH formats | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 100 | 7.1.6 | Other | 93780 | available |
| R1-1719379 | Remaining issues on initial DL/UL active bandwidth part | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 100 | 7.1.6 | Other | 93790 | available |
| R1-1719380 | Remaining issues on bandwidth part | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 153 | 7.3.4.1 | Other aspects on bandwidth Parts | 93800 | available |
| R1-1719381 | Resource allocation and TBS | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 145 | 7.3.3.1 | DL/UL resource allocation | 93810 | available |
| R1-1719382 | Remaining issues on reserved resources and rate-matching | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 155 | 7.3.5 | Remaining details on rate matching aspects for NR DL and UL | 93820 | available |
| R1-1719383 | Remaining issues on NR CA and DC including SRS switching | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 154 | 7.3.4.2 | Other aspects on carrier aggregation | 93830 | available |
| R1-1719384 | Draft reply LS on PRB grid in the NR | Huawei, HiSilicon | Brian Classon | 45750 | LS out | Decision | | | 4 | 5 | Incoming Liaison Statements | 93840 | noted |
| R1-1719385 | Draft reply LS on wideband operation | Huawei, HiSilicon | Brian Classon | 45750 | LS out | Decision | | | 4 | 5 | Incoming Liaison Statements | 93850 | noted |
| R1-1719386 | On NR-PDCCH structure | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 127 | 7.3.1.1 | Remaining details on PDCCH structure | 93860 | available |
| R1-1719387 | CORESET configuration and search space design | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 128 | 7.3.1.2 | Remaining details on Search space | 93870 | available |
| R1-1719388 | Remaining details of group-common PDCCH | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 129 | 7.3.1.3 | Remaining details on group-common PDCCH | 93880 | available |
| R1-1719389 | DCI contents and formats in NR | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 130 | 7.3.1.4 | DCI contents and formats | 93890 | available |
| R1-1719390 | Dynamic and semi-static DL/UL resource partition | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 131 | 7.3.1.5 | Other | 93900 | available |
| R1-1719391 | Short PUCCH for UCI of up to 2 bits | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 134 | 7.3.2.1.1 | Short-PUCCH for UCI of up to 2 bits | 93910 | noted |
| R1-1719392 | Short PUCCH for UCI of more than 2 bits | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 135 | 7.3.2.1.2 | Short-PUCCH for UCI of more than 2 bits | 93920 | available |
| R1-1719393 | Short PUCCH over 2 OFDM symbols | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 136 | 7.3.2.1.3 | Support of short-PUCCH over 2 OFDM symbols | 93930 | available |
| R1-1719394 | Long PUCCH for UCI of up to 2 bits | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 138 | 7.3.2.2.1 | Long-PUCCH for UCI of up to 2 bits | 93940 | available |
| R1-1719395 | Long-PUCCH for UCI of more than 2 bits | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 139 | 7.3.2.2.2 | Long-PUCCH for UCI of more than 2 bits | 93950 | available |
| R1-1719396 | Support of long-PUCCH over multiple slots | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 140 | 7.3.2.2.3 | Support of long-PUCCH over multiple slots | 93960 | available |
| R1-1719397 | On UCI multiplexing | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 141 | 7.3.2.3 | UCI multiplexing | 93970 | available |
| R1-1719398 | Resource allocation for PUCCH HARQ-ACK feedback | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 142 | 7.3.2.4 | Resource allocation for PUCCH | 93980 | available |
| R1-1719399 | Soft buffer management in NR and LTE-NR DC | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 149 | 7.3.3.5 | Soft-buffer management for NR | 93990 | available |
| R1-1719400 | On CBG-based (re)transmission | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 147 | 7.3.3.3 | CBG-based (re)transmission | 94000 | available |
| R1-1719401 | Remaining issues on HARQ | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 146 | 7.3.3.2 | DL/UL scheduling and HARQ management | 94010 | available |
| R1-1719402 | Remaining aspects on pre-emption indication for DL multiplexing of URLLC and eMBB | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 150 | 7.3.3.6 | Multiplexing data with different transmission durations | 94020 | revised |
| R1-1719403 | Support of 60 kHz subcarrier spacing | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 151 | 7.3.3.7 | Other | 94030 | revised |
| R1-1719404 | On supporting ultra reliability in a resource efficient way | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 151 | 7.3.3.7 | Other | 94040 | available |
| R1-1719405 | UE procedure of PDCCH monitoring for URLLC | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 131 | 7.3.1.5 | Other | 94050 | available |
| R1-1719406 | PDCCH reliability for URLLC | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 131 | 7.3.1.5 | Other | 94060 | available |
| R1-1719407 | PDSCH reliability for URLLC | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 151 | 7.3.3.7 | Other | 94070 | available |
| R1-1719408 | DCI design for URLLC | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 131 | 7.3.1.5 | Other | 94080 | available |
| R1-1719409 | Discussion on UL multiplexing of eMBB and URLLC | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 151 | 7.3.3.7 | Other | 94090 | available |
| R1-1719410 | Consideration on subsequent transmission after pre-emption | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 151 | 7.3.3.7 | Other | 94100 | available |
| R1-1719411 | UL data transmission procedure without UL grant | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 148 | 7.3.3.4 | UL data transmission procedure | 94110 | available |
| R1-1719412 | Link adaption and CSI reporting for URLLC transmission | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 151 | 7.3.3.7 | Other | 94120 | available |
| R1-1719413 | Discussion on UCI feedback for URLLC | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 143 | 7.3.2.5 | Other | 94130 | available |
| R1-1719414 | Discussion on over-the-air time synchronization for URLLC | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 151 | 7.3.3.7 | Other | 94140 | available |
| R1-1719415 | Remaining issues on scheduling, feedback and power control for SUL | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 166 | 7.5 | NR-LTE co-existence | 94150 | noted |
| R1-1719416 | SFI interpretation for NR paired and non-paired spectra | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 171 | 7.7 | Aspects related to FDD | 94160 | withdrawn |
| R1-1719417 | General consideration on self evaluation towards IMT-2020 | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 172 | 7.8 | Other | 94170 | available |
| R1-1719418 | Consideration on self evaluation of eMBB spectral efficiency for IMT-2020 | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 172 | 7.8 | Other | 94180 | available |
| R1-1719419 | Consideration on self evaluation of peak spectral efficiency and peak data rate for IMT-2020 | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 172 | 7.8 | Other | 94190 | noted |
| R1-1719420 | Consideration on self evaluation of NR latency and mobility interruption time for IMT-2020 | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 172 | 7.8 | Other | 94200 | available |
| R1-1719421 | Consideration on self evaluation of mMTC for IMT-2020 | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 172 | 7.8 | Other | 94210 | available |
| R1-1719422 | Beam measurement, reporting and indication | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 111 | 7.2.2.3 | Remaining details on beam measurement and reporting | 94220 | available |
| R1-1719423 | Remaining details on beam failure recovery | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 112 | 7.2.2.4 | Remaining details on mechanism to recover from beam failure | 94230 | available |
| R1-1719424 | Channel and interference measurement for CSI acquisition | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 109 | 7.2.2.1 | Remaining details on CSI measurement | 94240 | available |
| R1-1719425 | Remaining issues for CSI reporting | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 110 | 7.2.2.2 | Remaining details on CSI reporting | 94250 | available |
| R1-1719426 | Remaining issues for CSI framework | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 114 | 7.2.2.6 | Other | 94260 | available |
| R1-1719427 | Signaling design for CSI reporting | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 114 | 7.2.2.6 | Other | 94270 | available |

| TDoc | Title | Source | Contact | Contact ID | Type | For | Abstract | Secretary Remarks | Agenda item sort order | Agenda item | Agenda item description | TDoc sort order within agenda item | TDoc Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R1-1719428 | Remaining issues for codebook subset restriction | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 114 | 7.2.2.6 | Other | 94280 | available |
| R1-1719429 | Remaining details of CQI and MCS design | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 113 | 7.2.2.5 | Remaining details on CQI and MCS | 94290 | revised |
| R1-1719430 | Remaining details of codeword mapping in NR | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 103 | 7.2.1.1 | Remaining details on codeword mapping | 94300 | available |
| R1-1719431 | Remaining details of non-codebook based transmission for UL MIMO | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 105 | 7.2.1.3 | Remaining details on non-codebook based transmission for UL | 94310 | available |
| R1-1719432 | Remaining details on PRB bundling size for DL data precoding | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 106 | 7.2.1.4 | Remaining details on PRB bundling for DL | 94320 | available |
| R1-1719433 | Remaining details for codebook based transmission for UL MIMO | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 104 | 7.2.1.2 | Remaining details on codebook based transmission for UL | 94330 | available |
| R1-1719434 | Remaining details of UL power control design | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 94340 | available |
| R1-1719435 | Designs on power headroom calculation and reporting | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 170 | 7.6.3 | Other | 94350 | available |
| R1-1719436 | Power control for CA | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 169 | 7.6.2 | Remaining details on NR UL power control – CA aspects | 94360 | available |
| R1-1719437 | Multiplexing RSs and other signals | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 116 | 7.2.3.1 | Remaining details on Multiplexing of different types of RSs | 94370 | available |
| R1-1719438 | Remaining details on CSI-RS design in NR | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 117 | 7.2.3.2 | Remaining details on CSI-RS | 94380 | available |
| R1-1719439 | Summary of email discussion on CSI-RS open issues | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 117 | 7.2.3.2 | Remaining details on CSI-RS | 94390 | available |
| R1-1719440 | Remaining issues of PTRS | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 119 | 7.2.3.4 | Remaining details on PT-RS | 94400 | available |
| R1-1719441 | Remaining details of SRS design | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 120 | 7.2.3.5 | Remaining details on SRS | 94410 | available |
| R1-1719442 | Remaining details for CSI-RS for fine time and frequency tracking | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 121 | 7.2.3.6 | Remaining details on TRS | 94420 | available |
| R1-1719443 | Remaining details of QCL assumptions | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 122 | 7.2.3.7 | Remaining details on QCL | 94430 | available |
| R1-1719444 | Design of DL/UL DMRS for data transmission | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 118 | 7.2.3.3 | Remaining details on DMRS | 94440 | available |
| R1-1719445 | Signaling of DMRS ports for SU/MU-MIMO | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 123 | 7.2.3.8 | Other | 94450 | available |
| R1-1719446 | Remaining details on SRS switching among CCs | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 123 | 7.2.3.8 | Other | 94460 | available |
| R1-1719447 | Remaining details on shortened processing time for 1ms TTI | Huawei, HiSilicon | Yan Cheng | 58585 | discussion | Decision | | Changed from other to discussion and decision to align with the contribution. | 16 | 6.2.1.1 | Remaining details on shortened processing time for 1ms TTI | 94470 | available |
| R1-1719448 | Aspects related to interaction between different TTI lengths | Huawei, HiSilicon | Yan Cheng | 58585 | discussion | Decision | | Changed from other to discussion and decision to align with the contribution. | 18 | 6.2.1.2.1 | Remaining aspects related to interaction between different TTI lengths | 94480 | available |
| R1-1719449 | Remaining details on DL control channel design | Huawei, HiSilicon | Yan Cheng | 58585 | discussion | Decision | | Changed from other to discussion and decision to align with the contribution. | 19 | 6.2.1.2.2 | Remaining details on DL control channel design | 94490 | available |
| R1-1719450 | sPDCCH multiplexing with data | Huawei, HiSilicon | Yan Cheng | 58585 | discussion | Decision | | | 24 | 6.2.1.2.7 | Other | 94500 | available |
| R1-1719451 | Remaining details on UL control channel design | Huawei, HiSilicon | Yan Cheng | 58585 | discussion | Decision | | Changed from other to discussion and decision to align with the contribution. | 20 | 6.2.1.2.3 | Remaining details on UL control channel design | 94510 | available |
| R1-1719452 | sPDSCH and DL DMRS design for short TTI | Huawei, HiSilicon | Yan Cheng | 58585 | discussion | Decision | | Changed from other to discussion and decision to align with the contribution. | 21 | 6.2.1.2.4 | Remaining details on DL data channel design | 94520 | available |
| R1-1719453 | sPUSCH and UL DMRS design for sPUSCH | Huawei, HiSilicon | Yan Cheng | 58585 | discussion | Decision | | Changed from other to discussion and decision to align with the contribution. | 22 | 6.2.1.2.5 | Remaining details on UL data channel design | 94530 | available |
| R1-1719454 | Maximum TA and processing time reduction | Huawei, HiSilicon | Yan Cheng | 58585 | discussion | Decision | | | 25 | 6.2.1.3 | Remaining details on maximum TA and processing time | 94540 | available |
| R1-1719455 | sPUSCH and sPUCCH power control | Huawei, HiSilicon | Yan Cheng | 58585 | discussion | Decision | | | 24 | 6.2.1.2.7 | Other | 94550 | available |
| R1-1719456 | Soft buffer for short TTI | Huawei, HiSilicon | Yan Cheng | 58585 | discussion | Decision | | | 24 | 6.2.1.2.7 | Other | 94560 | available |
| R1-1719457 | TDD-specific design for short TTI | Huawei, HiSilicon | Yan Cheng | 58585 | discussion | Decision | | Changed from other to discussion and decision to align with the contribution. | 23 | 6.2.1.2.6 | Remaining details on FS2 aspects | 94570 | available |
| R1-1719458 | Remaining Issues for UL Polar Code Construction | Tsofun Algorithm | Alexander Smekhov | 71316 | discussion | | | | 162 | 7.4.2.1 | Uplink CRCs | 94580 | withdrawn |
| R1-1719459 | Channel Coding for URLLC | Tsofun Algorithm | Alexander Smekhov | 71316 | discussion | | | | 157 | 7.4 | Channel coding | 94590 | withdrawn |
| R1-1719460 | LS on UE baseband processing capability | RAN2, NTT DOCOMO | Patrick Merias | 52292 | LS in | | | | 4 | 5 | Incoming Liaison Statements | 94600 | treated |
| R1-1719461 | Cell search and system information acquisition improvements in eFeMTC | Huawei, HiSilicon | Matthew Webb | 45858 | discussion | Decision | | | 52 | 6.2.5.1 | Reduced system acquisition time | 94610 | available |
| R1-1719462 | Early data transmission for eFeMTC | Huawei, HiSilicon | Matthew Webb | 45858 | discussion | Decision | | | 53 | 6.2.5.2 | Early data transmission | 94620 | available |
| R1-1719463 | On 'wake-up signal' for eFeMTC | Huawei, HiSilicon | Matthew Webb | 45858 | discussion | Decision | | | 54 | 6.2.5.3 | Downlink channel power efficiency | 94630 | available |
| R1-1719464 | Further considerations on HARQ-ACK feedback for PUSCH in eFeMTC | Huawei, HiSilicon | Matthew Webb | 45858 | discussion | Decision | | | 55 | 6.2.5.4 | Uplink HARQ-ACK feedback | 94640 | available |
| R1-1719465 | On Sub-RB resource allocation for MTC PUSCH | Huawei, HiSilicon | Matthew Webb | 45858 | discussion | Decision | | | 57 | 6.2.5.6 | Increased PUSCH spectral efficiency | 94650 | available |
| R1-1719466 | Interference detection for drones | Huawei, HiSilicon | Matthew Webb | 45858 | discussion | Decision | | | 78 | 6.2.7.4 | Interference Detection | 94660 | available |
| R1-1719467 | DL enhancements for drones | Huawei, HiSilicon | Matthew Webb | 45858 | discussion | Decision | | | 76 | 6.2.7.2 | DL Interference Mitigation | 94670 | noted |
| R1-1719468 | Positioning for drones | Huawei, HiSilicon | Matthew Webb | 45858 | discussion | Decision | | | 81 | 6.2.7.7 | Other | 94680 | available |
| R1-1719469 | Baseline evaluation for drones | Huawei, HiSilicon | Matthew Webb | 45858 | discussion | Decision | | | 75 | 6.2.7.1 | Baseline Evaluation Results | 94690 | available |
| R1-1719470 | On functions of power saving signal | Huawei, HiSilicon | Matthew Webb | 45858 | discussion | Decision | | | 62 | 6.2.6.1.1.1 | Wake-up signal functions | 94700 | available |
| R1-1719471 | On configurations and procedures of power saving signal | Huawei, HiSilicon | Matthew Webb | 45858 | discussion | Decision | | | 63 | 6.2.6.1.1.2 | Wake-up signal configurations and procedures | 94710 | available |
| R1-1719472 | On detailed design and evaluations of power saving signal | Huawei, HiSilicon | Matthew Webb | 45858 | discussion | Decision | | | 64 | 6.2.6.1.1.3 | Detailed design of wake-up signal | 94720 | available |
| R1-1719473 | Use cases and design for physical layer scheduling request | Huawei, HiSilicon | Matthew Webb | 45858 | discussion | Decision | | | 73 | 6.2.6.4 | Other | 94730 | available |
| R1-1719474 | On support of semi-persistent scheduling | Huawei, HiSilicon | Matthew Webb | 45858 | discussion | Decision | | | 73 | 6.2.6.4 | Other | 94740 | available |
| R1-1719475 | Early data transmission in RACH for NB-IoT | Huawei, HiSilicon | Matthew Webb | 45858 | discussion | Decision | | | 65 | 6.2.6.1.2 | Data transmission during the random access procedure | 94750 | available |
| R1-1719476 | Common aspects for TDD NB-IoT | Huawei, HiSilicon | Matthew Webb | 45858 | discussion | Decision | | | 72 | 6.2.6.3.3 | Common aspects | 94760 | available |
| R1-1719477 | On downlink TDD NB-IoT | Huawei, HiSilicon | Matthew Webb | 45858 | discussion | Decision | | | 70 | 6.2.6.3.1 | Downlink aspects | 94770 | available |
| R1-1719478 | On uplink TDD NB-IoT | Huawei, HiSilicon | Matthew Webb | 45858 | discussion | Decision | | | 71 | 6.2.6.3.2 | Uplink aspects | 94780 | available |
| R1-1719479 | Remaining details of NB-IoT measurements improvement | Huawei, HiSilicon, Neul | Matthew Webb | 45858 | discussion | Decision | | | 73 | 6.2.6.4 | Other | 94790 | available |
| R1-1719480 | NPRACH enhancement for cell radius extension | Huawei, HiSilicon | Matthew Webb | 45858 | discussion | Decision | | | 73 | 6.2.6.4 | Other | 94800 | available |
| R1-1719481 | On NPRACH false alarm reduction due to inter-cell interference | Huawei, HiSilicon | Matthew Webb | 45858 | discussion | Decision | | | 73 | 6.2.6.4 | Other | 94810 | available |
| R1-1719482 | On the support of NB-IoT small cell | Huawei, HiSilicon | Matthew Webb | 45858 | discussion | Decision | | | 73 | 6.2.6.4 | Other | 94820 | available |
| R1-1719483 | Reduction of NB-IoT synchronization time | Huawei, HiSilicon, Neul | Matthew Webb | 45858 | discussion | Decision | | | 67 | 6.2.6.2.1 | Cell search | 94830 | available |
| R1-1719484 | Reduction of NB-IoT system information acquisition time | Huawei, HiSilicon, Neul | Matthew Webb | 45858 | discussion | Decision | | | 68 | 6.2.6.2.2 | System Information | 94840 | revised |
| R1-1719485 | On Rel-14 NB-IoT RACH power control | Huawei, HiSilicon | Matthew Webb | 45858 | discussion | Decision | | Changed from other to discussion and decision. Release and work item code are missing. | 12 | 6.1.6 | Maintenance of Release 14 Enhancements of NB-IoT for LTE | 94850 | noted |
| R1-1719486 | Correction of interference in NB-IoT RACH procedure | Huawei, HiSilicon | Matthew Webb | 45858 | draftCR | Decision | | Changed from empty to decision. | 12 | 6.1.6 | Maintenance of Release 14 Enhancements of NB-IoT for LTE | 97240 | revised |
| R1-1719487 | Reliability evaluations for drones | Huawei, HiSilicon | Matthew Webb | 45858 | discussion | Decision | | | 79 | 6.2.7.5 | Evaluation Results on Reliability | 94870 | available |

| TDoc | Title | Source | Contact | Contact ID | Type | For | Abstract | Secretary Remarks | Agenda item sort order | Agenda item | Agenda item description | TDoc sort order within agenda item | TDoc Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R1-1719488 | UL transmission power control | Mitsubishi Electric Co. | Fumihiro Hasegawa | 61720 | discussion | Decision | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 94880 | available |
| R1-1719489 | Remaining issues on NR PDCCH structure | ZTE, Sanechips | Yifei Yuan | 58525 | discussion | | | | 127 | 7.3.1.1 | Remaining details on PDCCH structure | 94890 | available |
| R1-1719490 | About DCI contents | ZTE, Sanechips | Yifei Yuan | 58525 | discussion | | | | 130 | 7.3.1.4 | DCI contents and formats | 94900 | available |
| R1-1719491 | Considerations on resource allocation issues | ZTE, Sanechips | Yifei Yuan | 58525 | discussion | | | | 145 | 7.3.3.1 | DL/UL resource allocation | 94910 | available |
| R1-1719492 | On CBG-based (re)transmission | ZTE, Sanechips | Yifei Yuan | 58525 | discussion | | | | 147 | 7.3.3.3 | CBG-based (re)transmission | 94920 | available |
| R1-1719493 | Considerations for soft-buffer management | ZTE, Sanechips | Yifei Yuan | 58525 | discussion | | | | 149 | 7.3.3.5 | Soft-buffer management for NR | 94930 | available |
| R1-1719494 | Remaining issues for preemption indication | ZTE, Sanechips | Yifei Yuan | 58525 | discussion | | | | 150 | 7.3.3.6 | Multiplexing data with different transmission durations | 94940 | available |
| R1-1719495 | About dynamic resource sharing | ZTE, Sanechips | Yifei Yuan | 58525 | discussion | | | | 155 | 7.3.5 | Remaining details on rate matching aspects for NR DL and UL | 94950 | available |
| R1-1719496 | FDD aspects of NR | ZTE, Sanechips | Yifei Yuan | 58525 | discussion | | | | 171 | 7.7 | Aspects related to FDD | 94960 | available |
| R1-1719497 | Support for partial subframe transmission for UL on SCell with frame structure 3 | Huawei, HiSilicon | Brian Classon | 45750 | discussion | Decision | | | 33 | 6.2.2.2.4 | Other | 94970 | available |
| R1-1719498 | Remaining issues for AUL resource allocation | Huawei, HiSilicon | Brian Classon | 45750 | discussion | Decision | | | 30 | 6.2.2.2.1 | Resource allocation for autonomous UL access | 94980 | available |
| R1-1719499 | Remaining issues for AUL HARQ operation | Huawei, HiSilicon | Brian Classon | 45750 | discussion | Decision | | | 31 | 6.2.2.2.2 | HARQ for autonomous uplink access | 94990 | available |
| R1-1719500 | Remaining issues on AUL channel access | Huawei, HiSilicon | Brian Classon | 45750 | discussion | Decision | | | 32 | 6.2.2.2.3 | Channel access for autonomous UL access | 95000 | available |
| R1-1719501 | Remaining issues in RACH Procedure | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 96 | 7.1.4.2 | Remaining details on RACH procedure | 95010 | available |
| R1-1719502 | Evaluation assumption and preliminary results for LTE URLLC | Huawei, HiSilicon | Brian Classon | 45750 | discussion | Decision | | | 83 | 6.2.8.1 | Remaining details of evaluations scenarios | 95020 | revised |
| R1-1719503 | Design impact on reliability for LTE URLLC | Huawei, HiSilicon | Brian Classon | 45750 | discussion | Decision | | | 84 | 6.2.8.2 | Candidate techniques enabling URLLC for LTE | 95030 | available |
| R1-1719504 | LTE URLLC and eMBB multiplexing | Huawei, HiSilicon | Brian Classon | 45750 | discussion | Decision | | | 85 | 6.2.8.3 | Other | 95040 | available |
| R1-1719505 | Remaining details on support of DL 1024QAM | Huawei, HiSilicon | Brian Classon | 45750 | discussion | Decision | | | 49 | 6.2.4.1 | Remaining details on support for 1024QAM for DL channels | 95050 | noted |
| R1-1719506 | Draft LS on RRC parameters on HCS | Huawei, HiSilicon | Brian Classon | 45750 | LS out | Decision | | | 48 | 6.2.4 | Enhancements for high capacity stationary wireless link and introduction of 1024 QAM for LTE - WID in RP-171738 | 0 | noted |
| R1-1719507 | Correction on higher layer parameter for eVoLTE | Huawei | Brian Classon | 45750 | draftCR | Decision | | Changed to subject for decision. | 13 | 6.1.7 | Other | 3890 | agreed |
| R1-1719508 | Remaining details of 64-QAM support for eV2X | Huawei, HiSilicon | Philippe Sartori | 47335 | discussion | Decision | | | 40 | 6.2.3.2 | Support for 64-QAM | 95080 | available |
| R1-1719509 | Discussion on resource pool sharing for eV2X | Huawei, HiSilicon | Philippe Sartori | 47335 | discussion | Decision | | | 45 | 6.2.3.4 | Resource pool sharing between mode-3 and mode-4 users | 95090 | available |
| R1-1719510 | Discussion on latency reduction for eV2X | Huawei, HiSilicon | Philippe Sartori | 47335 | discussion | Decision | | | 46 | 6.2.3.5 | Maximum time reduction between packet arrival at layer 1 and resource selection for transmission | 95100 | available |
| R1-1719511 | Remaining details of mode-4 resource selection and power sharing for eV2X | Huawei, HiSilicon | Philippe Sartori | 47335 | discussion | Decision | | | 37 | 6.2.3.1.1 | Mode-4 support | 95110 | available |
| R1-1719512 | Performance evaluation of transmit diversity for eV2X | Huawei, HiSilicon | Philippe Sartori | 47335 | discussion | Decision | | | 43 | 6.2.3.3.2 | Evaluation results | 95120 | available |
| R1-1719513 | Transmit diversity solutions for PSSCH and PSCCH | Huawei, HiSilicon | Philippe Sartori | 47335 | discussion | Decision | | | 42 | 6.2.3.3.1 | Transmit diversity solutions | 95130 | available |
| R1-1719514 | Remaining details for synchronization for carrier aggregation on sidelink | Huawei, HiSilicon | Philippe Sartori | 47335 | discussion | Decision | | | 38 | 6.2.3.1.2 | Synchronization | 95140 | available |
| R1-1719515 | Underlay SR: a complementary solution to overcome the limitations of periodic PUCCH-SR | Idaho National Laboratory | Ramon Khalona | 19055 | discussion | Discussion | | | 148 | 7.3.3.4 | UL data transmission procedure | 95150 | available |
| R1-1719516 | Remaining details of UL transmission without grant | ZTE, Sanechips | Yifei Yuan | 58525 | discussion | | | | 148 | 7.3.3.4 | UL data transmission procedure | 95160 | available |
| R1-1719517 | Remaining details on PTRS for DFTsOFDM | Mitsubishi Electric RCE | Cristina Ciochina-Duchesne | 56339 | discussion | Decision | | | 119 | 7.2.3.4 | Remaining details on PT-RS | 95170 | available |
| R1-1719518 | Views on DL DMRS designs | Mitsubishi Electric Co. | Fumihiro Hasegawa | 61720 | discussion | Decision | | | 118 | 7.2.3.3 | Remaining details on DMRS | 95180 | revised |
| R1-1719519 | Views on SRS designs | Mitsubishi Electric Co. | Fumihiro Hasegawa | 61720 | discussion | | | | 120 | 7.2.3.5 | Remaining details on SRS | 95190 | available |
| R1-1719520 | Remaining details of Polar coding | ZTE, Sanechips | Huaming Wu | 58331 | discussion | Decision | | | 165 | 7.4.2.4 | Other | 95200 | available |
| R1-1719521 | Study of FAR performance improvement | ZTE, Sanechips | Huaming Wu | 58331 | discussion | Decision | | | 162 | 7.4.2.1 | Uplink CRCs | 95210 | available |
| R1-1719522 | Further consideration on Polar code segmentation | ZTE, Sanechips | Huaming Wu | 58331 | discussion | Decision | | | 163 | 7.4.2.2 | Details of conditions for UCI segmentation | 95220 | revised |
| R1-1719523 | Coding scheme for PBCH | ZTE, Sanechips | Huaming Wu | 58331 | discussion | Decision | | | 164 | 7.4.2.3 | Order and mapping of PBCH fields | 95230 | revised |
| R1-1719524 | Considerations on BG determination | ZTE, Sanechips | Huaming Wu | 58331 | discussion | Decision | | | 159 | 7.4.1.1 | Nominal code rate / BG determination | 95240 | revised |
| R1-1719525 | Remaining details of LDPC coding | ZTE, Sanechips | Huaming Wu | 58331 | discussion | Decision | | | 160 | 7.4.1.2 | Other | 95250 | revised |
| R1-1719526 | Remaining details on codeword mapping | ZTE, Sanechips | Ruyue Yu-Ngok Li | 43128 | discussion | | | | 103 | 7.2.1.1 | Remaining details on codeword mapping | 95260 | available |
| R1-1719527 | Remaining details on codebook based UL transmission | ZTE, Sanechips | Ruyue Yu-Ngok Li | 43128 | discussion | | | | 104 | 7.2.1.2 | Remaining details on codebook based transmission for UL | 95270 | available |
| R1-1719528 | Remaining details on non-codebook based UL transmission | ZTE, Sanechips | Ruyue Yu-Ngok Li | 43128 | discussion | | | | 105 | 7.2.1.3 | Remaining details on non-codebook based transmission for UL | 95280 | available |
| R1-1719529 | Remaining details on PRB bundling for DL | ZTE, Sanechips | Ruyue Yu-Ngok Li | 43128 | discussion | | | | 106 | 7.2.1.4 | Remaining details on PRB bundling for DL | 95290 | available |
| R1-1719530 | On Transmission Setting | ZTE, Sanechips | Ruyue Yu-Ngok Li | 43128 | discussion | | | | 107 | 7.2.1.5 | Other | 95300 | available |
| R1-1719531 | Remaining details on CSI measurement | ZTE, Sanechips | Ruyue Yu-Ngok Li | 43128 | discussion | | | | 109 | 7.2.2.1 | Remaining details on CSI measurement | 95310 | available |
| R1-1719532 | Remaining details on CSI reporting | ZTE, Sanechips | Ruyue Yu-Ngok Li | 43128 | discussion | | | | 110 | 7.2.2.2 | Remaining details on CSI reporting | 95320 | available |
| R1-1719533 | Discussion on beam management | ZTE, Sanechips | Ruyue Yu-Ngok Li | 43128 | discussion | | | | 111 | 7.2.2.3 | Remaining details on beam measurement and reporting | 95330 | available |
| R1-1719534 | Discussion on beam recovery | ZTE, Sanechips | Ruyue Yu-Ngok Li | 43128 | discussion | | | | 112 | 7.2.2.4 | Remaining details on mechanism to recover from beam failure | 95340 | available |
| R1-1719535 | On CQI and MCS | ZTE, Sanechips | Ruyue Yu-Ngok Li | 43128 | discussion | | | | 113 | 7.2.2.5 | Remaining details on CQI and MCS | 95350 | available |
| R1-1719536 | Enhancements on CSI framework | ZTE, Sanechips | Ruyue Yu-Ngok Li | 43128 | discussion | | | | 114 | 7.2.2.6 | Other | 95360 | available |
| R1-1719537 | Details and evaluation results on beam reporting | ZTE, Sanechips | Ruyue Yu-Ngok Li | 43128 | discussion | | | | 114 | 7.2.2.6 | Other | 95370 | available |
| R1-1719538 | Details and evaluation results on beam indication | ZTE, Sanechips | Ruyue Yu-Ngok Li | 43128 | discussion | | | | 114 | 7.2.2.6 | Other | 95380 | available |
| R1-1719539 | Details of UL beam management | ZTE, Sanechips | Ruyue Yu-Ngok Li | 43128 | discussion | | | | 114 | 7.2.2.6 | Other | 95390 | revised |
| R1-1719540 | Remaining details on RS Multiplexing | ZTE, Sanechips | Ruyue Yu-Ngok Li | 43128 | discussion | | | | 116 | 7.2.3.1 | Remaining details on Multiplexing of different types of RSs | 95400 | available |
| R1-1719541 | On CSI-RS for CSI acquisition and beam management | ZTE, Sanechips | Ruyue Yu-Ngok Li | 43128 | discussion | | | | 117 | 7.2.3.2 | Remaining details on CSI-RS | 95410 | available |
| R1-1719542 | Remaining details on DL DMRS and UL DMRS | ZTE, Sanechips | Ruyue Yu-Ngok Li | 43128 | discussion | | | | 118 | 7.2.3.3 | Remaining details on DMRS | 95420 | available |
| R1-1719543 | Remaining details on PT-RS | ZTE, Sanechips | Ruyue Yu-Ngok Li | 43128 | discussion | | | | 119 | 7.2.3.4 | Remaining details on PT-RS | 95430 | available |
| R1-1719544 | Remaining details on SRS | ZTE, Sanechips | Ruyue Yu-Ngok Li | 43128 | discussion | | | | 120 | 7.2.3.5 | Remaining details on SRS | 95440 | available |
| R1-1719545 | Remaining details on TRS | ZTE, Sanechips | Ruyue Yu-Ngok Li | 43128 | discussion | | | | 121 | 7.2.3.6 | Remaining details on TRS | 95450 | available |
| R1-1719546 | Remaining details on QCL | ZTE, Sanechips | Ruyue Yu-Ngok Li | 43128 | discussion | | | | 122 | 7.2.3.7 | Remaining details on QCL | 95460 | available |
| R1-1719547 | On NR power control framework | ZTE, Sanechips | Ruyue Yu-Ngok Li | 43128 | discussion | | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 95470 | available |
| R1-1719548 | On NR power control for carrier aggregation | ZTE, Sanechips | Ruyue Yu-Ngok Li | 43128 | discussion | | | | 169 | 7.6.2 | Remaining details on NR UL power control – CA aspects | 95480 | available |
| R1-1719549 | Discussion on Measurement for Mobility Management | MediaTek Inc. | Tao Chen | 56050 | discussion | | | | 98 | 7.1.5.1 | Remaining details on measurement for mobility management | 95490 | available |
| R1-1719550 | Discussion on Radio Link Monitoring | MediaTek Inc. | Tao Chen | 56050 | discussion | | | | 99 | 7.1.5.2 | Remaining details Radio link monitoring for mobility management | 95500 | available |
| R1-1719551 | Remaining details on bandwidth part operation in NR | MediaTek Inc. | Tao Chen | 56050 | discussion | | | | 153 | 7.3.4.1 | Other aspects on bandwidth Parts | 95510 | available |
| R1-1719552 | HARQ-ACK & UL Scheduling Timing Relationship | MediaTek Inc. | Tao Chen | 56050 | discussion | | | | 146 | 7.3.3.2 | DL/UL scheduling and HARQ management | 95520 | available |

| TDoc | Title | Source | Contact | Contact ID | Type | For | Abstract | Secretary Remarks | Agenda item sort order | Agenda item | Agenda item description | TDoc sort order within agenda item | TDoc Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R1-1719553 | Remaining issues on PDCCH structure | MediaTek Inc. | Tao Chen | 56050 | discussion | | | | 127 | 7.3.1.1 | Remaining details on PDCCH structure | 95530 | available |
| R1-1719554 | Remaining issues on search space | MediaTek Inc. | Tao Chen | 56050 | discussion | | | | 128 | 7.3.1.2 | Remaining details on Search space | 95540 | available |
| R1-1719555 | Remaining issues on GC-PDCCH | MediaTek Inc. | Tao Chen | 56050 | discussion | | | | 129 | 7.3.1.3 | Remaining details on group-common PDCCH | 95550 | revised |
| R1-1719556 | SS block transmissions in wideband carrier | MediaTek Inc. | Tao Chen | 56050 | discussion | | | | 88 | 7.1.1 | Remaining Details on Synchronization signal | 95560 | available |
| R1-1719557 | Remaining details on PBCH | MediaTek Inc. | Tao Chen | 56050 | discussion | | | | 90 | 7.1.2.1 | Remaining details on NR-PBCH | 95570 | available |
| R1-1719558 | Further discussion on RMSI transmission | MediaTek Inc. | Tao Chen | 56050 | discussion | | | | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 95580 | available |
| R1-1719559 | Further discussion on OSI delivery | MediaTek Inc. | Tao Chen | 56050 | discussion | | | | 92 | 7.1.2.3 | Remaining details on other system information delivery | 95590 | available |
| R1-1719560 | Discussion on paging design | MediaTek Inc. | Tao Chen | 56050 | discussion | | | | 93 | 7.1.3 | Remaining details on Paging design | 95600 | available |
| R1-1719561 | Remaining details on codeword mapping | MediaTek Inc. | Tao Chen | 56050 | discussion | | | | 103 | 7.2.1.1 | Remaining details on codeword mapping | 95610 | available |
| R1-1719562 | Codebook based transmission for UL | MediaTek Inc. | Tao Chen | 56050 | discussion | | | | 104 | 7.2.1.2 | Remaining details on codebook based transmission for UL | 95620 | available |
| R1-1719563 | Non-codebook based transmission | MediaTek Inc. | Tao Chen | 56050 | discussion | | | | 105 | 7.2.1.3 | Remaining details on non-codebook based transmission for UL | 95630 | available |
| R1-1719564 | Remaining details for CSI reporting | MediaTek Inc. | Tao Chen | 56050 | discussion | | | | 110 | 7.2.2.2 | Remaining details on CSI reporting | 95640 | available |
| R1-1719565 | Further details on Beam management | MediaTek Inc. | Tao Chen | 56050 | discussion | | | | 111 | 7.2.2.3 | Remaining details on beam measurement and reporting | 95650 | available |
| R1-1719566 | Further details on beam failure recovery | MediaTek Inc. | Tao Chen | 56050 | discussion | | | | 112 | 7.2.2.4 | Remaining details on mechanism to recover from beam failure | 95660 | revised |
| R1-1719567 | Considerations on NR unlicensed channel access | MediaTek Inc. | Tao Chen | 56050 | discussion | | | | 172 | 7.8 | Other | 95670 | available |
| R1-1719568 | Considerations on NR NoMA operation | MediaTek Inc. | Tao Chen | 56050 | discussion | | | | 172 | 7.8 | Other | 95680 | available |
| R1-1719569 | Remaining details on RACH procedure | MediaTek Inc. | Tao Chen | 56050 | discussion | | | | 96 | 7.1.4.2 | Remaining details on RACH procedure | 95690 | available |
| R1-1719570 | Discussion on short-PUCCH for UCI of up to 2 bits | MediaTek Inc. | Tao Chen | 56050 | discussion | | | | 134 | 7.3.2.1.1 | Short-PUCCH for UCI of up to 2 bits | 95700 | available |
| R1-1719571 | Discussion on separate UCI encoding for long-PUCCH | MediaTek Inc. | Tao Chen | 56050 | discussion | | | | 139 | 7.3.2.2.2 | Long-PUCCH for UCI of more than 2 bits | 95710 | available |
| R1-1719572 | Discussion on support of long-PUCCH over multiple slots | MediaTek Inc. | Tao Chen | 56050 | discussion | | | | 140 | 7.3.2.2.3 | Support of long-PUCCH over multiple slots | 95720 | available |
| R1-1719573 | Discussion on UCI on PUSCH | MediaTek Inc. | Tao Chen | 56050 | discussion | | | | 141 | 7.3.2.3 | UCI multiplexing | 95730 | available |
| R1-1719574 | NR soft buffer design | MediaTek Inc. | Tao Chen | 56050 | discussion | | | | 149 | 7.3.3.5 | Soft-buffer management for NR | 95740 | available |
| R1-1719575 | On UCI segmentation design | MediaTek Inc. | Tao Chen | 56050 | discussion | | | | 163 | 7.4.2.2 | Details of conditions for UCI segmentation | 95750 | available |
| R1-1719576 | Design of order and mapping of PBCH fields | MediaTek Inc. | Tao Chen | 56050 | discussion | | | | 164 | 7.4.2.3 | Order and mapping of PBCH fields | 95760 | available |
| R1-1719577 | Probability of monitoring a false DCI | MediaTek Inc. | Tao Chen | 56050 | discussion | | | | 165 | 7.4.2.4 | Other | 95770 | available |
| R1-1719578 | On the issues of BG selection | MediaTek Inc. | Tao Chen | 56050 | discussion | | | | 159 | 7.4.1.1 | Nominal code rate / BG determination | 95780 | revised |
| R1-1719579 | On TBS determination formula | MediaTek Inc. | Tao Chen | 56050 | discussion | | | | 160 | 7.4.1.2 | Other | 95790 | revised |
| R1-1719580 | On remaining details of downlink DMRS | MediaTek Inc. | Tao Chen | 56050 | discussion | | | | 118 | 7.2.3.3 | Remaining details on DMRS | 95800 | available |
| R1-1719581 | On remaining details of TRS | MediaTek Inc. | Tao Chen | 56050 | discussion | | | | 121 | 7.2.3.6 | Remaining details on TRS | 95810 | available |
| R1-1719582 | On remaining details of PRB bundling: orphan RB consideration | MediaTek Inc. | Tao Chen | 56050 | discussion | | | | 106 | 7.2.1.4 | Remaining details on PRB bundling for DL | 95820 | available |
| R1-1719583 | ACK/NACK feedback reliability for LTE URLLC | MediaTek Inc. | Tao Chen | 56050 | discussion | Decision | | | 84 | 6.2.8.2 | Candidate techniques enabling URLLC for LTE | 95830 | available |
| R1-1719584 | CQI reporting for multiple services in NR | MediaTek Inc. | Tao Chen | 56050 | discussion | | | | 113 | 7.2.2.5 | Remaining details on CQI and MCS | 95840 | available |
| R1-1719585 | TBS Determination and Flexible Step Quantization Method in NR | MediaTek Inc. | Tao Chen | 56050 | discussion | | | | 145 | 7.3.3.1 | DL/UL resource allocation | 95850 | available |
| R1-1719586 | On UL data transmission without grant design and configuration | MediaTek Inc. | Tao Chen | 56050 | discussion | | | | 148 | 7.3.3.4 | UL data transmission procedure | 95860 | available |
| R1-1719587 | Remaining issues on pre-emption indication | MediaTek Inc. | Tao Chen | 56050 | discussion | | | | 150 | 7.3.3.6 | Multiplexing data with different transmission durations | 95870 | available |
| R1-1719588 | On repetition scheme for UL transmission without grant | MediaTek Inc. | Tao Chen | 56050 | discussion | | | | 151 | 7.3.3.7 | Other | 95880 | available |
| R1-1719589 | On use of scrambling for UL transmission without grant | MediaTek Inc. | Tao Chen | 56050 | discussion | | | | 151 | 7.3.3.7 | Other | 95890 | available |
| R1-1719590 | On synchronization aspects for NB-IoT Wake Up Signal | MediaTek Inc. | Tao Chen | 56050 | discussion | Decision | | | 62 | 6.2.6.1.1.1 | Wake-up signal functions | 95900 | available |
| R1-1719591 | On design aspects for NB-IoT Wake Up Signal | MediaTek Inc. | Tao Chen | 56050 | discussion | Decision | | | 64 | 6.2.6.1.1.3 | Detailed design of wake-up signal | 95910 | available |
| R1-1719592 | On NB-IoT EDT indication via PRACH | MediaTek Inc. | Tao Chen | 56050 | discussion | Decision | | | 65 | 6.2.6.1.2 | Data transmission during the random access procedure | 95920 | available |
| R1-1719593 | EPDCCH case selection for special subframe configuration 10 | MediaTek Inc. | Tao Chen | 56050 | discussion | Decision | | Changed to subject for decision. Release and work item code are missing. | 13 | 6.1.7 | Other | 95071 | noted |
| R1-1719594 | Draft CR - Correction to EPDCCH case selection for special subframe configuration 10 | MediaTek Inc., Nokia, Nokia Shanghai Bell | Tao Chen | 56050 | discussion | Decision | | | 13 | 6.1.7 | Other | 95930 | revised |
| R1-1719595 | CQI Tables and MCS Tables for NR | Ericsson | Yufei Blankenship | 59257 | discussion | Decision | | | 113 | 7.2.2.5 | Remaining details on CQI and MCS | 95950 | revised |
| R1-1719596 | On TBS Determination and DL/UL Resource Allocation | Ericsson | Yufei Blankenship | 59257 | discussion | Decision | | | 145 | 7.3.3.1 | DL/UL resource allocation | 95960 | available |
| R1-1719597 | DL/UL Transmit Buffer and Soft Buffer Management | Ericsson | Yufei Blankenship | 59257 | discussion | Decision | | | 149 | 7.3.3.5 | Soft-buffer management for NR | 95970 | available |
| R1-1719598 | Nominal Code Rate Calculation and Base Graph Determination | Ericsson | Yufei Blankenship | 59257 | discussion | Decision | | | 159 | 7.4.1.1 | Nominal code rate / BG determination | 95980 | revised |
| R1-1719599 | Selection of LDPC Shift Size | Ericsson | Yufei Blankenship | 59257 | discussion | Decision | | | 160 | 7.4.1.2 | Other | 95990 | available |
| R1-1719600 | Granularity of LDPC Code Block Sizes | Ericsson | Yufei Blankenship | 59257 | discussion | Decision | | | 160 | 7.4.1.2 | Other | 96000 | available |
| R1-1719601 | Maximum Code Rate for BG2 | Ericsson | Yufei Blankenship | 59257 | discussion | Decision | | | 160 | 7.4.1.2 | Other | 96010 | available |
| R1-1719602 | Bit Selection for Data Channels | Ericsson | Yufei Blankenship | 59257 | discussion | Decision | | | 160 | 7.4.1.2 | Other | 96020 | available |
| R1-1719603 | TBS Determination With LDPC Considerations | Ericsson | Yufei Blankenship | 59257 | discussion | Decision | | | 160 | 7.4.1.2 | Other | 96030 | revised |
| R1-1719604 | Reordering of Code Block Segments for Data Channel Retransmission | Ericsson | Yufei Blankenship | 59257 | discussion | Decision | | | 160 | 7.4.1.2 | Other | 96040 | available |
| R1-1719605 | Further Enhancement of Systematic Bit Priority | Ericsson | Yufei Blankenship | 59257 | discussion | Decision | | | 160 | 7.4.1.2 | Other | 96050 | available |
| R1-1719606 | CRC Length and Application for UCI | Ericsson | Yufei Blankenship | 59257 | discussion | Decision | | | 162 | 7.4.2.1 | Uplink CRCs | 96060 | available |
| R1-1719607 | Remaining Issues of Polar Code Segmentation for UCI | Ericsson | Yufei Blankenship | 59257 | discussion | Decision | | | 163 | 7.4.2.2 | Details of conditions for UCI segmentation | 96070 | available |
| R1-1719608 | Arrangement of PBCH Fields for Polar Codes | Ericsson | Yufei Blankenship | 59257 | discussion | Decision | | | 164 | 7.4.2.3 | Order and mapping of PBCH fields | 96080 | revised |
| R1-1719609 | Remaining Issues of Polar Code Construction for DCI | Ericsson | Yufei Blankenship | 59257 | discussion | Decision | | | 165 | 7.4.2.4 | Other | 96090 | noted |
| R1-1719610 | Further Discussion on Scrambling of DCI | Ericsson | Yufei Blankenship | 59257 | discussion | Decision | | | 165 | 7.4.2.4 | Other | 96100 | available |
| R1-1719611 | Remaining Issues of Polar Code Construction for UCI | Ericsson | Yufei Blankenship | 59257 | discussion | Decision | | | 165 | 7.4.2.4 | Other | 96110 | revised |
| R1-1719612 | Further Discussion on Channel Interleaver for Polar Codes of UCI | Ericsson | Yufei Blankenship | 59257 | discussion | Decision | | | 165 | 7.4.2.4 | Other | 96120 | available |
| R1-1719613 | Summary of email discussion [90b-LTE-09] on sPDCCH resource reuse for sPDSCH | Nokia, Nokia Shanghai Bell | Karol Schober | 68456 | discussion | Decision | | Changed from other and approval to discussion and decision to align with the contribution. | 19 | 6.2.1.2.2 | Remaining details on DL control channel design | 96130 | noted |
| R1-1719614 | Discussion on HARQ-ACK codebook and HARQ feedback timing | Fujitsu | Tim Moulsley | 10954 | other | | | | 146 | 7.3.3.2 | DL/UL scheduling and HARQ management | 96140 | available |
| R1-1719615 | Discussion on DCI composition for DL CBG based (re-)transmission; | Fujitsu | Tim Moulsley | 10954 | other | | | | 147 | 7.3.3.3 | CBG-based (re)transmission | 96150 | available |
| R1-1719616 | On eMBB and URLLC multiplexing | Fujitsu | Tim Moulsley | 10954 | other | | | | 150 | 7.3.3.6 | Multiplexing data with different transmission durations | 96160 | available |
| R1-1719617 | Remaining details on RA procedure | Fujitsu | Tim Moulsley | 10954 | other | | | | 96 | 7.1.4.2 | Remaining details on RACH procedure | 96170 | available |
| R1-1719618 | Discussion on UL data transmission without grant | Fujitsu | Tim Moulsley | 10954 | other | | | | 148 | 7.3.3.4 | UL data transmission procedure | 96180 | available |

| TDoc | Title | Source | Contact | Contact ID | Type | For | Abstract | Secretary Remarks | Agenda item sort order | Agenda item | Agenda item description | TDoc sort order within agenda item | TDoc Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R1-1719619 | Discussion on beam failure recovery | Fujitsu | Tim Moulsley | 10954 | other | | | | 112 | 7.2.2.4 | Remaining details on mechanism to recover from beam failure | 96190 | available |
| R1-1719620 | Remaining details on Synchronization signal | AT&T | Arun Ghosh | 57084 | discussion | Decision | | | 88 | 7.1.1 | Remaining Details on Synchronization signal | 96200 | available |
| R1-1719621 | Remaining details on NR-PBCH | AT&T | Arun Ghosh | 57084 | discussion | Decision | | | 90 | 7.1.2.1 | Remaining details on NR-PBCH | 96210 | available |
| R1-1719622 | Remaining details on Remaining minimum system information | AT&T | Arun Ghosh | 57084 | discussion | Decision | | | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 96220 | available |
| R1-1719623 | Remaining details on other system information delivery | AT&T | Arun Ghosh | 57084 | discussion | Decision | | | 92 | 7.1.2.3 | Remaining details on other system information delivery | 96230 | available |
| R1-1719624 | Remaining details on Paging design | AT&T | Arun Ghosh | 57084 | discussion | Decision | | | 93 | 7.1.3 | Remaining details on Paging design | 96240 | available |
| R1-1719625 | Remaining details on RACH procedure and configuration | AT&T | Arun Ghosh | 57084 | discussion | Decision | | | 96 | 7.1.4.2 | Remaining details on RACH procedure | 96250 | available |
| R1-1719626 | Remaining details of measurement configuration for mobility management | AT&T | Arun Ghosh | 57084 | discussion | Decision | | | 98 | 7.1.5.1 | Remaining details on measurement for mobility management | 96260 | available |
| R1-1719627 | Remaining details of Radio Link Monitoring procedure and RS configuration | AT&T | Arun Ghosh | 57084 | discussion | Decision | | | 99 | 7.1.5.2 | Remaining details Radio link monitoring for mobility management | 96270 | available |
| R1-1719628 | On Data Scrambling for NR PDSCH and PUSCH | AT&T | Arun Ghosh | 57084 | discussion | Decision | | | 102 | 7.2.1 | Remaining details on Multi-antenna scheme | 96280 | available |
| R1-1719629 | On Frequency hopping for NR PUSCH | AT&T | Arun Ghosh | 57084 | discussion | Decision | | | 103 | 7.2.1.1 | Remaining details on codeword mapping | 96290 | available |
| R1-1719630 | Remaining details on codebook based transmission for UL-MIMO | AT&T | Arun Ghosh | 57084 | discussion | Decision | | | 104 | 7.2.1.2 | Remaining details on codebook based transmission for UL | 96300 | available |
| R1-1719631 | Remaining details on CSI measurement | AT&T | Arun Ghosh | 57084 | discussion | Decision | | | 109 | 7.2.2.1 | Remaining details on CSI measurement | 96310 | available |
| R1-1719632 | Remaining details on beam measurement and reporting | AT&T | Arun Ghosh | 57084 | discussion | Decision | | | 111 | 7.2.2.3 | Remaining details on beam measurement and reporting | 96320 | available |
| R1-1719633 | Remaining details on mechanisms to recover from beam failure | AT&T | Arun Ghosh | 57084 | discussion | Decision | | | 112 | 7.2.2.4 | Remaining details on mechanism to recover from beam failure | 96330 | available |
| R1-1719634 | Remaining issues of CQI and MCS tables | AT&T | Arun Ghosh | 57084 | discussion | Decision | | | 113 | 7.2.2.5 | Remaining details on CQI and MCS | 96340 | available |
| R1-1719635 | Remaining details on Multiplexing of different types of RSs | AT&T | Arun Ghosh | 57084 | discussion | Decision | | | 116 | 7.2.3.1 | Remaining details on Multiplexing of different types of RSs | 96350 | available |
| R1-1719636 | Remaining issues on CSI-RS | AT&T | Arun Ghosh | 57084 | discussion | Decision | | | 117 | 7.2.3.2 | Remaining details on CSI-RS | 96360 | available |
| R1-1719637 | Remaining details on DM-RS | AT&T | Arun Ghosh | 57084 | discussion | Decision | | | 118 | 7.2.3.3 | Remaining details on DMRS | 96370 | available |
| R1-1719638 | Remaining details on SRS | AT&T | Arun Ghosh | 57084 | discussion | Decision | | | 120 | 7.2.3.5 | Remaining details on SRS | 96380 | withdrawn |
| R1-1719639 | Remaining details on TRS | AT&T | Arun Ghosh | 57084 | discussion | Decision | | | 121 | 7.2.3.6 | Remaining details on TRS | 96390 | available |
| R1-1719640 | Remaining details on PDCCH structure | AT&T | Arun Ghosh | 57084 | discussion | Decision | | | 127 | 7.3.1.1 | Remaining details on PDCCH structure | 96400 | available |
| R1-1719641 | Remaining details on Search space | AT&T | Arun Ghosh | 57084 | discussion | Decision | | | 128 | 7.3.1.2 | Remaining details on Search space | 96410 | available |
| R1-1719642 | Remaining details on group-common PDCCH | AT&T | Arun Ghosh | 57084 | discussion | Decision | | | 129 | 7.3.1.3 | Remaining details on group-common PDCCH | 96420 | available |
| R1-1719643 | On DCI contents and formats | AT&T | Arun Ghosh | 57084 | discussion | Decision | | | 130 | 7.3.1.4 | DCI contents and formats | 96430 | available |
| R1-1719644 | On Long PUCCH for UCI up to 2 bits | AT&T | Arun Ghosh | 57084 | discussion | Decision | | | 138 | 7.3.2.2.1 | Long-PUCCH for UCI of up to 2 bits | 96440 | available |
| R1-1719645 | Remaining issues on long PUCCH with more than 2 bits | AT&T | Arun Ghosh | 57084 | discussion | Decision | | | 139 | 7.3.2.2.2 | Long-PUCCH for UCI of more than 2 bits | 96450 | available |
| R1-1719646 | On Frequency hopping of long PUCCH over multiple slots | AT&T | Arun Ghosh | 57084 | discussion | Decision | | | 140 | 7.3.2.2.3 | Support of long-PUCCH over multiple slots | 96460 | available |
| R1-1719647 | Remaining details on DL/UL resource allocation | AT&T | Arun Ghosh | 57084 | discussion | Decision | | | 145 | 7.3.3.1 | DL/UL resource allocation | 96470 | available |
| R1-1719648 | Remaining details on DL/UL scheduling and HARQ management | AT&T | Arun Ghosh | 57084 | discussion | Decision | | | 146 | 7.3.3.2 | DL/UL scheduling and HARQ management | 96480 | available |
| R1-1719649 | Remaining details of CBG based transmission | AT&T | Arun Ghosh | 57084 | discussion | Decision | | | 147 | 7.3.3.3 | CBG-based (re)transmission | 96490 | available |
| R1-1719650 | Remaining details on bandwidth parts | AT&T | Arun Ghosh | 57084 | discussion | Decision | | | 153 | 7.3.4.1 | Other aspects on bandwidth Parts | 96500 | available |
| R1-1719651 | Remaining details on carrier aggregation | AT&T | Arun Ghosh | 57084 | discussion | Decision | | | 154 | 7.3.4.2 | Other aspects on carrier aggregation | 96510 | available |
| R1-1719652 | Remaining details on rate matching aspects for NR DL and UL | AT&T | Arun Ghosh | 57084 | discussion | Decision | | | 155 | 7.3.5 | Remaining details on rate matching aspects for NR DL and UL | 96520 | available |
| R1-1719653 | Dynamic power control and its impact on coverage for EN-DC | AT&T | Arun Ghosh | 57084 | discussion | Decision | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 96530 | available |
| R1-1719654 | Carrier selection and resource selection in SL CA | ZTE, Sanechips | Carolyn Taylor | 19440 | discussion | Decision | | | 37 | 6.2.3.1.1 | Mode-4 support | 96540 | available |
| R1-1719655 | Synchronization in Sidelink CA | ZTE, Sanechips | Carolyn Taylor | 19440 | discussion | Decision | | | 38 | 6.2.3.1.2 | Synchronization | 96550 | available |
| R1-1719656 | Support for 64QAM | ZTE, Sanechips | Carolyn Taylor | 19440 | discussion | Decision | | | 40 | 6.2.3.2 | Support for 64-QAM | 96560 | available |
| R1-1719657 | Discussion on transmit diversity for PC5 | ZTE, Sanechips | Carolyn Taylor | 19440 | discussion | Decision | | | 42 | 6.2.3.3.1 | Transmit diversity solutions | 96570 | available |
| R1-1719658 | Evaluation results of TxD | ZTE, Sanechips | Carolyn Taylor | 19440 | discussion | Decision | | | 43 | 6.2.3.3.2 | Evaluation results | 96580 | available |
| R1-1719659 | Consideration for resource pool sharing between mode 3 and mode 4 | ZTE, Sanechips | Carolyn Taylor | 19440 | discussion | Decision | | | 45 | 6.2.3.4 | Resource pool sharing between mode-3 and mode-4 users | 96590 | available |
| R1-1719660 | Consideration for maximum time reduction | ZTE, Sanechips | Carolyn Taylor | 19440 | discussion | Decision | | | 46 | 6.2.3.5 | Maximum time reduction between packet arrival at layer 1 and resource selection for transmission | 96600 | available |
| R1-1719661 | Remaining issues of shortened processing time for 1ms TTI | ZTE, Sanechips | Xianghui Han | 65696 | discussion | Decision | | | 16 | 6.2.1.1 | Remaining details on shortened processing time for 1ms TTI | 96610 | available |
| R1-1719662 | Remaining issues of sPUCCH design | ZTE, Sanechips | Xianghui Han | 65696 | discussion | Decision | | | 20 | 6.2.1.2.3 | Remaining details on UL control channel design | 96620 | available |
| R1-1719663 | Summary of email discussion 90b-LTE-10 on sPUCCH format design | ZTE, Sanechips | Xianghui Han | 65696 | discussion | Decision | | | 20 | 6.2.1.2.3 | Remaining details on UL control channel design | 96630 | available |
| R1-1719664 | Remaining issues on DL data channel design | ZTE, Sanechips | Xianghui Han | 65696 | discussion | Decision | | | 21 | 6.2.1.2.4 | Remaining details on DL data channel design | 96640 | available |
| R1-1719665 | Remaining issues on FS2 aspects | ZTE, Sanechips | Xianghui Han | 65696 | discussion | Decision | | | 23 | 6.2.1.2.6 | Remaining details on FS2 aspects | 96650 | available |
| R1-1719666 | Remaining issues on SPS design for shortened TTI | ZTE, Sanechips | Xianghui Han | 65696 | discussion | Decision | | | 24 | 6.2.1.2.7 | Other | 96660 | available |
| R1-1719667 | Discussion on SLS results and LLS assumption for LTE URLLC | ZTE, Sanechips | Xianghui Han | 65696 | discussion | Decision | | | 83 | 6.2.8.1 | Remaining details of evaluations scenarios | 96670 | available |
| R1-1719668 | Candidate techniques for LTE URLLC | ZTE, Sanechips | Xianghui Han | 65696 | discussion | Decision | | | 84 | 6.2.8.2 | Candidate techniques enabling URLLC for LTE | 96680 | available |
| R1-1719669 | CORESET configuration and Search space for NR-PDCCH | ZTE, Sanechips | Zhisong Zuo | 33890 | discussion | Decision | | | 128 | 7.3.1.2 | Remaining details on Search space | 96690 | revised |
| R1-1719670 | Remaining details on group-common PDCCH | ZTE, Sanechips | Zhisong Zuo | 33890 | discussion | Decision | | | 129 | 7.3.1.3 | Remaining details on group-common PDCCH | 96700 | available |
| R1-1719671 | Supporting Multi-beam in NR-PDCCH | ZTE, Sanechips | Zhisong Zuo | 33890 | discussion | Decision | | | 131 | 7.3.1.5 | Other | 96710 | available |
| R1-1719672 | Short PUCCH issues for up to 2 bits UCI | ZTE, Sanechips | Zhisong Zuo | 33890 | discussion | Decision | | | 134 | 7.3.2.1.1 | Short-PUCCH for UCI of up to 2 bits | 96720 | available |
| R1-1719673 | On long-PUCCH for up to 2 bits | ZTE, Sanechips | Zhisong Zuo | 33890 | discussion | Decision | | | 138 | 7.3.2.2.1 | Long-PUCCH for UCI of up to 2 bits | 96730 | available |
| R1-1719674 | On long-PUCCH for more than 2 bits | ZTE, Sanechips | Zhisong Zuo | 33890 | discussion | Decision | | | 139 | 7.3.2.2.2 | Long-PUCCH for UCI of more than 2 bits | 96740 | available |
| R1-1719675 | Support of long-PUCCH over multiple slots | ZTE, Sanechips | Zhisong Zuo | 33890 | discussion | Decision | | | 140 | 7.3.2.2.3 | Support of long-PUCCH over multiple slots | 96750 | available |
| R1-1719676 | UCI multiplexing on PUSCH | ZTE, Sanechips | Zhisong Zuo | 33890 | discussion | Decision | | | 141 | 7.3.2.3 | UCI multiplexing | 96760 | available |
| R1-1719677 | NR PUCCH resource allocation | ZTE, Sanechips | Zhisong Zuo | 33890 | discussion | Decision | | | 142 | 7.3.2.4 | Resource allocation for PUCCH | 96770 | available |
| R1-1719678 | Ultra-reliable part of URLLC for scheduling/HARQ procedure | ZTE, Sanechips | Zhisong Zuo | 33890 | discussion | Decision | | | 151 | 7.3.3.7 | Other | 96780 | available |
| R1-1719679 | Discussion on Mode-4 supporting for V2X Sidelink CA Scheduling | ITRI | Hua-Lung Tsai | 61783 | discussion | Decision | | | 37 | 6.2.3.1.1 | Mode-4 support | 96790 | available |
| R1-1719680 | Discussion on Synchronization aspect for V2X carrier aggregation | ITRI | Hua-Lung Tsai | 61783 | discussion | Decision | | | 38 | 6.2.3.1.2 | Synchronization | 96800 | available |
| R1-1719681 | Discussion on Resource Pool Sharing for eNB-Controlled and UE-Autonomous in V2X Communication | ITRI | Hua-Lung Tsai | 61783 | discussion | Decision | | | 45 | 6.2.3.4 | Resource pool sharing between mode-3 and mode-4 users | 96810 | available |
| R1-1719682 | Discussion on Latency Reduction for V2X Phase 2 | ITRI | Hua-Lung Tsai | 61783 | discussion | Decision | | | 46 | 6.2.3.5 | Maximum time reduction between packet arrival at layer 1 and resource selection for transmission | 96820 | available |
| R1-1719683 | Discussion on Short TTI for V2X Phase 2 | ITRI | Hua-Lung Tsai | 61783 | discussion | Decision | | | 47 | 6.2.3.6 | Other | 96830 | available |

| TDoc | Title | Source | Contact | Contact ID | Type | For | Abstract | Secretary Remarks | Agenda item sort order | Agenda item | Agenda item description | TDoc sort order within agenda item | TDoc Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R1-1719684 | Resource Configuration Signaling in Uplink Transmission Without Grant | ITRI | Hua-Lung Tsai | 61783 | discussion | Decision | | | 148 | 7.3.3.4 | UL data transmission procedure | 96840 | available |
| R1-1719685 | TS 38.211 V1.1.2 | Ericsson | Stefan Parkvall | 28759 | draft TS | Decision | | | 86 | 7 | NR - WID in RP-172115 | 96850 | revised |
| R1-1719686 | Reduced overhead paging design | Sequans Communications | Michal Palgy | 66137 | discussion | Decision | | | 93 | 7.1.3 | Remaining details on Paging design | 96860 | available |
| R1-1719687 | Essential enhancement to rate matching of Reed Muller code | Sequans Communications | Michal Palgy | 66137 | discussion | Discussion | | | 172 | 7.8 | Other | 96870 | available |
| R1-1719688 | Cell searching with multiple SS blocks in wideband CC | Spreadtrum Communications | Arto Lehti | 61519 | discussion | Decision | | | 88 | 7.1.1 | Remaining Details on Synchronization signal | 96880 | withdrawn |
| R1-1719689 | Discussion on the association between the SMTC and the measurement object | Spreadtrum Communications | Arto Lehti | 61519 | discussion | Decision | | | 98 | 7.1.5.1 | Remaining details on measurement for mobility management | 96890 | available |
| R1-1719690 | Remaining issues on beam reporting | Spreadtrum Communications | Arto Lehti | 61519 | discussion | Decision | | | 111 | 7.2.2.3 | Remaining details on beam measurement and reporting | 96900 | available |
| R1-1719691 | Remaining issues on RS multiplexing | Spreadtrum Communications | Arto Lehti | 61519 | discussion | Decision | | | 116 | 7.2.3.1 | Remaining details on Multiplexing of different types of RSs | 96910 | available |
| R1-1719692 | Remaining issues on DMRS | Spreadtrum Communications | Arto Lehti | 61519 | discussion | Decision | | | 118 | 7.2.3.3 | Remaining details on DMRS | 96920 | available |
| R1-1719693 | Remaining issues on PT-RS | Spreadtrum Communications | Arto Lehti | 61519 | discussion | Decision | | | 119 | 7.2.3.4 | Remaining details on PT-RS | 96930 | available |
| R1-1719694 | Discussion on rate matching | Spreadtrum Communications | Arto Lehti | 61519 | discussion | Decision | | | 155 | 7.3.5 | Remaining details on rate matching aspects for NR DL and UL | 96940 | available |
| R1-1719695 | Remaining issues on UE initiated beam failure recovery | Spreadtrum Communications | Arto Lehti | 61519 | discussion | Decision | | | 112 | 7.2.2.4 | Remaining details on mechanism to recover from beam failure | 96950 | available |
| R1-1719696 | Remaining issues on CSI feedback | Spreadtrum Communications | Arto Lehti | 61519 | discussion | Decision | | | 110 | 7.2.2.2 | Remaining details on CSI reporting | 96960 | available |
| R1-1719697 | Discussion of UL transmission without grant considering BWP | Spreadtrum Communications | Arto Lehti | 61519 | discussion | Decision | | | 144 | 7.3.3 | Remaining details on DL/UL data scheduling and HARQ procedure | 96970 | withdrawn |
| R1-1719698 | Remaining issues on UL/DL BWP configuration | Spreadtrum Communications | Arto Lehti | 61519 | discussion | Decision | | | 153 | 7.3.4.1 | Other aspects on bandwidth Parts | 96980 | available |
| R1-1719699 | Remaining details on search space | Spreadtrum Communications | Arto Lehti | 61519 | discussion | Decision | | | 128 | 7.3.1.2 | Remaining details on Search space | 96990 | available |
| R1-1719700 | Remaining details on short-PUCCH for UCI of up to 2 bits | Spreadtrum Communications | Arto Lehti | 61519 | discussion | Decision | | | 134 | 7.3.2.1.1 | Short-PUCCH for UCI of up to 2 bits | 97000 | available |
| R1-1719701 | Remaining details on UE processing time | Spreadtrum Communications | Arto Lehti | 61519 | discussion | Decision | | | 146 | 7.3.3.2 | DL/UL scheduling and HARQ management | 97010 | withdrawn |
| R1-1719702 | Remaining details on HARQ process in UL transmission without grant | Spreadtrum Communications | Arto Lehti | 61519 | discussion | Decision | | | 148 | 7.3.3.4 | UL data transmission procedure | 97020 | available |
| R1-1719703 | On remaining details of NR DMRS | Panasonic | Ankit Bhamri | 72646 | discussion | Decision | | | 118 | 7.2.3.3 | Remaining details on DMRS | 97030 | available |
| R1-1719704 | Discussion on paging design for NR | PANASONIC R&D Center Germany | David Gonzalez | 72557 | discussion | | | | 93 | 7.1.3 | Remaining details on Paging design | 97040 | available |
| R1-1719705 | NR Paging Overhead Reduction | TCL Communication | Umer Salim | 70602 | discussion | | | | 93 | 7.1.3 | Remaining details on Paging design | 97050 | available |
| R1-1719706 | Dynamic TDD - SFI Handling and Interference Management | TCL Communication | Umer Salim | 70602 | discussion | | | | 172 | 7.8 | Other | 97060 | available |
| R1-1719707 | Correction of section references for feMTC | Ericsson | Johan Bergman | 51222 | draftCR | Decision | | | 11 | 6.1.5 | Maintenance of Release 14 Further Enhanced MTC for LTE | 3880 | agreed |
| R1-1719708 | On improved random access procedure for Rel-14 NB-IoT | Ericsson | Johan Bergman | 51222 | discussion | Decision | | | 12 | 6.1.6 | Maintenance of Release 14 Enhancements of NB-IoT for LTE | 94860 | noted |
| R1-1719709 | Clarification of carrier indication in DCI format N1 in NB-IoT | Ericsson | Johan Bergman | 51222 | draftCR | Decision | | Spelling errors on the cover page should be corrected;<br>meaining => meaning<br>interperte => interprete<br>Clariy => Clarify<br>Imcomplete => Incomplete<br>Also straight quotation marks should be used in the change marks. | 12 | 6.1.6 | Maintenance of Release 14 Enhancements of NB-IoT for LTE | 5640 | revised |
| R1-1719710 | Correction of section reference for eVoLTE | Ericsson | Johan Bergman | 51222 | draftCR | Decision | | Added Cat F to align with the cover page. | 13 | 6.1.7 | Other | 3900 | agreed |
| R1-1719711 | System acquisition time reduction for MTC | ZTE, SaneChips | Shupeng Li | 58860 | discussion | Decision | | | 52 | 6.2.5.1 | Reduced system acquisition time | 97110 | available |
| R1-1719712 | Remaining issues on UL HARQ-ACK feedback for MTC | ZTE, SaneChips | Shupeng Li | 58860 | discussion | Decision | | | 55 | 6.2.5.4 | Uplink HARQ-ACK feedback | 97120 | available |
| R1-1719713 | Remaining details on CQI table for 64QAM support for MTC | ZTE, SaneChips | Shupeng Li | 58860 | discussion | Decision | | | 56 | 6.2.5.5 | Increased PDSCH spectral efficiency | 97130 | available |
| R1-1719714 | Details on sub-PRB allocation design for MTC | ZTE, SaneChips | Shupeng Li | 58860 | discussion | Decision | | | 57 | 6.2.5.6 | Increased PUSCH spectral efficiency | 97140 | available |
| R1-1719715 | Cell search enhancement for NB-IoT | ZTE, SaneChips | Shupeng Li | 58860 | discussion | Decision | | | 67 | 6.2.6.2.1 | Cell search | 97150 | available |
| R1-1719716 | System information acquisition improvement for NB-IoT | ZTE, SaneChips | Shupeng Li | 58860 | discussion | Decision | | | 68 | 6.2.6.2.2 | System Information | 97160 | available |
| R1-1719717 | Remaining details on downlink aspects to support TDD NB-IoT | ZTE, SaneChips | Shupeng Li | 58860 | discussion | Decision | | | 70 | 6.2.6.3.1 | Downlink aspects | 97170 | available |
| R1-1719718 | Remaining details on uplink aspects to support TDD NB-IoT | ZTE, SaneChips | Shupeng Li | 58860 | discussion | Decision | | | 71 | 6.2.6.3.2 | Uplink aspects | 97180 | available |
| R1-1719719 | Remaining details on common aspects to support TDD NB-IoT | ZTE, SaneChips | Shupeng Li | 58860 | discussion | Decision | | | 72 | 6.2.6.3.3 | Common aspects | 97190 | available |
| R1-1719720 | Considerations on physical layer aspects on SPS in NB-IoT | ZTE, SaneChips | Shupeng Li | 58860 | discussion | Decision | | | 73 | 6.2.6.4 | Other | 97200 | available |
| R1-1719721 | Details on physical layer SR for NB-IoT | ZTE, SaneChips | Shupeng Li | 58860 | discussion | Decision | | | 73 | 6.2.6.4 | Other | 97210 | available |
| R1-1719722 | On early data transmission for eMTC | ZTE, SaneChips | Shupeng Li | 58860 | discussion | Decision | | | 53 | 6.2.5.2 | Early data transmission | 97220 | available |
| R1-1719723 | On early data transmission for NB-IoT | ZTE, SaneChips | Shupeng Li | 58860 | discussion | Decision | | | 65 | 6.2.6.1.2 | Data transmission during the random access procedure | 97230 | available |
| R1-1719724 | NPRACH power control for Rel-14 NB-IoT | ZTE, SaneChips | Shupeng Li | 58860 | discussion | Decision | | Release and work item code are missing. | 12 | 6.1.6 | Maintenance of Release 14 Enhancements of NB-IoT for LTE | 97080 | noted |
| R1-1719725 | Details design of wake up signal for NB-IoT | ZTE, SaneChips | Shupeng Li | 58860 | discussion | Decision | | | 64 | 6.2.6.1.1.3 | Detailed design of wake-up signal | 97250 | available |
| R1-1719726 | Wake up signal function for NB-IoT | ZTE, SaneChips | Shupeng Li | 58860 | discussion | Decision | | | 62 | 6.2.6.1.1.1 | Wake-up signal functions | 97260 | available |
| R1-1719727 | Discussion on wake up signal configuration for NB-IoT | ZTE, SaneChips | Shupeng Li | 58860 | discussion | Decision | | | 63 | 6.2.6.1.1.2 | Wake-up signal configurations and procedures | 97270 | available |
| R1-1719728 | Power consumption reduction for physical channels for MTC | ZTE, SaneChips | Shupeng Li | 58860 | discussion | Decision | | | 54 | 6.2.5.3 | Downlink channel power efficiency | 97280 | available |
| R1-1719729 | NPRACH range enhancement | ZTE, SaneChips | Shupeng Li | 58860 | discussion | Decision | | | 73 | 6.2.6.4 | Other | 97290 | available |
| R1-1719730 | NPRACH reliability enhancement for NB-IoT | ZTE, SaneChips | Shupeng Li | 58860 | discussion | Decision | | | 73 | 6.2.6.4 | Other | 97300 | available |
| R1-1719731 | Discussion on CQI and MCS table | ZTE, Sanechips | Yifei Yuan | 58525 | discussion | Decision | | | 49 | 6.2.4.1 | Remaining details for support for 1024QAM for DL channels | 97310 | noted |
| R1-1719732 | CQI signalling on 1024QAM | ZTE, Sanechips | Yifei Yuan | 58525 | discussion | Decision | | | 49 | 6.2.4.1 | Remaining details for support for 1024QAM for DL channels | 97320 | noted |
| R1-1719733 | Remaining details of codeword mapping for DFT-s-OFDM | Lenovo, Motorola Mobility | Chenxi Zhu | 64707 | discussion | Discussion | | Late contribution | 103 | 7.2.1.1 | Remaining details on codeword mapping | 97330 | available |
| R1-1719734 | Discussion of beam measurement and reporting | Lenovo, Motorola Mobility | Chenxi Zhu | 64707 | discussion | Discussion | | Late contribution | 111 | 7.2.2.3 | Remaining details on beam measurement and reporting | 97340 | available |
| R1-1719735 | Discussion of beam failure recovery | Lenovo, Motorola Mobility | Chenxi Zhu | 64707 | discussion | Discussion | | Late contribution | 112 | 7.2.2.4 | Remaining details on mechanism to recover from beam failure | 97350 | available |
| R1-1719736 | Remaining issues on DMRS | Lenovo, Motorola Mobility | Chenxi Zhu | 64707 | discussion | Discussion | | Late contribution | 118 | 7.2.3.3 | Remaining details on DMRS | 97360 | available |
| R1-1719737 | Discussion of codebook based UL transmission | Lenovo, Motorola Mobility | Chenxi Zhu | 64707 | discussion | Discussion | | Late contribution | 104 | 7.2.1.2 | Remaining details on codebook based transmission for UL | 97370 | available |
| R1-1719738 | Discussion of non-codebook based UL transmission | Lenovo, Motorola Mobility | Chenxi Zhu | 64707 | discussion | Discussion | | Late contribution | 105 | 7.2.1.3 | Remaining details on non-codebook based transmission for UL | 97380 | available |
| R1-1719739 | Uplink HARQ-ACK feedback in efeMTC | Lenovo, Motorola Mobility | Chenxi Zhu | 64707 | discussion | Discussion | | Late contribution | 55 | 6.2.5.4 | Uplink HARQ-ACK feedback | 97390 | available |
| R1-1719740 | Views on TDD downlink aspect | Lenovo, Motorola Mobility | Chenxi Zhu | 64707 | discussion | Discussion | | Late contribution | 70 | 6.2.6.3.1 | Downlink aspects | 97400 | available |
| R1-1719741 | Common Aspects of NB-IoT TDD Operation | Lenovo, Motorola Mobility | Chenxi Zhu | 64707 | discussion | Discussion | | Late contribution | 72 | 6.2.6.3.3 | Common aspects | 97410 | available |
| R1-1719742 | Discussion on remaining issues of RMSI delivery | Lenovo, Motorola Mobility | Chenxi Zhu | 64707 | discussion | Discussion | | Late contribution | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 97420 | available |
| R1-1719743 | Disucussion on remaing issues of OSI delivery | Lenovo, Motorola Mobility | Chenxi Zhu | 64707 | discussion | Discussion | | Late contribution | 92 | 7.1.2.3 | Remaining details on other system information delivery | 97430 | available |
| R1-1719744 | On HARQ-ACK multiplexing and bundling | Lenovo, Motorola Mobility | Chenxi Zhu | 64707 | discussion | Discussion | | Late contribution | 146 | 7.3.3.2 | DL/UL scheduling and HARQ management | 97440 | available |
| R1-1719745 | Remaining issues on CBG-based (re)transmission | Lenovo, Motorola Mobility | Chenxi Zhu | 64707 | discussion | Discussion | | Late contribution | 147 | 7.3.3.3 | CBG-based (re)transmission | 97450 | available |
| R1-1719746 | HARQ design for uplink grant-free transmission | Lenovo, Motorola Mobility | Chenxi Zhu | 64707 | discussion | Discussion | | Late contribution | 151 | 7.3.3.7 | Other | 97460 | available |

| TDoc | Title | Source | Contact | Contact ID | Type | For | Abstract | Secretary Remarks | Agenda item sort order | Agenda item | Agenda item description | TDoc sort order within agenda item | TDoc Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R1-1719747 | HARQ-ACK codebook determination for CA | Lenovo, Motorola Mobility | Chenxi Zhu | 64707 | discussion | Discussion | | Late contribution | 154 | 7.3.4.2 | Other aspects on carrier aggregation | 97470 | available |
| R1-1719748 | Remaining issues on long PUCCH design for UCI of more than 2 bits | Lenovo, Motorola Mobility | Chenxi Zhu | 64707 | discussion | Discussion | | Late contribution | 139 | 7.3.2.2.2 | Long-PUCCH for UCI of more than 2 bits | 97480 | available |
| R1-1719749 | On UL transmission procedures to reduce latency and enhance reilability | Lenovo, Motorola Mobility | Chenxi Zhu | 64707 | discussion | Discussion | | Late contribution | 148 | 7.3.3.4 | UL data transmission procedure | 97490 | available |
| R1-1719750 | Discussion on Mode 4 support for V2X carrier aggregation | Lenovo, Motorola Mobility | Chenxi Zhu | 64707 | discussion | Discussion | | Late contribution | 37 | 6.2.3.1.1 | Mode-4 support | 97500 | available |
| R1-1719751 | Discussion on latency reduction for V2X | Lenovo, Motorola Mobility | Chenxi Zhu | 64707 | discussion | Discussion | | Late contribution | 46 | 6.2.3.5 | Maximum time reduction between packet arrival at layer 1 and resource selection for transmission | 97510 | available |
| R1-1719752 | On mode 3 and mode 4 pool sharing | NEC | Rajitha Palipana | 57803 | discussion | Decision | | | 45 | 6.2.3.4 | Resource pool sharing between mode-3 and mode-4 users | 97520 | available |
| R1-1719753 | On NR paging | NEC | Rajitha Palipana | 57803 | discussion | Decision | | | 93 | 7.1.3 | Remaining details on Paging design | 97530 | available |
| R1-1719754 | Remaining issues for wake-up signal for efeMTC | vivo | Yu Ding | 67720 | discussion | Decision | | | 54 | 6.2.5.3 | Downlink channel power efficiency | 97540 | available |
| R1-1719755 | Remaining details on wake-up signal functions for feNB-IoT | vivo | Yu Ding | 67720 | discussion | Decision | | | 62 | 6.2.6.1.1.1 | Wake-up signal functions | 97550 | available |
| R1-1719756 | Discussion on Remaining Details on Synchronization signal | vivo | Yu Ding | 67720 | discussion | | | | 88 | 7.1.1 | Remaining Details on Synchronization signal | 97560 | available |
| R1-1719757 | Remaining aspects on NR-PBCH contents and payload | vivo | Yu Ding | 67720 | discussion | | | | 90 | 7.1.2.1 | Remaining details on NR-PBCH | 97570 | available |
| R1-1719758 | Discussion on Remaining Minimum System Information | vivo | Yu Ding | 67720 | discussion | | | | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 97580 | available |
| R1-1719759 | Remaining details on NR paging design | vivo | Yu Ding | 67720 | discussion | | | | 93 | 7.1.3 | Remaining details on Paging design | 97590 | available |
| R1-1719760 | Remaining issues for RLM | vivo | Yu Ding | 67720 | discussion | | | | 99 | 7.1.5.2 | Remaining details Radio link monitoring for mobility management | 97600 | available |
| R1-1719761 | Remaining details on other system information delivery | vivo | Yu Ding | 67720 | discussion | | | | 92 | 7.1.2.3 | Remaining details on other system information delivery | 97610 | available |
| R1-1719762 | Remaining issues for RRM | vivo | Yu Ding | 67720 | discussion | | | | 98 | 7.1.5.1 | Remaining details on measurement for mobility management | 97620 | available |
| R1-1719763 | Remaining issues on codeword mapping | vivo | Yu Ding | 67720 | discussion | | | | 103 | 7.2.1.1 | Remaining details on codeword mapping | 97630 | available |
| R1-1719764 | Remaining issues on codebook based UL transmission | vivo | Yu Ding | 67720 | discussion | | | | 104 | 7.2.1.2 | Remaining details on codebook based transmission for UL | 97640 | available |
| R1-1719765 | Remaining issues on non-codebook based UL transmission | vivo | Yu Ding | 67720 | discussion | | | | 105 | 7.2.1.3 | Remaining details on non-codebook based transmission for UL | 97650 | available |
| R1-1719766 | Remaining issues on PRB bundling for DL | vivo | Yu Ding | 67720 | discussion | | | | 106 | 7.2.1.4 | Remaining details on PRB bundling for DL | 97660 | available |
| R1-1719767 | Remaining details on CSI measurement | vivo | Yu Ding | 67720 | discussion | | | | 109 | 7.2.2.1 | Remaining details on CSI measurement | 97670 | available |
| R1-1719768 | Remaining details on CSI reporting | vivo | Yu Ding | 67720 | discussion | | | | 110 | 7.2.2.2 | Remaining details on CSI reporting | 97680 | available |
| R1-1719769 | Remaining details on beam measurement and reporting | vivo | Yu Ding | 67720 | discussion | | | | 111 | 7.2.2.3 | Remaining details on beam measurement and reporting | 97690 | available |
| R1-1719770 | Remaining details on mechanism to recover from beam failure | vivo | Yu Ding | 67720 | discussion | | | | 112 | 7.2.2.4 | Remaining details on mechanism to recover from beam failure | 97700 | available |
| R1-1719771 | Remaining issues on CQI and MCS | vivo | Yu Ding | 67720 | discussion | | | | 113 | 7.2.2.5 | Remaining details on CQI and MCS | 97710 | available |
| R1-1719772 | Remaining details on multiplexing of different types of RSs | vivo | Yu Ding | 67720 | discussion | | | | 116 | 7.2.3.1 | Remaining details on Multiplexing of different types of RSs | 97720 | available |
| R1-1719773 | Discussion on CSI-RS | vivo | Yu Ding | 67720 | discussion | | | | 117 | 7.2.3.2 | Remaining details on CSI-RS | 97730 | available |
| R1-1719774 | Remaining details on DMRS design | vivo | Yu Ding | 67720 | discussion | | | | 118 | 7.2.3.3 | Remaining details on DMRS | 97740 | available |
| R1-1719775 | Discussion on the remaining details on PT-RS | vivo | Yu Ding | 67720 | discussion | | | | 119 | 7.2.3.4 | Remaining details on PT-RS | 97750 | available |
| R1-1719776 | Remaining details on SRS design | vivo | Yu Ding | 67720 | discussion | | | | 120 | 7.2.3.5 | Remaining details on SRS | 97760 | available |
| R1-1719777 | Discussion on TRS | vivo | Yu Ding | 67720 | discussion | | | | 121 | 7.2.3.6 | Remaining details on TRS | 97770 | available |
| R1-1719778 | Remaining issues on QCL | vivo | Yu Ding | 67720 | discussion | | | | 122 | 7.2.3.7 | Remaining details on QCL | 97780 | available |
| R1-1719779 | Remaining issues on NR UL power control | vivo | Yu Ding | 67720 | discussion | | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 97790 | available |
| R1-1719780 | Remaining details on NR-PDCCH structure | vivo | Yu Ding | 67720 | discussion | | | | 127 | 7.3.1.1 | Remaining details on PDCCH structure | 97800 | available |
| R1-1719781 | Remaining details on NR-PDCCH search space | vivo | Yu Ding | 67720 | discussion | | | | 128 | 7.3.1.2 | Remaining details on Search space | 97810 | available |
| R1-1719782 | Remaining details on group-common PDCCH | vivo | Yu Ding | 67720 | discussion | | | | 129 | 7.3.1.3 | Remaining details on group-common PDCCH | 97820 | available |
| R1-1719783 | DCI contents and design | vivo | Yu Ding | 67720 | discussion | | | | 130 | 7.3.1.4 | DCI contents and formats | 97830 | available |
| R1-1719784 | Discussion on ultra-reliable design for PDCCH | vivo | Yu Ding | 67720 | discussion | | | | 131 | 7.3.1.5 | Other | 97840 | available |
| R1-1719785 | Remaining issues on short-PUCCH for UCI of up to 2 bits | vivo | Yu Ding | 67720 | discussion | | | | 134 | 7.3.2.1.1 | Short-PUCCH for UCI of up to 2 bits | 97850 | available |
| R1-1719786 | Remaining issues on Short-PUCCH for UCI of more than 2 bits | vivo | Yu Ding | 67720 | discussion | | | | 135 | 7.3.2.1.2 | Short-PUCCH for UCI of more than 2 bits | 97860 | available |
| R1-1719787 | Support of short-PUCCH over 2 OFDM symbols | vivo | Yu Ding | 67720 | discussion | | | | 136 | 7.3.2.1.3 | Support of short-PUCCH over 2 OFDM symbols | 97870 | available |
| R1-1719788 | Long-PUCCH for UCI of up to 2 bits | vivo | Yu Ding | 67720 | discussion | | | | 138 | 7.3.2.2.1 | Long-PUCCH for UCI of up to 2 bits | 97880 | available |
| R1-1719789 | Long-PUCCH for UCI of more than 2 bits | vivo | Yu Ding | 67720 | discussion | | | | 139 | 7.3.2.2.2 | Long-PUCCH for UCI of more than 2 bits | 97890 | available |
| R1-1719790 | Support of long-PUCCH over multiple slots | vivo | Yu Ding | 67720 | discussion | | | | 140 | 7.3.2.2.3 | Support of long-PUCCH over multiple slots | 97900 | available |
| R1-1719791 | On UCI multiplexing | vivo | Yu Ding | 67720 | discussion | | | | 141 | 7.3.2.3 | UCI multiplexing | 97910 | available |
| R1-1719792 | On PUCCH resource allocation | vivo | Yu Ding | 67720 | discussion | | | | 142 | 7.3.2.4 | Resource allocation for PUCCH | 97920 | available |
| R1-1719793 | On DL/UL resource allocation | vivo | Yu Ding | 67720 | discussion | | | | 145 | 7.3.3.1 | DL/UL resource allocation | 97930 | available |
| R1-1719794 | Remaining issues on DL/UL scheduling and HARQ | vivo | Yu Ding | 67720 | discussion | | | | 146 | 7.3.3.2 | DL/UL scheduling and HARQ management | 97940 | available |
| R1-1719795 | Remaining issues on CBG-based (re)transmission | vivo | Yu Ding | 67720 | discussion | | | | 147 | 7.3.3.3 | CBG-based (re)transmission | 97950 | available |
| R1-1719796 | On UL data transmission procedure | vivo | Yu Ding | 67720 | discussion | | | | 148 | 7.3.3.4 | UL data transmission procedure | 97960 | available |
| R1-1719797 | On soft-buffer management for NR | vivo | Yu Ding | 67720 | discussion | | | | 149 | 7.3.3.5 | Soft-buffer management for NR | 97970 | available |
| R1-1719798 | Remaining issues on multiplexing of different transmission durations | vivo | Yu Ding | 67720 | discussion | | | | 150 | 7.3.3.6 | Multiplexing data with different transmission durations | 97980 | available |
| R1-1719799 | Discussion on scheduling and HARQ for URLLC reliability | vivo | Yu Ding | 67720 | discussion | | | | 151 | 7.3.3.7 | Other | 97990 | available |
| R1-1719800 | Other aspects on bandwidth Parts | vivo | Yu Ding | 67720 | discussion | | | | 153 | 7.3.4.1 | Other aspects on bandwidth Parts | 98000 | available |
| R1-1719801 | Other aspects on carrier aggregation | vivo | Yu Ding | 67720 | discussion | | | | 154 | 7.3.4.2 | Other aspects on carrier aggregation | 98010 | available |
| R1-1719802 | Remaining details on rate matching aspects for NR DL and UL | vivo | Yu Ding | 67720 | discussion | | | Late contribution | 155 | 7.3.5 | Remaining details on rate matching aspects for NR DL and UL | 98020 | withdrawn |
| R1-1719803 | Remaining issues on harmonic interference handling | vivo | Yu Ding | 67720 | discussion | | | | 166 | 7.5 | NR-LTE co-existence | 98030 | noted |
| R1-1719804 | Measurement results and analysis on UE power consumption | vivo | Yu Ding | 67720 | discussion | | | | 172 | 7.8 | Other | 98040 | available |
| R1-1719805 | NR UE power saving | vivo | Yu Ding | 67720 | discussion | | | | 172 | 7.8 | Other | 98050 | available |
| R1-1719806 | Further details on beam indication | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 114 | 7.2.2.6 | Other | 98060 | available |
| R1-1719807 | Beam management for PUCCH | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 114 | 7.2.2.6 | Other | 98070 | available |
| R1-1719808 | Design of PRACH-based Beam Failure Recovery | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 114 | 7.2.2.6 | Other | 98080 | available |
| R1-1719809 | Design of PUCCH-based Beam Failure Recovery | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 114 | 7.2.2.6 | Other | 98090 | available |
| R1-1719810 | Considerations on timing advance design in NR | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 114 | 7.2.2.6 | Other | 98100 | available |
| R1-1719811 | Multi-beam transmission for DL control channel | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 114 | 7.2.2.6 | Other | 98110 | available |
| R1-1719812 | Robust transmission for UL control | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 114 | 7.2.2.6 | Other | 98120 | available |

| TDoc | Title | Source | Contact | Contact ID | Type | For | Abstract | Secretary Remarks | Agenda item sort order | Agenda item | Agenda item description | TDoc sort order within agenda item | TDoc Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R1-1719813 | On aperiodic CSI-RS triggering | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 114 | 7.2.2.6 | Other | 98130 | available |
| R1-1719814 | DL multi-TRP/panel/beam operation in R15 | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 124 | 7.2.4 | Other | 98140 | available |
| R1-1719815 | CSI acquisition details for NCJT | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 114 | 7.2.2.6 | Other | 98150 | available |
| R1-1719816 | Enabling multiple NR-PDCCH for multiple TRP transmission | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 107 | 7.2.1.5 | Other | 98160 | available |
| R1-1719817 | Differential Rank Indication for Multi-subband UL MIMO | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 107 | 7.2.1.5 | Other | 98170 | available |
| R1-1719818 | UL multi-TRP/panel/beam operation in R15 | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 124 | 7.2.4 | Other | 98180 | available |
| R1-1719819 | Further enhancements on codebook design | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 114 | 7.2.2.6 | Other | 98190 | available |
| R1-1719820 | Power control design for SUL and LNC | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 170 | 7.6.3 | Other | 98200 | available |
| R1-1719821 | Remaining details of SRS antenna switching | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 123 | 7.2.3.8 | Other | 98210 | available |
| R1-1719822 | Considerations on UE-specific RS Sequence Design | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 123 | 7.2.3.8 | Other | 98220 | available |
| R1-1719823 | Evaluation results of DMRS design for DL/UL data channel | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 123 | 7.2.3.8 | Other | 98230 | available |
| R1-1719824 | Remaining issues on supporting Common UL/DL DMRS design | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 123 | 7.2.3.8 | Other | 98240 | available |
| R1-1719825 | Remaining details for reference signals for ECP | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 123 | 7.2.3.8 | Other | 98250 | available |
| R1-1719826 | DMRS design for URLLC | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 123 | 7.2.3.8 | Other | 98260 | available |
| R1-1719827 | Association between SS blocks and the corresponding RMSI(s) in wideband operation | Spreadtrum Communications | Arto Lehti | 61519 | discussion | Decision | | | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 98270 | available |
| R1-1719828 | Bandwidth part activation and adaptation | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 156 | 7.3.6 | Other | 98280 | available |
| R1-1719829 | On uplink hopping and DVRB | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 151 | 7.3.3.7 | Other | 98290 | available |
| R1-1719830 | On data channel scrambling | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 151 | 7.3.3.7 | Other | 98300 | available |
| R1-1719831 | Remaining issues on PRACH for SUL | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 100 | 7.1.6 | Other | 98310 | available |
| R1-1719832 | Designs for UE power saving | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 131 | 7.3.1.5 | Other | 98320 | available |
| R1-1719833 | Discussion on UE category in NR | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 172 | 7.8 | Other | 98330 | noted |
| R1-1719834 | On CSI feedback in NR | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 143 | 7.3.2.5 | Other | 98340 | available |
| R1-1719835 | UE-to-UE measurement for cross-link interference mitigation | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 172 | 7.8 | Other | 98350 | available |
| R1-1719836 | Timing alignment on cross-link | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 172 | 7.8 | Other | 98360 | available |
| R1-1719837 | UL Power control for cross-link interference mitigation | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 172 | 7.8 | Other | 98370 | available |
| R1-1719838 | High level consideration on NR unlicensed band operation | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 172 | 7.8 | Other | 98380 | available |
| R1-1719839 | NR Numerology on unlicensed bands | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 172 | 7.8 | Other | 98390 | available |
| R1-1719840 | NR Frame structure on unlicensed bands | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 172 | 7.8 | Other | 98400 | available |
| R1-1719841 | Coexistence and Channel access for NR unlicensed band operations | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 172 | 7.8 | Other | 98410 | available |
| R1-1719842 | NR standalone operation on unlicensed bands | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 172 | 7.8 | Other | 98420 | available |
| R1-1719843 | NLOS state due to vehicle blockage for V2X sidelink channel model | Huawei, HiSilicon, Spirent Communications, Keysight Technologies, Cohere Technologies | Brian Classon | 45750 | other | | | | 172 | 7.8 | Other | 98430 | available |
| R1-1719844 | NTN channel modeling | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 172 | 7.8 | Other | 98440 | available |
| R1-1719845 | On interaction between different TTI lengths | Nokia, Nokia Shanghai Bell | Timo Lunttila | 69949 | discussion | Decision | | Changed to subject for decision to align with the contribution. | 18 | 6.2.1.2.1 | Remaining aspects related to interaction between different TTI lengths | 98450 | available |
| R1-1719846 | Remaining details on UL control channel design | Nokia, Nokia Shanghai Bell | Timo Lunttila | 69949 | discussion | Decision | | Changed to subject for decision to align with the contribution. | 20 | 6.2.1.2.3 | Remaining details on UL control channel design | 98460 | available |
| R1-1719847 | Remaining details on UL data channel design | Nokia, Nokia Shanghai Bell | Timo Lunttila | 69949 | discussion | Decision | | Changed to subject for decision to align with the contribution. | 22 | 6.2.1.2.5 | Remaining details on UL data channel design | 98470 | available |
| R1-1719848 | On CSI Reporting for sTTI | Nokia, Nokia Shanghai Bell | Timo Lunttila | 69949 | discussion | Decision | | | 24 | 6.2.1.2.7 | Other | 98480 | available |
| R1-1719849 | Multiple starting and ending positions in a subframe for UL | Nokia, Nokia Shanghai Bell | Timo Lunttila | 69949 | discussion | Decision | | | 28 | 6.2.2.1 | Multiple starting and ending positions in a subframe for UL | 98490 | available |
| R1-1719850 | Summary of email discussion [90b-LTE-19] on AUL resource allocation | Nokia | Timo Lunttila | 69949 | discussion | Decision | | | 30 | 6.2.2.2.1 | Resource allocation for autonomous UL access | 98500 | available |
| R1-1719851 | Resource Allocation for Autonomous UL Access | Nokia, Nokia Shanghai Bell | Timo Lunttila | 69949 | discussion | Decision | | | 30 | 6.2.2.2.1 | Resource allocation for autonomous UL access | 98510 | available |
| R1-1719852 | HARQ for autonomous uplink access | Nokia, Nokia Shanghai Bell | Timo Lunttila | 69949 | discussion | Decision | | | 31 | 6.2.2.2.2 | HARQ for autonomous uplink access | 98520 | available |
| R1-1719853 | On channel access for autonomous UL access | Nokia, Nokia Shanghai Bell | Timo Lunttila | 69949 | discussion | Decision | | | 32 | 6.2.2.2.3 | Channel access for autonomous UL access | 98530 | available |
| R1-1719854 | Discussion on CBSR for advanced CSI | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | Release and work item code are missing. | 10 | 6.1.4 | Maintenance of Release 14 Full-Dimension MIMO for LTE | 2350 | noted |
| R1-1719855 | Remaining issues on collision handling between different TTI lengths | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 18 | 6.2.1.2.1 | Remaining aspects related to interaction between different TTI lengths | 98550 | available |
| R1-1719856 | Summary of email approval [90b-LTE-12] on sPUSCH/sPUCCH power control and UL collision handling between different TTI lengths | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 18 | 6.2.1.2.1 | Remaining aspects related to interaction between different TTI lengths | 98560 | available |
| R1-1719857 | Remaining issues on DL control channel design | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 19 | 6.2.1.2.2 | Remaining details on DL control channel design | 98570 | available |
| R1-1719858 | Summary of email approval [90b-LTE-07] on details of sDCI formats | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 19 | 6.2.1.2.2 | Remaining details on DL control channel design | 98580 | available |
| R1-1719859 | Remaining issues on sPUCCH design | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 20 | 6.2.1.2.3 | Remaining details on UL control channel design | 98590 | available |
| R1-1719860 | UCI on subslot sPUSCH | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 22 | 6.2.1.2.5 | Remaining details on UL data channel design | 98600 | available |
| R1-1719861 | Discussion on sTTI SPS | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 24 | 6.2.1.2.7 | Other | 98610 | available |
| R1-1719862 | Discussion on multiple starting and ending positions for LAA UL | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 28 | 6.2.2.1 | Multiple starting and ending positions in a subframe for UL | 98620 | available |
| R1-1719863 | Resource allocation and control signaling for autonomous UL access | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 30 | 6.2.2.2.1 | Resource allocation for autonomous UL access | 98630 | available |
| R1-1719864 | HARQ operation for autonomous UL access | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 31 | 6.2.2.2.2 | HARQ for autonomous uplink access | 98640 | available |
| R1-1719865 | Channel access procedure for autonomous UL access | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 32 | 6.2.2.2.3 | Channel access for autonomous UL access | 98650 | available |
| R1-1719866 | Discussion on carrier aggregation in sidelink mode 4 operation | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 37 | 6.2.3.1.1 | Mode-4 support | 98660 | available |
| R1-1719867 | Remaining issues on synchronization for sidelink CA | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 38 | 6.2.3.1.2 | Synchronization | 98670 | available |
| R1-1719868 | Discussion on 64QAM support in PC5 operation | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 40 | 6.2.3.2 | Support for 64-QAM | 98680 | available |
| R1-1719869 | Discussion on transmit diversity support in PC5 based V2X | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 42 | 6.2.3.3.1 | Transmit diversity solutions | 98690 | available |
| R1-1719870 | Discussion on resource pool sharing between UEs using mode 3 and 4 | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 45 | 6.2.3.4 | Resource pool sharing between mode-3 and mode-4 users | 98700 | available |
| R1-1719871 | Discussion on maximum time reduction between packet arrival and selected transmission resource | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 46 | 6.2.3.5 | Maximum time reduction between packet arrival at layer 1 and resource selection for transmission | 98710 | available |
| R1-1719872 | Evaluation results of PC5 operation with Short TTI | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | Late contribution | 47 | 6.2.3.6 | Other | 98720 | withdrawn |
| R1-1719873 | System information acquisition time enhancement in MTC | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 52 | 6.2.5.1 | Reduced system acquisition time | 98730 | available |
| R1-1719874 | Data transmission during random access procedure in MTC | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 53 | 6.2.5.2 | Early data transmission | 98740 | available |
| R1-1719875 | Discussion on wake up signal in MTC | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 54 | 6.2.5.3 | Downlink channel power efficiency | 98750 | available |

| TDoc | Title | Source | Contact | Contact ID | Type | For | Abstract | Secretary Remarks | Agenda item sort order | Agenda item | Agenda item description | TDoc sort order within agenda item | TDoc Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R1-1719876 | Discussion on early termination of uplink repetitions for MTC | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 55 | 6.2.5.4 | Uplink HARQ-ACK feedback | 98760 | available |
| R1-1719877 | Discussion on wake up signal function in NB-IoT | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 62 | 6.2.6.1.1.1 | Wake-up signal functions | 98770 | available |
| R1-1719878 | Discussion on wake up signal configurations and procedures in NB-IoT | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 63 | 6.2.6.1.1.2 | Wake-up signal configurations and procedures | 98780 | available |
| R1-1719879 | Wake up signal design in NB-IoT | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 64 | 6.2.6.1.1.3 | Detailed design of wake-up signal | 98790 | available |
| R1-1719880 | Data transmission during random access procedure in NB-IoT | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 65 | 6.2.6.1.2 | Data transmission during the random access procedure | 98800 | available |
| R1-1719881 | Cell search latency enhancement | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 67 | 6.2.6.2.1 | Cell search | 98810 | available |
| R1-1719882 | MIB-NB skipping and System information acquisition latency enhancement | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 68 | 6.2.6.2.2 | System Information | 98820 | available |
| R1-1719883 | Discussion on DL aspects in TDD NB-IoT | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 70 | 6.2.6.3.1 | Downlink aspects | 98830 | available |
| R1-1719884 | Discussion on UL aspects in TDD NB-IoT | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 71 | 6.2.6.3.2 | Uplink aspects | 98840 | available |
| R1-1719885 | Discussion on common aspects in TDD NB-IoT | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 72 | 6.2.6.3.3 | Common aspects | 98850 | available |
| R1-1719886 | Discussion on Scheduling request in NB-IoT | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 73 | 6.2.6.4 | Other | 98860 | available |
| R1-1719887 | RRM measurement enhancement in NB-IoT | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 73 | 6.2.6.4 | Other | 98870 | available |
| R1-1719888 | Preamble structure for NPRACH enhancement | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 73 | 6.2.6.4 | Other | 98880 | available |
| R1-1719889 | Resource configuration for NPRACH enhancement | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 73 | 6.2.6.4 | Other | 98890 | available |
| R1-1719890 | Interference Mitigation for Aerial Vehicles | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 77 | 6.2.7.3 | UL Interference Mitigation | 98900 | available |
| R1-1719891 | Potential techniques for URLLC in LTE | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 84 | 6.2.8.2 | Candidate techniques enabling URLLC for LTE | 98910 | available |
| R1-1719892 | Remaining Details on Synchronization signal | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 88 | 7.1.1 | Remaining Details on Synchronization signal | 98920 | available |
| R1-1719893 | Remaining Details on PBCH design and contents | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 90 | 7.1.2.1 | Remaining details on NR-PBCH | 98930 | available |
| R1-1719894 | RMSI delivery and CORESET configuration | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 98940 | available |
| R1-1719895 | Other system information delivery | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 92 | 7.1.2.3 | Remaining details on other system information delivery | 98950 | available |
| R1-1719896 | Paging design in NR | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 93 | 7.1.3 | Remaining details on Paging design | 98960 | available |
| R1-1719897 | Discussion on PRACH preamble format details | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 95 | 7.1.4.1 | Remaining details on PRACH formats | 98970 | available |
| R1-1719898 | RACH Procedure | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 96 | 7.1.4.2 | Remaining details on RACH procedure | 98980 | available |
| R1-1719899 | Remaining Details on L3 measurement and mobility management | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 98 | 7.1.5.1 | Remaining details on measurement for mobility management | 98990 | available |
| R1-1719900 | Discussion on Radio Link Monitoring in NR | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 99 | 7.1.5.2 | Remaining details Radio link monitoring for mobility management | 99000 | available |
| R1-1719901 | Discussion on codeword mapping | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 103 | 7.2.1.1 | Remaining details on codeword mapping | 99010 | available |
| R1-1719902 | Discussion on codebook based transmission for UL | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 104 | 7.2.1.2 | Remaining details on codebook based transmission for UL | 99020 | revised |
| R1-1719903 | Discussion on non-codebook based transmission for UL | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 105 | 7.2.1.3 | Remaining details on non-codebook based transmission for UL | 99030 | available |
| R1-1719904 | Discussion on PRB bundling | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 106 | 7.2.1.4 | Remaining details on PRB bundling for DL | 99040 | available |
| R1-1719905 | Discussion on CSI measurement | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 109 | 7.2.2.1 | Remaining details on CSI measurement | 99050 | available |
| R1-1719906 | Discussions on CSI reporting | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 110 | 7.2.2.2 | Remaining details on CSI reporting | 99060 | available |
| R1-1719907 | Discussion on DL/UL beam management | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 111 | 7.2.2.3 | Remaining details on beam measurement and reporting | 99070 | available |
| R1-1719908 | Discussion on beam failure recovery | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 112 | 7.2.2.4 | Remaining details on mechanism to recover from beam failure | 99080 | available |
| R1-1719909 | Discussion on CQI and MCS tables | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 113 | 7.2.2.5 | Remaining details on CQI and MCS | 99090 | available |
| R1-1719910 | On multiplexing of different types of RSs | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 116 | 7.2.3.1 | Remaining details on Multiplexing of different types of RSs | 99100 | available |
| R1-1719911 | On CSI-RS design | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 117 | 7.2.3.2 | Remaining details on CSI-RS | 99110 | revised |
| R1-1719912 | On DMRS design | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 118 | 7.2.3.3 | Remaining details on DMRS | 99120 | available |
| R1-1719913 | On PT-RS design | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 119 | 7.2.3.4 | Remaining details on PT-RS | 99130 | available |
| R1-1719914 | On SRS design | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 120 | 7.2.3.5 | Remaining details on SRS | 99140 | available |
| R1-1719915 | Discussion on fine time/frequency tracking of channel | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 121 | 7.2.3.6 | Remaining details on TRS | 99150 | available |
| R1-1719916 | Discussion on QCL for NR | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 122 | 7.2.3.7 | Remaining details on QCL | 99160 | available |
| R1-1719917 | Remaining details on PDCCH strucutre | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 127 | 7.3.1.1 | Remaining details on PDCCH structure | 99170 | available |
| R1-1719918 | Remaining details on search space | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 128 | 7.3.1.2 | Remaining details on Search space | 99180 | available |
| R1-1719919 | Discussion on group common PDCCH | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 129 | 7.3.1.3 | Remaining details on group-common PDCCH | 99190 | available |
| R1-1719920 | Remaining issues on DCI contents and formats | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 130 | 7.3.1.4 | DCI contents and formats | 99200 | available |
| R1-1719921 | Remaining aspects of short PUCCH for UCI of up to 2 bits | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 134 | 7.3.2.1.1 | Short-PUCCH for UCI of up to 2 bits | 99210 | available |
| R1-1719922 | Remaining aspects of short PUCCH for UCI of more than 2 bits | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 135 | 7.3.2.1.2 | Short-PUCCH for UCI of more than 2 bits | 99220 | available |
| R1-1719923 | Remaining aspects of short PUCCH over 2 OFDM symbols | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 136 | 7.3.2.1.3 | Support of short-PUCCH over 2 OFDM symbols | 99230 | available |
| R1-1719924 | Remaining aspects of long PUCCH for UCI of up to 2 bits | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 138 | 7.3.2.2.1 | Long-PUCCH for UCI of up to 2 bits | 99240 | available |
| R1-1719925 | Remaining aspects of long PUCCH for UCI of more than 2 bits | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 139 | 7.3.2.2.2 | Long-PUCCH for UCI of more than 2 bits | 99250 | available |
| R1-1719926 | Remaining aspects of long PUCCH over multiple slots | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 140 | 7.3.2.2.3 | Support of long-PUCCH over multiple slots | 99260 | available |
| R1-1719927 | UCI on PUSCH and UL channel multiplexing for NR | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 141 | 7.3.2.3 | UCI multiplexing | 99270 | available |
| R1-1719928 | Remaining aspects of PUCCH resource allocation for NR | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 142 | 7.3.2.4 | Resource allocation for PUCCH | 99280 | available |
| R1-1719929 | Discussion on resource allocation and TBS determination | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 145 | 7.3.3.1 | DL/UL resource allocation | 99290 | available |
| R1-1719930 | HARQ process and HARQ-ACK feedback for NR | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 146 | 7.3.3.2 | DL/UL scheduling and HARQ management | 99300 | available |
| R1-1719931 | Remaining aspects of CBG based retransmission for NR | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 147 | 7.3.3.3 | CBG-based (re)transmission | 99310 | available |
| R1-1719932 | Remaining issues on UL data transmission procedure | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 148 | 7.3.3.4 | UL data transmission procedure | 99320 | available |
| R1-1719933 | Considerations on soft buffer management for NR | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 149 | 7.3.3.5 | Soft-buffer management for NR | 99330 | available |
| R1-1719934 | Remaining issues on pre-emption indication | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 150 | 7.3.3.6 | Multiplexing data with different transmission durations | 99340 | available |
| R1-1719935 | Remaining issues on bandwidth parts | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 153 | 7.3.4.1 | Other aspects on bandwidth Parts | 99350 | available |
| R1-1719936 | Considerations on carrier aggregation for NR | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 154 | 7.3.4.2 | Other aspects on carrier aggregation | 99360 | available |
| R1-1719937 | Remaining issues on rate matching resources | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 155 | 7.3.5 | Remaining details on rate matching aspects for NR DL and UL | 99370 | available |
| R1-1719938 | Base graph indication | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 159 | 7.4.1.1 | Nominal code rate / BG determination | 99380 | noted |
| R1-1719939 | On transport block size for two base graphs | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 160 | 7.4.1.2 | Other | 99390 | available |
| R1-1719940 | Joint coding of segmented UCI | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 163 | 7.4.2.2 | Details of conditions for UCI segmentation | 99400 | available |
| R1-1719941 | Bit mapping of NR PBCH field | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 164 | 7.4.2.3 | Order and mapping of PBCH fields | 99410 | available |
| R1-1719942 | Information bit positions for short PUCCH-based reporting | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 165 | 7.4.2.4 | Other | 99420 | available |

| TDoc | Title | Source | Contact | Contact ID | Type | For | Abstract | Secretary Remarks | Agenda item sort order | Agenda item | Agenda item description | TDoc sort order within agenda item | TDoc Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R1-1719943 | Remaing issues on NR LTE coexistence | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 166 | 7.5 | NR-LTE co-existence | 99430 | noted |
| R1-1719944 | Discussion on UL power control for NR non-CA case | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 99440 | available |
| R1-1719945 | Discussion on UL power control for NR CA case | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 169 | 7.6.2 | Remaining details on NR UL power control – CA aspects | 99450 | available |
| R1-1719946 | Design considerations for paired spectrum | LG Electronics | Youngwoo Yun | 45048 | discussion | Decision | | | 171 | 7.7 | Aspects related to FDD | 99460 | available |
| R1-1719947 | Remaining details on shortened processing time for 1ms TTI | Nokia, Nokia Shanghai Bell | Klaus Hugl | 68338 | discussion | Decision | | Changed from other to discussion to align with the contribution. | 16 | 6.2.1.1 | Remaining details on shortened processing time for 1ms TTI | 99470 | available |
| R1-1719948 | On remaining details on DL control channel design | Nokia, Nokia Shanghai Bell | Klaus Hugl | 68338 | discussion | Decision | | Changed from other to discussion to align with the contribution. | 19 | 6.2.1.2.2 | Remaining details on DL control channel design | 99480 | available |
| R1-1719949 | On remaining details on DL data channel design | Nokia, Nokia Shanghai Bell | Klaus Hugl | 68338 | discussion | Decision | | Changed from other to discussion to align with the contribution. | 21 | 6.2.1.2.4 | Remaining details on DL data channel design | 99490 | available |
| R1-1719950 | On SPS operation for shorter TTI | Nokia, Nokia Shanghai Bell | Klaus Hugl | 68338 | discussion | Decision | | | 24 | 6.2.1.2.7 | Other | 99500 | available |
| R1-1719951 | On candidate techniques enabling URLLC for LTE | Nokia, Nokia Shanghai Bell | Klaus Hugl | 68338 | discussion | Decision | | | 84 | 6.2.8.2 | Candidate techniques enabling URLLC for LTE | 99510 | available |
| R1-1719952 | Remaining details of CSI feedback for sTTI | Huawei, HiSilicon | Yan Cheng | 58585 | discussion | Decision | | | 26 | 6.2.1.4 | Other | 99520 | available |
| R1-1719953 | UL PC in CA scenario | Huawei, HiSilicon | Yan Cheng | 58585 | discussion | Decision | | | 24 | 6.2.1.2.7 | Other | 99530 | available |
| R1-1719954 | sTTI scheduling | Huawei, HiSilicon | Yan Cheng | 58585 | discussion | Decision | | | 24 | 6.2.1.2.7 | Other | 99540 | available |
| R1-1719955 | SPS for short TTI | Huawei, HiSilicon | Yan Cheng | 58585 | discussion | Decision | | | 24 | 6.2.1.2.7 | Other | 99550 | available |
| R1-1719956 | Summary of email approval [90b-LTE-08] on remaining details of sPDCCH design and search space | Huawei | Yan Cheng | 58585 | discussion | Decision | | Changed from other to discussion and decision to align with the contribution. | 19 | 6.2.1.2.2 | Remaining details on DL control channel design | 99560 | available |
| R1-1719957 | Summary of email approval [90b-LTE-13] on remaining details of sPDSCH/sPUSCH design | Huawei | Yan Cheng | 58585 | discussion | Decision | | Changed from other to discussion and decision to align with the contribution. | 17 | 6.2.1.2 | Remaining details on shortened TTI with shortened processing time | 99570 | available |
| R1-1719958 | Summary of email discussion [90b-LTE-16] on SPS details | Huawei | Yan Cheng | 58585 | discussion | Decision | | | 24 | 6.2.1.2.7 | Other | 99580 | available |
| R1-1719959 | Editor's document of open issues on sPT and sTTI for the 36.212 specification | Huawei | Yan Cheng | 58585 | discussion | Decision | | Changed from other to discussion to align with the contribution. | 15 | 6.2.1 | Shortened TTI and processing time for LTE - WID in RP-171468 | 99590 | available |
| R1-1719960 | Multiple SS block transmissions in a wideband carrier | ASUSTEK COMPUTER (SHANGHAI) | Eddie Lin | 40159 | discussion | | | | 88 | 7.1.1 | Remaining Details on Synchronization signal | 99600 | available |
| R1-1719961 | Multiplexing of UL eMBB and URLLC in NR | ASUSTEK COMPUTER (SHANGHAI) | Eddie Lin | 40159 | discussion | | | | 150 | 7.3.3.6 | Multiplexing data with different transmission durations | 99610 | available |
| R1-1719962 | Corrections on UCI multiplexing on PUSCH | ASUSTEK COMPUTER (SHANGHAI) | Eddie Lin | 40159 | discussion | Decision | | Changed from empty to decision. Release and work item code are missing. | 8 | 6.1.2 | Maintenance of Release 14 Enhanced Licensed-Assisted Access to Unlicensed Spectrum | 99620 | revised |
| R1-1719963 | Control of UE beamforming in RRC_CONNECTED | ASUSTEK COMPUTER (SHANGHAI) | Eddie Lin | 40159 | discussion | | | | 107 | 7.2.1.5 | Other | 99630 | available |
| R1-1719964 | Remaining issues on UL codebook design | Guangdong OPPO Mobile Telecom | Zhihua SHI | 67442 | discussion | Decision | | | 104 | 7.2.1.2 | Remaining details on codebook based transmission for UL | 99640 | available |
| R1-1719965 | Remaining issues on uplink non-codebook transmission | Guangdong OPPO Mobile Telecom | Zhihua SHI | 67442 | discussion | Decision | | | 105 | 7.2.1.3 | Remaining details on non-codebook based transmission for UL | 99650 | available |
| R1-1719966 | Discussion on UL single Tx port transmission | Guangdong OPPO Mobile Telecom | Zhihua SHI | 67442 | discussion | Decision | | | 107 | 7.2.1.5 | Other | 99660 | available |
| R1-1719967 | Further discussion on SRS design for NR | Guangdong OPPO Mobile Telecom | Zhihua SHI | 67442 | discussion | Decision | | | 120 | 7.2.3.5 | Remaining details on SRS | 99670 | available |
| R1-1719968 | Uplink power control for NR | Guangdong OPPO Mobile Telecom | Zhihua SHI | 67442 | discussion | Decision | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 99680 | available |
| R1-1719969 | Considerations on DCI formats and DCI contents | Guangdong OPPO Mobile Telecom | Zhihua SHI | 67442 | discussion | Decision | | | 130 | 7.3.1.4 | DCI contents and formats | 99690 | available |
| R1-1719970 | PDCCH for URLLC | Guangdong OPPO Mobile Telecom | Zhihua SHI | 67442 | discussion | Decision | | | 131 | 7.3.1.5 | Other | 99700 | available |
| R1-1719971 | Resource allocation for PUCCH | Guangdong OPPO Mobile Telecom | Zhihua SHI | 67442 | discussion | Decision | | | 142 | 7.3.2.4 | Resource allocation for PUCCH | 99710 | available |
| R1-1719972 | Summary of email discussion [90b-NR-29] on PUCCH resource set | Guangdong OPPO Mobile Telecom | Zhihua SHI | 67442 | discussion | Decision | | | 142 | 7.3.2.4 | Resource allocation for PUCCH | 99720 | available |
| R1-1719973 | Resource allocation for PDSCH/PUSCH | Guangdong OPPO Mobile Telecom | Zhihua SHI | 67442 | discussion | Decision | | | 145 | 7.3.3.1 | DL/UL resource allocation | 99730 | available |
| R1-1719974 | Multiplexing between slot-based and symbol-based transmissions and pre-emption indication | Guangdong OPPO Mobile Telecom | Zhihua SHI | 67442 | discussion | Decision | | | 150 | 7.3.3.6 | Multiplexing data with different transmission durations | 99740 | available |
| R1-1719975 | Remaining issues on bandwidth part configuration and activation | Guangdong OPPO Mobile Telecom | Zhihua SHI | 67442 | discussion | Decision | | | 153 | 7.3.4.1 | Other aspects on bandwidth Parts | 99750 | available |
| R1-1719976 | Mode 4 support in eV2X carrier aggregation | Guangdong OPPO Mobile Telecom | Zhihua SHI | 67442 | discussion | Decision | | | 37 | 6.2.3.1.1 | Mode-4 support | 99760 | available |
| R1-1719977 | Synchronization in eV2X carrier aggregation | Guangdong OPPO Mobile Telecom | Zhihua SHI | 67442 | discussion | Decision | | | 38 | 6.2.3.1.2 | Synchronization | 99770 | available |
| R1-1719978 | 64QAM support for eV2X | Guangdong OPPO Mobile Telecom | Zhihua SHI | 67442 | discussion | Decision | | | 40 | 6.2.3.2 | Support for 64-QAM | 99780 | available |
| R1-1719979 | Transmit diversity scheme in eV2X | Guangdong OPPO Mobile Telecom | Zhihua SHI | 67442 | discussion | Decision | | | 42 | 6.2.3.3.1 | Transmit diversity solutions | 99790 | available |
| R1-1719980 | Resource pool sharing between mode 3 and mode 4 | Guangdong OPPO Mobile Telecom | Zhihua SHI | 67442 | discussion | Decision | | | 45 | 6.2.3.4 | Resource pool sharing between mode-3 and mode-4 users | 99800 | available |
| R1-1719981 | Latency reduction for eV2X | Guangdong OPPO Mobile Telecom | Zhihua SHI | 67442 | discussion | Decision | | | 46 | 6.2.3.5 | Maximum time reduction between packet arrival at layer 1 and resource selection for transmission | 99810 | available |
| R1-1719982 | Remaining issues on PDCCH structure | Guangdong OPPO Mobile Telecom | Zhihua SHI | 67442 | discussion | Decision | | | 127 | 7.3.1.1 | Remaining details on PDCCH structure | 99820 | available |
| R1-1719983 | Remaining issues on Search space | Guangdong OPPO Mobile Telecom | Zhihua SHI | 67442 | discussion | Decision | | | 128 | 7.3.1.2 | Remaining details on Search space | 99830 | available |
| R1-1719984 | Remaining issues on GC-PDCCH | Guangdong OPPO Mobile Telecom | Zhihua SHI | 67442 | discussion | Decision | | | 129 | 7.3.1.3 | Remaining details on group-common PDCCH | 99840 | available |
| R1-1719985 | Discussion on Remaining Issues of Random Access Procedure | Guangdong OPPO Mobile Telecom | Zhihua SHI | 67442 | discussion | Decision | | | 96 | 7.1.4.2 | Remaining details on RACH procedure | 99850 | available |
| R1-1719986 | Discussion on UL Power Control for CA | Guangdong OPPO Mobile Telecom | Zhihua SHI | 67442 | discussion | Decision | | | 169 | 7.6.2 | Remaining details on NR UL power control – CA aspects | 99860 | available |
| R1-1719987 | Discussion on Remaining Issues of Beam Management | Guangdong OPPO Mobile Telecom | Zhihua SHI | 67442 | discussion | Decision | | | 111 | 7.2.2.3 | Remaining details on beam measurement and reporting | 99870 | available |
| R1-1719988 | Discussion on Beam Recovery Mechanism | Guangdong OPPO Mobile Telecom | Zhihua SHI | 67442 | discussion | Decision | | | 112 | 7.2.2.4 | Remaining details on mechanism to recover from beam failure | 99880 | available |
| R1-1719989 | Discussion on Remaining Issues for LTE-NR Dual Connectivity | Guangdong OPPO Mobile Telecom | Zhihua SHI | 67442 | discussion | Decision | | | 170 | 7.6.3 | Other | 99890 | available |
| R1-1719990 | Discussion on Remaining Issues of QCL | Guangdong OPPO Mobile Telecom | Zhihua SHI | 67442 | discussion | Decision | | | 122 | 7.2.3.7 | Remaining details on QCL | 99900 | available |
| R1-1719991 | Short-PUCCH for UCI of up to 2 bits | Guangdong OPPO Mobile Telecom | Zhihua SHI | 67442 | discussion | Decision | | | 134 | 7.3.2.1.1 | Short-PUCCH for UCI of up to 2 bits | 99910 | available |
| R1-1719992 | Short-PUCCH for UCI of more than 2 bits | Guangdong OPPO Mobile Telecom | Zhihua SHI | 67442 | discussion | Decision | | | 135 | 7.3.2.1.2 | Short-PUCCH for UCI of more than 2 bits | 99920 | available |
| R1-1719993 | Discussion on HARQ-ACK transmission | Guangdong OPPO Mobile Telecom | Zhihua SHI | 67442 | discussion | Decision | | | 146 | 7.3.3.2 | DL/UL scheduling and HARQ management | 99930 | available |
| R1-1719994 | DCI composition for CBG based retransmission | Guangdong OPPO Mobile Telecom | Zhihua SHI | 67442 | discussion | Decision | | | 147 | 7.3.3.3 | CBG-based (re)transmission | 99940 | available |
| R1-1719995 | Remaining details on NR RRM measurement | Guangdong OPPO Mobile Telecom | Zhihua SHI | 67442 | discussion | Decision | | | 98 | 7.1.5.1 | Remaining details on measurement for mobility management | 99950 | available |
| R1-1719996 | Remaining details on NR radio link monitoring | Guangdong OPPO Mobile Telecom | Zhihua SHI | 67442 | discussion | Decision | | | 99 | 7.1.5.2 | Remaining details Radio link monitoring for mobility management | 99960 | available |
| R1-1719997 | On wake-up signal functionalities | Guangdong OPPO Mobile Telecom | Zhihua SHI | 67442 | discussion | Decision | | | 62 | 6.2.6.1.1.1 | Wake-up signal functions | 99970 | available |
| R1-1719998 | On wake-up signal transmission scheme | Guangdong OPPO Mobile Telecom | Zhihua SHI | 67442 | discussion | Decision | | | 63 | 6.2.6.1.1.2 | Wake-up signal configurations and procedures | 99980 | available |
| R1-1719999 | On wake-up signal design | Guangdong OPPO Mobile Telecom | Zhihua SHI | 67442 | discussion | Decision | | | 64 | 6.2.6.1.1.3 | Detailed design of wake-up signal | 99990 | available |
| R1-1720000 | Considerations on the DL power consumption reduction for efeMTC | Guangdong OPPO Mobile Telecom | Zhihua SHI | 67442 | discussion | Decision | | | 54 | 6.2.5.3 | Downlink channel power efficiency | 0 | available |
| R1-1720001 | On NR paging design | Guangdong OPPO Mobile Telecom | Zhihua SHI | 67442 | discussion | Decision | | | 93 | 7.1.3 | Remaining details on Paging design | 10 | available |
| R1-1720002 | Remaining Details of NR PBCH contents | Guangdong OPPO Mobile Telecom | Zhihua SHI | 67442 | discussion | Decision | | | 90 | 7.1.2.1 | Remaining details on NR-PBCH | 20 | available |

| TDoc | Title | Source | Contact | Contact ID | Type | For | Abstract | Secretary Remarks | Agenda item sort order | Agenda item | Agenda item description | TDoc sort order within agenda item | TDoc Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R1-1720003 | On support of long-PUCCH over multiple slots | Guangdong OPPO Mobile Telecom | Zhihua SHI | 67442 | discussion | Decision | | | 140 | 7.3.2.2.3 | Support of long-PUCCH over multiple slots | 30 | available |
| R1-1720004 | On UL data transmission without UL grant | Guangdong OPPO Mobile Telecom | Zhihua SHI | 67442 | discussion | Decision | | | 148 | 7.3.3.4 | UL data transmission procedure | 40 | available |
| R1-1720005 | Remaining details on PRACH formats | Nokia, Nokia Shanghai Bell | Emad Farag | 66840 | discussion | Decision | | | 95 | 7.1.4.1 | Remaining details on PRACH formats | 50 | available |
| R1-1720006 | Remaining details on PRACH procedure | Nokia, Nokia Shanghai Bell | Emad Farag | 66840 | discussion | Decision | | | 96 | 7.1.4.2 | Remaining details on RACH procedure | 60 | available |
| R1-1720007 | Remaining details of short PUCCH for UCI up to 2 bits | Nokia, Nokia Shanghai Bell | Emad Farag | 66840 | discussion | Decision | | | 134 | 7.3.2.1.1 | Short-PUCCH for UCI of up to 2 bits | 70 | available |
| R1-1720008 | On remaining details of short PUCCH for UCI of more than 2 bits | Nokia, Nokia Shanghai Bell | Emad Farag | 66840 | discussion | Decision | | | 135 | 7.3.2.1.2 | Short-PUCCH for UCI of more than 2 bits | 80 | available |
| R1-1720009 | On remaining aspects of 2-symbol short PUCCH design | Nokia, Nokia Shanghai Bell | Emad Farag | 66840 | discussion | Decision | | | 136 | 7.3.2.1.3 | Support of short-PUCCH over 2 OFDM symbols | 90 | available |
| R1-1720010 | Remaining details of Long PUCCH with small UCI payload | Nokia, Nokia Shanghai Bell | Emad Farag | 66840 | discussion | Decision | | | 138 | 7.3.2.2.1 | Long-PUCCH for UCI of up to 2 bits | 100 | available |
| R1-1720011 | On the remaining details of long PUCCH for UCI more than 2 bits | Nokia, Nokia Shanghai Bell | Emad Farag | 66840 | discussion | Decision | | | 139 | 7.3.2.2.2 | Long-PUCCH for UCI of more than 2 bits | 110 | revised |
| R1-1720012 | Long PUCCH over multiple slots | Nokia, Nokia Shanghai Bell | Emad Farag | 66840 | discussion | Decision | | | 140 | 7.3.2.2.3 | Support of long-PUCCH over multiple slots | 120 | available |
| R1-1720013 | On multiplexing of UCI | Nokia, Nokia Shanghai Bell | Emad Farag | 66840 | discussion | Decision | | | 141 | 7.3.2.3 | UCI multiplexing | 130 | available |
| R1-1720014 | PUCCH Resource Allocation | Nokia, Nokia Shanghai Bell | Emad Farag | 66840 | discussion | Decision | | | 142 | 7.3.2.4 | Resource allocation for PUCCH | 140 | available |
| R1-1720015 | NR-NTN Channel model: System level evaluations | CNES | Sonia CAZALENS | 48373 | discussion | Information | The objective of this document is to propose a modification of §6.5.4 "System level evaluations" for the document TR 38.811 "Study on New Radio (NR) to support Non Terrestrial Networks". It presents the distribution of Ricean K-factors and powers for UEs | | 172 | 7.8 | Other | 150 | available |
| R1-1720016 | NR-NTN Channel model: Fast fading model | CNES | Sonia CAZALENS | 48373 | discussion | Information | The objective of this document is to propose a modification of §6.5.3 "Fast fading model" for the document TR 38.811 "Study on New Radio (NR) to support Non Terrestrial Networks". | | 172 | 7.8 | Other | 160 | available |
| R1-1720017 | NR-NTN Channel model : justification and definition of HAPS channel model | CNES | Benjamin ROS | 48062 | discussion | Information | The objective of this document is to propose a modification of §6.2 "Differences between satellite/HAPS and cellular modelling" for the document TR 38.811 "Study on New Radio (NR) to support Non Terrestrial Networks". | | 172 | 7.8 | Other | 170 | available |
| R1-1720018 | Reduced RA for paged UEs | Sequans Communications | Michal Palgy | 66137 | discussion | Discussion | | | 96 | 7.1.4.2 | Remaining details on RACH procedure | 180 | available |
| R1-1720019 | [draft] Reply LS on CR for Reference Signals for MBSFN with 1.25kHz and 7.5khz sub-carrier spacing | Intel Corporation | Seunghee Han | 47329 | LS out | Decision | | | 4 | 5 | Incoming Liaison Statements | 190 | revised |
| R1-1720020 | Correction on MPDCCH assignment procedure for Type1-MPDCCH common search space | Intel Corporation | Seunghee Han | 47329 | draftCR | Decision | | | 7 | 6.1.1 | Maintenance of E-UTRA Release 8 – 13 | 200 | revised |
| R1-1720021 | Evaluation of CBSR with different beam restriction granularities | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | Release and work item code are missing. | 10 | 6.1.4 | Maintenance of Release 14 Full-Dimension MIMO for LTE | 3870 | noted |
| R1-1720022 | Remaining aspects related to interaction between different TTI lengths | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 18 | 6.2.1.2.1 | Remaining aspects related to interaction between different TTI lengths | 220 | available |
| R1-1720023 | Remaining details on DL control channel design | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 19 | 6.2.1.2.2 | Remaining details on DL control channel design | 230 | available |
| R1-1720024 | Remaining details of sPDSCH designs | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 21 | 6.2.1.2.4 | Remaining details on DL data channel design | 240 | available |
| R1-1720025 | Remaining details of sPUSCH designs | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 22 | 6.2.1.2.5 | Remaining details on UL data channel design | 250 | available |
| R1-1720026 | Remaining details on uplink starting and ending positions in a subframe for FS3 | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 28 | 6.2.2.1 | Multiple starting and ending positions in a subframe for UL | 260 | available |
| R1-1720027 | Remaining Details for Resource Allocation for Autonomous Uplink Transmissions | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 30 | 6.2.2.2.1 | Resource allocation for autonomous UL access | 270 | available |
| R1-1720028 | Remaining Details for HARQ for Autonomous Uplink Transmissions | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 31 | 6.2.2.2.2 | HARQ for autonomous uplink access | 280 | available |
| R1-1720029 | Summary of email discussion [90b-LTE-21] on AUL channel access | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 32 | 6.2.2.2.3 | Channel access for autonomous UL access | 290 | available |
| R1-1720030 | Channel access mechanism for autonomous UL transmission | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 32 | 6.2.2.2.3 | Channel access for autonomous UL access | 300 | available |
| R1-1720031 | Physical layer aspects of sidelink carrier aggregation for mode-4 LTE V2V communication | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 37 | 6.2.3.1.1 | Mode-4 support | 310 | available |
| R1-1720032 | Synchronization aspects for LTE V2V sidelink carrier aggregation | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 38 | 6.2.3.1.2 | Synchronization | 320 | available |
| R1-1720033 | Support of 64QAM for LTE V2V sidelink communication | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 40 | 6.2.3.2 | Support for 64-QAM | 330 | available |
| R1-1720034 | Candidate transmit diversity schemes for LTE V2V sidelink communication | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 42 | 6.2.3.3.1 | Transmit diversity solutions | 340 | available |
| R1-1720035 | Evaluation of candidate transmit diversity schemes for LTE V2V sidelink communication | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 43 | 6.2.3.3.2 | Evaluation results | 350 | available |
| R1-1720036 | Resource selection latency reduction for LTE V2V sidelink communication | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 45 | 6.2.3.4 | Resource pool sharing between mode-3 and mode-4 users | 360 | available |
| R1-1720037 | Sidelink resource pool sharing for eNB-controlled and UE-autonomous V2V transmission modes | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 46 | 6.2.3.5 | Maximum time reduction between packet arrival at layer 1 and resource selection for transmission | 370 | available |
| R1-1720038 | On support of 1024QAM | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 49 | 6.2.4.1 | Remaining details on support for 1024QAM for DL channels | 380 | noted |
| R1-1720039 | Remaining details of DM-RS overhead reduction | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 50 | 6.2.4.2 | Other | 390 | available |
| R1-1720040 | System acquisition time reduction for efeMTC | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 52 | 6.2.5.1 | Reduced system acquisition time | 400 | available |
| R1-1720041 | Early data transmission for efeMTC | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 53 | 6.2.5.2 | Early data transmission | 410 | available |
| R1-1720042 | Power saving signal for efeMTC | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 54 | 6.2.5.3 | Downlink channel power efficiency | 420 | available |
| R1-1720043 | HARQ-ACK feedback for efeMTC UL transmission | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 55 | 6.2.5.4 | Uplink HARQ-ACK feedback | 430 | available |
| R1-1720044 | Design of sub-PRB PUSCH for efeMTC | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 57 | 6.2.5.6 | Increased PUSCH spectral efficiency | 440 | available |
| R1-1720045 | The function scope of wake-up signal for feNB-IoT | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 62 | 6.2.6.1.1.1 | Wake-up signal functions | 450 | available |
| R1-1720046 | Configurations of wake-up signal for feNB-IoT | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 63 | 6.2.6.1.1.2 | Wake-up signal configurations and procedures | 460 | available |
| R1-1720047 | Early data transmission for feNB-IoT | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 65 | 6.2.6.1.2 | Data transmission during the random access procedure | 470 | available |
| R1-1720048 | System information acquisition time reduction for feNB-IoT | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 68 | 6.2.6.2.2 | System Information | 480 | available |
| R1-1720049 | Design of DL aspects for TDD support in feNB-IoT | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 70 | 6.2.6.3.1 | Downlink aspects | 490 | available |
| R1-1720050 | Design of UL aspects for TDD support in feNB-IoT | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 71 | 6.2.6.3.2 | Uplink aspects | 500 | available |
| R1-1720051 | Design of common aspects for TDD support in feNB-IoT | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 72 | 6.2.6.3.3 | Common aspects | 510 | available |
| R1-1720052 | Baseline evaluation results for UMa AV | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 75 | 6.2.7.1 | Baseline Evaluation Results | 520 | available |
| R1-1720053 | On Interference Mitigation schemes for DL | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 76 | 6.2.7.2 | DL Interference Mitigation | 530 | noted |
| R1-1720054 | On Interference Mitigation schemes for UL | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 77 | 6.2.7.3 | UL Interference Mitigation | 540 | available |
| R1-1720055 | Preliminary System Level Evaluations for LTE URLLC | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 83 | 6.2.8.1 | Remaining details of evaluations scenarios | 550 | revised |

| TDoc | Title | Source | Contact | Contact ID | Type | For | Abstract | Secretary Remarks | Agenda item sort order | Agenda item | Agenda item description | TDoc sort order within agenda item | TDoc Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R1-1720056 | On design aspects enabling URLLC for LTE | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 84 | 6.2.8.2 | Candidate techniques enabling URLLC for LTE | 560 | available |
| R1-1720057 | Remaining details of SS/PBCH block | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 88 | 7.1.1 | Remaining Details on Synchronization signal | 570 | available |
| R1-1720058 | Remaining details of NR PBCH | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 90 | 7.1.2.1 | Remaining details on NR-PBCH | 580 | available |
| R1-1720059 | Remaining details of RMSI | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 590 | available |
| R1-1720060 | NR Paging Channel Design | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 93 | 7.1.3 | Remaining details on Paging design | 600 | withdrawn |
| R1-1720061 | Remaining details of PRACH formats | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 95 | 7.1.4.1 | Remaining details on PRACH formats | 610 | available |
| R1-1720062 | Remaining details of RACH procedures | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 96 | 7.1.4.2 | Remaining details on RACH procedure | 620 | available |
| R1-1720063 | Measurements for RRM | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 98 | 7.1.5.1 | Remaining details on measurement for mobility management | 630 | available |
| R1-1720064 | NR Radio link monitoring design | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 99 | 7.1.5.2 | Remaining details Radio link monitoring for mobility management | 640 | available |
| R1-1720065 | Remaining details on CW to MIMO layer mapping | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 103 | 7.2.1.1 | Remaining details on codeword mapping | 650 | available |
| R1-1720066 | Remaining issues on codebook based UL transmission | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 104 | 7.2.1.2 | Remaining details on codebook based transmission for UL | 660 | available |
| R1-1720067 | Remaining issues on non-codebook based UL transmission | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 105 | 7.2.1.3 | Remaining details on non-codebook based transmission for UL | 670 | available |
| R1-1720068 | On PRB bundling for DL | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 106 | 7.2.1.4 | Remaining details on PRB bundling for DL | 680 | available |
| R1-1720069 | Remaining issues on interference measurement for CSI | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 109 | 7.2.2.1 | Remaining details on CSI measurement | 690 | available |
| R1-1720070 | Remaining issues on CSI reporting | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 110 | 7.2.2.2 | Remaining details on CSI reporting | 700 | available |
| R1-1720071 | Remaining issues on Beam Management | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 111 | 7.2.2.3 | Remaining details on beam measurement and reporting | 710 | available |
| R1-1720072 | Remaining issues on beam failure recovery | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 112 | 7.2.2.4 | Remaining details on mechanism to recover from beam failure | 720 | available |
| R1-1720073 | CQI/MCS for NR | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 113 | 7.2.2.5 | Remaining details on CQI and MCS | 730 | available |
| R1-1720074 | On multiplexing of DM-RS and SS block | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 116 | 7.2.3.1 | Remaining details on Multiplexing of different types of RSs | 740 | available |
| R1-1720075 | Remaining details on CSI-RS | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 117 | 7.2.3.2 | Remaining details on CSI-RS | 750 | available |
| R1-1720076 | On the remaining details of DM-RS | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 118 | 7.2.3.3 | Remaining details on DMRS | 760 | available |
| R1-1720077 | Remaining details on PT-RS | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 119 | 7.2.3.4 | Remaining details on PT-RS | 770 | available |
| R1-1720078 | Discussion on SRS for NR | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 120 | 7.2.3.5 | Remaining details on SRS | 780 | available |
| R1-1720079 | Remaining Details on TRS | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 121 | 7.2.3.6 | Remaining details on TRS | 790 | available |
| R1-1720080 | On remaining details of QCL for NR | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 122 | 7.2.3.7 | Remaining details on QCL | 800 | available |
| R1-1720081 | Remaining details on PDCCH structure | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 127 | 7.3.1.1 | Remaining details on PDCCH structure | 810 | noted |
| R1-1720082 | PDCCH CORESETs and search spaces | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 128 | 7.3.1.2 | Remaining details on Search space | 820 | available |
| R1-1720083 | Remaining aspects of Group common PDCCH and SFI | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 129 | 7.3.1.3 | Remaining details on group-common PDCCH | 830 | available |
| R1-1720084 | Ultra-reliability for NR PDCCH | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 131 | 7.3.1.5 | Other | 840 | available |
| R1-1720085 | Short PUCCH for UCI of up to 2 bits | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 134 | 7.3.2.1.1 | Short-PUCCH for UCI of up to 2 bits | 850 | available |
| R1-1720086 | Short PUCCH for UCI of more than 2 bits | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 135 | 7.3.2.1.2 | Short-PUCCH for UCI of more than 2 bits | 860 | available |
| R1-1720087 | 2-symbol NR PUCCH | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 136 | 7.3.2.1.3 | Support of short-PUCCH over 2 OFDM symbols | 870 | available |
| R1-1720088 | Long PUCCH for up to 2 UCI bits | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 138 | 7.3.2.2.1 | Long-PUCCH for UCI of up to 2 bits | 880 | available |
| R1-1720089 | Long PUCCH for more than 2 UCI bits | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 139 | 7.3.2.2.2 | Long-PUCCH for UCI of more than 2 bits | 890 | available |
| R1-1720090 | Long PUCCH over multiple slots | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 140 | 7.3.2.2.3 | Support of long-PUCCH over multiple slots | 900 | available |
| R1-1720091 | UCI multiplexing on PUSCH | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 141 | 7.3.2.3 | UCI multiplexing | 910 | available |
| R1-1720092 | Resource allocation for PUCCH | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 142 | 7.3.2.4 | Resource allocation for PUCCH | 920 | available |
| R1-1720093 | Ultra-reliability for NR PUCCH | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 143 | 7.3.2.5 | Other | 930 | available |
| R1-1720094 | Remaining details on TBS determination and resource allocation | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 145 | 7.3.3.1 | DL/UL resource allocation | 940 | available |
| R1-1720095 | On DL/UL Scheduling and HARQ management | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 146 | 7.3.3.2 | DL/UL scheduling and HARQ management | 950 | available |
| R1-1720096 | On remaining aspects of CBG-based (re)transmission | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 147 | 7.3.3.3 | CBG-based (re)transmission | 960 | available |
| R1-1720097 | Remaining details of UL data transmission procedures in NR | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 148 | 7.3.3.4 | UL data transmission procedure | 970 | available |
| R1-1720098 | Soft buffer management for NR | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 149 | 7.3.3.5 | Soft-buffer management for NR | 980 | available |
| R1-1720099 | Remaining details of multiplexing of different data channel durations | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 150 | 7.3.3.6 | Multiplexing data with different transmission durations | 990 | available |
| R1-1720100 | Remaining details for bandwidth parts | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 153 | 7.3.4.1 | Other aspects on bandwidth Parts | 1000 | available |
| R1-1720101 | Remaining aspects of CA operation | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 154 | 7.3.4.2 | Other aspects on carrier aggregation | 1010 | available |
| R1-1720102 | Remaining details of LDPC coding | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 159 | 7.4.1.1 | Nominal code rate / BG determination | 1020 | noted |
| R1-1720103 | Remaining details of Polar coding | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 161 | 7.4.2 | Remaining details of Polar coding | 1030 | available |
| R1-1720104 | Remaining Details On UL Power Control Framework | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 1040 | available |
| R1-1720105 | Remaining aspects on power sharing between LTE and NR | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 170 | 7.6.3 | Other | 1050 | available |
| R1-1720106 | Remaining issues of NR-LTE coexistence | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 166 | 7.5 | NR-LTE co-existence | 1060 | noted |
| R1-1720107 | Remaining details on NR FDD | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 171 | 7.7 | Aspects related to FDD | 1070 | available |
| R1-1720108 | On UE capabilities and peak rates | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 172 | 7.8 | Other | 1080 | noted |
| R1-1720109 | CQI table for 64-QAM | Huawei, HiSilicon | Matthew Webb | 45858 | discussion | Decision | | | 56 | 6.2.5.5 | Increased PDSCH spectral efficiency | 1090 | available |
| R1-1720110 | UL enhancements for drones | Huawei, HiSilicon | Matthew Webb | 45858 | discussion | Decision | | | 77 | 6.2.7.3 | UL Interference Mitigation | 1100 | available |
| R1-1720111 | Field measurements for drones | Huawei, HiSilicon | Matthew Webb | 45858 | discussion | Decision | | | 80 | 6.2.7.6 | Field measurement results | 1110 | available |
| R1-1720112 | Resource Pool Sharing between V2X Mode 3 and Mode 4 UEs | Fraunhofer HHI | Thomas Fehrenbach | 65063 | discussion | Decision | | | 45 | 6.2.3.4 | Resource pool sharing between mode-3 and mode-4 users | 1120 | available |
| R1-1720113 | TS 38.214 V1.1.2 | Nokia | Mihai Enescu | 68296 | draft TS | Decision | | | 86 | 7 | NR - WID in RP-172115 | 1130 | revised |
| R1-1720114 | TS 38.214 V1.1.3 | Nokia | Mihai Enescu | 68296 | draft TS | Decision | | | 86 | 7 | NR - WID in RP-172115 | 1140 | revised |
| R1-1720115 | Reference scenarios for evaluation for GEO satellite channels | HUGHES Network Systems Ltd | Lin-Nan Lee | 70452 | SID new | Discussion | This document describes reference scenarios for evaluation of applicability of NR to the geosynchronous satellite networks. | | 172 | 7.8 | Other | 1150 | available |

| TDoc | Title | Source | Contact | Contact ID | Type | For | Abstract | Secretary Remarks | Agenda item sort order | Agenda item | Agenda item description | TDoc sort order within agenda item | TDoc Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R1-1720116 | Uplink/Downlink Paring for Ka-band Satellites | HUGHES Network Systems Ltd | Lin-Nan Lee | 70452 | SID new | Discussion | This document describes the uplink/downlink channel frequency used by Ka-band satellite channels in order to highlight the following issues:<br>1. How the carrier numbering needs to be extended to address this new spectrum and specific pairing?<br>2.How the e | | 172 | 7.8 | Other | 1160 | available |
| R1-1720117 | Discussion on Beam Measurement and Reporting | Apple Inc. | Wei Zeng | 70918 | discussion | Discussion | | | 111 | 7.2.2.3 | Remaining details on beam measurement and reporting | 1170 | available |
| R1-1720118 | Slot Format Indicator in Group-common PDCCH | Apple Inc. | Wei Zeng | 70918 | discussion | Discussion | | | 129 | 7.3.1.3 | Remaining details on group-common PDCCH | 1180 | available |
| R1-1720119 | On Mode-4 Support for CA | Ericsson | Ricardo Blasco Serrano | 63151 | discussion | Decision | | | 37 | 6.2.3.1.1 | Mode-4 support | 1190 | available |
| R1-1720120 | On Synchronization Aspects for PC5 CA | Ericsson | Ricardo Blasco Serrano | 63151 | discussion | Decision | | | 38 | 6.2.3.1.2 | Synchronization | 1200 | available |
| R1-1720121 | Supporting 64QAM on PC5 | Ericsson | Ricardo Blasco Serrano | 63151 | discussion | Decision | | | 40 | 6.2.3.2 | Support for 64-QAM | 1210 | available |
| R1-1720122 | DMRS design for two port PSSCH transmission | Ericsson | Ricardo Blasco Serrano | 63151 | discussion | Decision | | | 44 | 6.2.3.3.3 | Other | 1220 | available |
| R1-1720123 | Transmit diversity solutions for Rel-15 PSCCH and PSSCH transmissions | Ericsson | Ricardo Blasco Serrano | 63151 | discussion | Decision | | | 42 | 6.2.3.3.1 | Transmit diversity solutions | 1230 | available |
| R1-1720124 | Reducing time-to-transmit for V2X | Ericsson | Ricardo Blasco Serrano | 63151 | discussion | Decision | | | 46 | 6.2.3.5 | Maximum time reduction between packet arrival at layer 1 and resource selection for transmission | 1240 | available |
| R1-1720125 | Resource pool sharing between mode 3 and mode 4 UEs | Ericsson | Ricardo Blasco Serrano | 63151 | discussion | Decision | | | 45 | 6.2.3.4 | Resource pool sharing between mode-3 and mode-4 users | 1250 | available |
| R1-1720126 | Reducing system acquisition time for efeMTC | Nokia, Nokia Shanghai Bell | Rapeepat Ratasuk | 70297 | discussion | Decision | | | 52 | 6.2.5.1 | Reduced system acquisition time | 1260 | available |
| R1-1720127 | Data transmission during random access procedure | Nokia, Nokia Shanghai Bell | Rapeepat Ratasuk | 70297 | discussion | Decision | | | 53 | 6.2.5.2 | Early data transmission | 1270 | available |
| R1-1720128 | Wake-up signal for efeMTC | Nokia, Nokia Shanghai Bell | Rapeepat Ratasuk | 70297 | discussion | Decision | | | 54 | 6.2.5.3 | Downlink channel power efficiency | 1280 | available |
| R1-1720129 | Uplink HARQ-ACK feedback in efeMTC | Nokia, Nokia Shanghai Bell | Rapeepat Ratasuk | 70297 | discussion | Decision | | | 55 | 6.2.5.4 | Uplink HARQ-ACK feedback | 1290 | available |
| R1-1720130 | Remaining issue on supporting DL 64QAM for efeMTC | Nokia, Nokia Shanghai Bell | Rapeepat Ratasuk | 70297 | discussion | Decision | | | 56 | 6.2.5.5 | Increased PDSCH spectral efficiency | 1300 | available |
| R1-1720131 | Design of PUSCH Sub-PRB Allocation | Nokia, Nokia Shanghai Bell | Rapeepat Ratasuk | 70297 | discussion | Decision | | | 57 | 6.2.5.6 | Increased PUSCH spectral efficiency | 1310 | available |
| R1-1720132 | Functions of wake-up signal | Nokia, Nokia Shanghai Bell | Rapeepat Ratasuk | 70297 | discussion | Decision | | | 62 | 6.2.6.1.1.1 | Wake-up signal functions | 1320 | available |
| R1-1720133 | Wake-up signal configurations and procedures | Nokia, Nokia Shanghai Bell | Rapeepat Ratasuk | 70297 | discussion | Decision | | | 63 | 6.2.6.1.1.2 | Wake-up signal configurations and procedures | 1330 | available |
| R1-1720134 | Considerations for design of wake-up signal | Nokia, Nokia Shanghai Bell | Rapeepat Ratasuk | 70297 | discussion | Decision | | | 64 | 6.2.6.1.1.3 | Detailed design of wake-up signal | 1340 | available |
| R1-1720135 | Data transmission during random access procedure | Nokia, Nokia Shanghai Bell | Rapeepat Ratasuk | 70297 | discussion | Decision | | | 65 | 6.2.6.1.2 | Data transmission during the random access procedure | 1350 | available |
| R1-1720136 | Reducing cell search time for feNB-IoT | Nokia, Nokia Shanghai Bell | Rapeepat Ratasuk | 70297 | discussion | Decision | | | 67 | 6.2.6.2.1 | Cell search | 1360 | available |
| R1-1720137 | Reducing system acquisition time for feNB-IoT | Nokia, Nokia Shanghai Bell | Rapeepat Ratasuk | 70297 | discussion | Decision | | | 68 | 6.2.6.2.2 | System Information | 1370 | available |
| R1-1720138 | Downlink aspects of TDD support in NB-IoT | Nokia, Nokia Shanghai Bell | Rapeepat Ratasuk | 70297 | discussion | Decision | | | 70 | 6.2.6.3.1 | Downlink aspects | 1380 | available |
| R1-1720139 | Uplink aspects of TDD support in NB-IoT | Nokia, Nokia Shanghai Bell | Rapeepat Ratasuk | 70297 | discussion | Decision | | | 71 | 6.2.6.3.2 | Uplink aspects | 1390 | available |
| R1-1720140 | Common Aspects of NB-IoT TDD Operation | Nokia, Nokia Shanghai Bell | Rapeepat Ratasuk | 70297 | discussion | Decision | | | 72 | 6.2.6.3.3 | Common aspects | 1400 | available |
| R1-1720141 | Measurement accuracy improvement in NB-IoT | Nokia, Nokia Shanghai Bell | Rapeepat Ratasuk | 70297 | discussion | Decision | | | 73 | 6.2.6.4 | Other | 1410 | available |
| R1-1720142 | Support for semi-persistent scheduling in NB-IoT | Nokia, Nokia Shanghai Bell | Rapeepat Ratasuk | 70297 | discussion | Decision | | | 73 | 6.2.6.4 | Other | 1420 | available |
| R1-1720143 | Design of physical layer scheduling request | Nokia, Nokia Shanghai Bell | Rapeepat Ratasuk | 70297 | discussion | Decision | | | 73 | 6.2.6.4 | Other | 1430 | available |
| R1-1720144 | Small cell support in NB-IoT | Nokia, Nokia Shanghai Bell | Rapeepat Ratasuk | 70297 | discussion | Decision | | | 73 | 6.2.6.4 | Other | 1440 | available |
| R1-1720145 | NPRACH cell range enhancement in NB-IoT | Nokia, Nokia Shanghai Bell | Rapeepat Ratasuk | 70297 | discussion | Decision | | | 73 | 6.2.6.4 | Other | 1450 | available |
| R1-1720146 | NPRACH reliability enhancement in NB-IoT | Nokia, Nokia Shanghai Bell | Rapeepat Ratasuk | 70297 | discussion | Decision | | | 73 | 6.2.6.4 | Other | 1460 | available |
| R1-1720147 | Low PAPR SFBC for V2X transmit diversity | Mitsubishi Electric RCE | Cristina Ciochina-Duchesne | 56339 | discussion | Decision | | | 42 | 6.2.3.3.1 | Transmit diversity solutions | 1470 | available |
| R1-1720148 | Low PAPR SFBC evaluations for PSSCH | Mitsubishi Electric RCE | Cristina Ciochina-Duchesne | 56339 | discussion | Decision | | | 43 | 6.2.3.3.2 | Evaluation results | 1480 | available |
| R1-1720149 | On formula or table for L1 data rate | Ericsson | Daniel Larsson | 39861 | discussion | Decision | | | 4 | 5 | Incoming Liaison Statements | 1490 | available |
| R1-1720150 | Draft LS reply on formula or table for L1 data rate | Ericsson | Daniel Larsson | 39861 | discussion | Decision | | | 4 | 5 | Incoming Liaison Statements | 1500 | available |
| R1-1720151 | On UE categories | Ericsson | Daniel Larsson | 39861 | discussion | Decision | | | 172 | 7.8 | Other | 1510 | noted |
| R1-1720152 | Draft LS on UE category data rates | Ericsson | Daniel Larsson | 39861 | discussion | Decision | | | 172 | 7.8 | Other | 1520 | available |
| R1-1720153 | UE feature list on Scheduling and HARQ | Ericsson | Daniel Larsson | 39861 | discussion | Decision | | | 172 | 7.8 | Other | 1530 | withdrawn |
| R1-1720154 | UE feature list on CA/DC, BWP, SUL | Ericsson | Daniel Larsson | 39861 | discussion | Decision | | | 172 | 7.8 | Other | 1540 | withdrawn |
| R1-1720155 | Sub-PRB Design Analysis | Sierra Wireless, S.A. | Gustav Vos | 31476 | discussion | Discussion | | | 57 | 6.2.5.6 | Increased PUSCH spectral efficiency | 1550 | available |
| R1-1720156 | Idle Mode Power Efficiency Reduction | Sierra Wireless, S.A. | Gustav Vos | 31476 | discussion | Discussion | | | 54 | 6.2.5.3 | Downlink channel power efficiency | 1560 | available |
| R1-1720157 | Enhanced PSS Analysis | Sierra Wireless, S.A. | Gustav Vos | 31476 | discussion | Discussion | | | 52 | 6.2.5.1 | Reduced system acquisition time | 1570 | available |
| R1-1720158 | Discussion on carrier aggregation for mode 4 in V2X phase 2 | CATT | Teng Ma | 67340 | discussion | Decision | | | 37 | 6.2.3.1.1 | Mode-4 support | 1580 | available |
| R1-1720159 | Discussion on synchronization for carrier aggregation in V2X Phase 2 | CATT | Teng Ma | 67340 | discussion | Decision | | | 38 | 6.2.3.1.2 | Synchronization | 1590 | available |
| R1-1720160 | Discussion on 64QAM modulation scheme in V2X phase 2 | CATT | Teng Ma | 67340 | discussion | Decision | | | 40 | 6.2.3.2 | Support for 64-QAM | 1600 | available |
| R1-1720161 | Discussion on Tx diversity schemes in PC5 | CATT | Teng Ma | 67340 | discussion | Decision | | | 42 | 6.2.3.3.1 | Transmit diversity solutions | 1610 | available |
| R1-1720162 | Evaluation results for Tx diversity schemes in PC5 | CATT | Teng Ma | 67340 | discussion | Decision | | | 43 | 6.2.3.3.2 | Evaluation results | 1620 | available |
| R1-1720163 | Discussion on resource pool sharing between mode 3 and mode 4 | CATT | Teng Ma | 67340 | discussion | Decision | | | 45 | 6.2.3.4 | Resource pool sharing between mode-3 and mode-4 users | 1630 | available |
| R1-1720164 | Discussion on latency reduction between packet arrival and resource selection | CATT | Teng Ma | 67340 | discussion | Decision | | | 46 | 6.2.3.5 | Maximum time reduction between packet arrival at layer 1 and resource selection for transmission | 1640 | available |
| R1-1720165 | Discussion on shorten TTI in PC5 | CATT | Teng Ma | 67340 | discussion | Decision | | | 47 | 6.2.3.6 | Other | 1650 | available |
| R1-1720166 | Evaluations for shorten TTI in PC5 | CATT | Teng Ma | 67340 | discussion | Decision | | | 47 | 6.2.3.6 | Other | 1660 | available |
| R1-1720167 | Remaining details on SS block transmission | CATT | Teng Ma | 67340 | discussion | Decision | | | 88 | 7.1.1 | Remaining Details on Synchronization signal | 1670 | available |
| R1-1720168 | Remaining details on NR-PBCH | CATT | Teng Ma | 67340 | discussion | Decision | | | 90 | 7.1.2.1 | Remaining details on NR-PBCH | 1680 | available |
| R1-1720169 | Summary of Offline Discussion on RMSI | CATT | Teng Ma | 67340 | discussion | Decision | | | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 1690 | revised |
| R1-1720170 | On Remaining details on RMSI | CATT | Teng Ma | 67340 | discussion | Decision | | | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 1700 | available |
| R1-1720171 | OSI delivery | CATT | Teng Ma | 67340 | discussion | Decision | | | 92 | 7.1.2.3 | Remaining details on other system information delivery | 1710 | available |
| R1-1720172 | NR Paging Channel | CATT | Teng Ma | 67340 | discussion | Decision | | | 93 | 7.1.3 | Remaining details on Paging design | 1720 | available |
| R1-1720173 | Further details on NR RACH format | CATT | Teng Ma | 67340 | discussion | Decision | | | 95 | 7.1.4.1 | Remaining details on PRACH formats | 1730 | available |
| R1-1720174 | Further details on NR 4-step RA Procedure | CATT | Teng Ma | 67340 | discussion | Decision | | | 96 | 7.1.4.2 | Remaining details on RACH procedure | 1740 | available |
| R1-1720175 | Mobility Management based on SS block and CSI-RS measurements | CATT | Teng Ma | 67340 | discussion | Decision | | | 98 | 7.1.5.1 | Remaining details on measurement for mobility management | 1750 | available |

| TDoc | Title | Source | Contact | Contact ID | Type | For | Abstract | Secretary Remarks | Agenda item sort order | Agenda item | Agenda item description | TDoc sort order within agenda item | TDoc Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R1-1720176 | NR Radio Link Monitoring | CATT | Teng Ma | 67340 | discussion | Decision | | | 99 | 7.1.5.2 | Remaining details Radio link monitoring for mobility management | 1760 | available |
| R1-1720177 | On remaining details of codeword mapping | CATT | Teng Ma | 67340 | discussion | Decision | | | 103 | 7.2.1.1 | Remaining details on codeword mapping | 1770 | available |
| R1-1720178 | Discussion on remaining details of codebook based UL transmission | CATT | Teng Ma | 67340 | discussion | Decision | | | 104 | 7.2.1.2 | Remaining details on codebook based transmission for UL | 1780 | available |
| R1-1720179 | Discussion on remaining details of non-codebook based transmission for UL | CATT | Teng Ma | 67340 | discussion | Decision | | | 105 | 7.2.1.3 | Remaining details on non-codebook based transmission for UL | 1790 | available |
| R1-1720180 | PRB bundling for DL transmission | CATT | Teng Ma | 67340 | discussion | Decision | | | 106 | 7.2.1.4 | Remaining details on PRB bundling for DL | 1800 | available |
| R1-1720181 | Remaining details on CSI reporting | CATT | Teng Ma | 67340 | discussion | Discussion | | | 110 | 7.2.2.2 | Remaining details on CSI reporting | 1810 | available |
| R1-1720182 | Remaining details on beam management | CATT | Teng Ma | 67340 | discussion | Decision | | | 111 | 7.2.2.3 | Remaining details on beam measurement and reporting | 1820 | available |
| R1-1720183 | Remaining issues on DL beam failure recovery | CATT | Teng Ma | 67340 | discussion | Decision | | | 112 | 7.2.2.4 | Remaining details on mechanism to recover from beam failure | 1830 | available |
| R1-1720184 | Remaining details on RS multiplexing | CATT | Teng Ma | 67340 | discussion | Discussion | | | 116 | 7.2.3.1 | Remaining details on Multiplexing of different types of RSs | 1840 | available |
| R1-1720185 | Remaining details on CSI-RS | CATT | Teng Ma | 67340 | discussion | Discussion | | | 117 | 7.2.3.2 | Remaining details on CSI-RS | 1850 | available |
| R1-1720186 | Discussion on remaining details of DMRS design | CATT | Teng Ma | 67340 | discussion | Decision | | | 118 | 7.2.3.3 | Remaining details on DMRS | 1860 | available |
| R1-1720187 | Remaining details on PT-RS | CATT | Teng Ma | 67340 | discussion | Discussion | | | 119 | 7.2.3.4 | Remaining details on PT-RS | 1870 | available |
| R1-1720188 | Discussion on remaining details of SRS design | CATT | Teng Ma | 67340 | discussion | Decision | | | 120 | 7.2.3.5 | Remaining details on SRS | 1880 | available |
| R1-1720189 | On QCL for NR | CATT | Teng Ma | 67340 | discussion | Decision | | | 122 | 7.2.3.7 | Remaining details on QCL | 1890 | available |
| R1-1720190 | Remaining details of PDCCH structure | CATT | Teng Ma | 67340 | discussion | Decision | | | 127 | 7.3.1.1 | Remaining details on PDCCH structure | 1900 | available |
| R1-1720191 | Further discussion on NR PDCCH search space | CATT | Teng Ma | 67340 | discussion | Decision | | | 128 | 7.3.1.2 | Remaining details on Search space | 1910 | available |
| R1-1720192 | On semi-static and dynamic signaling of SFI | CATT | Teng Ma | 67340 | discussion | Decision | | | 129 | 7.3.1.3 | Remaining details on group-common PDCCH | 1920 | available |
| R1-1720193 | Discussion on NR DCI formats | CATT | Teng Ma | 67340 | discussion | Decision | | | 130 | 7.3.1.4 | DCI contents and formats | 1930 | available |
| R1-1720194 | On short PUCCH format for up to two UCI bits | CATT | Teng Ma | 67340 | discussion | Decision | | | 134 | 7.3.2.1.1 | Short-PUCCH for UCI of up to 2 bits | 1940 | available |
| R1-1720195 | On short PUCCH format for more than two UCI bits | CATT | Teng Ma | 67340 | discussion | Decision | | | 135 | 7.3.2.1.2 | Short-PUCCH for UCI of more than 2 bits | 1950 | available |
| R1-1720196 | Other aspects of 2-symbol short PUCCH | CATT | Teng Ma | 67340 | discussion | Decision | | | 136 | 7.3.2.1.3 | Support of short-PUCCH over 2 OFDM symbols | 1960 | available |
| R1-1720197 | On long PUCCH format for up to 2 UCI bits | CATT | Teng Ma | 67340 | discussion | Decision | | | 138 | 7.3.2.2.1 | Long-PUCCH for UCI of up to 2 bits | 1970 | available |
| R1-1720198 | On design of long PUCCH formats for more than 2 UCI bits | CATT | Teng Ma | 67340 | discussion | Decision | | | 139 | 7.3.2.2.2 | Long-PUCCH for UCI of more than 2 bits | 1980 | available |
| R1-1720199 | Design of multi-slot PUCCH transmission | CATT | Teng Ma | 67340 | discussion | Decision | | | 140 | 7.3.2.2.3 | Support of long-PUCCH over multiple slots | 1990 | available |
| R1-1720200 | Multiplexing of UCI and UL data on PUSCH | CATT | Teng Ma | 67340 | discussion | Decision | | | 141 | 7.3.2.3 | UCI multiplexing | 2000 | available |
| R1-1720201 | Further discussion on PUCCH resource allocation | CATT | Teng Ma | 67340 | discussion | Decision | | | 142 | 7.3.2.4 | Resource allocation for PUCCH | 2010 | available |
| R1-1720202 | On PDSCH and PUSCH resource allocation | CATT | Teng Ma | 67340 | discussion | Decision | | | 145 | 7.3.3.1 | DL/UL resource allocation | 2020 | revised |
| R1-1720203 | Discussion on HARQ management and HARQ-ACK feedback | CATT | Teng Ma | 67340 | discussion | Decision | | | 146 | 7.3.3.2 | DL/UL scheduling and HARQ management | 2030 | available |
| R1-1720204 | Remaining aspects of CBG-based operation | CATT | Teng Ma | 67340 | discussion | Decision | | | 147 | 7.3.3.3 | CBG-based (re)transmission | 2040 | available |
| R1-1720205 | Further details of UL transmission procedures | CATT | Teng Ma | 67340 | discussion | Decision | | | 148 | 7.3.3.4 | UL data transmission procedure | 2050 | available |
| R1-1720206 | Soft buffer management for NR | CATT | Teng Ma | 67340 | discussion | Decision | | | 149 | 7.3.3.5 | Soft-buffer management for NR | 2060 | available |
| R1-1720207 | Remaining aspects of pre-emption indication | CATT | Teng Ma | 67340 | discussion | Decision | | | 150 | 7.3.3.6 | Multiplexing data with different transmission durations | 2070 | available |
| R1-1720208 | Further details of BWP operation | CATT | Teng Ma | 67340 | discussion | Decision | | | 153 | 7.3.4.1 | Other aspects on bandwidth Parts | 2080 | available |
| R1-1720209 | On remaining aspects of CA operation | CATT | Teng Ma | 67340 | discussion | Decision | | | 154 | 7.3.4.2 | Other aspects on carrier aggregation | 2090 | available |
| R1-1720210 | Details of rate matching for PDSCH and PUSCH | CATT | Teng Ma | 67340 | discussion | Decision | | | 155 | 7.3.5 | Remaining details on rate matching aspects for NR DL and UL | 2100 | available |
| R1-1720211 | RV sequence consideration for UL grant-free transmission | CATT | Teng Ma | 67340 | discussion | Decision | | | 160 | 7.4.1.2 | Other | 2110 | available |
| R1-1720212 | Design details for UCI segmentation | CATT | Teng Ma | 67340 | discussion | Decision | | | 163 | 7.4.2.2 | Details of conditions for UCI segmentation | 2120 | revised |
| R1-1720213 | Discussion on order and mapping of PBCH fields | CATT | Teng Ma | 67340 | discussion | Decision | | | 164 | 7.4.2.3 | Order and mapping of PBCH fields | 2130 | available |
| R1-1720214 | Remaining issues on LTE/NR coexistence | CATT | Teng Ma | 67340 | discussion | Decision | | | 166 | 7.5 | NR-LTE co-existence | 2140 | available |
| R1-1720215 | Remaining Aspects of NR Power Control | CATT | Teng Ma | 67340 | discussion | Decision | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 2150 | revised |
| R1-1720216 | Remaining details of NR power control for CA | CATT | Teng Ma | 67340 | discussion | Decision | | | 169 | 7.6.2 | Remaining details on NR UL power control – CA aspects | 2160 | available |
| R1-1720217 | Discussion on Rel-15 NOMA study item | CATT | Teng Ma | 67340 | discussion | Information | | | 172 | 7.8 | Other | 2170 | available |
| R1-1720218 | Correction of NRS-CRS power offset configuration for NB-IoT | ZTE, SaneChips | Shupeng Li | 58860 | draftCR | Decision | | Changed from approval to decision. Category missing on the allocation. Proposed change affect box needs to be checked on the CR cover page. | 7 | 6.1.1 | Maintenance of E-UTRA Release 8 – 13 | 3860 | postponed |
| R1-1720219 | Some remaining issues with SUL | ZTE, Sanechips | Wenfeng Zhang | 71639 | discussion | Decision | | | 166 | 7.5 | NR-LTE co-existence | 2190 | available |
| R1-1720220 | Correction on sidelink index field name in DCI format 5A for V2V in 36.213 | CATT | Teng Ma | 67340 | draftCR | Decision | | | 9 | 6.1.3 | Maintenance of Release 14 V2V/V2X services based on LTE sidelink | 2200 | agreed |
| R1-1720221 | On the receiver design of grant-free MUSA | ZTE, Sanechips | Yifei Yuan | 58525 | discussion | | | | 172 | 7.8 | Other | 2210 | available |
| R1-1720222 | Link level simulations and preliminary performance comparison of NOMA schemes | ZTE, Sanechips | Yifei Yuan | 58525 | discussion | | | | 172 | 7.8 | Other | 2220 | available |
| R1-1720223 | Remaining details on SRS design for NR | ETRI | Jihyung Kim | 65152 | discussion | | | | 120 | 7.2.3.5 | Remaining details on SRS | 2230 | available |
| R1-1720224 | Remaining details on PRACH formats | ETRI | Jihyung Kim | 65152 | discussion | | | | 95 | 7.1.4.1 | Remaining details on PRACH formats | 2240 | available |
| R1-1720225 | Support of long-PUCCH over multiple slots | ETRI | Jihyung Kim | 65152 | discussion | | | | 140 | 7.3.2.2.3 | Support of long-PUCCH over multiple slots | 2250 | available |
| R1-1720226 | UCI multiplexing of different usage scenario | ETRI | Jihyung Kim | 65152 | discussion | | | | 143 | 7.3.2.5 | Other | 2260 | available |
| R1-1720227 | Resource allocation for PUCCH | ETRI | Jihyung Kim | 65152 | discussion | | | | 142 | 7.3.2.4 | Resource allocation for PUCCH | 2270 | available |
| R1-1720228 | Remaining issues on DMRS design | ETRI | Jihyung Kim | 65152 | discussion | | | | 118 | 7.2.3.3 | Remaining details on DMRS | 2280 | available |
| R1-1720229 | Remaining issues on DL preemption indication | ETRI | Jihyung Kim | 65152 | discussion | | | | 150 | 7.3.3.6 | Multiplexing data with different transmission durations | 2290 | available |
| R1-1720230 | Calibration results for Phase 2 NR MIMO link level simulation | ETRI | Jihyung Kim | 65152 | discussion | | | | 124 | 7.2.4 | Other | 2300 | available |
| R1-1720231 | PDCCH design for multi-beam operation | ETRI | Jihyung Kim | 65152 | discussion | | | | 131 | 7.3.1.5 | Other | 2310 | available |
| R1-1720232 | URLLC based on grant-based Dynamic TDD | ETRI | Jihyung Kim | 65152 | discussion | | | | 151 | 7.3.3.7 | Other | 2320 | available |
| R1-1720233 | [Draft] Reply LS on SPS and Grant-free | Samsung | Youngbum Kim | 39963 | other | | | | 4 | 5 | Incoming Liaison Statements | 2330 | available |
| R1-1720234 | DL SPS operation for NR | Samsung | Youngbum Kim | 39963 | other | | | | 4 | 5 | Incoming Liaison Statements | 2340 | available |
| R1-1720235 | Codebook subset restriciton for advanced CSI codebook | Samsung | Youngbum Kim | 39963 | discussion | Decision | | Changed from other to discussion and decision to align with the contribution. Release and work item code are missing. | 10 | 6.1.4 | Maintenance of Release 14 Full-Dimension MIMO for LTE | 7150 | noted |
| R1-1720236 | Summary of [90b-LTE-14]Email approval on remaining issues for 1 ms + FS2 (sTTI and 1 ms) + FS3 | Samsung | Youngbum Kim | 39963 | discussion | Decision | | Changed from other to discussion and decision to align with the contribution. | 16 | 6.2.1.1 | Remaining details on shortened processing time for 1ms TTI | 2360 | revised |

| TDoc | Title | Source | Contact | Contact ID | Type | For | Abstract | Secretary Remarks | Agenda item sort order | Agenda item | Agenda item description | TDoc sort order within agenda item | TDoc Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R1-1720237 | Remaining details on shortened processing time for 1ms TTI | Samsung | Youngbum Kim | 39963 | discussion | Decision | | Changed from other to discussion and decision to align with the contribution. | 16 | 6.2.1.1 | Remaining details on shortened processing time for 1ms TTI | 2370 | available |
| R1-1720238 | Remaining aspects related to interaction between different TTI lengths | Samsung | Youngbum Kim | 39963 | discussion | Decision | | Changed from other to discussion and decision to align with the contribution. | 18 | 6.2.1.2.1 | Remaining aspects related to interaction between different TTI lengths | 2380 | available |
| R1-1720239 | Remaining details on sPDCCH-related aspects | Samsung | Youngbum Kim | 39963 | discussion | Decision | | Changed from other to discussion and decision to align with the contribution. | 19 | 6.2.1.2.2 | Remaining details on DL control channel design | 2390 | available |
| R1-1720240 | Remaining details on sPUCCH-related aspects | Samsung | Youngbum Kim | 39963 | discussion | Decision | | Changed from other to discussion and decision to align with the contribution. | 20 | 6.2.1.2.3 | Remaining details on UL control channel design | 2400 | available |
| R1-1720241 | Remaining details on sPDSCH-related aspects | Samsung | Youngbum Kim | 39963 | discussion | Decision | | Changed from other to discussion and decision to align with the contribution. | 21 | 6.2.1.2.4 | Remaining details on DL data channel design | 2410 | available |
| R1-1720242 | Remaining details on sPUSCH-related aspects | Samsung | Youngbum Kim | 39963 | discussion | Decision | | Changed from other to discussion and decision to align with the contribution. | 22 | 6.2.1.2.5 | Remaining details on UL data channel design | 2420 | available |
| R1-1720243 | Remaining details on FS2 aspects | Samsung | Youngbum Kim | 39963 | discussion | Decision | | Changed from other to discussion and decision to align with the contribution. | 23 | 6.2.1.2.6 | Remaining details on FS2 aspects | 2430 | available |
| R1-1720244 | Remaining details on maximum TA and processing time | Samsung | Youngbum Kim | 39963 | discussion | Decision | | | 25 | 6.2.1.3 | Remaining details on maximum TA and processing time | 2440 | available |
| R1-1720245 | Multiple starting and ending positions for UL | Samsung | Youngbum Kim | 39963 | discussion | Decision | | | 28 | 6.2.2.1 | Multiple starting and ending positions in a subframe for UL | 2450 | available |
| R1-1720246 | Resource allocation for autonomous UL access | Samsung | Youngbum Kim | 39963 | discussion | Decision | | | 30 | 6.2.2.2.1 | Resource allocation for autonomous UL access | 2460 | available |
| R1-1720247 | HARQ for autonomous UL access | Samsung | Youngbum Kim | 39963 | discussion | Decision | | | 31 | 6.2.2.2.2 | HARQ for autonomous uplink access | 2470 | available |
| R1-1720248 | Channel access for autonomous UL access | Samsung | Youngbum Kim | 39963 | discussion | Decision | | | 32 | 6.2.2.2.3 | Channel access for autonomous UL access | 2480 | available |
| R1-1720249 | mode-4 support in V2X CA | Samsung | Youngbum Kim | 39963 | discussion | Decision | | | 37 | 6.2.3.1.1 | Mode-4 support | 2490 | available |
| R1-1720250 | Synchronization in V2X CA | Samsung | Youngbum Kim | 39963 | discussion | Decision | | | 38 | 6.2.3.1.2 | Synchronization | 2500 | available |
| R1-1720251 | Other considerations on V2X CA | Samsung | Youngbum Kim | 39963 | discussion | Decision | | | 39 | 6.2.3.1.3 | Other | 2510 | available |
| R1-1720252 | High order modulation in V2X | Samsung | Youngbum Kim | 39963 | discussion | Decision | | | 40 | 6.2.3.2 | Support for 64-QAM | 2520 | available |
| R1-1720253 | Transmit diversity schemes for PSSCH | Samsung | Youngbum Kim | 39963 | discussion | Decision | | | 42 | 6.2.3.3.1 | Transmit diversity solutions | 2530 | available |
| R1-1720254 | Evaluation results for Tx diversity for PSSCH | Samsung | Youngbum Kim | 39963 | discussion | Decision | | | 43 | 6.2.3.3.2 | Evaluation results | 2540 | available |
| R1-1720255 | Impact of transmit diversity on PC5 interface | Samsung | Youngbum Kim | 39963 | discussion | Decision | | | 44 | 6.2.3.3.3 | Other | 2550 | available |
| R1-1720256 | Control signaling for Tx diversity transmission of PSSCH and PSCCH | Samsung | Youngbum Kim | 39963 | discussion | Decision | | | 44 | 6.2.3.3.3 | Other | 2560 | available |
| R1-1720257 | Resource pool sharing among mode 3/4 UEs | Samsung | Youngbum Kim | 39963 | discussion | Decision | | | 45 | 6.2.3.4 | Resource pool sharing between mode-3 and mode-4 users | 2570 | available |
| R1-1720258 | Discussion on latency smaller than 20 | Samsung | Youngbum Kim | 39963 | discussion | Decision | | | 46 | 6.2.3.5 | Maximum time reduction between packet arrival at layer 1 and resource selection for transmission | 2580 | available |
| R1-1720259 | Discussion on enhanced synchronization signals and resynchronization signals | Samsung | Youngbum Kim | 39963 | discussion | Decision | | | 52 | 6.2.5.1 | Reduced system acquisition time | 2590 | available |
| R1-1720260 | Discussion on Early data transmission for eMTC | Samsung | Youngbum Kim | 39963 | discussion | Decision | | | 53 | 6.2.5.2 | Early data transmission | 2600 | available |
| R1-1720261 | DL power consumption reduction for eMTC | Samsung | Youngbum Kim | 39963 | discussion | Decision | | | 54 | 6.2.5.3 | Downlink channel power efficiency | 2610 | available |
| R1-1720262 | Uplink HARQ-ACK feedback for eMTC | Samsung | Youngbum Kim | 39963 | discussion | Decision | | | 55 | 6.2.5.4 | Uplink HARQ-ACK feedback | 0 | noted |
| R1-1720263 | Discussion on sub-PRB allocation for eFeMTC | Samsung | Youngbum Kim | 39963 | discussion | Decision | | | 57 | 6.2.5.6 | Increased PUSCH spectral efficiency | 2630 | available |
| R1-1720264 | Discussion on Wake up signal configuraion | Samsung | Youngbum Kim | 39963 | discussion | Decision | | | 63 | 6.2.6.1.1.2 | Wake-up signal configurations and procedures | 2640 | noted |
| R1-1720265 | Discussion on early data transmission for NB-IoT | Samsung | Youngbum Kim | 39963 | discussion | Decision | | | 65 | 6.2.6.1.2 | Data transmission during the random access procedure | 2650 | available |
| R1-1720266 | Discussion on DL common channel/signal for TDD NB-IoT | Samsung | Youngbum Kim | 39963 | discussion | Decision | | | 70 | 6.2.6.3.1 | Downlink aspects | 2660 | available |
| R1-1720267 | Discussion on UL channel for TDD NB-IoT | Samsung | Youngbum Kim | 39963 | discussion | Decision | | | 71 | 6.2.6.3.2 | Uplink aspects | 2670 | available |
| R1-1720268 | Discussion on 2 HARQ processes and cross carrier scheduling | Samsung | Youngbum Kim | 39963 | discussion | Decision | | | 72 | 6.2.6.3.3 | Common aspects | 2680 | available |
| R1-1720269 | Discussion on scheduling request for NB-IoT | Samsung | Youngbum Kim | 39963 | discussion | Decision | | | 73 | 6.2.6.4 | Other | 2690 | available |
| R1-1720270 | Discussion on remaining details of evaluation scenarios for LTE URLLC | Samsung | Youngbum Kim | 39963 | discussion | Decision | | | 83 | 6.2.8.1 | Remaining details of evaluations scenarios | 2700 | revised |
| R1-1720271 | Discussion on possible techniques for LTE URLLC | Samsung | Youngbum Kim | 39963 | discussion | Decision | | | 84 | 6.2.8.2 | Candidate techniques enabling URLLC for LTE | 2710 | available |
| R1-1720272 | Remaining details on sync signals | Samsung | Youngbum Kim | 39963 | other | | | | 88 | 7.1.1 | Remaining Details on Synchronization signal | 2720 | revised |
| R1-1720273 | Remaining details on NR-PBCH | Samsung | Youngbum Kim | 39963 | other | | | | 90 | 7.1.2.1 | Remaining details on NR-PBCH | 2730 | available |
| R1-1720274 | Remaining details on RMSI | Samsung | Youngbum Kim | 39963 | other | | | | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 2740 | available |
| R1-1720275 | Remaining details on OSI delivery | Samsung | Youngbum Kim | 39963 | other | | | | 92 | 7.1.2.3 | Remaining details on other system information delivery | 2750 | available |
| R1-1720276 | Remaining details on paging design | Samsung | Youngbum Kim | 39963 | other | | | | 93 | 7.1.3 | Remaining details on Paging design | 2760 | available |
| R1-1720277 | Remaining details on PRACH formats | Samsung | Youngbum Kim | 39963 | other | | | | 95 | 7.1.4.1 | Remaining details on PRACH formats | 2770 | available |
| R1-1720278 | Remaining details on PRACH procedure | Samsung | Youngbum Kim | 39963 | other | | | | 96 | 7.1.4.2 | Remaining details on RACH procedure | 2780 | available |
| R1-1720279 | Remaining details on NR mobility | Samsung | Youngbum Kim | 39963 | other | | | | 98 | 7.1.5.1 | Remaining details on measurement for mobility management | 2790 | available |
| R1-1720280 | Remaining details on Radio link monitoring | Samsung | Youngbum Kim | 39963 | other | | | | 99 | 7.1.5.2 | Remaining details Radio link monitoring for mobility management | 2800 | available |
| R1-1720281 | Finalizing Layer Mapping | Samsung | Youngbum Kim | 39963 | other | | | | 103 | 7.2.1.1 | Remaining details on codeword mapping | 2810 | available |
| R1-1720282 | Codebook-Based UL Transmission | Samsung | Youngbum Kim | 39963 | other | | | | 104 | 7.2.1.2 | Remaining details on codebook based transmission for UL | 2820 | revised |
| R1-1720283 | Discussion on Non-Codebook-Based UL Transmission | Samsung | Youngbum Kim | 39963 | other | | | | 105 | 7.2.1.3 | Remaining details on non-codebook based transmission for UL | 2830 | available |
| R1-1720284 | Remaining details for DL PRB bundling | Samsung | Youngbum Kim | 39963 | other | | | | 106 | 7.2.1.4 | Remaining details on PRB bundling for DL | 2840 | available |
| R1-1720285 | Simulation results for 4-Tx UL Codebook | Samsung | Youngbum Kim | 39963 | other | | | | 107 | 7.2.1.5 | Other | 2850 | available |
| R1-1720286 | Continuous precoding for NR DMRS in time domain | Samsung | Youngbum Kim | 39963 | other | | | | 107 | 7.2.1.5 | Other | 2860 | available |
| R1-1720287 | Discussions on UE assistance/reporting for NR | Samsung | Youngbum Kim | 39963 | other | | | | 107 | 7.2.1.5 | Other | 2870 | available |
| R1-1720288 | Remaining details on CSI measurements | Samsung | Youngbum Kim | 39963 | other | | | | 109 | 7.2.2.1 | Remaining details on CSI measurement | 2880 | available |
| R1-1720289 | CSI Reporting and UCI Multiplexing | Samsung | Youngbum Kim | 39963 | other | | | | 110 | 7.2.2.2 | Remaining details on CSI reporting | 2890 | available |
| R1-1720290 | On Beam Management, Measurement and Reporting | Samsung | Youngbum Kim | 39963 | other | | | | 111 | 7.2.2.3 | Remaining details on beam measurement and reporting | 2900 | available |
| R1-1720291 | Beam failure recovery | Samsung | Youngbum Kim | 39963 | other | | | | 112 | 7.2.2.4 | Remaining details on mechanism to recover from beam failure | 2910 | available |
| R1-1720292 | CQI Definition | Samsung | Youngbum Kim | 39963 | other | | | | 113 | 7.2.2.5 | Remaining details on CQI and MCS | 2920 | available |
| R1-1720293 | CSI Acquisition and Beam Management Framework | Samsung | Youngbum Kim | 39963 | other | | | | 114 | 7.2.2.6 | Other | 2930 | available |
| R1-1720294 | CSI Reporting for Reciprocity Operation | Samsung | Youngbum Kim | 39963 | other | | | | 114 | 7.2.2.6 | Other | 2940 | available |
| R1-1720295 | Discussion on CSI-RS Resource Allocation | Samsung | Youngbum Kim | 39963 | other | | | | 114 | 7.2.2.6 | Other | 2950 | available |
| R1-1720296 | Port selection codebook for beamformed CSI-RS | Samsung | Youngbum Kim | 39963 | other | | | | 114 | 7.2.2.6 | Other | 2960 | available |

| TDoc | Title | Source | Contact | Contact ID | Type | For | Abstract | Secretary Remarks | Agenda item sort order | Agenda item | Agenda item description | TDoc sort order within agenda item | TDoc Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R1-1720297 | Extension of Type I multi-panel codebook | Samsung | Youngbum Kim | 39963 | other | | | | 114 | 7.2.2.6 | Other | 2970 | available |
| R1-1720298 | Differential reporting of Type II CSI | Samsung | Youngbum Kim | 39963 | other | | | | 114 | 7.2.2.6 | Other | 2980 | available |
| R1-1720299 | On higher rank Type II CSI | Samsung | Youngbum Kim | 39963 | other | | | | 114 | 7.2.2.6 | Other | 2990 | available |
| R1-1720300 | Remaining details on subband CSI reporting | Samsung | Youngbum Kim | 39963 | other | | | | 114 | 7.2.2.6 | Other | 3000 | available |
| R1-1720301 | Remaining details on UE group based beam reporting | Samsung | Youngbum Kim | 39963 | other | | | | 114 | 7.2.2.6 | Other | 3010 | available |
| R1-1720302 | Remaing details on PDSCH beam indication | Samsung | Youngbum Kim | 39963 | other | | | | 114 | 7.2.2.6 | Other | 3020 | available |
| R1-1720303 | Discussions on high reliability CQI for NR | Samsung | Youngbum Kim | 39963 | other | | | Late contribution | 114 | 7.2.2.6 | Other | 3030 | withdrawn |
| R1-1720304 | Discussion on beam indication for UL transmission | Samsung | Youngbum Kim | 39963 | other | | | | 114 | 7.2.2.6 | Other | 3040 | available |
| R1-1720305 | Discussion on cross-carrier beam management | Samsung | Youngbum Kim | 39963 | other | | | | 114 | 7.2.2.6 | Other | 3050 | available |
| R1-1720306 | CSI Feedback Overhead Reduction | Samsung | Youngbum Kim | 39963 | other | | | | 114 | 7.2.2.6 | Other | 3060 | available |
| R1-1720307 | Discussion on joint CLI measurement and beam management | Samsung | Youngbum Kim | 39963 | other | | | | 114 | 7.2.2.6 | Other | 3070 | available |
| R1-1720308 | Details on configuration of presence of TCI in DCI | Samsung | Youngbum Kim | 39963 | other | | | | 114 | 7.2.2.6 | Other | 3080 | available |
| R1-1720309 | Remaining details on DL/UL RS multiplexing | Samsung | Youngbum Kim | 39963 | other | | | | 116 | 7.2.3.1 | Remaining details on Multiplexing of different types of RSs | 3090 | available |
| R1-1720310 | Remaining details on CSI-RS | Samsung | Youngbum Kim | 39963 | other | | | | 117 | 7.2.3.2 | Remaining details on CSI-RS | 3100 | available |
| R1-1720311 | Remaining details on DMRS | Samsung | Youngbum Kim | 39963 | other | | | | 118 | 7.2.3.3 | Remaining details on DMRS | 3110 | available |
| R1-1720312 | Remaining details on PT-RS | Samsung | Youngbum Kim | 39963 | other | | | | 119 | 7.2.3.4 | Remaining details on PT-RS | 3120 | available |
| R1-1720313 | Remaining details on SRS | Samsung | Youngbum Kim | 39963 | other | | | | 120 | 7.2.3.5 | Remaining details on SRS | 3130 | available |
| R1-1720314 | Remaining details on TRS | Samsung | Youngbum Kim | 39963 | other | | | | 121 | 7.2.3.6 | Remaining details on TRS | 3140 | available |
| R1-1720315 | Remaining details on QCL | Samsung | Youngbum Kim | 39963 | other | | | | 122 | 7.2.3.7 | Remaining details on QCL | 3150 | available |
| R1-1720316 | Discussions on data scrambling | Samsung | Youngbum Kim | 39963 | other | | | | 123 | 7.2.3.8 | Other | 3160 | available |
| R1-1720317 | PTRS design for 40 GHz and higher frequency bands | Samsung | Youngbum Kim | 39963 | other | | | | 123 | 7.2.3.8 | Other | 3170 | available |
| R1-1720318 | Evaluations on pre-DFT PTRS insertion | Samsung | Youngbum Kim | 39963 | other | | | | 123 | 7.2.3.8 | Other | 3180 | available |
| R1-1720319 | Remaining Issues on PDCCH Structure | Samsung | Youngbum Kim | 39963 | other | | | | 127 | 7.3.1.1 | Remaining details on PDCCH structure | 3190 | available |
| R1-1720320 | Remaining Issues on Search Space Design | Samsung | Youngbum Kim | 39963 | other | | | | 128 | 7.3.1.2 | Remaining details on Search space | 3200 | available |
| R1-1720321 | Remaining Issues on UE-Group Common PDCCH | Samsung | Youngbum Kim | 39963 | other | | | | 129 | 7.3.1.3 | Remaining details on group-common PDCCH | 3210 | available |
| R1-1720322 | DCI Contents and Formats | Samsung | Youngbum Kim | 39963 | other | | | | 130 | 7.3.1.4 | DCI contents and formats | 3220 | available |
| R1-1720323 | Aperiodic CSI reporting on PUCCH | Samsung | Youngbum Kim | 39963 | other | | | | 130 | 7.3.1.4 | DCI contents and formats | 3230 | available |
| R1-1720324 | On UE Power Savings | Samsung | Youngbum Kim | 39963 | other | | | | 131 | 7.3.1.5 | Other | 3240 | available |
| R1-1720325 | PDCCH Design for URLLC | Samsung | Youngbum Kim | 39963 | other | | | | 131 | 7.3.1.5 | Other | 3250 | available |
| R1-1720326 | Remaining Issues for Short PUCCH with UCI of 1 or 2 Bits | Samsung | Youngbum Kim | 39963 | other | | | | 134 | 7.3.2.1.1 | Short-PUCCH for UCI of up to 2 bits | 3260 | available |
| R1-1720327 | Remaining Issues for Short PUCCH with UCI of more than 2 Bits | Samsung | Youngbum Kim | 39963 | other | | | | 135 | 7.3.2.1.2 | Short-PUCCH for UCI of more than 2 bits | 3270 | available |
| R1-1720328 | Remaining Issues for Short PUCCH over 2 OFDM symbols | Samsung | Youngbum Kim | 39963 | other | | | | 136 | 7.3.2.1.3 | Support of short-PUCCH over 2 OFDM symbols | 3280 | available |
| R1-1720329 | Remaining Issues for Long PUCCH for UCI of 1 or 2 Bits | Samsung | Youngbum Kim | 39963 | other | | | | 138 | 7.3.2.2.1 | Long-PUCCH for UCI of up to 2 bits | 3290 | available |
| R1-1720330 | Remaining Issues for Long PUCCH for UCI of more than 2 Bits | Samsung | Youngbum Kim | 39963 | other | | | | 139 | 7.3.2.2.2 | Long-PUCCH for UCI of more than 2 bits | 3300 | available |
| R1-1720331 | Remaining Issues for Multi-Slot Long PUCCH Transmission | Samsung | Youngbum Kim | 39963 | other | | | | 140 | 7.3.2.2.3 | Support of long-PUCCH over multiple slots | 3310 | available |
| R1-1720332 | Remaining Issues for UCI Multiplexing in PUSCH | Samsung | Youngbum Kim | 39963 | other | | | | 141 | 7.3.2.3 | UCI multiplexing | 3320 | available |
| R1-1720333 | Resource Allocation for PUCCH Transmissions | Samsung | Youngbum Kim | 39963 | other | | | | 142 | 7.3.2.4 | Resource allocation for PUCCH | 3330 | available |
| R1-1720334 | PUCCH Design for URLLC | Samsung | Youngbum Kim | 39963 | other | | | | 143 | 7.3.2.5 | Other | 3340 | available |
| R1-1720335 | Performance Results for Long PUCCH | Samsung | Youngbum Kim | 39963 | other | | | | 143 | 7.3.2.5 | Other | 3350 | available |
| R1-1720336 | Performance Results for UCI and Data Multiplexing | Samsung | Youngbum Kim | 39963 | other | | | | 143 | 7.3.2.5 | Other | 3360 | available |
| R1-1720337 | Multiplexing PUSCH with Short PUCCH or SRS | Samsung | Youngbum Kim | 39963 | other | | | | 143 | 7.3.2.5 | Other | 3370 | available |
| R1-1720338 | On timing between DCI indicating active BWP switching and active BWP switching | Samsung | Youngbum Kim | 39963 | other | | | | 143 | 7.3.2.5 | Other | 3380 | available |
| R1-1720339 | DL/UL Resource Allocation | Samsung | Youngbum Kim | 39963 | other | | | | 145 | 7.3.3.1 | DL/UL resource allocation | 3390 | available |
| R1-1720340 | HARQ Management and Feedback | Samsung | Youngbum Kim | 39963 | other | | | | 146 | 7.3.3.2 | DL/UL scheduling and HARQ management | 3400 | available |
| R1-1720341 | Remaining Issues on CBG-Based UL/DL Retransmissions | Samsung | Youngbum Kim | 39963 | other | | | | 147 | 7.3.3.3 | CBG-based (re)transmission | 3410 | available |
| R1-1720342 | Procedures for UL Transmissions | Samsung | Youngbum Kim | 39963 | other | | | | 148 | 7.3.3.4 | UL data transmission procedure | 3420 | available |
| R1-1720343 | Soft Buffer Management | Samsung | Youngbum Kim | 39963 | other | | | Late contribution | 149 | 7.3.3.5 | Soft-buffer management for NR | 3430 | available |
| R1-1720344 | Indication of Preempted Resources in DL | Samsung | Youngbum Kim | 39963 | other | | | | 150 | 7.3.3.6 | Multiplexing data with different transmission durations | 3440 | available |
| R1-1720345 | Flushing Indication of Preempted Resources for TB-based re-transmission | Samsung | Youngbum Kim | 39963 | other | | | | 151 | 7.3.3.7 | Other | 3450 | available |
| R1-1720346 | Multiplexing Transmissions with Different Durations | Samsung | Youngbum Kim | 39963 | other | | | | 151 | 7.3.3.7 | Other | 3460 | available |
| R1-1720347 | Scheduling/HARQ Procedures for URLLC | Samsung | Youngbum Kim | 39963 | other | | | | 151 | 7.3.3.7 | Other | 3470 | available |
| R1-1720348 | Indication of Preempted Resources in UL | Samsung | Youngbum Kim | 39963 | other | | | | 151 | 7.3.3.7 | Other | 3480 | available |
| R1-1720349 | On Bandwidth Part Operation | Samsung | Youngbum Kim | 39963 | other | | | | 153 | 7.3.4.1 | Other aspects on bandwidth Parts | 3490 | available |
| R1-1720350 | CA Operation Aspects | Samsung | Youngbum Kim | 39963 | other | | | | 154 | 7.3.4.2 | Other aspects on carrier aggregation | 3500 | available |
| R1-1720351 | On Rate Matching | Samsung | Youngbum Kim | 39963 | other | | | | 155 | 7.3.5 | Remaining details on rate matching aspects for NR DL and UL | 3510 | available |
| R1-1720352 | Remaining details on nominal code rate and BG determination | Samsung | Youngbum Kim | 39963 | other | | | | 159 | 7.4.1.1 | Nominal code rate / BG determination | 3520 | noted |
| R1-1720353 | Remaining details on TBS determination | Samsung | Youngbum Kim | 39963 | other | | | | 160 | 7.4.1.2 | Other | 3530 | available |
| R1-1720354 | Max code rate for BG2-based decoding and the length of rate matching output sequence | Samsung | Youngbum Kim | 39963 | other | | | | 160 | 7.4.1.2 | Other | 3540 | available |
| R1-1720355 | Remaining details on uplink CRCs | Samsung | Youngbum Kim | 39963 | other | | | | 162 | 7.4.2.1 | Uplink CRCs | 3550 | available |
| R1-1720356 | Details of conditions for UCI segmentation | Samsung | Youngbum Kim | 39963 | other | | | | 163 | 7.4.2.2 | Details of conditions for UCI segmentation | 3560 | available |
| R1-1720357 | Remaining details on PBCH polar code construction | Samsung | Youngbum Kim | 39963 | other | | | | 164 | 7.4.2.3 | Order and mapping of PBCH fields | 3570 | available |
| R1-1720358 | Downlink control channel code construction | Samsung | Youngbum Kim | 39963 | other | | | | 165 | 7.4.2.4 | Other | 3580 | noted |
| R1-1720359 | On LTE-NR Coexistence | Samsung | Youngbum Kim | 39963 | other | | | | 166 | 7.5 | NR-LTE co-existence | 3590 | noted |
| R1-1720360 | Email discussion on SRS power control framework | Samsung | Youngbum Kim | 39963 | other | | | | 167 | 7.6 | UL power control | 3600 | available |
| R1-1720361 | Remaining Issues on UL Power Control | Samsung | Youngbum Kim | 39963 | other | | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 3610 | available |
| R1-1720362 | On UL Power Sharing for Multi-Cell Transmissions | Samsung | Youngbum Kim | 39963 | other | | | | 169 | 7.6.2 | Remaining details on NR UL power control – CA aspects | 3620 | available |
| R1-1720363 | On PHR Requirements and Calculation | Samsung | Youngbum Kim | 39963 | other | | | | 170 | 7.6.3 | Other | 3630 | available |
| R1-1720364 | FDD Operation | Samsung | Youngbum Kim | 39963 | other | | | Late contribution | 171 | 7.7 | Aspects related to FDD | 3640 | available |
| R1-1720365 | Consideration on NoMA study | Samsung | Youngbum Kim | 39963 | other | | | | 172 | 7.8 | Other | 3650 | available |

| TDoc | Title | Source | Contact | Contact ID | Type | For | Abstract | Secretary Remarks | Agenda item sort order | Agenda item | Agenda item description | TDoc sort order within agenda item | TDoc Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R1-1720366 | DFT-based IGMA scheme | Samsung | Youngbum Kim | 39963 | other | | | | 172 | 7.8 | Other | 3660 | available |
| R1-1720367 | Carrier aggregation for CCs with different TTI lengths | ZTE, Sanechips | Zhisong Zuo | 33890 | discussion | Discussion | | | 154 | 7.3.4.2 | Other aspects on carrier aggregation | 3670 | available |
| R1-1720368 | DL/UL scheduling and HARQ timing management | ZTE, Sanechips | Zhisong Zuo | 33890 | discussion | Discussion | | | 146 | 7.3.3.2 | DL/UL scheduling and HARQ management | 3680 | available |
| R1-1720369 | Remaining issues on multiple starting and ending points for LAA UL | Ericsson Japan K.K. | Reem Karaki | 72817 | discussion | Decision | | | 28 | 6.2.2.1 | Multiple starting and ending positions in a subframe for UL | 3690 | available |
| R1-1720370 | PT-RS design | Panasonic | Shotaro Maki | 69884 | discussion | | | | 119 | 7.2.3.4 | Remaining details on PT-RS | 3700 | available |
| R1-1720371 | Discussion on NR power control framework | Panasonic | Shotaro Maki | 69884 | discussion | | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 3710 | available |
| R1-1720372 | on AUL Configuration and Activation | Ericsson Japan K.K. | Reem Karaki | 72817 | discussion | Decision | | | 30 | 6.2.2.2.1 | Resource allocation for autonomous UL access | 3720 | available |
| R1-1720373 | Remaining Issues on AUL HARQ Design | Ericsson Japan K.K. | Reem Karaki | 72817 | discussion | Decision | | | 31 | 6.2.2.2.2 | HARQ for autonomous uplink access | 3730 | available |
| R1-1720374 | on AUL Channel Access | Ericsson Japan K.K. | Reem Karaki | 72817 | discussion | Decision | | | 32 | 6.2.2.2.3 | Channel access for autonomous UL access | 3740 | available |
| R1-1720375 | NTN NR impacts Timing Advance | Fraunhofer IIS | Rohit Datta | 63252 | discussion | | | | 172 | 7.8 | Other | 3750 | available |
| R1-1720376 | Remaining details on remaining minimum system information delivery | Potevio | Lanying Zhou | 74047 | discussion | | | | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 3760 | available |
| R1-1720377 | Discussion on frequency domain resource allocation | Potevio | Lanying Zhou | 74047 | discussion | | | | 145 | 7.3.3.1 | DL/UL resource allocation | 3770 | available |
| R1-1720378 | Correction on scrambling sequence identity for 2+4 PRBs sets in MPDCCH | NEC | Yassin Awad | 37300 | draftCR | Decision | | Cat F agreed in R1-721078 CR0401, Cat A in R1-1721079 CR0402. | 7 | 6.1.1 | Maintenance of E-UTRA Release 8 – 13 | 2180 | agreed |
| R1-1720379 | Correction on resource elements reserved for CRS for PBCH with repetition | NEC | Yassin Awad | 37300 | draftCR | Decision | | Wrong font (Times New Roman) on the cover page. | 7 | 6.1.1 | Maintenance of E-UTRA Release 8 – 13 | 3841 | agreed |
| R1-1720380 | Resource allocation for NR PUCCH | NEC | Yassin Awad | 37300 | discussion | Decision | | | 142 | 7.3.2.4 | Resource allocation for PUCCH | 3800 | available |
| R1-1720381 | Remaining issues of RA schemes and TBS | NEC | Yassin Awad | 37300 | discussion | Decision | | | 145 | 7.3.3.1 | DL/UL resource allocation | 3810 | available |
| R1-1720382 | Remaining issues on UL transmission without grant | NEC | Yassin Awad | 37300 | discussion | Decision | | | 148 | 7.3.3.4 | UL data transmission procedure | 3820 | available |
| R1-1720383 | Reply LS on CR for Reference Signals for MBSFN with 1.25kHz and 7.5khz sub-carrier spacing | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | LS out | Agreement | | | 4 | 5 | Incoming Liaison Statements | 3830 | available |
| R1-1720384 | Clarification for DAI for eCA | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | draftCR | Decision | | | 7 | 6.1.1 | Maintenance of E-UTRA Release 8 – 13 | 5451 | revised |
| R1-1720385 | Usage of PUCCH format 3 with more than 5 CC | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | draftCR | Decision | | | 7 | 6.1.1 | Maintenance of E-UTRA Release 8 – 13 | 108100 | agreed |
| R1-1720386 | Typo correction for table 16.5.1.2.1-1 | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | draftCR | Decision | | Wrong font (Times New Roman) on the cover page. | 7 | 6.1.1 | Maintenance of E-UTRA Release 8 – 13 | 3861 | agreed |
| R1-1720387 | Correction on the scale factor for semi-OL rank-1 | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | draftCR | Decision | | Changed from agreement to decision. Wrong font (Times New Roman) on the cover page. | 10 | 6.1.4 | Maintenance of Release 14 Full-Dimension MIMO for LTE | 210 | agreed |
| R1-1720388 | Correction for TBS determination under larger TBS for random access response grant | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | draftCR | Decision | | Changed from agreement to decision. Wrong font (Times New Roman) on the cover page. | 11 | 6.1.5 | Maintenance of Release 14 Further Enhanced MTC for LTE | 97070 | agreed |
| R1-1720389 | Correction for dropping rules in intra-band SRS carrier switching. | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | draftCR | Decision | | | 13 | 6.1.7 | Other | 0 | agreed |
| R1-1720390 | Discussion on modulation enhancements | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | Release and work item code are missing. | 13 | 6.1.7 | Other | 5976 | noted |
| R1-1720391 | Correction for PUSCH puncturing in SRS carrier switching | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | draftCR | Decision | | Changed from agreement to decision. Wrong font (Times New Roman) on the cover page. | 13 | 6.1.7 | Other | 5973 | revised |
| R1-1720392 | Remaining details on shortened processing time for 1ms TTI | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 16 | 6.2.1.1 | Remaining details on shortened processing time for 1ms TTI | 3920 | available |
| R1-1720393 | Remaining aspects related to interaction between different TTI lengths | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 18 | 6.2.1.2.1 | Remaining aspects related to interaction between different TTI lengths | 3930 | available |
| R1-1720394 | Remaining details on DL control channel design | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 19 | 6.2.1.2.2 | Remaining details on DL control channel design | 3940 | available |
| R1-1720395 | Remaining details of UL control channel design | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 20 | 6.2.1.2.3 | Remaining details on UL control channel design | 3950 | available |
| R1-1720396 | Remaining details of DL data channel design | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 21 | 6.2.1.2.4 | Remaining details on DL data channel design | 3960 | available |
| R1-1720397 | Remaining details of UL data channel design | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 22 | 6.2.1.2.5 | Remaining details on UL data channel design | 3970 | available |
| R1-1720398 | Remaining details of FS2 aspects | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 23 | 6.2.1.2.6 | Remaining details on FS2 aspects | 3980 | available |
| R1-1720399 | Remaining details of SPS for sTTI operation | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 24 | 6.2.1.2.7 | Other | 3990 | available |
| R1-1720400 | Link-level evaluation of DL data transmission under symbol-dependent impact | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 26 | 6.2.1.4 | Other | 4000 | available |
| R1-1720401 | Remaining details of maximum TA and processing time | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 25 | 6.2.1.3 | Remaining details on maximum TA and processing time | 4010 | available |
| R1-1720402 | Summary of [90b-LTE-11] email discussion on remaining details of CSI reporting | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Discussion | | | 21 | 6.2.1.2.4 | Remaining details on DL data channel design | 4020 | noted |
| R1-1720403 | Multiple starting and ending positions in a subframe in UL | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 28 | 6.2.2.1 | Multiple starting and ending positions in a subframe for UL | 4030 | available |
| R1-1720404 | Resource allocation for automonous UL access | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 30 | 6.2.2.2.1 | Resource allocation for autonomous UL access | 4040 | available |
| R1-1720405 | HARQ for autonomous UL access | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 31 | 6.2.2.2.2 | HARQ for autonomous uplink access | 4050 | available |
| R1-1720406 | Channel access mechanism for autonomous UL access | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 32 | 6.2.2.2.3 | Channel access for autonomous UL access | 4060 | available |
| R1-1720407 | Miscellaneous aspects | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 33 | 6.2.2.2.4 | Other | 4070 | available |
| R1-1720408 | Carrier Aggregation for V2X Phase 2 | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 36 | 6.2.3.1 | Carrier Aggregation (up to 8 PC5 carriers) | 4080 | available |
| R1-1720409 | Synchronization for V2X PC5 Carrier Aggregation | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 38 | 6.2.3.1.2 | Synchronization | 4090 | available |
| R1-1720410 | Support of 64-QAM for V2X Phase 2 | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 40 | 6.2.3.2 | Support for 64-QAM | 4100 | available |
| R1-1720411 | Transmit Diversity for V2X Phase 2 | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 41 | 6.2.3.3 | Feasibility and gain of PC5 operation with Transmit Diversity | 4110 | available |
| R1-1720412 | Resource pool sharing between Mode 3 and Mode 4 | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 45 | 6.2.3.4 | Resource pool sharing between mode-3 and mode-4 users | 4120 | noted |
| R1-1720413 | Reduction of time between packet arrival and transmisison | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 46 | 6.2.3.5 | Maximum time reduction between packet arrival at layer 1 and resource selection for transmission | 4130 | available |
| R1-1720414 | Introduction of 1024QAM for PDSCH | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 49 | 6.2.4.1 | Remaining details on support for 1024QAM for DL channels | 4140 | noted |
| R1-1720415 | Reduced system acquisition time | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 52 | 6.2.5.1 | Reduced system acquisition time | 4150 | available |
| R1-1720416 | Physical layer aspects of early data transmission | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 66 | 6.2.6.2 | Reduced system acquisition time | 4160 | available |
| R1-1720417 | Efficient monitoring of DL control channels | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 54 | 6.2.5.3 | Downlink channel power efficiency | 4170 | available |
| R1-1720418 | Uplink HARQ-ACK feedback | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 55 | 6.2.5.4 | Uplink HARQ-ACK feedback | 4180 | available |
| R1-1720419 | CQI table for 64-QAM | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 56 | 6.2.5.5 | Increased PDSCH spectral efficiency | 4190 | available |
| R1-1720420 | Increased PUSCH spectral efficiency | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 57 | 6.2.5.6 | Increased PUSCH spectral efficiency | 4200 | available |
| R1-1720421 | Modulation enhancements for eMTC | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 58 | 6.2.5.7 | Other | 4210 | available |
| R1-1720422 | Wake-up signal functions | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 62 | 6.2.6.1.1.1 | Wake-up signal functions | 4220 | available |
| R1-1720423 | Wake-up signal configurations and procedures | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 63 | 6.2.6.1.1.2 | Wake-up signal configurations and procedures | 4230 | available |
| R1-1720424 | Wake-up signal design | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 64 | 6.2.6.1.1.3 | Detailed design of wake-up signal | 4240 | available |
| R1-1720425 | Physical layer aspects of data transmission during random access procedure | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 65 | 6.2.6.1.2 | Data transmission during the random access procedure | 4250 | available |
| R1-1720426 | Enhancements to cell search | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 67 | 6.2.6.2.1 | Cell search | 4260 | available |

| TDoc | Title | Source | Contact | Contact ID | Type | For | Abstract | Secretary Remarks | Agenda item sort order | Agenda item | Agenda item description | TDoc sort order within agenda item | TDoc Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R1-1720427 | Enhancements to system information acquisiton | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 68 | 6.2.6.2.2 | System Information | 4270 | available |
| R1-1720428 | Downlink aspects of TDD | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 70 | 6.2.6.3.1 | Downlink aspects | 4280 | available |
| R1-1720429 | Uplink aspects of TDD | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 71 | 6.2.6.3.2 | Uplink aspects | 4290 | available |
| R1-1720430 | General considerations on TDD design | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 72 | 6.2.6.3.3 | Common aspects | 4300 | available |
| R1-1720431 | Coexistence with NR | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 69 | 6.2.6.3 | TDD | 4310 | available |
| R1-1720432 | Modulation enhancements for NB-IoT | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 73 | 6.2.6.4 | Other | 4320 | available |
| R1-1720433 | Physical layer scheduling request | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 73 | 6.2.6.4 | Other | 4330 | available |
| R1-1720434 | Support of small cells | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 73 | 6.2.6.4 | Other | 4340 | available |
| R1-1720435 | Improvement of PHY measurements | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 73 | 6.2.6.4 | Other | 4350 | available |
| R1-1720436 | NPRACH support for large cell access | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 73 | 6.2.6.4 | Other | 4360 | available |
| R1-1720437 | NPRACH Reliability Enhancement | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 73 | 6.2.6.4 | Other | 4370 | available |
| R1-1720438 | Phyiscal layer impact of enhancements to RRC Connection Release | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 73 | 6.2.6.4 | Other | 4380 | available |
| R1-1720439 | Field measurement results | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 80 | 6.2.7.6 | Field measurement results | 4390 | noted |
| R1-1720440 | Remaining details of evaluations scenarios | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 83 | 6.2.8.1 | Remaining details of evaluations scenarios | 4400 | available |
| R1-1720441 | Candidate techniques enabling URLLC for LTE | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | discussion | Decision | | | 84 | 6.2.8.2 | Candidate techniques enabling URLLC for LTE | 4410 | available |
| R1-1720442 | Design impact on low latency for LTE UL URLLC | Huawei, HiSilicon | Brian Classon | 45750 | discussion | Decision | | | 85 | 6.2.8.3 | Other | 4420 | available |
| R1-1720443 | Discussion on new scenarios and requirements for URLLC service | Huawei, HiSilicon | Brian Classon | 45750 | discussion | Decision | | | 85 | 6.2.8.3 | Other | 4430 | revised |
| R1-1720444 | Remaining bandwidth-part issues | Ericsson | Erik Dahlman | 23366 | discussion | Decision | | | 153 | 7.3.4.1 | Other aspects on bandwidth Parts | 4440 | available |
| R1-1720445 | Remaining rate-matching issues | Ericsson | Erik Dahlman | 23366 | discussion | Decision | | | 155 | 7.3.5 | Remaining details on rate matching aspects for NR DL and UL | 4450 | available |
| R1-1720446 | Remaining coex-related issues | Ericsson | Erik Dahlman | 23366 | discussion | Decision | | | 166 | 7.5 | NR-LTE co-existence | 4460 | revised |
| R1-1720447 | Discussion on 1-symbol short-PUCCH for UCI of up to 2 bits | Panasonic Corporation | Tetsuya Yamamoto | 59095 | discussion | Decision | | | 134 | 7.3.2.1.1 | Short-PUCCH for UCI of up to 2 bits | 4470 | noted |
| R1-1720448 | Frequency-hopping details of long-PUCCH | Panasonic Corporation | Tetsuya Yamamoto | 59095 | discussion | Decision | | | 138 | 7.3.2.2.1 | Long-PUCCH for UCI of up to 2 bits | 4480 | available |
| R1-1720449 | Discussion on support of long-PUCCH over multiple slots | Panasonic Corporation | Tetsuya Yamamoto | 59095 | discussion | Decision | | | 140 | 7.3.2.2.3 | Support of long-PUCCH over multiple slots | 4490 | available |
| R1-1720450 | Discussion on UCI multiplexing | Panasonic Corporation | Tetsuya Yamamoto | 59095 | discussion | Decision | | | 141 | 7.3.2.3 | UCI multiplexing | 4500 | available |
| R1-1720451 | Discussion on resource allocation for uplink control channel | Panasonic Corporation | Tetsuya Yamamoto | 59095 | discussion | Decision | | | 142 | 7.3.2.4 | Resource allocation for PUCCH | 4510 | available |
| R1-1720452 | On UL power sharing for coverage enhancement | ORANGE | Hao Lin | 65530 | discussion | | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 4520 | available |
| R1-1720453 | Remaining details on remaining minimum system information | Sony | Martin Beale | 59973 | discussion | | | | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 4530 | available |
| R1-1720454 | Considerations on Beam Reporting in RACH Procedure | Sony | Martin Beale | 59973 | discussion | | | | 96 | 7.1.4.2 | Remaining details on RACH procedure | 4540 | available |
| R1-1720455 | RRM Measurements for UE supporting Wideband CC | Sony | Martin Beale | 59973 | discussion | | | | 98 | 7.1.5.1 | Remaining details on measurement for mobility management | 4550 | available |
| R1-1720456 | Remaining CW-to-layer mapping issue | Sony | Martin Beale | 59973 | discussion | | | | 103 | 7.2.1.1 | Remaining details on codeword mapping | 4560 | available |
| R1-1720457 | Considerations on interference measurement | Sony | Martin Beale | 59973 | discussion | | | | 109 | 7.2.2.1 | Remaining details on CSI measurement | 4570 | available |
| R1-1720458 | Considerations on CSI framework | Sony | Martin Beale | 59973 | discussion | | | | 114 | 7.2.2.6 | Other | 4580 | available |
| R1-1720459 | Considerations on SRS design | Sony | Martin Beale | 59973 | discussion | | | | 120 | 7.2.3.5 | Remaining details on SRS | 4590 | available |
| R1-1720460 | On remaining details on group-common PDCCH | Sony | Martin Beale | 59973 | discussion | | | | 129 | 7.3.1.3 | Remaining details on group-common PDCCH | 4600 | available |
| R1-1720461 | Discussion on the DCI composition for CBG retransmission | Sony | Martin Beale | 59973 | discussion | | | | 147 | 7.3.3.3 | CBG-based (re)transmission | 4610 | available |
| R1-1720462 | Discussion on the RV sequence within the repetition for UL transmission without UL grant | Sony | Martin Beale | 59973 | discussion | | | | 148 | 7.3.3.4 | UL data transmission procedure | 4620 | available |
| R1-1720463 | Remaining issues in Pre-emption Indicator | Sony | Martin Beale | 59973 | discussion | | | | 150 | 7.3.3.6 | Multiplexing data with different transmission durations | 4630 | available |
| R1-1720464 | Rate matching resources for compatibility with efeMTC / NB-IoT | Sony | Martin Beale | 59973 | discussion | | | | 155 | 7.3.5 | Remaining details on rate matching aspects for NR DL and UL | 4640 | available |
| R1-1720465 | MTC Synchronisation Signal evaluations for efeMTC | Sony | Martin Beale | 59973 | discussion | Decision | | | 52 | 6.2.5.1 | Reduced system acquisition time | 4650 | available |
| R1-1720466 | Early data transmission on Msg 3 | Sony | Martin Beale | 59973 | discussion | Decision | | | 53 | 6.2.5.2 | Early data transmission | 4660 | available |
| R1-1720467 | WUS evaluations for efeMTC | Sony | Martin Beale | 59973 | discussion | Decision | | | 54 | 6.2.5.3 | Downlink channel power efficiency | 4670 | available |
| R1-1720468 | Early termination for PUSCH repetition | Sony | Martin Beale | 59973 | discussion | Decision | | | 55 | 6.2.5.4 | Uplink HARQ-ACK feedback | 4680 | available |
| R1-1720469 | CQI reporting for efeMTC supporting 64QAM | Sony | Martin Beale | 59973 | discussion | Decision | | | 56 | 6.2.5.5 | Increased PDSCH spectral efficiency | 4690 | available |
| R1-1720470 | Sub-PRB transmissions for efeMTC | Sony | Martin Beale | 59973 | discussion | Decision | | | 57 | 6.2.5.6 | Increased PUSCH spectral efficiency | 4700 | available |
| R1-1720471 | Discussion on carrier aggregation in sidelink mode 4 operation | Sony | Martin Beale | 59973 | discussion | Decision | | | 37 | 6.2.3.1.1 | Mode-4 support | 4710 | available |
| R1-1720472 | DL interference mitigation for aerial vehicle | Sony | Martin Beale | 59973 | discussion | Decision | | | 76 | 6.2.7.2 | DL Interference Mitigation | 4720 | available |
| R1-1720473 | CRS collision for aerial vehicle | Sony | Martin Beale | 59973 | discussion | Decision | | | 78 | 6.2.7.4 | Interference Detection | 4730 | available |
| R1-1720474 | DRS design for NR unlicensed spectrum | Sony | Martin Beale | 59973 | discussion | | | | 172 | 7.8 | Other | 4740 | available |
| R1-1720475 | High level views on NR-U BWP | Sony | Martin Beale | 59973 | discussion | | | | 172 | 7.8 | Other | 4750 | available |
| R1-1720476 | Discussion on resource pool sharing between UEs in mode 3 and UEs in mode 4 | Panasonic | Lilei Wang | 56630 | discussion | Discussion | | | 45 | 6.2.3.4 | Resource pool sharing between mode-3 and mode-4 users | 4760 | available |
| R1-1720477 | Discussion on latency reduction for V2X phase 2 | Panasonic | Lilei Wang | 56630 | discussion | Discussion | | | 46 | 6.2.3.5 | Maximum time reduction between packet arrival at layer 1 and resource selection for transmission | 4770 | available |
| R1-1720478 | Discussion on UE behaviour of mode 4 in case of multiple carriers | Panasonic | Lilei Wang | 56630 | discussion | Discussion | | | 37 | 6.2.3.1.1 | Mode-4 support | 4780 | available |
| R1-1720479 | On resource allocation for PDSCH and PUSCH in NR | Nokia, Nokia Shanghai Bell | Karri Ranta-aho | 64268 | discussion | Decision | | | 145 | 7.3.3.1 | DL/UL resource allocation | 4790 | available |
| R1-1720480 | On remaining details of HARQ procedure | Nokia, Nokia Shanghai Bell | Karri Ranta-aho | 64268 | discussion | Decision | | | 146 | 7.3.3.2 | DL/UL scheduling and HARQ management | 4800 | available |
| R1-1720481 | On remaining issues for UL transmission without grant | Nokia, Nokia Shanghai Bell | Karri Ranta-aho | 64268 | discussion | Decision | | | 148 | 7.3.3.4 | UL data transmission procedure | 4810 | available |
| R1-1720482 | Limited buffer rate matching application details | Nokia, Nokia Shanghai Bell | Karri Ranta-aho | 64268 | discussion | Decision | | | 149 | 7.3.3.5 | Soft-buffer management for NR | 4820 | available |
| R1-1720483 | On LTE HARQ ACK feedback in 1Tx EN-DC | Nokia, Nokia Shanghai Bell | Karri Ranta-aho | 64268 | discussion | Decision | | | 166 | 7.5 | NR-LTE co-existence | 4830 | noted |
| R1-1720484 | Mode 4 support for V2X carrier aggregation | Nokia, Nokia Shanghai Bell | Torsten Wildschek | 68154 | discussion | Decision | | | 37 | 6.2.3.1.1 | Mode-4 support | 4840 | available |
| R1-1720485 | Discussion on synchronization for SL CA | Nokia, Nokia Shanghai Bell | Torsten Wildschek | 68154 | discussion | Decision | | | 38 | 6.2.3.1.2 | Synchronization | 4850 | available |
| R1-1720486 | Tx power allocation in SL CA | Nokia, Nokia Shanghai Bell | Torsten Wildschek | 68154 | discussion | Decision | | | 39 | 6.2.3.1.3 | Other | 4860 | available |
| R1-1720487 | Discussions on Transmit diversity schemes and DMRS for PSSCH | Nokia, Nokia Shanghai Bell | Torsten Wildschek | 68154 | discussion | Decision | | | 42 | 6.2.3.3.1 | Transmit diversity solutions | 4870 | available |
| R1-1720488 | Evaluations of transmit diversity schemes for V2X | Nokia, Nokia Shanghai Bell | Torsten Wildschek | 68154 | discussion | Decision | | | 43 | 6.2.3.3.2 | Evaluation results | 4880 | available |
| R1-1720489 | On Resource pool sharing between mode-3 and mode-4 | Nokia, Nokia Shanghai Bell | Torsten Wildschek | 68154 | discussion | Decision | | | 45 | 6.2.3.4 | Resource pool sharing between mode-3 and mode-4 users | 4890 | available |
| R1-1720490 | On Maximum time reduction between packet arrival at layer 1 and resource selection for transmission | Nokia, Nokia Shanghai Bell | Torsten Wildschek | 68154 | discussion | Decision | | | 46 | 6.2.3.5 | Maximum time reduction between packet arrival at layer 1 and resource selection for transmission | 4900 | available |
| R1-1720491 | Discussion on 1024QAM DL | Nokia, Nokia Shanghai Bell | Jari Lindholm | 68379 | discussion | Decision | | | 49 | 6.2.4.1 | Remaining details on support for 1024QAM for DL channels | 4910 | noted |
| R1-1720492 | Early HARQ for URLLC | Fraunhofer HHI | Baris Goktepe | 63782 | discussion | | | | 151 | 7.3.3.7 | Other | 4920 | available |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R1-1720493 | DMRS design aspects and results for pi/2 BPSK with PA model | IITH | Kiran Kuchi | 61547 | discussion | | | | 118 | 7.2.3.3 | Remaining details on DMRS | 4930 | available |
| R1-1720494 | Configuration of CORESET and search space design | Panasonic | Hidetoshi Suzuki | 21346 | discussion | Decision | | | 128 | 7.3.1.2 | Remaining details on Search space | 4940 | available |
| R1-1720495 | Remaining details on group-common PDCCH | Panasonic | Hidetoshi Suzuki | 21346 | discussion | Decision | | | 129 | 7.3.1.3 | Remaining details on group-common PDCCH | 4950 | available |
| R1-1720496 | Discussion on DCI formats | Panasonic | Hidetoshi Suzuki | 21346 | discussion | Decision | | | 130 | 7.3.1.4 | DCI contents and formats | 4960 | available |
| R1-1720497 | DL/UL resource allocation | Panasonic | Hidetoshi Suzuki | 21346 | discussion | Decision | | | 145 | 7.3.3.1 | DL/UL resource allocation | 4970 | available |
| R1-1720498 | HARQ-ACK codebook for CBG-based transmission | Panasonic | Hidetoshi Suzuki | 21346 | discussion | Decision | | | 146 | 7.3.3.2 | DL/UL scheduling and HARQ management | 4980 | available |
| R1-1720499 | CBG-based (re)transmission | Panasonic | Hidetoshi Suzuki | 21346 | discussion | Decision | | | 147 | 7.3.3.3 | CBG-based (re)transmission | 4990 | available |
| R1-1720500 | UL data transmission procedure | Panasonic | Hidetoshi Suzuki | 21346 | discussion | Decision | | | 148 | 7.3.3.4 | UL data transmission procedure | 5000 | available |
| R1-1720501 | Resource reservation for NR DL and UL | Panasonic | Hidetoshi Suzuki | 21346 | discussion | Decision | | | 155 | 7.3.5 | Remaining details on rate matching aspects for NR DL and UL | 5010 | available |
| R1-1720502 | Sequences for Long PUCCH for UCI up to 2 bits | IITH | Kiran Kuchi | 61547 | discussion | | | | 138 | 7.3.2.2.1 | Long-PUCCH for UCI of up to 2 bits | 5020 | available |
| R1-1720503 | Remaining design details of long-PUCCH for UCI more than 2-bits | IITH | Kiran Kuchi | 61547 | discussion | | | Late contribution | 139 | 7.3.2.2.2 | Long-PUCCH for UCI of more than 2 bits | 5030 | withdrawn |
| R1-1720504 | Remaining design details of long-PUCCH for UCI more than 2-bits | IITH | Kiran Kuchi | 61547 | discussion | | | Late contribution | 139 | 7.3.2.2.2 | Long-PUCCH for UCI of more than 2 bits | 5040 | withdrawn |
| R1-1720505 | Remaining Issues on Bandwidth Part Operation | PANASONIC | Quan Kuang | 64589 | discussion | Decision | | | 153 | 7.3.4.1 | Other aspects on bandwidth Parts | 5050 | available |
| R1-1720506 | Remaining details on PDCCH structure | Nokia, Nokia Shanghai Bell | Karol Schober | 68456 | other | Approval | | | 127 | 7.3.1.1 | Remaining details on PDCCH structure | 5060 | available |
| R1-1720507 | Remaining details on search space | Nokia, Nokia Shanghai Bell | Karol Schober | 68456 | other | Approval | | | 128 | 7.3.1.2 | Remaining details on Search space | 5070 | available |
| R1-1720508 | On the remaining aspects of group-common PDCCH in NR | Nokia, Nokia Shanghai Bell | Karol Schober | 68456 | other | Approval | | | 129 | 7.3.1.3 | Remaining details on group-common PDCCH | 5080 | available |
| R1-1720509 | On DCI formats in NR | Nokia, Nokia Shanghai Bell | Karol Schober | 68456 | other | Approval | | | 130 | 7.3.1.4 | DCI contents and formats | 5090 | available |
| R1-1720510 | On the usage of PDCCH DMRS as a complementary synchronization signal in DL | Nokia, Nokia Shanghai Bell | Karol Schober | 68456 | other | Approval | | | 131 | 7.3.1.5 | Other | 5100 | available |
| R1-1720511 | On remaining aspects of BWPs | Nokia, Nokia Shanghai Bell | Karol Schober | 68456 | other | Approval | | | 153 | 7.3.4.1 | Other aspects on bandwidth Parts | 5110 | available |
| R1-1720512 | On remaining aspects of NR CA/DC | Nokia, Nokia Shanghai Bell | Karol Schober | 68456 | other | Approval | | | 154 | 7.3.4.2 | Other aspects on carrier aggregation | 5120 | available |
| R1-1720513 | On rate-matching in NR | Nokia, Nokia Shanghai Bell | Karol Schober | 68456 | other | Approval | | | 155 | 7.3.5 | Remaining details on rate matching aspects for NR DL and UL | 5130 | available |
| R1-1720514 | Baseline Evaluation Results for Aerial Vehicles | Nokia, Nokia Shanghai Bell | Zhilan Xiong | 68162 | discussion | Decision | | | 75 | 6.2.7.1 | Baseline Evaluation Results | 5140 | revised |
| R1-1720515 | Downlink Interference Mitigation for Aerial Vehicles | Nokia, Nokia Shanghai Bell | Zhilan Xiong | 68162 | discussion | Decision | | | 76 | 6.2.7.2 | DL Interference Mitigation | 5150 | revised |
| R1-1720516 | Uplink Interference Mitigation for Aerial Vehicles | Nokia, Nokia Shanghai Bell | Zhilan Xiong | 68162 | discussion | Decision | | | 77 | 6.2.7.3 | UL Interference Mitigation | 5160 | noted |
| R1-1720517 | RSRP Statistics Results for Aerial Vehicles | Nokia, Nokia Shanghai Bell | Zhilan Xiong | 68162 | discussion | Decision | | | 78 | 6.2.7.4 | Interference Detection | 5170 | available |
| R1-1720518 | Field Measurement Results for Aerial Vehicles | Nokia, Nokia Shanghai Bell | Zhilan Xiong | 68162 | discussion | Decision | | | 80 | 6.2.7.6 | Field measurement results | 5180 | revised |
| R1-1720519 | NTN NR impacts Cyclic Prefix | Fraunhofer IIS | Thomas Heyn | 63127 | discussion | | | | 172 | 7.8 | Other | 5190 | available |
| R1-1720520 | NR-NTN: Analysis of the applicability of NR numerology to satellite communication | THALES | Olivier Peyrusse | 73869 | discussion | Discussion | This Tdoc is part of study item "sFS_NR_nonterr_nw". | | 172 | 7.8 | Other | 5200 | available |
| R1-1720521 | NTN NR Channel model – Link level evaluations | Fraunhofer IIS | Thomas Heyn | 63127 | discussion | | | | 172 | 7.8 | Other | 5210 | available |
| R1-1720522 | Configuration and UE capabilities for 1ms n+3 | Ericsson | Marten Sundberg | 37909 | discussion | Decision | | | 16 | 6.2.1.1 | Remaining details on shortened processing time for 1ms TTI | 5220 | available |
| R1-1720523 | Aspects related to the dynamic switching between 1ms TTI and sTTI | Ericsson | Marten Sundberg | 37909 | discussion | Decision | | | 18 | 6.2.1.2.1 | Remaining aspects related to interaction between different TTI lengths | 5230 | available |
| R1-1720524 | Remaining aspects of sPDCCH, search space and sDCI | Ericsson | Marten Sundberg | 37909 | discussion | Decision | | | 19 | 6.2.1.2.2 | Remaining details on DL control channel design | 5240 | available |
| R1-1720525 | Remaining aspects of UL control for sTTI | Ericsson | Marten Sundberg | 37909 | discussion | Decision | | | 20 | 6.2.1.2.3 | Remaining details on UL control channel design | 5250 | available |
| R1-1720526 | Remaining aspects of sPDSCH | Ericsson | Marten Sundberg | 37909 | discussion | Decision | | | 21 | 6.2.1.2.4 | Remaining details on DL data channel design | 5260 | available |
| R1-1720527 | Remaining aspects of sPUSCH | Ericsson | Marten Sundberg | 37909 | discussion | Decision | | | 22 | 6.2.1.2.5 | Remaining details on UL data channel design | 5270 | available |
| R1-1720528 | FS2 aspects of short TTI | Ericsson | Marten Sundberg | 37909 | discussion | Decision | | | 23 | 6.2.1.2.6 | Remaining details on FS2 aspects | 5280 | available |
| R1-1720529 | Multiplexing sPDCCH with sPDSCH/PDSCH | Ericsson | Marten Sundberg | 37909 | discussion | Decision | | | 24 | 6.2.1.2.7 | Other | 5290 | available |
| R1-1720530 | On CSI reporting for sTTI | Ericsson | Marten Sundberg | 37909 | discussion | Decision | | | 24 | 6.2.1.2.7 | Other | 5300 | available |
| R1-1720531 | UE capabilities for sTTI | Ericsson | Marten Sundberg | 37909 | discussion | Decision | | | 24 | 6.2.1.2.7 | Other | 5310 | available |
| R1-1720532 | SPS for sTTI | Ericsson | Marten Sundberg | 37909 | discussion | Decision | | | 24 | 6.2.1.2.7 | Other | 5320 | available |
| R1-1720533 | Evaluation scenarios for URLLC | Ericsson | Marten Sundberg | 37909 | discussion | Decision | | | 83 | 6.2.8.1 | Remaining details of evaluations scenarios | 5330 | revised |
| R1-1720534 | URLLC design for LTE | Ericsson | Marten Sundberg | 37909 | discussion | Decision | | | 84 | 6.2.8.2 | Candidate techniques enabling URLLC for LTE | 5340 | available |
| R1-1720535 | Evaluation of latency in LTE | Ericsson | Marten Sundberg | 37909 | discussion | Decision | | | 85 | 6.2.8.3 | Other | 5350 | available |
| R1-1720536 | Indoor evaluation scenario for URLLC | Ericsson | Marten Sundberg | 37909 | discussion | Decision | | | 85 | 6.2.8.3 | Other | 5360 | revised |
| R1-1720537 | Summary of email discussion [90b-LTE-24] on system level evaluation assumption and methodology for URLLC for LTE | Ericsson | Marten Sundberg | 37909 | discussion | Decision | | | 83 | 6.2.8.1 | Remaining details of evaluations scenarios | 5370 | noted |
| R1-1720538 | Number of HARQ processes for sTTI | Ericsson LM | Marten Sundberg | 37909 | discussion | Decision | | | 25 | 6.2.1.3 | Remaining details on maximum TA and processing time | 5380 | withdrawn |
| R1-1720539 | NR-NTN: Description of cell search and synchronization to support the Non-Terrestrial Network deployment scenarios | THALES | Olivier Peyrusse | 73869 | discussion | Information | This Tdoc is part of Study item on NR to support non terrestrial networks. It deals with synchronization aspects. | | 172 | 7.8 | Other | 5390 | available |
| R1-1720540 | Summary of 90b-LTE-20 email discussion on AUL HARQ design | Ericsson Japan K.K. | Reem Karaki | 72817 | discussion | Decision | | | 31 | 6.2.2.2.2 | HARQ for autonomous uplink access | 5400 | available |
| R1-1720541 | On the interest of more flexible resource allocation for efeMTC | Orange Spain | Jean Schwoerer | 43380 | discussion | Decision | | | 58 | 6.2.5.7 | Other | 5410 | revised |
| R1-1720542 | Preamble timing ambiguity during PDCCH order | Nokia, Nokia Shanghai Bell | Rapeepat Ratasuk | 70297 | discussion | Decision | | Release and work item code are missing. | 7 | 6.1.1 | Maintenance of E-UTRA Release 8 – 13 | 5450 | noted |
| R1-1720543 | UE uplink gap capability signaling description | Nokia, Nokia Shanghai Bell | Rapeepat Ratasuk | 70297 | discussion | Decision | | Release and work item code are missing. | 7 | 6.1.1 | Maintenance of E-UTRA Release 8 – 13 | 3842 | noted |
| R1-1720544 | NR-NTN: Channel model principles | THALES | Thibault Deleu | 64070 | other | Information | | | 172 | 7.8 | Other | 5440 | available |
| R1-1720545 | Correction on the SI-RNTI for MPDCCH | Intel Corporation | Seunghee Han | 47329 | draftCR | Decision | | Changed from approval to decision. The CR modifies a paragraph in v13.9.0 but the same paragraph is slighty different in the latest version of the specification. It should still be clear how to draft the shadow. | 7 | 6.1.1 | Maintenance of E-UTRA Release 8 – 13 | 0 | not pursued |
| R1-1720546 | UE Power Saving with BWP of Size Zero | Apple Europe Limited | Wei Zeng | 70918 | discussion | | | | 153 | 7.3.4.1 | Other aspects on bandwidth Parts | 5460 | available |
| R1-1720547 | Discussion on the support of downlink SPS in NR | InterDigital, Inc. | Aata El Hamss | 71288 | discussion | | | | 4 | 5 | Incoming Liaison Statements | 5470 | available |
| R1-1720548 | [Draft] LS response to RAN2 on SPS and Grant free | InterDigital, Inc. | Aata El Hamss | 71288 | discussion | Decision | | | 4 | 5 | Incoming Liaison Statements | 5480 | available |
| R1-1720549 | Overhead reduction techniques for NR paging based on beam sweeping | InterDigital, Inc. | Aata El Hamss | 71288 | discussion | | | | 93 | 7.1.3 | Remaining details on Paging design | 5490 | available |
| R1-1720550 | RACH configuration of Multiple Msg1 transmissions before the end of a monitored RAR window | InterDigital, Inc. | Aata El Hamss | 71288 | discussion | | | | 96 | 7.1.4.2 | Remaining details on RACH procedure | 5500 | available |
| R1-1720551 | PDCCH candidate determination | InterDigital, Inc. | Aata El Hamss | 71288 | discussion | | | | 128 | 7.3.1.2 | Remaining details on Search space | 5510 | withdrawn |

| TDoc | Title | Source | Contact | Contact ID | Type | For | Abstract | Secretary Remarks | Agenda item sort order | Agenda item | Agenda item description | TDoc sort order within agenda item | TDoc Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R1-1720552 | Considerations for ultra-reliable DCI transmission | InterDigital, Inc. | Aata El Hamss | 71288 | discussion | | | | 131 | 7.3.1.5 | Other | 5520 | available |
| R1-1720553 | Considerations for ultra-reliable UCI transmission | InterDigital, Inc. | Aata El Hamss | 71288 | discussion | | | | 143 | 7.3.2.5 | Other | 5530 | available |
| R1-1720554 | HARQ-ACK codebook with dynamic timing indication | InterDigital, Inc. | Aata El Hamss | 71288 | discussion | | | | 146 | 7.3.3.2 | DL/UL scheduling and HARQ management | 5540 | available |
| R1-1720555 | On the remaining details of CBG-based (re)transmission | InterDigital, Inc. | Aata El Hamss | 71288 | discussion | | | | 147 | 7.3.3.3 | CBG-based (re)transmission | 5550 | available |
| R1-1720556 | Details of BWP switching operation | InterDigital, Inc. | Aata El Hamss | 71288 | discussion | | | | 153 | 7.3.4.1 | Other aspects on bandwidth Parts | 5560 | available |
| R1-1720557 | Scell activation/deactivation in NR | InterDigital, Inc. | Aata El Hamss | 71288 | discussion | | | | 154 | 7.3.4.2 | Other aspects on carrier aggregation | 5570 | available |
| R1-1720558 | Aspects related to Supplementary Uplink | InterDigital, Inc. | Aata El Hamss | 71288 | discussion | | | | 166 | 7.5 | NR-LTE co-existence | 5580 | available |
| R1-1720559 | Power Control for NR CA | InterDigital, Inc. | Aata El Hamss | 71288 | discussion | | | | 169 | 7.6.2 | Remaining details on NR UL power control – CA aspects | 5590 | available |
| R1-1720560 | Power Control for NR DC | InterDigital, Inc. | Aata El Hamss | 71288 | discussion | | | | 170 | 7.6.3 | Other | 5600 | available |
| R1-1720561 | Number of HARQ processes for co-existence with TD-LTE | NEC | Takahiro Sasaki | 39454 | discussion | Decision | | | 146 | 7.3.3.2 | DL/UL scheduling and HARQ management | 5610 | available |
| R1-1720562 | Discussion on beam information indication for CA and DC | MTI | Chie Ming Chou | 64291 | discussion | | | | 154 | 7.3.4.2 | Other aspects on carrier aggregation | 5620 | available |
| R1-1720563 | On remaining details of SS/PBCH block | ITL | Donghyun Park | 58631 | discussion | | | | 88 | 7.1.1 | Remaining Details on Synchronization signal | 5630 | available |
| R1-1720564 | Support of new NPRACH power control mechanisms | SoftBank Corp. | Yosuke Akimoto | 59235 | discussion | Decision | | Changed from empty to subject for decision. | 12 | 6.1.6 | Maintenance of Release 14 Enhancements of NB-IoT for LTE | 97090 | noted |
| R1-1720565 | Avoiding the impact on MME | SoftBank Corp. | Yosuke Akimoto | 59235 | discussion | Discussion | | | 63 | 6.2.6.1.1.2 | Wake-up signal configurations and procedures | 5650 | available |
| R1-1720566 | Procedure for Reliable UL Transmission in URLLC | III | Chun-che Chien | 43585 | discussion | | | | 148 | 7.3.3.4 | UL data transmission procedure | 5660 | available |
| R1-1720567 | Remaining Issues for Beam Failure Recovery Procedure | ASUSTEK COMPUTER (SHANGHAI) | Alex Liou | 65894 | discussion | | | | 112 | 7.2.2.4 | Remaining details on mechanism to recover from beam failure | 5670 | available |
| R1-1720568 | LBT Considering Beamforming in Unlicensed Spectrum | ASUSTEK COMPUTER (SHANGHAI) | Alex Liou | 65894 | discussion | | | | 172 | 7.8 | Other | 5680 | available |
| R1-1720569 | Baseline evaluation results for LTE aerials | ZTE,Sanechips | Nan Zhang | 64596 | discussion | Decision | | | 75 | 6.2.7.1 | Baseline Evaluation Results | 5690 | available |
| R1-1720570 | Potential enhancements on UL interference mitigation based on power control | ZTE,Sanechips | Nan Zhang | 64596 | discussion | Decision | | | 77 | 6.2.7.3 | UL Interference Mitigation | 5700 | available |
| R1-1720571 | Evaluation on reliability for LTE aerials | ZTE,Sanechips | Nan Zhang | 64596 | discussion | Decision | | | 79 | 6.2.7.5 | Evaluation Results on Reliability | 5710 | available |
| R1-1720572 | Field measurement results for LTE aerials | ZTE,Sanechips, Tongji university | Nan Zhang | 64596 | discussion | Decision | | | 80 | 6.2.7.6 | Field measurement results | 5720 | available |
| R1-1720573 | Discussions on beam reporting | NEC | Wang Gang | 43643 | discussion | Decision | | | 111 | 7.2.2.3 | Remaining details on beam measurement and reporting | 5730 | available |
| R1-1720574 | On partial beam failure recovery | NEC | Wang Gang | 43643 | discussion | Decision | | | 112 | 7.2.2.4 | Remaining details on mechanism to recover from beam failure | 5740 | available |
| R1-1720575 | Remaining issues on DMRS configurations | NEC | Wang Gang | 43643 | discussion | Decision | | | 118 | 7.2.3.3 | Remaining details on DMRS | 5750 | available |
| R1-1720576 | Remaining issues on PTRS configurations | NEC | Wang Gang | 43643 | discussion | Decision | | | 119 | 7.2.3.4 | Remaining details on PT-RS | 5760 | available |
| R1-1720577 | Remaining issues on CBG-based (re)transmission | China Telecommunications | Jianchi Zhu | 58216 | discussion | | | | 147 | 7.3.3.3 | CBG-based (re)transmission | 5770 | available |
| R1-1720578 | Discussion on LBTof NR unlicensed band | NEC | Wang Gang | 43643 | discussion | Decision | This contribution mainly discusses on the listen before talk mechanism for coexistence of NR unlicensed band. | | 172 | 7.8 | Other | 5780 | available |
| R1-1720579 | Waveform and numerology consideration on NR unlicensed band | NEC | Wang Gang | 43643 | discussion | Decision | This contribution mainly discusses on the waveform and numerology consideration on NR unlicensed band. | | 172 | 7.8 | Other | 5790 | available |
| R1-1720580 | Remaining issues on UL transmission without grant | China Telecommunications | Jianchi Zhu | 58216 | discussion | | | | 148 | 7.3.3.4 | UL data transmission procedure | 5800 | available |
| R1-1720581 | Details on PRB grid offset indication | CMCC | Hui Tong | 58245 | other | Discussion | | | 90 | 7.1.2.1 | Remaining details on NR-PBCH | 5810 | available |
| R1-1720582 | Discussion on FDM based RMSI CORESET Design | CMCC | Hui Tong | 58245 | other | Discussion | | | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 5820 | available |
| R1-1720583 | Discussion on Paging Occasion Design for NR | CMCC | Hui Tong | 58245 | other | Discussion | | | 93 | 7.1.3 | Remaining details on Paging design | 5830 | available |
| R1-1720584 | Discussion on RACH configuration | CMCC | Hui Tong | 58245 | other | Discussion | | | 95 | 7.1.4.1 | Remaining details on PRACH formats | 5840 | available |
| R1-1720585 | Remaining details on measurement for mobility management | CMCC | Hui Tong | 58245 | other | Discussion | | | 98 | 7.1.5.1 | Remaining details on measurement for mobility management | 5850 | available |
| R1-1720586 | Discussion on remaining issues for beam management | CMCC | Hui Tong | 58245 | other | Discussion | | | 111 | 7.2.2.3 | Remaining details on beam measurement and reporting | 5860 | available |
| R1-1720587 | Discontinuous beam recovery mechanism | CMCC | Hui Tong | 58245 | other | Discussion | | | 112 | 7.2.2.4 | Remaining details on mechanism to recover from beam failure | 5870 | available |
| R1-1720588 | Discussion on multiplexing of different types of RSs | CMCC | Hui Tong | 58245 | other | Discussion | | | 116 | 7.2.3.1 | Remaining details on Multiplexing of different types of RSs | 5880 | available |
| R1-1720589 | Discussion on remaining issues on PT-RS | CMCC | Hui Tong | 58245 | other | Discussion | | | 119 | 7.2.3.4 | Remaining details on PT-RS | 5890 | available |
| R1-1720590 | DMRS Sequence Design for NR PDCCH | CMCC | Hui Tong | 58245 | other | Discussion | | | 127 | 7.3.1.1 | Remaining details on PDCCH structure | 5900 | available |
| R1-1720591 | Discussion on aggregation level 16 for NR PDCCH | CMCC | Hui Tong | 58245 | other | Discussion | | | 128 | 7.3.1.2 | Remaining details on Search space | 5910 | available |
| R1-1720592 | Discussion on remaining issues on Semi-static DL/UL assignment | CMCC | Hui Tong | 58245 | other | Discussion | | | 129 | 7.3.1.3 | Remaining details on group-common PDCCH | 5920 | available |
| R1-1720593 | Discussion on NR DCI format design | CMCC | Hui Tong | 58245 | other | Discussion | | | 130 | 7.3.1.4 | DCI contents and formats | 5930 | available |
| R1-1720594 | Discussion on HARQ-ACK feedback | CMCC | Hui Tong | 58245 | other | Discussion | | | 147 | 7.3.3.3 | CBG-based (re)transmission | 5940 | available |
| R1-1720595 | Discussion on NR UL power control | CMCC | Hui Tong | 58245 | other | Discussion | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 5950 | available |
| R1-1720596 | CR of TS36.213 for introduction of new UE behavior for special subframe configuration 10 | CMCC | Hui Tong | 58245 | draftCR | Decision | | Changed from other to draftCR as subject for decision. Specification number added. What is the Category of this CR? Cat B is difficult for Rel-14. Wrong CR-form v11.1, should v11.2. Work item code should be LTE_UL_CAP_enh-Core. | 13 | 6.1.7 | Other | 7670 | agreed |
| R1-1720597 | CR of TS36.211 for introduction of new UE behavior for special subframe configuration 10 | CMCC | Hui Tong | 58245 | draftCR | Decision | | Changed from other to draftCR as subject for decision. Specification number added. What is the Category of this CR? Cat B is difficult for Rel-14. Wrong CR-form v11.1, should v11.2. Work item code should be LTE_UL_CAP_enh-Core. | 13 | 6.1.7 | Other | 10550 | agreed |
| R1-1720598 | Discussion on remaining TDD specific sTTI issues | CMCC | Hui Tong | 58245 | discussion | Discussion | | Changed from other to discussion to align with the contribution. | 23 | 6.2.1.2.6 | Remaining details on FS2 aspects | 5980 | available |
| R1-1720599 | eV2X Phase III Channel Modeling | Cohere Technologies | Christian Ibars Casas | 66231 | discussion | Decision | | | 172 | 7.8 | Other | 5990 | available |
| R1-1720600 | Discussion on remaining details for RMSI delivery in PBCH | Xiaomi Technology | Yang Liu | 66714 | discussion | Decision | | | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 6000 | available |
| R1-1720601 | Optimization on the SSB Bitmap in Group indication in RMSI | Xiaomi Technology | Yang Liu | 66714 | discussion | Decision | | | 88 | 7.1.1 | Remaining Details on Synchronization signal | 6010 | available |
| R1-1720602 | Considerations on NR-based Access to Unlicensed Spectrum | Shenzhen Coolpad Technologies | Mingju Li | 60196 | discussion | | | | 172 | 7.8 | Other | 6020 | available |
| R1-1720603 | Resource multiplexing between PDCCH and PDSCH | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 131 | 7.3.1.5 | Other | 6030 | available |

| TDoc | Title | Source | Contact | Contact ID | Type | For | Abstract | Secretary Remarks | Agenda item sort order | Agenda item | Agenda item description | TDoc sort order within agenda item | TDoc Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R1-1720604 | Comparison of V2V channels at 60 GHz under LOS and non-LOS due to vehicle blockage | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 172 | 7.8 | Other | 6040 | available |
| R1-1720605 | Scenarios and requirements on integrated access and backhaul | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 172 | 7.8 | Other | 6050 | available |
| R1-1720606 | Consideration on IAB physical layer enhancement | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 172 | 7.8 | Other | 6060 | available |
| R1-1720607 | Discussion on NoMA study for Rel-15 SI | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 172 | 7.8 | Other | 6070 | available |
| R1-1720608 | Discussion on LLS evaluation for NoMA | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 172 | 7.8 | Other | 6080 | available |
| R1-1720609 | Remaining issues for sub-PRB allocation | Sharp | Toshizo Nogami | 60264 | discussion | Decision | | | 57 | 6.2.5.6 | Increased PUSCH spectral efficiency | 6090 | available |
| R1-1720610 | Discussion on NB-IoT TDD-UL | Sharp | Toshizo Nogami | 60264 | discussion | Decision | | | 71 | 6.2.6.3.2 | Uplink aspects | 6100 | available |
| R1-1720611 | Remaining issue on RACH preambles in NR | Sharp | Toshizo Nogami | 60264 | other | | | | 96 | 7.1.4.2 | Remaining details on RACH procedure | 6110 | available |
| R1-1720612 | Remaining issues on CSI reporting | Sharp, APT | Toshizo Nogami | 60264 | other | | | | 110 | 7.2.2.2 | Remaining details on CSI reporting | 6120 | available |
| R1-1720613 | Discussion on mechanisms for beam failure recovery | Sharp | Toshizo Nogami | 60264 | other | | | | 112 | 7.2.2.4 | Remaining details on mechanism to recover from beam failure | 6130 | available |
| R1-1720614 | Group common PDCCH for NR | Sharp | Toshizo Nogami | 60264 | other | | | | 129 | 7.3.1.3 | Remaining details on group-common PDCCH | 6140 | available |
| R1-1720615 | DMRS for NR long PUCCH for more than 2 bits | Sharp | Toshizo Nogami | 60264 | other | | | | 139 | 7.3.2.2.2 | Long-PUCCH for UCI of more than 2 bits | 6150 | available |
| R1-1720616 | NR long PUCCH over multiple slots | Sharp, APT | Toshizo Nogami | 60264 | other | | | | 140 | 7.3.2.2.3 | Support of long-PUCCH over multiple slots | 6160 | available |
| R1-1720617 | Discussion on CBG-based (re)transmission | Sharp, APT | Toshizo Nogami | 60264 | other | | | | 147 | 7.3.3.3 | CBG-based (re)transmission | 6170 | available |
| R1-1720618 | Transmission Repetition and Slot Aggregation | Sharp, APT | Toshizo Nogami | 60264 | other | | | | 148 | 7.3.3.4 | UL data transmission procedure | 6180 | available |
| R1-1720619 | Rate matching configuration/signaling for PDSCH/PUSCH | Sharp | Toshizo Nogami | 60264 | other | | | | 155 | 7.3.5 | Remaining details on rate matching aspects for NR DL and UL | 6190 | available |
| R1-1720620 | Considerations on Rel-15 NoMA SI | CMCC | Hui Tong | 58245 | other | Discussion | | | 172 | 7.8 | Other | 6200 | available |
| R1-1720621 | On Remaining Details of Synchronization Signal Designs | InterDigital, Inc. | Shahrokh Nayeb Nazar | 72080 | discussion | | | | 88 | 7.1.1 | Remaining Details on Synchronization signal | 6210 | available |
| R1-1720622 | Discussion on WUS Sequence Design | Samsung | Youngbum Kim | 39963 | discussion | Decision | | | 64 | 6.2.6.1.1.3 | Detailed design of wake-up signal | 6220 | available |
| R1-1720623 | On Remaining Details of System Information Delivery | InterDigital, Inc. | Shahrokh Nayeb Nazar | 72080 | discussion | | | | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 6230 | available |
| R1-1720624 | On Remaining Details of PRACH Formats and Designs | InterDigital, Inc. | Shahrokh Nayeb Nazar | 72080 | discussion | | | | 95 | 7.1.4.1 | Remaining details on PRACH formats | 6240 | available |
| R1-1720625 | TPMI for Codebook-based UL Transmission | InterDigital, Inc. | Shahrokh Nayeb Nazar | 72080 | discussion | | | | 104 | 7.2.1.2 | Remaining details on codebook based transmission for UL | 6250 | available |
| R1-1720626 | Details on PRG size determination | InterDigital, Inc. | Shahrokh Nayeb Nazar | 72080 | discussion | | | | 106 | 7.2.1.4 | Remaining details on PRB bundling for DL | 6260 | available |
| R1-1720627 | On PDSCH rate matching for NR | InterDigital, Inc. | Shahrokh Nayeb Nazar | 72080 | discussion | | | | 107 | 7.2.1.5 | Other | 6270 | available |
| R1-1720628 | Remaining issues on CSI reporting | InterDigital, Inc. | Shahrokh Nayeb Nazar | 72080 | discussion | | | | 110 | 7.2.2.2 | Remaining details on CSI reporting | 6280 | available |
| R1-1720629 | Remaining issues on CSI reporting | InterDigital, Inc. | Shahrokh Nayeb Nazar | 72080 | discussion | | | | 110 | 7.2.2.2 | Remaining details on CSI reporting | 6290 | withdrawn |
| R1-1720630 | Remaining issues on beam management | InterDigital, Inc. | Shahrokh Nayeb Nazar | 72080 | discussion | | | | 111 | 7.2.2.3 | Remaining details on beam measurement and reporting | 6300 | available |
| R1-1720631 | Remaining issues on beam recovery | InterDigital, Inc. | Shahrokh Nayeb Nazar | 72080 | discussion | | | | 112 | 7.2.2.4 | Remaining details on mechanism to recover from beam failure | 6310 | available |
| R1-1720632 | On ZP CSI-RS configuration for NR | Intel Corporation | Seunghee Han | 47329 | discussion | Decision | | | 155 | 7.3.5 | Remaining details on rate matching aspects for NR DL and UL | 6320 | available |
| R1-1720633 | Remaining issues on DM-RS | InterDigital, Inc. | Shahrokh Nayeb Nazar | 72080 | discussion | | | | 118 | 7.2.3.3 | Remaining details on DMRS | 6330 | available |
| R1-1720634 | Remaining issues on PTRS | InterDigital, Inc. | Shahrokh Nayeb Nazar | 72080 | discussion | | | | 119 | 7.2.3.4 | Remaining details on PT-RS | 6340 | available |
| R1-1720635 | Design of UL DMRS sequence for data transmission | Huawei, HiSilicon | Xiao Weimin | 56706 | other | | | | 123 | 7.2.3.8 | Other | 6350 | available |
| R1-1720636 | On frequency-first REG bundling for multi-symbol CORESETs | InterDigital, Inc. | Shahrokh Nayeb Nazar | 72080 | discussion | | | | 127 | 7.3.1.1 | Remaining details on PDCCH structure | 6360 | available |
| R1-1720637 | On configuration of GC-PDCCH for dynamic SFI | InterDigital, Inc. | Shahrokh Nayeb Nazar | 72080 | discussion | | | | 129 | 7.3.1.3 | Remaining details on group-common PDCCH | 6370 | available |
| R1-1720638 | On HARQ-ACK and SR multiplexing on Short-PUCCH | InterDigital, Inc. | Shahrokh Nayeb Nazar | 72080 | discussion | | | | 134 | 7.3.2.1.1 | Short-PUCCH for UCI of up to 2 bits | 6380 | available |
| R1-1720639 | On pi/2 BPSK modulation for long PUCCH | InterDigital, Inc. | Shahrokh Nayeb Nazar | 72080 | discussion | | | | 139 | 7.3.2.2.2 | Long-PUCCH for UCI of more than 2 bits | 6390 | available |
| R1-1720640 | Remaining details of UL transmission without grant | InterDigital, Inc. | Shahrokh Nayeb Nazar | 72080 | discussion | | | | 148 | 7.3.3.4 | UL data transmission procedure | 6400 | available |
| R1-1720641 | On UL multiplexing of data with different transmission durations | InterDigital, Inc. | Shahrokh Nayeb Nazar | 72080 | discussion | | | | 150 | 7.3.3.6 | Multiplexing data with different transmission durations | 6410 | available |
| R1-1720642 | LDPC Base Graph Determination and Signaling | InterDigital, Inc. | Shahrokh Nayeb Nazar | 72080 | discussion | | | | 159 | 7.4.1.1 | Nominal code rate / BG determination | 6420 | noted |
| R1-1720643 | On TB Size Design | InterDigital, Inc. | Shahrokh Nayeb Nazar | 72080 | discussion | | | Late contribution | 160 | 7.4.1.2 | Other | 6430 | available |
| R1-1720644 | CRC Selection for UL Polar Code | InterDigital, Inc. | Shahrokh Nayeb Nazar | 72080 | discussion | | | | 162 | 7.4.2.1 | Uplink CRCs | 6440 | available |
| R1-1720645 | Ordering of PBCH Fields | InterDigital, Inc. | Shahrokh Nayeb Nazar | 72080 | discussion | | | | 164 | 7.4.2.3 | Order and mapping of PBCH fields | 6450 | available |
| R1-1720646 | Remaining issues on UL power control for NR | HTC Corporation | Ling-san Meng | 59466 | discussion | | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 6460 | available |
| R1-1720647 | Remaining details on synchronization signal design | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 88 | 7.1.1 | Remaining Details on Synchronization signal | 6470 | available |
| R1-1720648 | Remaining details on NR-PBCH | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 90 | 7.1.2.1 | Remaining details on NR-PBCH | 6480 | available |
| R1-1720649 | Remaining system information delivery consideration | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 6490 | available |
| R1-1720650 | Other system information delivery consideration | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 92 | 7.1.2.3 | Remaining details on other system information delivery | 6500 | available |
| R1-1720651 | Paging design consideration | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 93 | 7.1.3 | Remaining details on Paging design | 6510 | revised |
| R1-1720652 | Remaining details on PRACH formats | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 95 | 7.1.4.1 | Remaining details on PRACH formats | 6520 | available |
| R1-1720653 | Remaining details on RACH procedure | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 96 | 7.1.4.2 | Remaining details on RACH procedure | 6530 | available |
| R1-1720654 | Remaining details on measurement for mobility management | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 98 | 7.1.5.1 | Remaining details on measurement for mobility management | 6540 | available |
| R1-1720655 | Radio link monitoring consideration | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 99 | 7.1.5.2 | Remaining details Radio link monitoring for mobility management | 6550 | available |
| R1-1720656 | Remaining issues on CW-to-layer mapping | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 103 | 7.2.1.1 | Remaining details on codeword mapping | 6560 | available |
| R1-1720657 | Remaining details on codebook based UL transmission | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 104 | 7.2.1.2 | Remaining details on codebook based transmission for UL | 6570 | available |
| R1-1720658 | Remaining details on non-codebook based UL transmission | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 105 | 7.2.1.3 | Remaining details on non-codebook based transmission for UL | 6580 | available |
| R1-1720659 | Discussion on PRB bundling for DL | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 106 | 7.2.1.4 | Remaining details on PRB bundling for DL | 6590 | available |
| R1-1720660 | Remaining details on CSI measurement | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 109 | 7.2.2.1 | Remaining details on CSI measurement | 6600 | available |
| R1-1720661 | Remaining details on CSI reporting | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 110 | 7.2.2.2 | Remaining details on CSI reporting | 6610 | available |
| R1-1720662 | Beam management for NR | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 111 | 7.2.2.3 | Remaining details on beam measurement and reporting | 6620 | revised |
| R1-1720663 | Beam recovery procedures | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 112 | 7.2.2.4 | Remaining details on mechanism to recover from beam failure | 6630 | available |
| R1-1720664 | Remaining details on MCS | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | Late contribution | 113 | 7.2.2.5 | Remaining details on CQI and MCS | 6640 | available |
| R1-1720665 | Remaining details on CSI framework | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 114 | 7.2.2.6 | Other | 6650 | available |
| R1-1720666 | On multiplexing of different types of RSs | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 116 | 7.2.3.1 | Remaining details on Multiplexing of different types of RSs | 6660 | available |
| R1-1720667 | Remaining details on CSI-RS | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 117 | 7.2.3.2 | Remaining details on CSI-RS | 6670 | available |
| R1-1720668 | Remaining details on DMRS | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 118 | 7.2.3.3 | Remaining details on DMRS | 6680 | revised |
| R1-1720669 | PTRS considerations | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 119 | 7.2.3.4 | Remaining details on PT-RS | 6690 | available |
| R1-1720670 | Remaining details on SRS | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 120 | 7.2.3.5 | Remaining details on SRS | 6700 | available |

| TDoc | Title | Source | Contact | Contact ID | Type | For | Abstract | Secretary Remarks | Agenda item sort order | Agenda item | Agenda item description | TDoc sort order within agenda item | TDoc Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R1-1720671 | Remaining issues on TRS | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 121 | 7.2.3.6 | Remaining details on TRS | 6710 | available |
| R1-1720672 | Remaining details on QCL | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 122 | 7.2.3.7 | Remaining details on QCL | 6720 | available |
| R1-1720673 | Evaluation of DMRS design | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 123 | 7.2.3.8 | Other | 6730 | available |
| R1-1720674 | Summary of email discussion [90b-NR-20] on the DMRS of 2-4-7-symbol for non-slot based scheduling | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 123 | 7.2.3.8 | Other | 6740 | available |
| R1-1720675 | Remaining issues on PDCCH structure | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 127 | 7.3.1.1 | Remaining details on PDCCH structure | 6750 | revised |
| R1-1720676 | Remaining issues on control resource set and search space | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 128 | 7.3.1.2 | Remaining details on Search space | 6760 | available |
| R1-1720677 | Remaining issues on slot format indication | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 129 | 7.3.1.3 | Remaining details on group-common PDCCH | 6770 | available |
| R1-1720678 | Discussion on DCI related issues | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 130 | 7.3.1.4 | DCI contents and formats | 6780 | available |
| R1-1720679 | Channelization of 1-symbol short PUCCH with 1 or 2 bits payload | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 134 | 7.3.2.1.1 | Short-PUCCH for UCI of up to 2 bits | 6790 | available |
| R1-1720680 | Channelization of 1-symbol short PUCCH with more than 2 bits payload | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 135 | 7.3.2.1.2 | Short-PUCCH for UCI of more than 2 bits | 6800 | available |
| R1-1720681 | Channelization of 2-symbol short PUCCH | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 136 | 7.3.2.1.3 | Support of short-PUCCH over 2 OFDM symbols | 6810 | available |
| R1-1720682 | Long PUCCH design with 1 or 2 bits UCI payload | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 138 | 7.3.2.2.1 | Long-PUCCH for UCI of up to 2 bits | 6820 | available |
| R1-1720683 | Long PUCCH design with more than 2 bits UCI payload | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 139 | 7.3.2.2.2 | Long-PUCCH for UCI of more than 2 bits | 6830 | revised |
| R1-1720684 | Long PUCCH over multiple slots | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 140 | 7.3.2.2.3 | Support of long-PUCCH over multiple slots | 6840 | available |
| R1-1720685 | Multiplexing of PUCCH and PUSCH | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 141 | 7.3.2.3 | UCI multiplexing | 6850 | revised |
| R1-1720686 | Resource allocation for PUCCH | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 142 | 7.3.2.4 | Resource allocation for PUCCH | 6860 | available |
| R1-1720687 | DL-UL resource allocation | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 145 | 7.3.3.1 | DL/UL resource allocation | 6870 | available |
| R1-1720688 | DL-UL Scheduling, Processing Time and HARQ management | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 146 | 7.3.3.2 | DL/UL scheduling and HARQ management | 6880 | available |
| R1-1720689 | On remaining issues in CBG-based (re)-transmission | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 147 | 7.3.3.3 | CBG-based (re)transmission | 6890 | available |
| R1-1720690 | UL data transmission procedures | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 148 | 7.3.3.4 | UL data transmission procedure | 6900 | available |
| R1-1720691 | Soft-buffer management | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 149 | 7.3.3.5 | Soft-buffer management for NR | 6910 | available |
| R1-1720692 | URLLC DL pre-emption and UL suspension indication channel design | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 150 | 7.3.3.6 | Multiplexing data with different transmission durations | 6920 | available |
| R1-1720693 | Open issues on BWP | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 153 | 7.3.4.1 | Other aspects on bandwidth Parts | 6930 | available |
| R1-1720694 | Open issues on CA | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 154 | 7.3.4.2 | Other aspects on carrier aggregation | 6940 | available |
| R1-1720695 | Rate matching aspects for NR DL and UL | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 155 | 7.3.5 | Remaining details on rate matching aspects for NR DL and UL | 6950 | available |
| R1-1720696 | NR Features and Capabilities | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 172 | 7.8 | Other | 6960 | revised |
| R1-1720697 | The necessity of reliable SR design for GFGB UL URLLC transmission | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 156 | 7.3.6 | Other | 6970 | available |
| R1-1720698 | UL URLLC capacity based on URLLC and eMBB dynamic multiplexing | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 156 | 7.3.6 | Other | 6980 | available |
| R1-1720699 | TBS and Base-graph Determination | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 159 | 7.4.1.1 | Nominal code rate / BG determination | 6990 | noted |
| R1-1720700 | Remaining Details of LDPC Coding | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 160 | 7.4.1.2 | Other | 7000 | available |
| R1-1720701 | Considerations for short-length uplink control | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 162 | 7.4.2.1 | Uplink CRCs | 7010 | revised |
| R1-1720702 | UCI Segmentation | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 163 | 7.4.2.2 | Details of conditions for UCI segmentation | 7020 | available |
| R1-1720703 | PBCH Performance and Field Mapping | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 164 | 7.4.2.3 | Order and mapping of PBCH fields | 7030 | available |
| R1-1720704 | DCI CRC Initialization and Masking | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 165 | 7.4.2.4 | Other | 7040 | revised |
| R1-1720705 | NR LTE Coexistence Considerations | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | Late contribution | 166 | 7.5 | NR-LTE co-existence | 7050 | withdrawn |
| R1-1720706 | Remaining issues on power control for NR | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 7060 | available |
| R1-1720707 | Power control for NR CA | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 169 | 7.6.2 | Remaining details on NR UL power control – CA aspects | 7070 | available |
| R1-1720708 | FDD Design Considerations | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | Late contribution | 171 | 7.7 | Aspects related to FDD | 7080 | withdrawn |
| R1-1720709 | Advance Grant Indication for UE Power Saving | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 131 | 7.3.1.5 | Other | 7090 | available |
| R1-1720710 | Scheduling data in slots containing SS blocks in multi-beam scenario | Qualcomm Incorporated | Peter Gaal | 57198 | discussion | Decision | | | 151 | 7.3.3.7 | Other | 7100 | available |
| R1-1720711 | Considerations for UL Power Control Framework | InterDigital, Inc. | Shahrokh Nayeb Nazar | 72080 | discussion | | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 7110 | available |
| R1-1720712 | HARQ ACK multiplexing for NR | HTC Corporation | Ling-san Meng | 59466 | discussion | | | | 146 | 7.3.3.2 | DL/UL scheduling and HARQ management | 7120 | available |
| R1-1720713 | Remaining issues on CBG-based (re)transmission | HTC Corporation | Ling-san Meng | 59466 | discussion | | | | 147 | 7.3.3.3 | CBG-based (re)transmission | 7130 | available |
| R1-1720714 | UE Capability for Multi-antenna Transmission | Ericsson Inc. | Stephen Grant | 65572 | discussion | Decision | | | 172 | 7.8 | Other | 7140 | withdrawn |
| R1-1720715 | On Advanced CSI codebook subset restriction | Ericsson | Stephen Grant | 65572 | discussion | Decision | | Release and work item code are missing. | 10 | 6.1.4 | Maintenance of Release 14 Full-Dimension MIMO for LTE | 7640 | noted |
| R1-1720716 | Codebook based transmission with multiple SRI | Ericsson | Stephen Grant | 65572 | discussion | Decision | | | 107 | 7.2.1.5 | Other | 7160 | available |
| R1-1720717 | UL MIMO Signaling Details | Ericsson | Stephen Grant | 65572 | discussion | Decision | | | 107 | 7.2.1.5 | Other | 7170 | available |
| R1-1720718 | NR CSI Computation Capability | Ericsson | Stephen Grant | 65572 | discussion | Decision | | | 114 | 7.2.2.6 | Other | 7180 | available |
| R1-1720719 | Multi-cell beam recovery | Ericsson | Stephen Grant | 65572 | discussion | Decision | | | 114 | 7.2.2.6 | Other | 7190 | available |
| R1-1720720 | Beam management in C-DRX | Ericsson | Stephen Grant | 65572 | discussion | Decision | | | 114 | 7.2.2.6 | Other | 7200 | available |
| R1-1720721 | Performance of beam management without beam indication | Ericsson | Stephen Grant | 65572 | discussion | Decision | | | 114 | 7.2.2.6 | Other | 7210 | available |
| R1-1720722 | Beam management without beam indication | Ericsson | Stephen Grant | 65572 | discussion | Decision | | | 114 | 7.2.2.6 | Other | 7220 | revised |
| R1-1720723 | On CSI subband size | Ericsson | Stephen Grant | 65572 | discussion | Decision | | | 114 | 7.2.2.6 | Other | 7230 | available |
| R1-1720724 | Performance impact of inactive antenna ports | Ericsson | Stephen Grant | 65572 | discussion | Decision | | | 114 | 7.2.2.6 | Other | 7240 | available |
| R1-1720725 | Further evaluations on PTRS | Ericsson | Stephen Grant | 65572 | discussion | Decision | | | 123 | 7.2.3.8 | Other | 7250 | available |
| R1-1720726 | Sequence initialization for DMRS and CSI-RS | Ericsson | Stephen Grant | 65572 | discussion | Decision | | | 123 | 7.2.3.8 | Other | 7260 | revised |
| R1-1720727 | Further details on CSI-RS Design | Ericsson | Stephen Grant | 65572 | discussion | Decision | | | 123 | 7.2.3.8 | Other | 7270 | available |
| R1-1720728 | Further evaluations on DMRS | Ericsson | Stephen Grant | 65572 | discussion | Decision | | | 123 | 7.2.3.8 | Other | 7280 | available |
| R1-1720729 | CM evaluations of DMRS for pi/2-BPSK | Ericsson | Stephen Grant | 65572 | discussion | Decision | | | 123 | 7.2.3.8 | Other | 7290 | available |
| R1-1720730 | Remaining details of beam management | Ericsson | Stephen Grant | 65572 | discussion | Decision | | | 111 | 7.2.2.3 | Remaining details on beam measurement and reporting | 7300 | revised |
| R1-1720731 | Codebook based UL MIMO remaining details | Ericsson | Stephen Grant | 65572 | discussion | Decision | | | 104 | 7.2.1.2 | Remaining details on codebook based transmission for UL | 7310 | revised |
| R1-1720732 | On CW mapping and data scrambling | Ericsson | Stephen Grant | 65572 | discussion | Decision | | | 103 | 7.2.1.1 | Remaining details on codeword mapping | 7320 | available |
| R1-1720733 | On remaining details of CSI measurement | Ericsson | Stephen Grant | 65572 | discussion | Decision | | | 109 | 7.2.2.1 | Remaining details on CSI measurement | 7330 | available |
| R1-1720734 | On remaining details of CSI reporting | Ericsson | Stephen Grant | 65572 | discussion | Decision | | | 110 | 7.2.2.2 | Remaining details on CSI reporting | 7340 | available |
| R1-1720735 | Remaining details on CSI-RS design | Ericsson | Stephen Grant | 65572 | discussion | Decision | | | 117 | 7.2.3.2 | Remaining details on CSI-RS | 7350 | available |
| R1-1720736 | Remaining details on DMRS design | Ericsson | Stephen Grant | 65572 | discussion | Decision | | | 118 | 7.2.3.3 | Remaining details on DMRS | 7360 | available |
| R1-1720737 | Remaining details of beam recovery | Ericsson | Stephen Grant | 65572 | discussion | Decision | | | 112 | 7.2.2.4 | Remaining details on mechanism to recover from beam failure | 7370 | available |
| R1-1720738 | On multiplexing of RS types | Ericsson | Stephen Grant | 65572 | discussion | Decision | | | 116 | 7.2.3.1 | Remaining details on Multiplexing of different types of RSs | 7380 | available |

| TDoc | Title | Source | Contact | Contact ID | Type | For | Abstract | Secretary Remarks | Agenda item sort order | Agenda item | Agenda item description | TDoc sort order within agenda item | TDoc Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R1-1720739 | Non-Codebook based UL MIMO remaining details | Ericsson | Stephen Grant | 65572 | discussion | Decision | | | 105 | 7.2.1.3 | Remaining details on non-codebook based transmission for UL | 7390 | withdrawn |
| R1-1720740 | PRB bundling for DL | Ericsson | Stephen Grant | 65572 | discussion | Decision | | | 106 | 7.2.1.4 | Remaining details on PRB bundling for DL | 7400 | available |
| R1-1720741 | Remaining details on PTRS design | Ericsson | Stephen Grant | 65572 | discussion | Decision | | | 119 | 7.2.3.4 | Remaining details on PT-RS | 7410 | available |
| R1-1720742 | Remaining details on QCL | Ericsson | Stephen Grant | 65572 | discussion | Decision | | | 122 | 7.2.3.7 | Remaining details on QCL | 7420 | available |
| R1-1720743 | Signaling overhead analysis for CSI framework | Ericsson | Stephen Grant | 65572 | discussion | Decision | | | 114 | 7.2.2.6 | Other | 7430 | available |
| R1-1720744 | Remaining details on SRS design | Ericsson | Stephen Grant | 65572 | discussion | Decision | | | 120 | 7.2.3.5 | Remaining details on SRS | 7440 | revised |
| R1-1720745 | Remaining details on TRS | Ericsson | Stephen Grant | 65572 | discussion | Decision | | | 121 | 7.2.3.6 | Remaining details on TRS | 7450 | available |
| R1-1720746 | On semi-persistent CSI reporting on PUSCH | Ericsson | Stephen Grant | 65572 | discussion | Decision | | | 114 | 7.2.2.6 | Other | 7460 | available |
| R1-1720747 | Frequency parameterization for Type II CSI codebook | Ericsson | Stephen Grant | 65572 | discussion | Decision | | | 114 | 7.2.2.6 | Other | 7470 | available |
| R1-1720748 | Further Consideration on DCI Loading | Coherent Logix | Kevin Shelby | 67999 | discussion | Discussion | Examines the impact of DCI loading plays in determining suitable methods of blind decoding. | | 165 | 7.4.2.4 | Other | 7480 | revised |
| R1-1720749 | HARQ-ACK transmission for DL transmission in NR | CATR | Huiying Jiao | 42098 | other | Discussion | | | 146 | 7.3.3.2 | DL/UL scheduling and HARQ management | 7490 | available |
| R1-1720750 | UCI transmission on PUSCH in NR | CATR | Huiying Jiao | 42098 | other | Discussion | | | 141 | 7.3.2.3 | UCI multiplexing | 7500 | available |
| R1-1720751 | Discussion on the remaining details of SFI design | CATR | Huiying Jiao | 42098 | other | Discussion | | | 129 | 7.3.1.3 | Remaining details on group-common PDCCH | 7510 | available |
| R1-1720752 | Consideration on DM RS of PDCCH for MU MIMO | CATR | Huiying Jiao | 42098 | other | Discussion | | | 127 | 7.3.1.1 | Remaining details on PDCCH structure | 7520 | available |
| R1-1720753 | Consideration on long PUCCH for UCI of more than 2 bits | CATR | Huiying Jiao | 42098 | other | Discussion | | | 139 | 7.3.2.2.2 | Long-PUCCH for UCI of more than 2 bits | 7530 | available |
| R1-1720754 | Consideration on physical downlink control channel for URLLC | CATR | Huiying Jiao | 42098 | other | Discussion | | | 131 | 7.3.1.5 | Other | 7540 | available |
| R1-1720755 | SRS for SUL | Huawei, HiSilicon | Brian Classon | 45750 | other | | | | 123 | 7.2.3.8 | Other | 7550 | withdrawn |
| R1-1720756 | On nFAR for UL code construction | Huawei, HiSilicon | Carmela Cozzo | 55181 | discussion | | | | 162 | 7.4.2.1 | Uplink CRCs | 7560 | available |
| R1-1720757 | On UCI segmentation | Huawei, HiSilicon | Carmela Cozzo | 55181 | discussion | | | | 163 | 7.4.2.2 | Details of conditions for UCI segmentation | 7570 | available |
| R1-1720758 | Order of PBCH fields | Huawei, HiSilicon | Carmela Cozzo | 55181 | discussion | | | | 164 | 7.4.2.3 | Order and mapping of PBCH fields | 7580 | available |
| R1-1720759 | Channel coding for URLLC | Huawei, HiSilicon | Carmela Cozzo | 55181 | discussion | | | | 165 | 7.4.2.4 | Other | 7590 | available |
| R1-1720760 | Base graph determination | Huawei, HiSilicon | Carmela Cozzo | 55181 | discussion | | | | 159 | 7.4.1.1 | Nominal code rate / BG determination | 7600 | noted |
| R1-1720761 | On BG2 segmentation | Huawei, HiSilicon | Carmela Cozzo | 55181 | discussion | | | | 160 | 7.4.1.2 | Other | 7610 | available |
| R1-1720762 | Discussion on MCS and TBS designs | Huawei, HiSilicon | Carmela Cozzo | 55181 | discussion | | | | 160 | 7.4.1.2 | Other | 7620 | revised |
| R1-1720763 | LDPC coded bits interleaving and mapping to modulation symbols for HARQ retransmissions | Huawei, HiSilicon | Carmela Cozzo | 55181 | discussion | | | | 160 | 7.4.1.2 | Other | 7630 | revised |
| R1-1720764 | Codebook Subset Restriction in advanced CSI | Huawei, HiSilicon | Brian Classon | 45750 | discussion | Decision | | Changed from other to discussion and decision. Release and work item code are missing. | 10 | 6.1.4 | Maintenance of Release 14 Full-Dimension MIMO for LTE | 98540 | noted |
| R1-1720765 | Remaining details on DMRS for NR | ITL | Sung Jun Yoon | 58632 | other | | | | 118 | 7.2.3.3 | Remaining details on DMRS | 7650 | available |
| R1-1720766 | Enhancement of SRS antenna switching in 36.213 | Huawei, HiSilicon | Brian Classon | 45750 | draftCR | Decision | | Changed from empty to subject for decision. Spelling errors on the cover page should be corrected; specificantion => specification, swtiching => switching. Wrong CR-form v11.1, should be v11.2. | 13 | 6.1.7 | Other | 95942 | postponed |
| R1-1720767 | On SRS antenna switching | Huawei, HiSilicon | Brian Classon | 45750 | discussion | Decision | | Changed from other to discussion and decision. Release and work item code are missing. | 13 | 6.1.7 | Other | 97100 | noted |
| R1-1720768 | Remaining details on uplink collision handling between different TTI lengths | ITRI | Hung-hsiang Wang | 46683 | discussion | Decision | | Changed to subject for decision to align with the contribution. | 18 | 6.2.1.2.1 | Remaining aspects related to interaction between different TTI lengths | 7680 | available |
| R1-1720769 | Remaining details on power headroom report for sTTI operation | ITRI | Hung-hsiang Wang | 46683 | discussion | Decision | | Changed to subject for decision to align with the contribution. | 22 | 6.2.1.2.5 | Remaining details on UL data channel design | 7690 | available |
| R1-1720770 | CSI reporting for sTTI operation | ITRI | Hung-hsiang Wang | 46683 | discussion | Decision | | Changed to subject for decision to align with the contribution. | 22 | 6.2.1.2.5 | Remaining details on UL data channel design | 7700 | available |
| R1-1720771 | Remaining details on RACH procedure | ITRI | Hung-hsiang Wang | 46683 | discussion | | | | 96 | 7.1.4.2 | Remaining details on RACH procedure | 7710 | available |
| R1-1720772 | Discussion on RE mapping for UCI multiplexing | Xiaomi Technology | Yajun Zhu | 71337 | discussion | | | | 141 | 7.3.2.3 | UCI multiplexing | 7720 | available |
| R1-1720773 | On the remaining issues of group common PDCCH | Xiaomi Technology | Yajun Zhu | 71337 | discussion | | | | 129 | 7.3.1.3 | Remaining details on group-common PDCCH | 7730 | available |
| R1-1720774 | UL restriction for High Power UE with dynamic TDD | SoftBank Corp. | Yosuke Akimoto | 59235 | discussion | | | | 129 | 7.3.1.3 | Remaining details on group-common PDCCH | 7740 | revised |
| R1-1720775 | On carrier aggregation using mode 4 resource selection | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 37 | 6.2.3.1.1 | Mode-4 support | 7750 | available |
| R1-1720776 | Discussion on synchronization for carrier aggregation | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 38 | 6.2.3.1.2 | Synchronization | 7760 | available |
| R1-1720777 | Transmission diversity solutions | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 42 | 6.2.3.3.1 | Transmit diversity solutions | 7770 | available |
| R1-1720778 | Evaluation results for transmission diversity schemes | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 43 | 6.2.3.3.2 | Evaluation results | 7780 | available |
| R1-1720779 | Resource pool sharing between UEs using mode 3 and UEs using mode 4 | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 45 | 6.2.3.4 | Resource pool sharing between mode-3 and mode-4 users | 7790 | noted |
| R1-1720780 | Reducing the maximum time between packet arrival and selected resource for data transmission | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 46 | 6.2.3.5 | Maximum time reduction between packet arrival at layer 1 and resource selection for transmission | 7800 | available |
| R1-1720781 | Views on UL HARQ-ACK feedback design | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 55 | 6.2.5.4 | Uplink HARQ-ACK feedback | 7810 | available |
| R1-1720782 | Views on SPS activation and deactivation mechanism | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 73 | 6.2.6.4 | Other | 7820 | available |
| R1-1720783 | On baseline evaluation results | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 75 | 6.2.7.1 | Baseline Evaluation Results | 7830 | revised |
| R1-1720784 | Views on issues and solutions in uplink | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 77 | 6.2.7.3 | UL Interference Mitigation | 7840 | available |
| R1-1720785 | Updated RSRP statistics for interference detection | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 78 | 6.2.7.4 | Interference Detection | 7850 | available |
| R1-1720786 | Field measurement results of aerial UE | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 80 | 6.2.7.6 | Field measurement results | 7860 | available |
| R1-1720787 | Updated work plan for Rel-15 NR WI | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | Work Plan | Information | | | 86 | 7 | NR - WID in RP-172115 | 7870 | available |
| R1-1720788 | Proposals on UE feature list | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Discussion | | | 86 | 7 | NR - WID in RP-172115 | 7880 | revised |
| R1-1720789 | Remaining details on Synchronization signal | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Discussion | | | 88 | 7.1.1 | Remaining Details on Synchronization signal | 7890 | available |
| R1-1720790 | Remaining details on NR-PBCH | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Discussion | | | 90 | 7.1.2.1 | Remaining details on NR-PBCH | 7900 | available |
| R1-1720791 | Remaining details on Remaining minimum system information delivery | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Discussion | | | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 7910 | available |
| R1-1720792 | Remaining details on other system information delivery | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Discussion | | | 92 | 7.1.2.3 | Remaining details on other system information delivery | 7920 | available |
| R1-1720793 | Remaining details on Paging design | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Discussion | | | 93 | 7.1.3 | Remaining details on Paging design | 7930 | available |
| R1-1720794 | Remaining details on PRACH formats | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Discussion | | | 95 | 7.1.4.1 | Remaining details on PRACH formats | 7940 | revised |
| R1-1720795 | Remaining details on RACH procedure | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Discussion | | | 96 | 7.1.4.2 | Remaining details on RACH procedure | 7950 | available |

| TDoc | Title | Source | Contact | Contact ID | Type | For | Abstract | Secretary Remarks | Agenda item sort order | Agenda item | Agenda item description | TDoc sort order within agenda item | TDoc Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R1-1720796 | Remaining details on measurement for mobility management | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Discussion | | | 98 | 7.1.5.1 | Remaining details on measurement for mobility management | 7960 | available |
| R1-1720797 | Remaining details on Radio link monitoring for mobility management | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Discussion | | | 99 | 7.1.5.2 | Remaining details Radio link monitoring for mobility management | 7970 | available |
| R1-1720798 | Remaining details on CW mapping | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 103 | 7.2.1.1 | Remaining details on codeword mapping | 7980 | available |
| R1-1720799 | Uplink codebook design | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 104 | 7.2.1.2 | Remaining details on codebook based transmission for UL | 7990 | available |
| R1-1720800 | Remaining details on non-codebook based transmission for uplink | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 105 | 7.2.1.3 | Remaining details on non-codebook based transmission for UL | 8000 | available |
| R1-1720801 | Views on CSI measurement for NR | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 109 | 7.2.2.1 | Remaining details on CSI measurement | 8010 | available |
| R1-1720802 | Remaining issues on CSI reporting | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 110 | 7.2.2.2 | Remaining details on CSI reporting | 8020 | available |
| R1-1720803 | Views on NR beam management | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 111 | 7.2.2.3 | Remaining details on beam measurement and reporting | 8030 | available |
| R1-1720804 | Remaining issues on beam recovery | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 112 | 7.2.2.4 | Remaining details on mechanism to recover from beam failure | 8040 | available |
| R1-1720805 | Performance investigation on beam reporting | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 114 | 7.2.2.6 | Other | 8050 | available |
| R1-1720806 | Remaining details on BM and CSI framework | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 114 | 7.2.2.6 | Other | 8060 | available |
| R1-1720807 | Remaining details on CSI-RS design | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 117 | 7.2.3.2 | Remaining details on CSI-RS | 8070 | available |
| R1-1720808 | Remaining details on DM-RS | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 118 | 7.2.3.3 | Remaining details on DMRS | 8080 | available |
| R1-1720809 | Remaining details on PT-RS | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 119 | 7.2.3.4 | Remaining details on PT-RS | 8090 | revised |
| R1-1720810 | Discussions on NR SRS Design | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 120 | 7.2.3.5 | Remaining details on SRS | 8100 | available |
| R1-1720811 | Remaining details on TRS | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 121 | 7.2.3.6 | Remaining details on TRS | 8110 | available |
| R1-1720812 | Remaining details on search space | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 128 | 7.3.1.2 | Remaining details on Search space | 8120 | available |
| R1-1720813 | Remaining details on group-common PDCCH | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 129 | 7.3.1.3 | Remaining details on group-common PDCCH | 8130 | available |
| R1-1720814 | DCI contents and formats | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 130 | 7.3.1.4 | DCI contents and formats | 8140 | available |
| R1-1720815 | Short-PUCCH for UCI of up to 2 bits | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 134 | 7.3.2.1.1 | Short-PUCCH for UCI of up to 2 bits | 8150 | available |
| R1-1720816 | Long-PUCCH for UCI of up to 2 bits | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 138 | 7.3.2.2.1 | Long-PUCCH for UCI of up to 2 bits | 8160 | available |
| R1-1720817 | Long-PUCCH for UCI of more than 2 bits | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 139 | 7.3.2.2.2 | Long-PUCCH for UCI of more than 2 bits | 8170 | available |
| R1-1720818 | Support of long-PUCCH over multiple slots | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 140 | 7.3.2.2.3 | Support of long-PUCCH over multiple slots | 8180 | available |
| R1-1720819 | UCI multiplexing | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 141 | 7.3.2.3 | UCI multiplexing | 8190 | available |
| R1-1720820 | Resource allocation for PUCCH | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 142 | 7.3.2.4 | Resource allocation for PUCCH | 8200 | available |
| R1-1720821 | DL/UL resource allocation | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 145 | 7.3.3.1 | DL/UL resource allocation | 8210 | available |
| R1-1720822 | DL/UL scheduling and HARQ management | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 146 | 7.3.3.2 | DL/UL scheduling and HARQ management | 8220 | available |
| R1-1720823 | CBG-based (re)transmission | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 147 | 7.3.3.3 | CBG-based (re)transmission | 8230 | available |
| R1-1720824 | UL data transmission procedure | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 148 | 7.3.3.4 | UL data transmission procedure | 8240 | available |
| R1-1720825 | Remaing issues on bandwidth parts for NR | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Discussion | | | 153 | 7.3.4.1 | Other aspects on bandwidth Parts | 8250 | available |
| R1-1720826 | Remaining issues on other aspect of carrier aggregation | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Discussion | | | 154 | 7.3.4.2 | Other aspects on carrier aggregation | 8260 | available |
| R1-1720827 | Uplink CRC and nFAR for Polar codes | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 162 | 7.4.2.1 | Uplink CRCs | 8270 | available |
| R1-1720828 | Segmentation of Polar codes for UCI | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 163 | 7.4.2.2 | Details of conditions for UCI segmentation | 8280 | available |
| R1-1720829 | Polar coding for CSI reporting | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 165 | 7.4.2.4 | Other | 8290 | available |
| R1-1720830 | Remaining details on NR power control | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | Late contribution | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 8300 | withdrawn |
| R1-1720831 | NR-NR CA power control | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 169 | 7.6.2 | Remaining details on NR UL power control – CA aspects | 8310 | available |
| R1-1720832 | Remaining details on LTE-NR power sharing | NTT DOCOMO, INC. | Kazuaki Takeda | 43136 | discussion | Decision | | | 170 | 7.6.3 | Other | 8320 | available |
| R1-1720833 | Beam management parameters | MediaTek Inc. | Tao Chen | 56050 | discussion | Decision | | | 114 | 7.2.2.6 | Other | 8330 | available |
| R1-1720834 | Correction to timing advance for BL/CE UEs | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | draftCR | Decision | | Changed from approval to decision. Wrong font (Times New Roman) on the cover page. | 7 | 6.1.1 | Maintenance of E-UTRA Release 8 – 13 | 3853 | revised |
| R1-1720835 | Correction to determination of number of PUCCH repetitions for BL/CE UE | Qualcomm Incorporated | Alberto Rico Alvarino | 63913 | draftCR | Decision | | Changed from approval to decision. Comments should be removed from the cover page. Wrong font (Times New Roman) on the cover page. | 7 | 6.1.1 | Maintenance of E-UTRA Release 8 – 13 | 3850 | postponed |
| R1-1720836 | Discussion on the RMSI delivery | OPPO | Zhi Zhang | 67059 | discussion | Decision | | | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 8360 | available |
| R1-1720837 | Discussion on the OSI delivery | OPPO | Zhi Zhang | 67059 | discussion | Decision | | | 92 | 7.1.2.3 | Remaining details on other system information delivery | 8370 | available |
| R1-1720838 | NB-IoT TDD UL PRACH for UL/DL configuration #2 | IITH | Kiran Kuchi | 61547 | discussion | Decision | | | 71 | 6.2.6.3.2 | Uplink aspects | 8380 | available |
| R1-1720839 | Summary of remaining issues on UL power control for A.I. 7.6 | ZTE, Sanechips | Ruyue Yu-Ngok Li | 43128 | discussion | | | | 167 | 7.6 | UL power control | 8390 | revised |
| R1-1720840 | Considerations for UCI for URLLC | III | Hai-Han Wang | 63209 | discussion | | | | 143 | 7.3.2.5 | Other | 8400 | available |
| R1-1720841 | Text Proposal for DL enhancements for drones | Huawei, HiSilicon | Matthew Webb | 45858 | discussion | Decision | | | 81 | 6.2.7.7 | Other | 8410 | noted |
| R1-1720842 | Text Proposal for UL enhancements for drones | Huawei, HiSilicon | Matthew Webb | 45858 | discussion | Decision | | | 81 | 6.2.7.7 | Other | 8420 | noted |
| R1-1720843 | Text Proposal for interference detection for drones | Huawei, HiSilicon | Matthew Webb | 45858 | discussion | Decision | | | 81 | 6.2.7.7 | Other | 8430 | available |
| R1-1720844 | Technology Components for Unlicensed Operation | Ericsson Japan K.K. | Reem Karaki | 72817 | discussion | | | | 172 | 7.8 | Other | 8440 | available |
| R1-1720845 | On Physical Layer Design Policies for Unlicensed Operation of NR | Ericsson Japan K.K. | Reem Karaki | 72817 | discussion | | | | 172 | 7.8 | Other | 8450 | available |
| R1-1720846 | On NR Operation in the 60 GHz Unlicensed Band | Ericsson Japan K.K. | Reem Karaki | 72817 | discussion | | | | 172 | 7.8 | Other | 8460 | available |
| R1-1720847 | On Channel Access Mechanisms for NR in Unlicensed Spectrum | Ericsson Japan K.K. | Reem Karaki | 72817 | discussion | | | | 172 | 7.8 | Other | 8470 | available |
| R1-1720848 | On Autonomous UL Transmissions for NR in Unlicensed Spectrum | Ericsson Japan K.K. | Reem Karaki | 72817 | discussion | | | | 172 | 7.8 | Other | 8480 | available |
| R1-1720849 | Discussion of Multi-Antenna and Highly Directional Beam-Forming for Operation in Unlicensed Spectrum | Ericsson Japan K.K. | Reem Karaki | 72817 | discussion | | | | 172 | 7.8 | Other | 8490 | available |
| R1-1720850 | TS 38.211 V1.1.3 | Ericsson | Stefan Parkvall | 28759 | draft TS | Decision | | | 86 | 7 | NR - WID in RP-172115 | 8500 | revised |
| R1-1720851 | On FDD in NR | Ericsson | Stefan Parkvall | 28759 | discussion | | | | 171 | 7.7 | Aspects related to FDD | 8510 | available |
| R1-1720852 | Summary of e-mail discussion on 90b-NR-25, DCI content | Ericsson | Stefan Parkvall | 28759 | discussion | Decision | | | 130 | 7.3.1.4 | DCI contents and formats | 8520 | revised |
| R1-1720853 | Remaining details on SS block transmissions | OPPO | Zhi Zhang | 67059 | discussion | Decision | | | 88 | 7.1.1 | Remaining Details on Synchronization signal | 8530 | available |
| R1-1720854 | Discussion on data scheduling | ASUSTEK COMPUTER (SHANGHAI) | Denny Huang | 65852 | discussion | | | | 145 | 7.3.3.1 | DL/UL resource allocation | 8540 | available |
| R1-1720855 | Discussion on GC PDCCH | ASUSTEK COMPUTER (SHANGHAI) | Denny Huang | 65852 | discussion | | | | 129 | 7.3.1.3 | Remaining details on group-common PDCCH | 8550 | available |
| R1-1720856 | Discussion on URLLC transmitted in same or different numerology resources | ASUSTEK COMPUTER (SHANGHAI) | Denny Huang | 65852 | discussion | | | | 151 | 7.3.3.7 | Other | 8560 | available |

| TDoc | Title | Source | Contact | Contact ID | Type | For | Abstract | Secretary Remarks | Agenda item sort order | Agenda item | Agenda item description | TDoc sort order within agenda item | TDoc Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R1-1720857 | Baseline evaluation results for RMa-AV | Ericsson | Siva Muruganathan | 59639 | discussion | Decision | | | 75 | 6.2.7.1 | Baseline Evaluation Results | 8570 | available |
| R1-1720858 | Further field measurement results for LTE connected aerials | Ericsson | Siva Muruganathan | 59639 | discussion | Decision | | | 80 | 6.2.7.6 | Field measurement results | 8580 | available |
| R1-1720859 | On DL interference mitigation | Ericsson | Siva Muruganathan | 59639 | discussion | Decision | | | 76 | 6.2.7.2 | DL Interference Mitigation | 8590 | available |
| R1-1720860 | On UL Interference Mitigation | Ericsson | Siva Muruganathan | 59639 | discussion | Decision | | | 77 | 6.2.7.3 | UL Interference Mitigation | 8600 | available |
| R1-1720861 | On RSRP statistics for aerial vehicles | Ericsson | Siva Muruganathan | 59639 | discussion | Decision | | | 78 | 6.2.7.4 | Interference Detection | 8610 | available |
| R1-1720862 | Reflection on performance of LTE networks serving C2 aerial traffic | Ericsson | Siva Muruganathan | 59639 | discussion | Decision | | | 79 | 6.2.7.5 | Evaluation Results on Reliability | 8620 | available |
| R1-1720863 | Remaining details on remaining minimum system information | FiberHome | Zhang Yuanyu | 62156 | discussion | | | Late contribution | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 8630 | available |
| R1-1720864 | Discussion on UE behaviour related to group-common PDCCH | FiberHome | Zhang Yuanyu | 62156 | discussion | | | Late contribution | 129 | 7.3.1.3 | Remaining details on group-common PDCCH | 8640 | available |
| R1-1720865 | Discussion uplink/downlink resource allocation in NR | FiberHome | Zhang Yuanyu | 62156 | discussion | | | Late contribution | 145 | 7.3.3.1 | DL/UL resource allocation | 8650 | available |
| R1-1720866 | Remaining details on CSI reporting | FiberHome | Zhang Yuanyu | 62156 | discussion | | | Late contribution | 110 | 7.2.2.2 | Remaining details on CSI reporting | 8660 | available |
| R1-1720867 | Nominal code rate and BG determination | Nokia, Nokia Shanghai Bell | Keeth Jayasinghe | 64118 | discussion | Decision | | | 159 | 7.4.1.1 | Nominal code rate / BG determination | 8670 | noted |
| R1-1720868 | Remaining details of TBS determination | Nokia, Nokia Shanghai Bell | Keeth Jayasinghe | 64118 | discussion | Decision | | | 160 | 7.4.1.2 | Other | 8680 | available |
| R1-1720869 | Segmentation for large UCI | Nokia, Nokia Shanghai Bell | Keeth Jayasinghe | 64118 | discussion | Decision | | | 163 | 7.4.2.2 | Details of conditions for UCI segmentation | 8690 | available |
| R1-1720870 | PBCH bit mapper | Nokia, Nokia Shanghai Bell | Keeth Jayasinghe | 64118 | discussion | Decision | | | 164 | 7.4.2.3 | Order and mapping of PBCH fields | 8700 | available |
| R1-1720871 | Discussion on DCI bit mapping | Nokia, Nokia Shanghai Bell | Keeth Jayasinghe | 64118 | discussion | Decision | | | 165 | 7.4.2.4 | Other | 8710 | available |
| R1-1720872 | Channel access for UL partial subframe on LAA Scell | WILUS Inc. | Minseok Noh | 62848 | discussion | Discussion | | | 28 | 6.2.2.1 | Multiple starting and ending positions in a subframe for UL | 8720 | available |
| R1-1720873 | Discussion on channel access for AUL transmission | WILUS Inc. | Minseok Noh | 62848 | discussion | Discussion | | | 32 | 6.2.2.2.3 | Channel access for autonomous UL access | 8730 | available |
| R1-1720874 | Remaining issues on group-common PDCCH for NR | WILUS Inc. | Minseok Noh | 62848 | discussion | Discussion | | | 129 | 7.3.1.3 | Remaining details on group-common PDCCH | 8740 | available |
| R1-1720875 | Remaining issues on Short PUCCH for UCI of up to 2 bits | WILUS Inc. | Minseok Noh | 62848 | discussion | Discussion | | | 134 | 7.3.2.1.1 | Short-PUCCH for UCI of up to 2 bits | 8750 | available |
| R1-1720876 | Discussion on HARQ-ACK multiplexing and bundling for NR | WILUS Inc. | Minseok Noh | 62848 | discussion | Discussion | | | 146 | 7.3.3.2 | DL/UL scheduling and HARQ management | 8760 | available |
| R1-1720877 | Remaining issues on pre-emption indication and UE behavior | WILUS Inc. | Minseok Noh | 62848 | discussion | Discussion | | | 150 | 7.3.3.6 | Multiplexing data with different transmission durations | 8770 | available |
| R1-1720878 | Discussion on L1 indication for dynamic resource sharing | WILUS Inc. | Minseok Noh | 62848 | discussion | Discussion | | | 155 | 7.3.5 | Remaining details on rate matching aspects for NR DL and UL | 8780 | available |
| R1-1720879 | Remaining details related to SS blocks | Nokia, Nokia Shanghai Bell | Jorma Kaikkonen | 70304 | discussion | Approval | | | 88 | 7.1.1 | Remaining Details on Synchronization signal | 8790 | revised |
| R1-1720880 | Remaining details on NR-PBCH | Nokia, Nokia Shanghai Bell | Jorma Kaikkonen | 70304 | discussion | Approval | | | 90 | 7.1.2.1 | Remaining details on NR-PBCH | 8800 | available |
| R1-1720881 | On Remaining System Information Delivery | Nokia, Nokia Shanghai Bell | Jorma Kaikkonen | 70304 | discussion | Approval | | | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 8810 | revised |
| R1-1720882 | On Other System Information Delivery | Nokia, Nokia Shanghai Bell | Jorma Kaikkonen | 70304 | discussion | Approval | | | 92 | 7.1.2.3 | Remaining details on other system information delivery | 8820 | available |
| R1-1720883 | Paging in NR | Nokia, Nokia Shanghai Bell | Jorma Kaikkonen | 70304 | discussion | Approval | | | 93 | 7.1.3 | Remaining details on Paging design | 8830 | available |
| R1-1720884 | Measurements for mobility management | Nokia, Nokia Shanghai Bell | Jorma Kaikkonen | 70304 | discussion | Approval | | | 98 | 7.1.5.1 | Remaining details on measurement for mobility management | 8840 | revised |
| R1-1720885 | Radio Link Monitoring in NR | Nokia, Nokia Shanghai Bell | Jorma Kaikkonen | 70304 | discussion | Approval | | | 99 | 7.1.5.2 | Remaining details Radio link monitoring for mobility management | 8850 | available |
| R1-1720886 | UL Codebook Based Transmission and Codebook Design | Nokia, Nokia Shanghai Bell | Mihai Enescu | 68296 | discussion | Decision | | | 104 | 7.2.1.2 | Remaining details on codebook based transmission for UL | 8860 | available |
| R1-1720887 | Non-codebook based UL-MIMO transmission | Nokia, Nokia Shanghai Bell | Mihai Enescu | 68296 | discussion | Decision | | | 105 | 7.2.1.3 | Remaining details on non-codebook based transmission for UL | 8870 | available |
| R1-1720888 | On remaining issues on PRB bundling | Nokia, Nokia Shanghai Bell | Mihai Enescu | 68296 | discussion | Decision | | | 106 | 7.2.1.4 | Remaining details on PRB bundling for DL | 8880 | available |
| R1-1720889 | Remaining details on CSI reporting | Nokia, Nokia Shanghai Bell | Mihai Enescu | 68296 | discussion | Decision | | | 110 | 7.2.2.2 | Remaining details on CSI reporting | 8890 | available |
| R1-1720890 | Beam Indication, Measurements and Reporting | Nokia, Nokia Shanghai Bell | Mihai Enescu | 68296 | discussion | Decision | | | 111 | 7.2.2.3 | Remaining details on beam measurement and reporting | 8900 | available |
| R1-1720891 | Beam Recovery in NR | Nokia, Nokia Shanghai Bell | Mihai Enescu | 68296 | discussion | Decision | | | 112 | 7.2.2.4 | Remaining details on mechanism to recover from beam failure | 8910 | available |
| R1-1720892 | Consideration on new MCS and CQI table for NR | Nokia, Nokia Shanghai Bell | Mihai Enescu | 68296 | discussion | Decision | | Late contribution | 113 | 7.2.2.5 | Remaining details on CQI and MCS | 8920 | withdrawn |
| R1-1720893 | On multiplexing of different RS types | Nokia, Nokia Shanghai Bell | Mihai Enescu | 68296 | discussion | Decision | | | 116 | 7.2.3.1 | Remaining details on Multiplexing of different types of RSs | 8930 | withdrawn |
| R1-1720894 | Remaining issues on CSI-RS design | Nokia, Nokia Shanghai Bell | Mihai Enescu | 68296 | discussion | Decision | | | 117 | 7.2.3.2 | Remaining details on CSI-RS | 8940 | available |
| R1-1720895 | On remaining issues of DM-RS for NR physical data channels | Nokia, Nokia Shanghai Bell | Mihai Enescu | 68296 | discussion | Decision | | | 118 | 7.2.3.3 | Remaining details on DMRS | 8950 | available |
| R1-1720896 | On remaining details of PT-RS design | Nokia, Nokia Shanghai Bell | Mihai Enescu | 68296 | discussion | Decision | | | 119 | 7.2.3.4 | Remaining details on PT-RS | 8960 | available |
| R1-1720897 | Remaining details on SRS design in NR | Nokia, Nokia Shanghai Bell | Mihai Enescu | 68296 | discussion | Decision | | | 120 | 7.2.3.5 | Remaining details on SRS | 8970 | available |
| R1-1720898 | Remaining details of TRS design | Nokia, Nokia Shanghai Bell | Mihai Enescu | 68296 | discussion | Decision | | | 121 | 7.2.3.6 | Remaining details on TRS | 8980 | revised |
| R1-1720899 | Remaining details on QCL | Nokia, Nokia Shanghai Bell | Mihai Enescu | 68296 | discussion | Decision | | | 122 | 7.2.3.7 | Remaining details on QCL | 8990 | available |
| R1-1720900 | Frequency hopping schemes for NR UL PUSCH | NEC | Yassin Awad | 37300 | discussion | Decision | | | 148 | 7.3.3.4 | UL data transmission procedure | 9000 | available |
| R1-1720901 | eMBMS for Non Standalone NR | Reliance Jio | Satish Nanjunda Swamy | 61788 | WID new | Decision | The NR specification work is progressing for the Non Standalone mode. It is anticipated that for the Non Standalone mode, the deployments will be for CPEs rather than mobility devices. 5G CPEs will primarily enable operators to address inhome connectivity | | 172 | 7.8 | Other | 9010 | available |
| R1-1720902 | New WID Proposal: 400Khz NB-IOT | Reliance Jio | Satish Nanjunda Swamy | 61788 | WID new | Discussion | The NB-IOT enhancement discussions are ongoing in RAN1. For some operators NB-IOT is the only deployment option due to the heavy load on the LTE eNBs. The option of deploying CAT-M1 for those applications that might need a slightly higher throughput would | | 13 | 6.1.7 | Other | 97101 | noted |
| R1-1720903 | Power control on SRS for beam management | ASUSTEK COMPUTER (SHANGHAI) | Mingche Li | 53966 | discussion | | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 9030 | available |
| R1-1720904 | Remaining details of pre-emption indication | Sequans Communications | GUANG LIU | 64119 | discussion | | | | 150 | 7.3.3.6 | Multiplexing data with different transmission durations | 9040 | available |
| R1-1720905 | Remaining details of short PUCCH for UCI up to 2 bits | Sequans Communications | GUANG LIU | 64119 | discussion | | | | 134 | 7.3.2.1.1 | Short-PUCCH for UCI of up to 2 bits | 9050 | available |
| R1-1720906 | Remaining details of the UL transmission without grant | Sequans Communications | GUANG LIU | 64119 | discussion | | | | 148 | 7.3.3.4 | UL data transmission procedure | 9060 | available |
| R1-1720907 | UCI on sPUSCH | Huawei, HiSilicon | Yan Cheng | 58585 | discussion | Decision | | | 24 | 6.2.1.2.7 | Other | 9070 | available |
| R1-1720908 | Discussion on sDCI2 | Huawei, HiSilicon | Yan Cheng | 58585 | discussion | Decision | | | 24 | 6.2.1.2.7 | Other | 9080 | available |
| R1-1720909 | Multi-sTTI scheduling | Huawei, HiSilicon | Yan Cheng | 58585 | discussion | Decision | | | 24 | 6.2.1.2.7 | Other | 9090 | available |
| R1-1720910 | Handling of list of MCS-TBS problematic cases | CATT | Teng Ma | 67340 | discussion | Decision | | Release and work item code are missing. | 9 | 6.1.3 | Maintenance of Release 14 V2V/V2X services based on LTE sidelink | 9870 | noted |

| TDoc | Title | Source | Contact | Contact ID | Type | For | Abstract | Secretary Remarks | Agenda item sort order | Agenda item | Agenda item description | TDoc sort order within agenda item | TDoc Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R1-1720911 | Enhancements for DL preemption | Sequans Communications | Efstathios Katranaras | 64062 | discussion | | In this contribution we provide our views on possible enhancements for preemption-based data multiplexing in DL. The need to address the issues arising with considered option for reference DL resource determination is discussed first. Then, we argue on ap | | 151 | 7.3.3.7 | Other | 9110 | available |
| R1-1720912 | DL interference mitigation for aerial vehicles | Sequans Communications | GUANG LIU | 64119 | discussion | Decision | | | 76 | 6.2.7.2 | DL Interference Mitigation | 9120 | available |
| R1-1720913 | UE-driven HARQ-ACK bundling for NR | Sequans Communications | Efstathios Katranaras | 64062 | discussion | | In this contribution, we discuss HARQ-ACK bundling and propose a revisited UE-driven approach for NR in order to provide adequate compression without high DL throughput loss. | | 146 | 7.3.3.2 | DL/UL scheduling and HARQ management | 9130 | available |
| R1-1720914 | Remaining details for AUL-UCI | Motorola Mobility Germany GmbH | Alexander Golitschek Edler Von Elbwart | 73673 | discussion | Decision | | | 31 | 6.2.2.2.2 | HARQ for autonomous uplink access | 9140 | available |
| R1-1720915 | Discussion on Power Offset for SUL | China Telecommunications | Sen Xu | 56667 | discussion | Agreement | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 9150 | available |
| R1-1720916 | Remaining details of sTTI DL control channel design | Motorola Mobility, Lenovo | Vijay Nangia | 34148 | discussion | Decision | | | 19 | 6.2.1.2.2 | Remaining details on DL control channel design | 9160 | available |
| R1-1720917 | CSI aspects of shortened TTI | Motorola Mobility, Lenovo | Vijay Nangia | 34148 | discussion | Decision | | | 24 | 6.2.1.2.7 | Other | 9170 | available |
| R1-1720918 | SPS for sTTI | Motorola Mobility, Lenovo | Vijay Nangia | 34148 | discussion | Decision | | | 24 | 6.2.1.2.7 | Other | 9180 | available |
| R1-1720919 | Remaining details of maximum TA and processing timeline for sTTI and sPT | Motorola Mobility, Lenovo | Vijay Nangia | 34148 | discussion | Decision | | | 25 | 6.2.1.3 | Remaining details on maximum TA and processing time | 9190 | available |
| R1-1720920 | Candidate techniques enabling URLLC for LTE | Motorola Mobility, Lenovo | Vijay Nangia | 34148 | discussion | Decision | | | 84 | 6.2.8.2 | Candidate techniques enabling URLLC for LTE | 9200 | available |
| R1-1720921 | NR paging design | Motorola Mobility, Lenovo | Vijay Nangia | 34148 | discussion | | | | 93 | 7.1.3 | Remaining details on Paging design | 9210 | available |
| R1-1720922 | Remaining details on RACH configuration | Motorola Mobility, Lenovo | Vijay Nangia | 34148 | discussion | | | | 96 | 7.1.4.2 | Remaining details on RACH procedure | 9220 | available |
| R1-1720923 | SS/PBCH block based measurement in wideband carrier | Motorola Mobility, Lenovo | Vijay Nangia | 34148 | discussion | | | | 98 | 7.1.5.1 | Remaining details on measurement for mobility management | 9230 | available |
| R1-1720924 | Discussion on higher rank Type II codebook and feedback overhead reduction | Motorola Mobility, Lenovo | Vijay Nangia | 34148 | discussion | | | | 114 | 7.2.2.6 | Other | 9240 | available |
| R1-1720925 | On group-common PDCCH | Motorola Mobility, Lenovo | Vijay Nangia | 34148 | discussion | | | | 129 | 7.3.1.3 | Remaining details on group-common PDCCH | 9250 | available |
| R1-1720926 | PUCCH resource allocation | Motorola Mobility, Lenovo | Vijay Nangia | 34148 | discussion | | | | 142 | 7.3.2.4 | Resource allocation for PUCCH | 9260 | available |
| R1-1720927 | Multiplexing of uplink channels with different transmission durations | Motorola Mobility, Lenovo | Vijay Nangia | 34148 | discussion | | | | 150 | 7.3.3.6 | Multiplexing data with different transmission durations | 9270 | available |
| R1-1720928 | On non-CA NR UL power control | Motorola Mobility, Lenovo | Vijay Nangia | 34148 | discussion | | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 9280 | available |
| R1-1720929 | On CA-related NR UL power control | Motorola Mobility, Lenovo | Vijay Nangia | 34148 | discussion | | | | 169 | 7.6.2 | Remaining details on NR UL power control – CA aspects | 9290 | available |
| R1-1720930 | Design Considerations for BWP in NR | Convida Wireless LLC | Qing Li | 65106 | discussion | | | | 153 | 7.3.4.1 | Other aspects on bandwidth Parts | 9300 | available |
| R1-1720931 | On URLLC reliability requirements | VODAFONE Group Plc | Razieh Razavi | 63862 | discussion | Decision | | | 172 | 7.8 | Other | 9310 | available |
| R1-1720932 | Multi-sTTI scheduling | Ericsson | Laetitia Falconetti | 63379 | discussion | Decision | | | 24 | 6.2.1.2.7 | Other | 9320 | available |
| R1-1720933 | RV selection fro AUL transmissions | Ericsson Japan K.K. | Reem Karaki | 72817 | discussion | Decision | | | 33 | 6.2.2.2.4 | Other | 9330 | available |
| R1-1720934 | Discussion on remaining details on UL control channel | KT Corp. | Kyu Jin Park | 58528 | discussion | Decision | | | 20 | 6.2.1.2.3 | Remaining details on UL control channel design | 9340 | available |
| R1-1720935 | Remaining details on synchronization signal | Ericsson | Asbjorn Grovlen | 45069 | discussion | Decision | | | 88 | 7.1.1 | Remaining Details on Synchronization signal | 9350 | available |
| R1-1720936 | Remaining details on NR-PBCH | Ericsson | Asbjorn Grovlen | 45069 | discussion | Decision | | | 90 | 7.1.2.1 | Remaining details on NR-PBCH | 9360 | available |
| R1-1720937 | Remaining details on Remaining minimum system information | Ericsson | Asbjorn Grovlen | 45069 | discussion | Decision | | | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 9370 | revised |
| R1-1720938 | Remaining details on other system information delivery | Ericsson | Asbjorn Grovlen | 45069 | discussion | Decision | | | 92 | 7.1.2.3 | Remaining details on other system information delivery | 9380 | available |
| R1-1720939 | Remaining details on Paging design | Ericsson | Asbjorn Grovlen | 45069 | discussion | Decision | | | 93 | 7.1.3 | Remaining details on Paging design | 9390 | available |
| R1-1720940 | Remaining details on NR-RACH formats and configurations | Ericsson | Asbjorn Grovlen | 45069 | discussion | Decision | | | 95 | 7.1.4.1 | Remaining details on PRACH formats | 9400 | available |
| R1-1720941 | Remaining details on RACH procedure | Ericsson | Asbjorn Grovlen | 45069 | discussion | Decision | | | 96 | 7.1.4.2 | Remaining details on RACH procedure | 9410 | available |
| R1-1720942 | Remaining details on measurement for mobility management | Ericsson | Asbjorn Grovlen | 45069 | discussion | Decision | | | 98 | 7.1.5.1 | Remaining details on measurement for mobility management | 9420 | available |
| R1-1720943 | Remaining details Radio link monitoring | Ericsson | Asbjorn Grovlen | 45069 | discussion | Decision | | | 99 | 7.1.5.2 | Remaining details Radio link monitoring for mobility management | 9430 | available |
| R1-1720944 | Synchronization using non-cell-defining signals | Ericsson | Asbjorn Grovlen | 45069 | discussion | Decision | | | 100 | 7.1.6 | Other | 9440 | available |
| R1-1720945 | Remaining details on NR-RACH capacity | Ericsson | Asbjorn Grovlen | 45069 | discussion | Decision | | | 100 | 7.1.6 | Other | 9450 | available |
| R1-1720946 | On intra-frequency frequency gaps | Ericsson | Asbjorn Grovlen | 45069 | discussion | Decision | | | 100 | 7.1.6 | Other | 9460 | available |
| R1-1720947 | Two different TA sizes for RAR and saving of a byte | Ericsson | Asbjorn Grovlen | 45069 | discussion | Decision | | | 100 | 7.1.6 | Other | 9470 | available |
| R1-1720948 | Analysis of CP latency on non-slot based scheduling of PDCCH for RAR | Ericsson | Asbjorn Grovlen | 45069 | discussion | Decision | | | 100 | 7.1.6 | Other | 9480 | available |
| R1-1720949 | Multiple Preamble Transmissions for contention-free random access | Ericsson | Asbjorn Grovlen | 45069 | discussion | Decision | | | 100 | 7.1.6 | Other | 9490 | available |
| R1-1720950 | On EN-DC STTD measurement capability | Ericsson | Asbjorn Grovlen | 45069 | discussion | Decision | | | 100 | 7.1.6 | Other | 9500 | available |
| R1-1720951 | Inter-RAT measurement capabilities in NR | Ericsson | Asbjorn Grovlen | 45069 | discussion | Decision | | | 100 | 7.1.6 | Other | 9510 | available |
| R1-1720952 | IMT-2020 self-evaluation: Mobility evaluations for NR | Ericsson | Asbjorn Grovlen | 45069 | discussion | Information | | | 172 | 7.8 | Other | 9520 | available |
| R1-1720953 | IMT-2020 self evaluation: On eMBB user experienced data rate | Ericsson | Asbjorn Grovlen | 45069 | discussion | Information | | | 172 | 7.8 | Other | 9530 | available |
| R1-1720954 | IMT-2020 self evaluation: Radio Network Energy Performance | Ericsson | Asbjorn Grovlen | 45069 | discussion | Information | | | 172 | 7.8 | Other | 9540 | available |
| R1-1720955 | IMT-2020 self evaluation: mMTC connection density for LTE-MTC and NB-IoT | Ericsson | Asbjorn Grovlen | 45069 | discussion | Information | | Late contribution | 172 | 7.8 | Other | 9550 | available |
| R1-1720956 | IMT-2020 self-evaluation calibration mMTC connection density for LTE-MTC and NB-IoT | Ericsson | Asbjorn Grovlen | 45069 | discussion | Information | | | 172 | 7.8 | Other | 9560 | available |
| R1-1720957 | IMT2020 self evaluation: On eMBB area traffic capacity | Ericsson | Asbjorn Grovlen | 45069 | discussion | Information | | | 172 | 7.8 | Other | 9570 | available |
| R1-1720958 | IMT-2020 self-evaluation: CP latency in NR | Ericsson | Asbjorn Grovlen | 45069 | discussion | Information | | | 172 | 7.8 | Other | 9580 | available |
| R1-1720959 | IMT-2020 self-evaluation: UP latency in NR | Ericsson | Asbjorn Grovlen | 45069 | discussion | Information | | | 172 | 7.8 | Other | 9590 | available |
| R1-1720960 | IMT-2020 self-evaluation: Reliability in NR | Ericsson | Asbjorn Grovlen | 45069 | discussion | Information | | | 172 | 7.8 | Other | 9600 | revised |
| R1-1720961 | IMT-2020 self-evaluation: Peak data rate and peak spectrum efficiency evaluations for NR | Ericsson | Asbjorn Grovlen | 45069 | discussion | Information | | | 172 | 7.8 | Other | 9610 | available |
| R1-1720962 | Introduction of reduced control plane latency | Ericsson | Asbjorn Grovlen | 45069 | draftCR | Decision | | Changed from Rel-14 to Rel-15, Category B added to align with the CR cover page. | 14 | 6.2 | LTE Release 15 | 9620 | available |
| R1-1720963 | Control Plane latency reduction | Ericsson | Asbjorn Grovlen | 45069 | discussion | Decision | | | 14 | 6.2 | LTE Release 15 | 9630 | available |
| R1-1720964 | Open issues on RRC parameters for Initial access and mobility | Ericsson | Asbjorn Grovlen | 45069 | discussion | Decision | | | 87 | 7.1 | Initial access and mobility | 9640 | available |
| R1-1720965 | On remaining details of DMRS design | KT Corp. | Kyu Jin Park | 58528 | discussion | Decision | | | 118 | 7.2.3.3 | Remaining details on DMRS | 9650 | available |
| R1-1720966 | On the CBG number and dynamic HARQ codebook | KT Corp. | Kyu Jin Park | 58528 | discussion | Decision | | | 147 | 7.3.3.3 | CBG-based (re)transmission | 9660 | available |

| TDoc | Title | Source | Contact | Contact ID | Type | For | Abstract | Secretary Remarks | Agenda item sort order | Agenda item | Agenda item description | TDoc sort order within agenda item | TDoc Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R1-1720967 | Remaining details on preemption indication | KT Corp. | Kyu Jin Park | 58528 | discussion | Decision | | | 150 | 7.3.3.6 | Multiplexing data with different transmission durations | 9670 | available |
| R1-1720968 | Considerations on NR CA for SUL | KT Corp. | Kyu Jin Park | 58528 | discussion | Decision | | | 154 | 7.3.4.2 | Other aspects on carrier aggregation | 9680 | available |
| R1-1720969 | Discussion on remaining details on UL control channel | KT Corp. | Kyu Jin Park | 58528 | discussion | Decision | | | 20 | 6.2.1.2.3 | Remaining details on UL control channel design | 9690 | withdrawn |
| R1-1720970 | On DCI triggering of aperiodic CSI reports on short PUCCH | Ericsson | Mark Harrison | 59252 | discussion | Decision | | | 130 | 7.3.1.4 | DCI contents and formats | 9700 | available |
| R1-1720971 | Antenna Selection UL Transmission | Ericsson | Mark Harrison | 59252 | discussion | Decision | | | 107 | 7.2.1.5 | Other | 9710 | available |
| R1-1720972 | Uplink Transmission on Non-homogeneous Arrays | Ericsson | Mark Harrison | 59252 | discussion | Decision | | | 107 | 7.2.1.5 | Other | 9720 | available |
| R1-1720973 | Details of CSI feedback for Transparent PDSCH TxD | Ericsson | Mark Harrison | 59252 | discussion | Decision | | | 114 | 7.2.2.6 | Other | 9730 | available |
| R1-1720974 | CSI feedback for multi-TRP | Ericsson | Mark Harrison | 59252 | discussion | Decision | | | 114 | 7.2.2.6 | Other | 9740 | available |
| R1-1720975 | On multi-panel codebook extension | Ericsson | Mark Harrison | 59252 | discussion | Decision | | | 114 | 7.2.2.6 | Other | 9750 | available |
| R1-1720976 | CQI tables for URLLC | Ericsson | Mark Harrison | 59252 | discussion | Decision | | | 114 | 7.2.2.6 | Other | 9760 | available |
| R1-1720977 | On MCS table for URLLC | Ericsson | Mark Harrison | 59252 | discussion | Decision | | | 114 | 7.2.2.6 | Other | 9770 | available |
| R1-1720978 | On size of the CSI request field in DCI | Ericsson | Mark Harrison | 59252 | discussion | Decision | | | 114 | 7.2.2.6 | Other | 9780 | available |
| R1-1720979 | TRS Frequency synchronization evaluations | Ericsson | Mark Harrison | 59252 | discussion | Decision | | | 123 | 7.2.3.8 | Other | 9790 | available |
| R1-1720980 | TRS Throughput evaluations | Ericsson | Mark Harrison | 59252 | discussion | Decision | | | 123 | 7.2.3.8 | Other | 9800 | available |
| R1-1720981 | TRS above-6 GHz evaluations | Ericsson | Mark Harrison | 59252 | discussion | Decision | | | 123 | 7.2.3.8 | Other | 9810 | available |
| R1-1720982 | On Frequency synchronization requirements | Ericsson | Mark Harrison | 59252 | discussion | Decision | | | 123 | 7.2.3.8 | Other | 9820 | available |
| R1-1720983 | On RS related rate matching for DL and UL | Ericsson | Mark Harrison | 59252 | discussion | Decision | | | 123 | 7.2.3.8 | Other | 9830 | available |
| R1-1720984 | Discussion on SRS frequency hopping in NR | Ericsson | Mark Harrison | 59252 | discussion | Decision | | | 123 | 7.2.3.8 | Other | 9840 | revised |
| R1-1720985 | On DMRS power boosting and power imbalance | Ericsson | Mark Harrison | 59252 | discussion | Decision | | | 123 | 7.2.3.8 | Other | 9850 | available |
| R1-1720986 | Introduction of FeCoMP into 36.212 | Huawei, HiSilicon | Brian Classon | 45750 | draftCR | Decision | | Changed to subject for decision. Comments should be removed from the alleged final version. | 14 | 6.2 | LTE Release 15 | 9860 | available |
| R1-1720987 | Summary of [90b-LTE-02] on the list of MCS-TBS problematic cases for Rel-14 V2X PSSCH decoding | Huawei, HiSilicon | Philippe Sartori | 47335 | discussion | Decision | | | 9 | 6.1.3 | Maintenance of Release 14 V2V/V2X services based on LTE sidelink | 9100 | noted |
| R1-1720988 | On multiplexing of CSI-RS and PDCCH | Ericsson | Mark Harrison | 59252 | discussion | Decision | | | 123 | 7.2.3.8 | Other | 9880 | available |
| R1-1720989 | Supporting of UL Grant-Free and SPS Configured Access | Fraunhofer IIS | Khaled Hassan | 64758 | discussion | Discussion | | | 148 | 7.3.3.4 | UL data transmission procedure | 9890 | available |
| R1-1720990 | Remaining details of max TA and processing time | Ericsson LM | Marten Sundberg | 37909 | discussion | Decision | | | 25 | 6.2.1.3 | Remaining details on maximum TA and processing time | 9900 | available |
| R1-1720991 | Time and Frequency Domain Resource Allocation with K Repetition | Fraunhofer IIS | Khaled Hassan | 64758 | discussion | Discussion | | | 148 | 7.3.3.4 | UL data transmission procedure | 9910 | available |
| R1-1720992 | On NR-PDCCH Structure | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 127 | 7.3.1.1 | Remaining details on PDCCH structure | 9920 | available |
| R1-1720993 | On Remaining Issues of Search Space and Blind Decoding | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 128 | 7.3.1.2 | Remaining details on Search space | 9930 | available |
| R1-1720994 | On Group-Common PDCCH | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 129 | 7.3.1.3 | Remaining details on group-common PDCCH | 9940 | available |
| R1-1720995 | On Compact DCI for URLLC | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 131 | 7.3.1.5 | Other | 9950 | available |
| R1-1720996 | On a Wake-up Signal for Active Mode UEs | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 131 | 7.3.1.5 | Other | 9960 | available |
| R1-1720997 | On PDCCH for Ultra-Reliable Transmission | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 131 | 7.3.1.5 | Other | 9970 | available |
| R1-1720998 | On the Performance Evaluation of PDCCH for Ultra-Reliable Transmission | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 131 | 7.3.1.5 | Other | 9980 | available |
| R1-1720999 | On the Design of 1-Symbol PUCCH for up to 2 bits | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 134 | 7.3.2.1.1 | Short-PUCCH for UCI of up to 2 bits | 9990 | available |
| R1-1721000 | On the Design of 1-Symnol PUCCH for more than 2 bits | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 135 | 7.3.2.1.2 | Short-PUCCH for UCI of more than 2 bits | 10000 | available |
| R1-1721001 | On the Design of 2-Symbols PUCCH | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 136 | 7.3.2.1.3 | Support of short-PUCCH over 2 OFDM symbols | 10010 | available |
| R1-1721002 | On the Design of Long PUCCH for up to 2 bits | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 138 | 7.3.2.2.1 | Long-PUCCH for UCI of up to 2 bits | 10020 | available |
| R1-1721003 | On the Design of Long PUCCH for more than 2 bits | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 139 | 7.3.2.2.2 | Long-PUCCH for UCI of more than 2 bits | 10030 | available |
| R1-1721004 | On Support of Long PUCCH Over Multiple Slots | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 140 | 7.3.2.2.3 | Support of long-PUCCH over multiple slots | 10040 | available |
| R1-1721005 | On UCI on PUSCH | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 141 | 7.3.2.3 | UCI multiplexing | 10050 | available |
| R1-1721006 | On PUCCH Resource Allocation | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 142 | 7.3.2.4 | Resource allocation for PUCCH | 10060 | available |
| R1-1721007 | On PUCCH Multiplexing from the Same or Different UEs | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 143 | 7.3.2.5 | Other | 10070 | available |
| R1-1721008 | On Simultaneous Transmission of PUCCH and PUSCH | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 143 | 7.3.2.5 | Other | 10080 | available |
| R1-1721009 | On Transmit Diversity for PUCCH | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 143 | 7.3.2.5 | Other | 10090 | available |
| R1-1721010 | On PUCCH for Ultra-Reliable Transmission | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 143 | 7.3.2.5 | Other | 10100 | available |
| R1-1721011 | On Performance of PUCCH Format 0 for URLLC Use Cases | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 143 | 7.3.2.5 | Other | 10110 | available |
| R1-1721012 | On Performance of PUCCH Format 2 for URLLC Use Cases | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 143 | 7.3.2.5 | Other | 10120 | available |
| R1-1721013 | On HARQ Management | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 146 | 7.3.3.2 | DL/UL scheduling and HARQ management | 10130 | available |
| R1-1721014 | Remaining issues for CBG based transmissions and retransmissions | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 147 | 7.3.3.3 | CBG-based (re)transmission | 10140 | available |
| R1-1721015 | On UL Data Trandmission Procedures | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 148 | 7.3.3.4 | UL data transmission procedure | 10150 | available |
| R1-1721016 | On Multiplexing Data with Different Transmission Durations | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 150 | 7.3.3.6 | Multiplexing data with different transmission durations | 10160 | available |
| R1-1721017 | On Polled Hybrid-ARQ Acknowledgement | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 151 | 7.3.3.7 | Other | 10170 | available |
| R1-1721018 | On Supporting High Reliability for Data Transmissions | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 151 | 7.3.3.7 | Other | 10180 | withdrawn |
| R1-1721019 | On Transmit Diversity for Ultra-high Reliability Use Cases | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 151 | 7.3.3.7 | Other | 10190 | available |
| R1-1721020 | On Frequency Hopping for Ultra-reliable Transmission | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 151 | 7.3.3.7 | Other | 10200 | available |
| R1-1721021 | On supporting reliable HARQ feedback for UL transmission without grant | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 151 | 7.3.3.7 | Other | 10210 | available |
| R1-1721022 | On Repetition in UL and DL | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 151 | 7.3.3.7 | Other | 10220 | available |
| R1-1721023 | On HARQ ID for UL transmission without grant | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 151 | 7.3.3.7 | Other | 10230 | available |
| R1-1721024 | On MCS table for URLLC | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 151 | 7.3.3.7 | Other | 10240 | withdrawn |
| R1-1721025 | On soft-buffer handling for DL pre-emption | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 151 | 7.3.3.7 | Other | 10250 | available |
| R1-1721026 | On URLLC downlink system level simulation results | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 151 | 7.3.3.7 | Other | 10260 | available |
| R1-1721027 | On Carrier aggregation related aspects | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 154 | 7.3.4.2 | Other aspects on carrier aggregation | 10270 | available |
| R1-1721028 | Remaining issues for NR power control framework | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 10280 | available |
| R1-1721029 | Power control for Carrier Aggregation | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 169 | 7.6.2 | Remaining details on NR UL power control – CA aspects | 10290 | available |
| R1-1721030 | Power headroom reporting | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 170 | 7.6.3 | Other | 10300 | available |
| R1-1721031 | Remaining issues of closed loop power control in NR | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 170 | 7.6.3 | Other | 10310 | available |
| R1-1721032 | Remaining issues of PUSCH power control | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 170 | 7.6.3 | Other | 10320 | available |
| R1-1721033 | Remaining issues of PUCCH power control | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 170 | 7.6.3 | Other | 10330 | available |

| TDoc | Title | Source | Contact | Contact ID | Type | For | Abstract | Secretary Remarks | Agenda item sort order | Agenda item | Agenda item description | TDoc sort order within agenda item | TDoc Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R1-1721034 | Remaining issues of SRS power control | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 170 | 7.6.3 | Other | 10340 | available |
| R1-1721035 | Impact of power class and P_cmax definition on power control procedures | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 4 | 5 | Incoming Liaison Statements | 10350 | available |
| R1-1721036 | URLLC for factory automation | Ericsson | Sorour Falahati | 58325 | discussion | Decision | | | 172 | 7.8 | Other | 10360 | available |
| R1-1721037 | Non-codebook based UL MIMO remaining details | Ericsson | Mark Harrison | 59252 | discussion | Decision | | | 105 | 7.2.1.3 | Remaining details on non-codebook based transmission for UL | 10370 | available |
| R1-1721038 | Remaining details on NR power control framework | Nokia, Nokia Shanghai Bell | Dan Park | 66404 | discussion | Decision | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 10380 | available |
| R1-1721039 | Summary of email discussion [90b-LTE-18] on partial UL subframes | Huawei, HiSilicon | Brian Classon | 45750 | discussion | Decision | | | 28 | 6.2.2.1 | Multiple starting and ending positions in a subframe for UL | 10390 | noted |
| R1-1721040 | Advance Grant Indication for UE Power Saving | Qualcomm | Peter Gaal | 57198 | discussion | Decision | | Late contribution | 131 | 7.3.1.5 | Other | 10400 | withdrawn |
| R1-1721041 | SR design for GF/GB UL URLLC transmission | Qualcomm | Peter Gaal | 57198 | discussion | Decision | | Late contribution | 143 | 7.3.2.5 | Other | 10410 | withdrawn |
| R1-1721042 | NPRACH design aspects for the support of TDD NB-IoT | CEWiT | Sree Charan Budama | 73705 | discussion | Discussion | | Late contribution | 71 | 6.2.6.3.2 | Uplink aspects | 10420 | available |
| R1-1721043 | Summary of email discussion [90b-LTE-25] on the link level evaluation assumptions for LTE URLLC | Huawei | Patrick Merias | 52292 | discussion | Decision | | | 82 | 6.2.8 | Ultra Reliable Low Latency Communication for LTE - WID in RP-171489 | 10430 | noted |
| R1-1721044 | Remaining details on PRACH formats | NTT DOCOMO, INC. | Patrick Merias | 52292 | discussion | Discussion | | | 95 | 7.1.4.1 | Remaining details on PRACH formats | 10440 | available |
| R1-1721045 | Remaining issues on GC-PDCCH | MediaTek Inc. | Patrick Merias | 52292 | discussion | | | | 129 | 7.3.1.3 | Remaining details on group-common PDCCH | 10450 | available |
| R1-1721046 | TS38.201 v1.1.0 NR; Physical layer general description | NTT DOCOMO | Patrick Merias | 52292 | draft TS | Endorsement | | | 86 | 7 | NR - WID in RP-172115 | 10460 | endorsed |
| R1-1721047 | TS38.202 v1.1.0 NR; Physical layer services provided by the physical layer | Qualcomm | Patrick Merias | 52292 | draft TS | Endorsement | | | 86 | 7 | NR - WID in RP-172115 | 10470 | endorsed |
| R1-1721048 | TS38.211 v1.2.0 NR; Physical channels and modulation | Ericsson | Patrick Merias | 52292 | draft TS | Endorsement | | | 86 | 7 | NR - WID in RP-172115 | 10480 | endorsed |
| R1-1721049 | TS38.212 v1.2.0 NR; Multiplexing and channel coding | Huawei | Patrick Merias | 52292 | draft TS | Endorsement | | | 86 | 7 | NR - WID in RP-172115 | 10490 | endorsed |
| R1-1721050 | TS38.213 v1.2.0 NR; Physical layer procedures for control | Samsung | Patrick Merias | 52292 | draft TS | Endorsement | | | 86 | 7 | NR - WID in RP-172115 | 10500 | endorsed |
| R1-1721051 | TS38.214 v1.2.0 NR; Physical layer procedures for data | Nokia | Patrick Merias | 52292 | draft TS | Endorsement | | | 86 | 7 | NR - WID in RP-172115 | 10510 | endorsed |
| R1-1721052 | TS38.215 v1.2.0 NR; Physical layer measurements | Intel Corporation (UK) Ltd | Patrick Merias | 52292 | draft TS | Endorsement | | | 86 | 7 | NR - WID in RP-172115 | 10520 | endorsed |
| R1-1721053 | UL restriction for High Power UE with dynamic TDD | SoftBank Corp., Sprint | Patrick Merias | 52292 | discussion | | | | 129 | 7.3.1.3 | Remaining details on group-common PDCCH | 10530 | available |
| R1-1721054 | NR PDCCH search space and number of BDs/CCEs per slot | ZTE, Sanechips | Patrick Merias | 52292 | discussion | Decision | | | 128 | 7.3.1.2 | Remaining details on Search space | 10540 | available |
| R1-1721055 | Performance of 256QAM | Intel Corporation | Patrick Merias | 52292 | discussion | Decision | | Late contribution. Changed as subject for decision. Release and work item code are missing. | 13 | 6.1.7 | Other | 7660 | noted |
| R1-1721056 | Further details on beam failure recovery | MediaTek Inc. | Patrick Merias | 52292 | discussion | | | | 112 | 7.2.2.4 | Remaining details on mechanism to recover from beam failure | 10560 | available |
| R1-1721057 | Field Measurement Results for Aerial Vehicles | Nokia, Nokia Shanghai Bell | Patrick Merias | 52292 | discussion | Decision | | | 80 | 6.2.7.6 | Field measurement results | 5181 | available |
| R1-1721058 | Clarification on 2 HARQ process applicability to UE-specific search space | Huawei, HiSilicon | Patrick Merias | 52292 | draftCR | Decision | | | 12 | 6.1.6 | Maintenance of Release 14 Enhancements of NB-IoT for LTE | 105800 | available |
| R1-1721059 | Clarification on 2 HARQ process applicability to UE-specific search space | Huawei, HiSilicon | Patrick Merias | 52292 | draftCR | Decision | | | 12 | 6.1.6 | Maintenance of Release 14 Enhancements of NB-IoT for LTE | 105900 | revised |
| R1-1721060 | Draft CR - Correction to EPDCCH case selection for special subframe configuration 10 | MediaTek Inc., Nokia, Nokia Shanghai Bell, Huawei, HiSilicon | Patrick Merias | 52292 | draftCR | Decision | | | 13 | 6.1.7 | Other | 95940 | revised |
| R1-1721061 | Introduction of FeCoMP into 36.212 | Huawei, HiSilicon | Patrick Merias | 52292 | CR | Agreement | Outcome of email discussion [90b-LTE-03-212] feCoMP 212 spec | | 14 | 6.2 | LTE Release 15 | 106100 | agreed |
| R1-1721062 | Evaluation scenarios for URLLC | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 83 | 6.2.8.1 | Remaining details of evaluations scenarios | 5331 | noted |
| R1-1721063 | Indoor evaluation scenario for URLLC | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 85 | 6.2.8.3 | Other | 5361 | noted |
| R1-1721064 | Draft CR - Correction to EPDCCH case selection for special subframe configuration 10 | MediaTek Inc., Nokia, Nokia Shanghai Bell, Huawei, HiSilicon, Ericsson | Patrick Merias | 52292 | draftCR | Decision | | | 13 | 6.1.7 | Other | 95941 | merged |
| R1-1721065 | Codebook Subset Restriction in advanced CSI | Huawei, HiSilicon | Patrick Merias | 52292 | discussion | Decision | | | 10 | 6.1.4 | Maintenance of Release 14 Full-Dimension MIMO for LTE | 7641 | noted |
| R1-1721066 | Clarification for DAI for eCA | Qualcomm Incorporated | Patrick Merias | 52292 | draftCR | Decision | | | 7 | 6.1.1 | Maintenance of E-UTRA Release 8 – 13 | 8340 | agreed |
| R1-1721067 | Summary of [90b-LTE-14]Email approval on remaining issues for 1 ms + FS2 (sTTI and 1 ms) + FS3 | Samsung | Patrick Merias | 52292 | discussion | Decision | | | 16 | 6.2.1.1 | Remaining details on shortened processing time for 1ms TTI | 2361 | available |
| R1-1721068 | Corrections on UCI multiplexing on PUSCH | ASUSTEK COMPUTER (SHANGHAI) | Patrick Merias | 52292 | discussion | Decision | | | 8 | 6.1.2 | Maintenance of Release 14 Enhanced Licensed-Assisted Access to Unlicensed Spectrum | 99621 | noted |
| R1-1721069 | Evaluation assumption and preliminary results for LTE URLLC | Huawei, HiSilicon | Patrick Merias | 52292 | discussion | Decision | | | 83 | 6.2.8.1 | Remaining details of evaluations scenarios | 95021 | available |
| R1-1721070 | Void | Void | Patrick Merias | 52292 | other | | | | 14 | 6.2 | LTE Release 15 | 107000 | withdrawn |
| R1-1721071 | Introduction of FeCoMP into 36.213 | Motorola Mobility, Lenovo | Patrick Merias | 52292 | CR | Agreement | | | 14 | 6.2 | LTE Release 15 | 107100 | revised |
| R1-1721072 | WF on CW Update for AUL in FeLAA | CableLabs, Broadcom, Comcast, HPE, Charter Communications, Brocade, Blackberry | Patrick Merias | 52292 | other | Discussion | | | 32 | 6.2.2.2.3 | Channel access for autonomous UL access | 107200 | available |
| R1-1721073 | WF on UE to eNB COT sharing in AUL in FeLAA | CableLabs, Broadcom, Comcast, HPE, Charter Communications, Brocade, Blackberry | Patrick Merias | 52292 | other | Discussion | | | 32 | 6.2.2.2.3 | Channel access for autonomous UL access | 107300 | available |
| R1-1721074 | WF on Multiple ending positions in a UL subframe in FeLAA | CableLabs, Broadcom, Comcast, HPE, Charter Communications, Brocade, Blackberry | Patrick Merias | 52292 | other | Discussion | | | 28 | 6.2.2.1 | Multiple starting and ending positions in a subframe for UL | 107400 | noted |
| R1-1721075 | WF on LBT for Mode 1 UL transmission in FeLAA | CableLabs, Broadcom, Comcast, HPE, Brocade, Charter Communications, Blackberry | Patrick Merias | 52292 | other | Discussion | | | 28 | 6.2.2.1 | Multiple starting and ending positions in a subframe for UL | 107500 | noted |
| R1-1721076 | WF to eNB to UE COT sharing in Autonomous UL in FeLAA | CableLabs, Broadcom, Comcast, HPE, Charter Communications, Brocade, Blackberry | Patrick Merias | 52292 | other | Discussion | | | 32 | 6.2.2.2.3 | Channel access for autonomous UL access | 107600 | available |
| R1-1721077 | Reduction of NB-IoT system information acquisition time | Huawei, HiSilicon, Neul | Patrick Merias | 52292 | discussion | Decision | | | 68 | 6.2.6.2.2 | System Information | 94841 | revised |
| R1-1721078 | Correction on scrambling sequence identity for 2+4 PRBs sets in MPDCCH | NEC, Qualcomm, Panasonic | Patrick Merias | 52292 | CR | Agreement | | | 7 | 6.1.1 | Maintenance of E-UTRA Release 8 – 13 | 3780 | agreed |
| R1-1721079 | Correction on scrambling sequence identity for 2+4 PRBs sets in MPDCCH | NEC, Qualcomm, Panasonic | Patrick Merias | 52292 | CR | Agreement | | | 7 | 6.1.1 | Maintenance of E-UTRA Release 8 – 13 | 3781 | agreed |
| R1-1721080 | Correction on the SI-RNTI for MPDCCH | Intel Corporation | Patrick Merias | 52292 | draftCR | Decision | | | 7 | 6.1.1 | Maintenance of E-UTRA Release 8 – 13 | 3840 | withdrawn |
| R1-1721081 | Correction on resource elements reserved for CRS for PBCH with repetition | NEC | Patrick Merias | 52292 | CR | Agreement | | Cat A CR in R1-1721082 CR0404 | 7 | 6.1.1 | Maintenance of E-UTRA Release 8 – 13 | 108700 | agreed |
| R1-1721082 | Correction on resource elements reserved for CRS for PBCH with repetition | NEC | Patrick Merias | 52292 | CR | Agreement | | | 7 | 6.1.1 | Maintenance of E-UTRA Release 8 – 13 | 108900 | agreed |
| R1-1721083 | Typo correction for table 16.5.1.2.1-1 | Qualcomm Incorporated | Patrick Merias | 52292 | CR | Agreement | | Cat A in R1-1721084 CR0997 | 7 | 6.1.1 | Maintenance of E-UTRA Release 8 – 13 | 5420 | agreed |

| TDoc | Title | Source | Contact | Contact ID | Type | For | Abstract | Secretary Remarks | Agenda item sort order | Agenda item | Agenda item description | TDoc sort order within agenda item | TDoc Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R1-1721084 | Typo correction for table 16.5.1.2.1-1 | Qualcomm Incorporated | Patrick Merias | 52292 | CR | Agreement | | | 7 | 6.1.1 | Maintenance of E-UTRA Release 8 – 13 | 5430 | agreed |
| R1-1721085 | Void | Void | Patrick Merias | 52292 | other | | | | 7 | 6.1.1 | Maintenance of E-UTRA Release 8 – 13 | 108500 | withdrawn |
| R1-1721086 | Clarification for DAI for eCA | Qualcomm Incorporated, Huawei, HiSilicon | Patrick Merias | 52292 | CR | Agreement | | Cat A in R1-1721087 CR0270 | 7 | 6.1.1 | Maintenance of E-UTRA Release 8 – 13 | 8350 | agreed |
| R1-1721087 | Clarification for DAI for eCA | Qualcomm Incorporated, Huawei, HiSilicon | Patrick Merias | 52292 | CR | Agreement | | | 7 | 6.1.1 | Maintenance of E-UTRA Release 8 – 13 | 107900 | agreed |
| R1-1721088 | Usage of PUCCH format 3 for with more than 5 CC | Qualcomm Incorporated, Nokia, NSB | Patrick Merias | 52292 | CR | Agreement | | Cat A in R1-1721089 CR0999 | 7 | 6.1.1 | Maintenance of E-UTRA Release 8 – 13 | 108300 | agreed |
| R1-1721089 | Usage of PUCCH format 3 for with more than 5 CC | Qualcomm Incorporated, Nokia, NSB | Patrick Merias | 52292 | CR | Agreement | | | 7 | 6.1.1 | Maintenance of E-UTRA Release 8 – 13 | 108400 | agreed |
| R1-1721090 | Correction on sidelink index field name in DCI format 5A for V2V in 36.213 | CATT | Patrick Merias | 52292 | CR | Agreement | | | 9 | 6.1.3 | Maintenance of Release 14 V2V/V2X services based on LTE sidelink | 2201 | agreed |
| R1-1721091 | Correction for modulation determination under larger TBS for random access response grant | Qualcomm Incorporated | Patrick Merias | 52292 | CR | Agreement | | | 11 | 6.1.5 | Maintenance of Release 14 Further Enhanced MTC for LTE | 97071 | agreed |
| R1-1721092 | Correction of section references for feMTC | Ericsson | Patrick Merias | 52292 | CR | Agreement | | | 11 | 6.1.5 | Maintenance of Release 14 Further Enhanced MTC for LTE | 3881 | agreed |
| R1-1721093 | Correction on higher layer parameter for eVoLTE | Huawei | Patrick Merias | 52292 | CR | Agreement | | | 13 | 6.1.7 | Other | 3891 | agreed |
| R1-1721094 | Correction of section reference for eVoLTE | Ericsson | Patrick Merias | 52292 | CR | Agreement | | | 13 | 6.1.7 | Other | 3910 | agreed |
| R1-1721095 | Correction for dropping rules in intra-band SRS carrier switching. | Qualcomm Incorporated | Patrick Merias | 52292 | CR | Agreement | | | 13 | 6.1.7 | Other | 5960 | agreed |
| R1-1721096 | Void | Void | Patrick Merias | 52292 | other | | | | 13 | 6.1.7 | Other | 109600 | withdrawn |
| R1-1721097 | Change request for UE behaviour under special subframe configuration 10 | CMCC | Patrick Merias | 52292 | CR | Agreement | | | 13 | 6.1.7 | Other | 9020 | agreed |
| R1-1721098 | Introduction of new UE behavior for special subframe configuration 10 | CMCC | Patrick Merias | 52292 | CR | Agreement | | | 13 | 6.1.7 | Other | 95070 | agreed |
| R1-1721099 | Introduction of feCoMP into 36.213 | Motorola Mobility, Lenovo | Patrick Merias | 52292 | CR | Agreement | | | 14 | 6.2 | LTE Release 15 | 107101 | agreed |
| R1-1721100 | Correction for PUSCH puncturing in SRS carrier switching | Qualcomm Incorporated | Patrick Merias | 52292 | draftCR | Decision | | | 13 | 6.1.7 | Other | 5961 | revised |
| R1-1721101 | WF on new triggering conditions for resource/carrier reselection on CA in mode 4 | CATT, OPPO | Patrick Merias | 52292 | discussion | Decision | | | 37 | 6.2.3.1.1 | Mode-4 support | 110100 | noted |
| R1-1721102 | WF on resource selection on carrier aggregation in mode 4 | CATT | Patrick Merias | 52292 | discussion | Decision | | | 37 | 6.2.3.1.1 | Mode-4 support | 110200 | noted |
| R1-1721103 | WF on Sub-PRB Modulated Symbols Mapping | Sony, Qualcomm, Samsung, Sierra Wireless | Patrick Merias | 52292 | discussion | Decision | | | 57 | 6.2.5.6 | Increased PUSCH spectral efficiency | 110300 | noted |
| R1-1721104 | WF on non-contiguous RX CA for V2X | LG Electronics, Qualcomm, Samsung, Nokia, Nokia Shanghai Bell | Patrick Merias | 52292 | other | Discussion | | | 37 | 6.2.3.1.1 | Mode-4 support | 110400 | noted |
| R1-1721105 | Correction on deriving number of available symbols for PUSCH | ASUSTeK | Patrick Merias | 52292 | draftCR | Decision | | | 8 | 6.1.2 | Maintenance of Release 14 Enhanced Licensed-Assisted Access to Unlicensed Spectrum | 110500 | agreed |
| R1-1721106 | Correction on number of SRS symbol for UCI multiplexing | ASUSTeK | Patrick Merias | 52292 | draftCR | Decision | | | 8 | 6.1.2 | Maintenance of Release 14 Enhanced Licensed-Assisted Access to Unlicensed Spectrum | 110600 | agreed |
| R1-1721107 | Correction on number of SRS symbol for UCI multiplexing | ASUSTeK | Patrick Merias | 52292 | draftCR | Decision | | | 8 | 6.1.2 | Maintenance of Release 14 Enhanced Licensed-Assisted Access to Unlicensed Spectrum | 110700 | agreed |
| R1-1721108 | Correction on number of SRS symbol for UCI multiplexing | ASUSTeK | Patrick Merias | 52292 | draftCR | Decision | | | 8 | 6.1.2 | Maintenance of Release 14 Enhanced Licensed-Assisted Access to Unlicensed Spectrum | 110800 | agreed |
| R1-1721109 | Text proposal for baseline evaluation results | Ericsson | Patrick Merias | 52292 | other | Discussion | | | 75 | 6.2.7.1 | Baseline Evaluation Results | 110900 | agreed |
| R1-1721110 | Text proposal for downlink interference mitigation | Ericsson | Patrick Merias | 52292 | other | Discussion | | | 76 | 6.2.7.2 | DL Interference Mitigation | 111000 | revised |
| R1-1721111 | Text proposal for uplink interference mitigation | Ericsson | Patrick Merias | 52292 | other | Discussion | | | 77 | 6.2.7.3 | UL Interference Mitigation | 111100 | revised |
| R1-1721112 | WF on scenario for radio resource pool sharing between UEs using mode 3 and UEs using mode 4 | NTT DOCOMO, LGE | Patrick Merias | 52292 | other | Discussion | | | 45 | 6.2.3.4 | Resource pool sharing between mode-3 and mode-4 users | 111200 | available |
| R1-1721113 | DL and UL CE level non-corresponding issue in NB-IoT | CMCC | Patrick Merias | 52292 | other | Discussion | | | 12 | 6.1.6 | Maintenance of Release 14 Enhancements of NB-IoT for LTE | 111300 | postponed |
| R1-1721114 | WF on Explicit HARQ-ACK feedback for multiple UEs | Samsung, Huawei, HiSilicon, Nokia, Nokia Shanghai Bell | Patrick Merias | 52292 | discussion | Decision | | | 55 | 6.2.5.4 | Uplink HARQ-ACK feedback | 0 | noted |
| R1-1721115 | WF on piggyback UCI for Sub-PRB allocation | Samsung | Patrick Merias | 52292 | discussion | Decision | | | 57 | 6.2.5.6 | Increased PUSCH spectral efficiency | 111500 | noted |
| R1-1721116 | WF on repetition for Sub-PRB allocation | Samsung | Patrick Merias | 52292 | discussion | Decision | | | 57 | 6.2.5.6 | Increased PUSCH spectral efficiency | 111600 | noted |
| R1-1721117 | TP for capturing RSRP statistics in TR36.777 | Ericsson | Patrick Merias | 52292 | other | Discussion | | | 78 | 6.2.7.4 | Interference Detection | 111700 | revised |
| R1-1721118 | Correction on MPDCCH assignment procedure for Type1-MPDCCH common search space | Intel Corporation | Patrick Merias | 52292 | draftCR | Decision | | | 7 | 6.1.1 | Maintenance of E-UTRA Release 8 – 13 | 201 | postponed |
| R1-1721119 | WF on network coordination | Huawei, HiSilicon, Sequans | Patrick Merias | 52292 | other | Discussion | | | 76 | 6.2.7.2 | DL Interference Mitigation | 111900 | noted |
| R1-1721120 | Correction on deriving number of available symbols for PUSCH | ASUSTeK | Patrick Merias | 52292 | CR | Agreement | | | 8 | 6.1.2 | Maintenance of Release 14 Enhanced Licensed-Assisted Access to Unlicensed Spectrum | 110501 | agreed |
| R1-1721121 | Correction on number of SRS symbol for UCI multiplexing | ASUSTeK | Patrick Merias | 52292 | CR | Agreement | | | 8 | 6.1.2 | Maintenance of Release 14 Enhanced Licensed-Assisted Access to Unlicensed Spectrum | 110601 | agreed |
| R1-1721122 | Correction on number of SRS symbol for UCI multiplexing | ASUSTeK | Patrick Merias | 52292 | CR | Agreement | | | 8 | 6.1.2 | Maintenance of Release 14 Enhanced Licensed-Assisted Access to Unlicensed Spectrum | 110701 | agreed |
| R1-1721123 | Correction on number of SRS symbol for UCI multiplexing | ASUSTeK | Patrick Merias | 52292 | CR | Agreement | | | 8 | 6.1.2 | Maintenance of Release 14 Enhanced Licensed-Assisted Access to Unlicensed Spectrum | 110801 | agreed |
| R1-1721124 | Way forward on NPRACH power control | Huawei, HiSilicon | Patrick Merias | 52292 | other | Discussion | | | 12 | 6.1.6 | Maintenance of Release 14 Enhancements of NB-IoT for LTE | 112400 | revised |
| R1-1721125 | WF on TBS Scaling for LTE V2V Sidelink Communication | Intel, Ericsson, Samsung, ZTE, OPPO | Patrick Merias | 52292 | other | Discussion | | | 40 | 6.2.3.2 | Support for 64-QAM | 112500 | available |
| R1-1721126 | WF on Sidelink Component Carrier Selection for LTE V2V Communication | Intel, Qualcomm, NEC | Patrick Merias | 52292 | other | Discussion | | | 37 | 6.2.3.1.1 | Mode-4 support | 112600 | noted |
| R1-1721127 | WF on Resource Pool Sharing by Mode-3/Mode-4 Ues | Intel, Qualcomm | Patrick Merias | 52292 | other | Discussion | | | 45 | 6.2.3.4 | Resource pool sharing between mode-3 and mode-4 users | 112700 | available |
| R1-1721128 | WF on SLSS/PSBCH transmission for sidelink CA | Huawei, HiSilicon, ITRI, ZTE, Samsung, OPPO, Nokia, Nokia Shanghai Bell | Patrick Merias | 52292 | other | Discussion | | | 38 | 6.2.3.1.2 | Synchronization | 0 | noted |
| R1-1721129 | WF on synchronization reference selection for sidelink CA | Huawei, HiSilicon, ITRI, CATT | Patrick Merias | 52292 | other | Discussion | | | 38 | 6.2.3.1.2 | Synchronization | 112900 | noted |
| R1-1721130 | Summary of Increased PUSCH spectral efficiency for MTC | Sierra Wireless | Patrick Merias | 52292 | discussion | Decision | | | 57 | 6.2.5.6 | Increased PUSCH spectral efficiency | 113000 | noted |
| R1-1721131 | WF on Sub-PRB Mode A Support | Sierra Wireless, Nokia, NSB, Sony, at&t, Qualcomm | Patrick Merias | 52292 | discussion | Decision | | | 57 | 6.2.5.6 | Increased PUSCH spectral efficiency | 113100 | noted |
| R1-1721132 | WF on Sub-PRB Multiple RU Support | Sierra Wireless, Samsung, Nokia, NSB, Intel, Sony, ZTE | Patrick Merias | 52292 | discussion | Decision | | | 57 | 6.2.5.6 | Increased PUSCH spectral efficiency | 113200 | noted |
| R1-1721133 | WF on Sub-PRB Subcarriers and Modulation | Sierra Wireless, Sony, Ericsson, Qualcomm, Verizon, Orange, AT&T | Patrick Merias | 52292 | discussion | Decision | | | 57 | 6.2.5.6 | Increased PUSCH spectral efficiency | 113300 | noted |
| R1-1721134 | Summary of [90b-LTE-02] on the list of MCS-TBS problematic cases for Rel-14 V2X PSSCH decoding | Huawei, HiSilicon | Patrick Merias | 52292 | discussion | Decision | | | 9 | 6.1.3 | Maintenance of Release 14 V2V/V2X services based on LTE sidelink | 113400 | revised |
| R1-1721135 | Summary of [90b-LTE-02] on the list of MCS-TBS problematic cases for Rel-14 V2X PSSCH decoding | Huawei, HiSilicon | Patrick Merias | 52292 | discussion | Decision | | | 9 | 6.1.3 | Maintenance of Release 14 V2V/V2X services based on LTE sidelink | 113500 | revised |
| R1-1721136 | Discussion on remaining details of evaluation scenarios for LTE URLLC | Samsung | Patrick Merias | 52292 | discussion | Decision | | | 83 | 6.2.8.1 | Remaining details of evaluations scenarios | 2701 | available |

| TDoc | Title | Source | Contact | Contact ID | Type | For | Abstract | Secretary Remarks | Agenda item sort order | Agenda item | Agenda item description | TDoc sort order within agenda item | TDoc Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R1-1721137 | WF on synchronization in sidelink CA | LG Electronics, Qualcomm, NTT DOCOMO | Patrick Merias | 52292 | other | Discussion | | | 38 | 6.2.3.1.2 | Synchronization | 113700 | noted |
| R1-1721138 | Discussion on subframe numbering issue in partial network coverage | LG Electronics | Patrick Merias | 52292 | other | Discussion | | | 9 | 6.1.3 | Maintenance of Release 14 V2V/V2X services based on LTE sidelink | 113800 | noted |
| R1-1721139 | WF on carrier selection rule and resource selection procedure for mode 4 CA | LG Electronics, Huawei, HiSilicon, ZTE | Patrick Merias | 52292 | other | Discussion | | | 37 | 6.2.3.1.1 | Mode-4 support | 113900 | noted |
| R1-1721140 | WF on resource pool sharing between UEs using mode 3 and 4 | LG Electronics, Qualcomm, ZTE | Patrick Merias | 52292 | other | Discussion | | | 45 | 6.2.3.4 | Resource pool sharing between mode-3 and mode-4 users | 114000 | available |
| R1-1721141 | WF on V2X further latency reduction | Huawei, HiSilicon, ITRI | Patrick Merias | 52292 | other | Discussion | | | 46 | 6.2.3.5 | Maximum time reduction between packet arrival at layer 1 and resource selection for transmission | 114100 | available |
| R1-1721142 | WF on V2X resource pool sharing | Huawei, HiSilicon, ITRI | Patrick Merias | 52292 | other | Discussion | | | 45 | 6.2.3.4 | Resource pool sharing between mode-3 and mode-4 users | 114200 | available |
| R1-1721143 | WF on 64QAM support | Qualcomm, LGE | Patrick Merias | 52292 | other | Discussion | | | 40 | 6.2.3.2 | Support for 64-QAM | 114300 | available |
| R1-1721144 | Summary of NB-IoT Downlink aspects | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 70 | 6.2.6.3.1 | Downlink aspects | 114400 | noted |
| R1-1721145 | Summary of NB-IoT Uplink aspects | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 71 | 6.2.6.3.2 | Uplink aspects | 0 | noted |
| R1-1721146 | Summary of NB-IoT Common aspects | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 72 | 6.2.6.3.3 | Common aspects | 114600 | noted |
| R1-1721147 | WF on NRS support in NB-IoT TDD | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 70 | 6.2.6.3.1 | Downlink aspects | 114700 | withdrawn |
| R1-1721148 | WF on SIB1-NB configurations in NB-IoT TDD | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 70 | 6.2.6.3.1 | Downlink aspects | 114800 | available |
| R1-1721149 | WF on Power Saving Signal Configuration for DL Channel in NB-IoT FDD | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 63 | 6.2.6.1.1.2 | Wake-up signal configurations and procedures | 114900 | available |
| R1-1721150 | WF on Power Saving Signal functions for DL Channel in NB-IoT FDD | Ericsson | Patrick Merias | 52292 | other | Discussion | | | 62 | 6.2.6.1.1.1 | Wake-up signal functions | 115000 | withdrawn |
| R1-1721151 | WF on Power Saving Signal sequence design for DL Channel in NB-IoT FDD | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 64 | 6.2.6.1.1.3 | Detailed design of wake-up signal | 115100 | withdrawn |
| R1-1721152 | WF on NPRACH TDD NB-IoT Design | ZTE, Sanechips, LG Electronics | Patrick Merias | 52292 | discussion | Decision | | | 71 | 6.2.6.3.2 | Uplink aspects | 115200 | noted |
| R1-1721153 | WF on support of multi-tone Msg3 for early data transmission in NB-IoT | ZTE, Sanechips | Patrick Merias | 52292 | other | Discussion | | | 65 | 6.2.6.1.2 | Data transmission during the random access procedure | 115300 | noted |
| R1-1721154 | WF on multi-level WUS configuration in NB-IoT | ZTE, Sanechips | Patrick Merias | 52292 | other | Discussion | | | 62 | 6.2.6.1.1.1 | Wake-up signal functions | 115400 | withdrawn |
| R1-1721155 | WF on Explicit HARQ-ACK feedback for a single UE | ZTE, Sanechips | Patrick Merias | 52292 | discussion | Decision | | | 54 | 6.2.5.3 | Downlink channel power efficiency | 0 | noted |
| R1-1721156 | WF on SIB1-NB transmission for TDD NB-IoT | ZTE, Sanechips, Qualcomm, Intel, Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 70 | 6.2.6.3.1 | Downlink aspects | 115600 | noted |
| R1-1721157 | WF on Explicit HARQ-ACK feedback for a single UEs | ZTE, Sanechips, Ericsson, Intel, Qualcomm | Patrick Merias | 52292 | discussion | Decision | | | 55 | 6.2.5.4 | Uplink HARQ-ACK feedback | 115700 | noted |
| R1-1721158 | WF on Explicit HARQ-ACK feedback for multiple Ues | ZTE , Sanechips, Intel, Ericsson, Qualcomm | Patrick Merias | 52292 | discussion | Decision | | | 55 | 6.2.5.4 | Uplink HARQ-ACK feedback | 0 | noted |
| R1-1721159 | WF on search space for explicit HARQ-ACK feedback | ZTE, Sanechips | Patrick Merias | 52292 | discussion | Decision | | | 55 | 6.2.5.4 | Uplink HARQ-ACK feedback | 115900 | available |
| R1-1721160 | WF on reducing the maximum time between packet arrival and resource selected for transmission | LG Electronics, ZTE | Patrick Merias | 52292 | other | Discussion | | | 46 | 6.2.3.5 | Maximum time reduction between packet arrival at layer 1 and resource selection for transmission | 116000 | available |
| R1-1721161 | UE uplink gap capability signaling description | Nokia, Nokia Shanghai Bell | Patrick Merias | 52292 | draftCR | Decision | | | 7 | 6.1.1 | Maintenance of E-UTRA Release 8 – 13 | 116100 | agreed |
| R1-1721162 | UE uplink gap capability signaling description | Nokia, Nokia Shanghai Bell | Patrick Merias | 52292 | draftCR | Decision | | | 7 | 6.1.1 | Maintenance of E-UTRA Release 8 – 13 | 116200 | agreed |
| R1-1721163 | WF on Enhanced PHY Resynchronization for efeMTC | Ericsson, Nokia, NSB, Sony, Sierra Wireless | Patrick Merias | 52292 | discussion | Decision | | | 52 | 6.2.5.1 | Reduced system acquisition time | 116300 | noted |
| R1-1721164 | WF on Power Saving Signal Configuration for DL Channel in efeMTC | Ericsson, Nokia, NSB, Sony, Sierra Wireless | Patrick Merias | 52292 | discussion | Decision | | | 54 | 6.2.5.3 | Downlink channel power efficiency | 116400 | noted |
| R1-1721165 | Summary of Reduced system acquisition time for MTC | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 52 | 6.2.5.1 | Reduced system acquisition time | 0 | noted |
| R1-1721166 | Follow-up on 3GPP Response LS (R4-164972) | Wi-Fi Alliance, CableLabs, Qualcomm, Ericsson | Patrick Merias | 52292 | LS in | | | | 7 | 6.1.1 | Maintenance of E-UTRA Release 8 – 13 | 116600 | treated |
| R1-1721167 | Summary of Uplink HARQ-ACK feedback for MTC | ZTE, Sanechips | Patrick Merias | 52292 | discussion | Decision | | | 55 | 6.2.5.4 | Uplink HARQ-ACK feedback | 0 | noted |
| R1-1721168 | Summary of Early Data Transmission for eMTC | Huawei, HiSilicon | Patrick Merias | 52292 | other | Discussion | | | 53 | 6.2.5.2 | Early data transmission | 116800 | noted |
| R1-1721169 | Summary of power saving signal in NB-IoT | Huawei, HiSilicon | Patrick Merias | 52292 | other | Discussion | | | 61 | 6.2.6.1.1 | Power consumption reduction for paging and connected-mode DRX | 116900 | noted |
| R1-1721170 | Summary of wake-up signal for NB-IoT | Huawei, HiSilicon | Patrick Merias | 52292 | other | Discussion | | | 65 | 6.2.6.1.2 | Data transmission during the random access procedure | 117000 | noted |
| R1-1721171 | WF on capabilities and configuration of UL HARQ-ACK feedback for MTC | Ericsson, Intel, Qualcomm | Patrick Merias | 52292 | discussion | Decision | | | 55 | 6.2.5.4 | Uplink HARQ-ACK feedback | 0 | noted |
| R1-1721172 | Summary of section 6.2.5.5 on PDSCH DL spectral efficiency for efeMTC | Sony | Patrick Merias | 52292 | discussion | Decision | | | 56 | 6.2.5.5 | Increased PDSCH spectral efficiency | 117200 | revised |
| R1-1721173 | Summary of 6.2.5.3 Downlink Channel Power efficiency | Qualcomm Incorporated | Patrick Merias | 52292 | discussion | Decision | | | 54 | 6.2.5.3 | Downlink channel power efficiency | 117300 | noted |
| R1-1721174 | Summary of 6.2.6.2 Reduced system acquisition time | Qualcomm Incorporated | Patrick Merias | 52292 | discussion | Decision | | | 66 | 6.2.6.2 | Reduced system acquisition time | 117400 | noted |
| R1-1721175 | WF on early data transmission | Huawei, HiSilicon | Patrick Merias | 52292 | other | Discussion | | | 53 | 6.2.5.2 | Early data transmission | 117500 | noted |
| R1-1721176 | WF on MCL or latency relaxation of NB-IoT | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 72 | 6.2.6.3.3 | Common aspects | 117600 | available |
| R1-1721177 | Draft 213 CR on correcting the scale factor for semi-OL rank-1 | Qualcomm Incorporated | Patrick Merias | 52292 | draftCR | Decision | | | 10 | 6.1.4 | Maintenance of Release 14 Full-Dimension MIMO for LTE | 117700 | revised |
| R1-1721178 | Correction for PUSCH puncturing in SRS carrier switching | Qualcomm Incorporated | Patrick Merias | 52292 | draftCR | Decision | | | 13 | 6.1.7 | Other | 5970 | agreed |
| R1-1721179 | WF on NPRACH preamble format for single UL subframe | LG Electronics, Qualcomm | Patrick Merias | 52292 | discussion | Decision | | | 71 | 6.2.6.3.2 | Uplink aspects | 117900 | available |
| R1-1721180 | Way Forward on function of power saving signal for IDLE mode paging | Huawei, HiSilicon | Patrick Merias | 52292 | other | Discussion | | | 62 | 6.2.6.1.1.1 | Wake-up signal functions | 118000 | noted |
| R1-1721181 | Way Forward on power saving signal in connected mode | Huawei, HiSilicon | Patrick Merias | 52292 | other | Discussion | | | 62 | 6.2.6.1.1.1 | Wake-up signal functions | 118100 | withdrawn |
| R1-1721182 | Way Forward on configuration of power saving signal for IDLE mode paging | Huawei, HiSilicon | Patrick Merias | 52292 | discussion | Decision | | | 63 | 6.2.6.1.1.2 | Wake-up signal configurations and procedures | 118200 | noted |
| R1-1721183 | Way Forward on enabling and disabling of power saving signal for IDLE mode paging | Huawei, HiSilicon | Patrick Merias | 52292 | discussion | Decision | | | 63 | 6.2.6.1.1.2 | Wake-up signal configurations and procedures | 118300 | noted |
| R1-1721184 | Way Forward on early data transmission in RACH for NB-IoT | Huawei, HiSilicon | Patrick Merias | 52292 | other | Discussion | | | 65 | 6.2.6.1.2 | Data transmission during the random access procedure | 118400 | noted |
| R1-1721185 | LS on HARQ-ACK feedback for eFeMTC | Qualcomm | Patrick Merias | 52292 | LS out | Decision | | | 55 | 6.2.5.4 | Uplink HARQ-ACK feedback | 118500 | revised |
| R1-1721186 | WF on Interpretation and application of subframes for additional SIB1-NB in FDD | LG Electronics, Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 68 | 6.2.6.2.2 | System Information | 118600 | noted |
| R1-1721187 | WF on Design of additional SIB1-NB in FDD | LG Electronics, ZTE | Patrick Merias | 52292 | discussion | Decision | | | 68 | 6.2.6.2.2 | System Information | 118700 | noted |
| R1-1721188 | WF on Wake-up signal transmission | Qualcomm Incorporated | Patrick Merias | 52292 | discussion | Decision | | | 64 | 6.2.6.1.1.3 | Detailed design of wake-up signal | 118800 | noted |
| R1-1721189 | WF on Wake-up signal design | Qualcomm, Huawei, HiSilicon | Patrick Merias | 52292 | discussion | Decision | | | 64 | 6.2.6.1.1.3 | Detailed design of wake-up signal | 118900 | noted |
| R1-1721190 | Correction to timing advance for BL/CE UEs | Qualcomm Incorporated | Patrick Merias | 52292 | draftCR | Decision | | | 7 | 6.1.1 | Maintenance of E-UTRA Release 8 – 13 | 3856 | postponed |
| R1-1721191 | Text proposal for uplink problem | NTT DOCOMO | Patrick Merias | 52292 | other | Discussion | | | 77 | 6.2.7.3 | UL Interference Mitigation | 119100 | noted |
| R1-1721192 | Way Forward on NPRACH for NB-IoT TDD | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 71 | 6.2.6.3.2 | Uplink aspects | 119200 | available |
| R1-1721193 | LS on wake-up signal | HiSilicon | Patrick Merias | 52292 | LS out | Decision | | | 64 | 6.2.6.1.1.3 | Detailed design of wake-up signal | 119300 | revised |
| R1-1721194 | Way Forward on NPUSCH for NB-IoT TDD | Ericsson, ZTE | Patrick Merias | 52292 | discussion | Decision | | | 71 | 6.2.6.3.2 | Uplink aspects | 119400 | noted |
| R1-1721195 | WF on Modulation Enhancement for 256 QAM | Intel, MediaTek, KT, Spreadtrum | Patrick Merias | 52292 | other | Discussion | | | 13 | 6.1.7 | Other | 119500 | noted |
| R1-1721196 | Baseline Evaluation Results for Aerial Vehicles | Nokia, Nokia Shanghai Bell | Patrick Merias | 52292 | discussion | Decision | | | 75 | 6.2.7.1 | Baseline Evaluation Results | 5141 | available |
| R1-1721197 | Downlink Interference Mitigation for Aerial Vehicles | Nokia, Nokia Shanghai Bell | Patrick Merias | 52292 | discussion | Decision | | | 76 | 6.2.7.2 | DL Interference Mitigation | 5151 | available |
| R1-1721198 | WF on CBSR for Advanced CSI | Intel, Ericsson | Patrick Merias | 52292 | other | Discussion | | | 10 | 6.1.4 | Maintenance of Release 14 Full-Dimension MIMO for LTE | 119800 | noted |

| TDoc | Title | Source | Contact | Contact ID | Type | For | Abstract | Secretary Remarks | Agenda item sort order | Agenda item | Agenda item description | TDoc sort order within agenda item | TDoc Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R1-1721199 | draft LS on PSCCH/PSSCH subframe numbering issue in partial network coverage | LG Electronics | Patrick Merias | 52292 | LS out | Decision | | | 9 | 6.1.3 | Maintenance of Release 14 V2V/V2X services based on LTE sidelink | 119900 | noted |
| R1-1721200 | Correction for PUSCH puncturing in SRS carrier switching | Qualcomm Incorporated, Huawei, HiSilicon | Patrick Merias | 52292 | CR | Agreement | | | 13 | 6.1.7 | Other | 5971 | agreed |
| R1-1721201 | Draft 213 CR on correcting the scale factor for semi-OL rank-1 | Qualcomm Incorporated | Patrick Merias | 52292 | draftCR | Decision | | | 10 | 6.1.4 | Maintenance of Release 14 Full-Dimension MIMO for LTE | 117701 | agreed |
| R1-1721202 | Text proposal for reliability evaluation results | Ericsson | Patrick Merias | 52292 | other | Discussion | | | 79 | 6.2.7.5 | Evaluation Results on Reliability | 120200 | revised |
| R1-1721203 | Text Proposal for field measurement results | Ericsson | Patrick Merias | 52292 | other | Discussion | | | 80 | 6.2.7.6 | Field measurement results | 120300 | revised |
| R1-1721204 | Text Proposal for uplink interference mitigation | Ericsson | Patrick Merias | 52292 | other | Discussion | | | 77 | 6.2.7.3 | UL Interference Mitigation | 120400 | revised |
| R1-1721205 | IMT-2020 self-evaluation calibration: mMTC connection density for LTE-MTC and NB-IoT | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 172 | 7.8 | Other | 0 | available |
| R1-1721206 | On baseline evaluation results | NTT DOCOMO, INC. | Patrick Merias | 52292 | discussion | Decision | | | 75 | 6.2.7.1 | Baseline Evaluation Results | 7831 | withdrawn |
| R1-1721207 | WF on DL interference randomization | Qualcomm Incorporated | Patrick Merias | 52292 | discussion | Decision | | | 70 | 6.2.6.3.1 | Downlink aspects | 120700 | available |
| R1-1721208 | Draft LS on problematic MCS-TBS configurations for PSSCH decoding | Huawei | Patrick Merias | 52292 | LS out | Decision | | | 9 | 6.1.3 | Maintenance of Release 14 V2V/V2X services based on LTE sidelink | 113501 | revised |
| R1-1721209 | Summary of [90b-LTE-02] on the list of MCS-TBS problematic cases for Rel-14 V2X PSSCH decoding | Huawei, HiSilicon | Patrick Merias | 52292 | discussion | Decision | | | 9 | 6.1.3 | Maintenance of Release 14 V2V/V2X services based on LTE sidelink | 113401 | revised |
| R1-1721210 | Reduction of NB-IoT system information acquisition time | Huawei, HiSilicon, Neul | Patrick Merias | 52292 | discussion | Decision | | | 68 | 6.2.6.2.2 | System Information | 94842 | noted |
| R1-1721211 | Way forward on NPRACH power control | Huawei, HiSilicon | Patrick Merias | 52292 | other | Discussion | | | 12 | 6.1.6 | Maintenance of Release 14 Enhancements of NB-IoT for LTE | 112401 | agreed |
| R1-1721212 | Way Forward on NRS in TDD NB-IoT | Huawei, HiSilicon | Patrick Merias | 52292 | discussion | Decision | | | 70 | 6.2.6.3.1 | Downlink aspects | 121200 | available |
| R1-1721213 | Way Forward on SIB1-NB transmission in TDD NB-IoT | Huawei, HiSilicon | Patrick Merias | 52292 | discussion | Decision | | | 70 | 6.2.6.3.1 | Downlink aspects | 121300 | noted |
| R1-1721214 | Way Forward on HARQ in TDD NB-IoT | Huawei, HiSilicon | Patrick Merias | 52292 | discussion | Decision | | | 72 | 6.2.6.3.3 | Common aspects | 121400 | available |
| R1-1721215 | Draft LS on additional agreements for shortened TTI and processing time for LTE | Ericsson | Patrick Merias | 52292 | LS out | Decision | | | 15 | 6.2.1 | Shortened TTI and processing time for LTE - WID in RP-171468 | 121500 | revised |
| R1-1721216 | LS on additional agreements for shortened TTI and processing time for LTE | RAN1, Ericsson | Patrick Merias | 52292 | LS out | Approval | | sent | 15 | 6.2.1 | Shortened TTI and processing time for LTE - WID in RP-171468 | 121600 | approved |
| R1-1721217 | Offline input from the sTTI session | Ericsson | Patrick Merias | 52292 | other | Discussion | | | 15 | 6.2.1 | Shortened TTI and processing time for LTE - WID in RP-171468 | 121700 | available |
| R1-1721218 | Offline input from the sTTI session | Ericsson | Patrick Merias | 52292 | other | Discussion | | | 15 | 6.2.1 | Shortened TTI and processing time for LTE - WID in RP-171468 | 121800 | available |
| R1-1721219 | Void | Void | Patrick Merias | 52292 | other | | | | 15 | 6.2.1 | Shortened TTI and processing time for LTE - WID in RP-171468 | 121900 | withdrawn |
| R1-1721220 | WF on Other issues on SIB1-NB in TDD | LG Electronics | Patrick Merias | 52292 | discussion | Decision | | | 70 | 6.2.6.3.1 | Downlink aspects | 122000 | available |
| R1-1721221 | WF on Cross-carrier scheduling in TDD | LG Electronics, Samsung | Patrick Merias | 52292 | discussion | Decision | | | 72 | 6.2.6.3.3 | Common aspects | 122100 | available |
| R1-1721222 | WF on Subframe configurations in TDD | LG Electronics | Patrick Merias | 52292 | discussion | Decision | | | 72 | 6.2.6.3.3 | Common aspects | 122200 | noted |
| R1-1721223 | Offline summary for mode 4 CA | LG Electronics | Patrick Merias | 52292 | other | Discussion | | | 37 | 6.2.3.1.1 | Mode-4 support | 122300 | noted |
| R1-1721224 | WF on Option B CQI table for efeMTC | Sony, Ericsson, Sierra Wireless, Orange, Verizon | Patrick Merias | 52292 | discussion | Decision | | | 56 | 6.2.5.5 | Increased PDSCH spectral efficiency | 122400 | noted |
| R1-1721225 | Summary of section 6.2.5.5 on PDSCH DL spectral efficiency for efeMTC | Sony | Patrick Merias | 52292 | discussion | Decision | | | 56 | 6.2.5.5 | Increased PDSCH spectral efficiency | 117201 | noted |
| R1-1721226 | WF on usage of Option B CQI table for efeMTC | Sony, Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 56 | 6.2.5.5 | Increased PDSCH spectral efficiency | 122600 | noted |
| R1-1721227 | [Draft] Reply LS on early data transmission | Huawei | Patrick Merias | 52292 | LS out | Decision | | | 65 | 6.2.6.1.2 | Data transmission during the random access procedure | 122700 | revised |
| R1-1721228 | WF on Enhancement on SRS Switching | Huawei, HiSilicon, SoftBank, Vodafone, CATR, CATT, CMCC | Patrick Merias | 52292 | other | Discussion | | | 13 | 6.1.7 | Other | 122800 | noted |
| R1-1721229 | Enhancement of SRS antenna switching in 36.213 | Huawei, HiSilicon, SoftBank | Patrick Merias | 52292 | draftCR | Decision | | | 13 | 6.1.7 | Other | 122900 | postponed |
| R1-1721230 | WF on single tone NPUSCH for NB-IoT TDD | Nokia, Nokia Shanghai Bell, LG Electronics | Patrick Merias | 52292 | discussion | Decision | | | 71 | 6.2.6.3.2 | Uplink aspects | 123000 | noted |
| R1-1721231 | WF on NPRACH Formats for NB-IoT TDD | Nokia, Nokia Shanghai Bell | Patrick Merias | 52292 | discussion | Decision | | | 71 | 6.2.6.3.2 | Uplink aspects | 123100 | available |
| R1-1721232 | Chairman's notes of AI 6.1 Maintenance of E-UTRA Releases 8 – 14 | Ad-Hoc chair (Ericsson) | Patrick Merias | 52292 | other | Endorsement | | | 6 | 6.1 | Maintenance of E-UTRA Releases 8 – 14 | 123200 | available |
| R1-1721233 | Chairman's notes of AI 6.2.1 Shortened TTI and processing time for LTE | Ad-Hoc chair (Ericsson) | Patrick Merias | 52292 | other | Endorsement | | | 15 | 6.2.1 | Shortened TTI and processing time for LTE - WID in RP-171468 | 123300 | endorsed |
| R1-1721234 | Chairman's notes of AI 6.2.2 Enhancements to LTE operation in unlicensed spectrum | Ad-Hoc chair (Ericsson) | Patrick Merias | 52292 | other | Endorsement | | | 27 | 6.2.2 | Enhancements to LTE operation in unlicensed spectrum - WID in RP-170848 | 123400 | endorsed |
| R1-1721235 | Chairman's notes of AI 6.2.3 3GPP V2X Phase 2 | Ad-Hoc chair (NTT DOCOMO) | Patrick Merias | 52292 | other | Endorsement | | | 35 | 6.2.3 | 3GPP V2X Phase 2 - WID in RP-171740 | 123500 | endorsed |
| R1-1721236 | Chairman's notes of AI 6.2.4 Enhancements for high capacity stationary wireless link and introduction of 1024 QAM for LTE | Ad-Hoc chair (Ericsson) | Patrick Merias | 52292 | other | Endorsement | | | 48 | 6.2.4 | Enhancements for high capacity stationary wireless link and introduction of 1024 QAM for LTE - WID in RP-171738 | 123600 | endorsed |
| R1-1721237 | Chairman's notes of AI 6.2.5 Even further Enhanced MTC for LTE | Ad-Hoc chair (NTT DOCOMO) | Patrick Merias | 52292 | other | Endorsement | | | 51 | 6.2.5 | Even further enhanced MTC for LTE - WID in RP-171427 | 123700 | endorsed |
| R1-1721238 | Chairman's notes of AI 6.2.6 Further enhancements of NB-IoT | Ad-Hoc chair (NTT DOCOMO) | Patrick Merias | 52292 | other | Endorsement | | | 59 | 6.2.6 | Further enhancements of NB-IoT - WID in RP-172063 | 123800 | endorsed |
| R1-1721239 | Chairman's notes of AI 6.2.7 Enhanced Support for Aerial Vehicles | Ad-Hoc chair (Ericsson) | Patrick Merias | 52292 | other | Endorsement | | | 74 | 6.2.7 | Enhanced Support for Aerial Vehicles - SID in RP-171050 | 123900 | endorsed |
| R1-1721240 | Chairman's notes of AI 6.2.8 Ultra Reliable Low Latency Communication for LTE | Ad-Hoc chair (Ericsson) | Patrick Merias | 52292 | other | Endorsement | | | 82 | 6.2.8 | Ultra Reliable Low Latency Communication for LTE - WID in RP-171489 | 124000 | endorsed |
| R1-1721241 | LS on wake-up signal | RAN1, HiSilicon | Patrick Merias | 52292 | LS out | Approval | | sent | 64 | 6.2.6.1.1.3 | Detailed design of wake-up signal | 119301 | approved |
| R1-1721242 | [Draft] Reply LS on early data transmission | Huawei | Patrick Merias | 52292 | LS out | Decision | | | 53 | 6.2.5.2 | Early data transmission | 122701 | revised |
| R1-1721243 | TP for capturing RSRP statistics in TR36.777 | Ericsson | Patrick Merias | 52292 | other | Discussion | | | 78 | 6.2.7.4 | Interference Detection | 111701 | agreed |
| R1-1721244 | WF on modulation enhancements | Qualcomm | Patrick Merias | 52292 | other | Discussion | | | 13 | 6.1.7 | Other | 124400 | revised |
| R1-1721245 | Way forward on AUL Channel Access | Intel, Ericsson, Huawei, HiSilicon, Nokia, Nokia Shanghai Bell, WiLUS | Patrick Merias | 52292 | other | Decision | | | 32 | 6.2.2.2.3 | Channel access for autonomous UL access | 0 | noted |
| R1-1721246 | Clarification of carrier indication in DCI format N1 in NB-IoT | Ericsson | Patrick Merias | 52292 | draftCR | Decision | | | 12 | 6.1.6 | Maintenance of Release 14 Enhancements of NB-IoT for LTE | 5641 | revised |
| R1-1721247 | Summary of offline discussions on PC5 CA synchronization | Qualcomm Incorporated | Patrick Merias | 52292 | other | Discussion | | | 38 | 6.2.3.1.2 | Synchronization | 124700 | noted |
| R1-1721248 | Void | ETSI | Patrick Merias | 52292 | other | | | | 53 | 6.2.5.2 | Early data transmission | 124800 | withdrawn |
| R1-1721249 | Void | ETSI | Patrick Merias | 52292 | other | | | | 53 | 6.2.5.2 | Early data transmission | 124900 | withdrawn |
| R1-1721250 | Summary of RAN1 Offline Discussion on 64 QAM Support | Intel | Patrick Merias | 52292 | other | Discussion | | | 40 | 6.2.3.2 | Support for 64-QAM | 125000 | noted |
| R1-1721251 | Summary of offline discussions on Latency reduction | CATT | Patrick Merias | 52292 | other | Discussion | | | 46 | 6.2.3.5 | Maximum time reduction between packet arrival at layer 1 and resource selection for transmission | 0 | noted |
| R1-1721252 | Correction of interference in NB-IoT RACH procedure | Huawei, HiSilicon | Patrick Merias | 52292 | draftCR | Decision | | Revised to R1-1721315 | 12 | 6.1.6 | Maintenance of Release 14 Enhancements of NB-IoT for LTE | 0 | revised |
| R1-1721253 | Offline summary of radio resource pool sharing between UEs using mode 3 and UEs using mode 4 | NTT DOCOMO | Patrick Merias | 52292 | discussion | Decision | | | 45 | 6.2.3.4 | Resource pool sharing between mode-3 and mode-4 users | 125300 | revised |
| R1-1721254 | LS on HARQ-ACK feedback for eFeMTC | RAN1, Qualcomm | Patrick Merias | 52292 | LS out | Decision | | | 55 | 6.2.5.4 | Uplink HARQ-ACK feedback | 118501 | approved |
| R1-1721255 | Reply LS on early data transmission | RAN1, Huawei | Patrick Merias | 52292 | LS out | Approval | | sent | 53 | 6.2.5.2 | Early data transmission | 122702 | approved |
| R1-1721256 | WF on two-port Transmit Diversity design for PSCCH | Huawei, HiSilicon | Patrick Merias | 52292 | other | Discussion | | | 42 | 6.2.3.3.1 | Transmit diversity solutions | 125600 | noted |
| R1-1721257 | WF on two-port Transmit Diversity design for PSSCH | Huawei, HiSilicon | Patrick Merias | 52292 | other | Discussion | | | 42 | 6.2.3.3.1 | Transmit diversity solutions | 125700 | noted |
| R1-1721258 | WF on two-port DMRS design | Huawei, HiSilicon | Patrick Merias | 52292 | other | Discussion | | | 42 | 6.2.3.3.1 | Transmit diversity solutions | 125800 | available |
| R1-1721259 | Clarification on 2 HARQ process applicability to UE-specific search space | Huawei, HiSilicon | Patrick Merias | 52292 | draftCR | Decision | | | 12 | 6.1.6 | Maintenance of Release 14 Enhancements of NB-IoT for LTE | 105901 | agreed |

| TDoc | Title | Source | Contact | Contact ID | Type | For | Abstract | Secretary Remarks | Agenda item sort order | Agenda item | Agenda item description | TDoc sort order within agenda item | TDoc Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R1-1721260 | Correction on the scale factor for semi-OL rank-1 | Qualcomm Incorporated | Patrick Merias | 52292 | CR | Agreement | | | 10 | 6.1.4 | Maintenance of Release 14 Full-Dimension MIMO for LTE | 117702 | agreed |
| R1-1721261 | Correction on the scale factor for semi-OL rank-1 | Qualcomm Incorporated | Patrick Merias | 52292 | CR | Agreement | | | 10 | 6.1.4 | Maintenance of Release 14 Full-Dimension MIMO for LTE | 211 | agreed |
| R1-1721262 | UE uplink gap capability signaling description | Nokia, Nokia Shanghai Bell | Patrick Merias | 52292 | CR | Agreement | | | 7 | 6.1.1 | Maintenance of E-UTRA Release 8 – 13 | 116101 | agreed |
| R1-1721263 | UE uplink gap capability signaling description | Nokia, Nokia Shanghai Bell | Patrick Merias | 52292 | CR | Agreement | | | 7 | 6.1.1 | Maintenance of E-UTRA Release 8 – 13 | 116201 | agreed |
| R1-1721264 | Correction to timing advance for BL/CE Ues | Qualcomm Incorporated | Patrick Merias | 52292 | CR | Agreement | | | 7 | 6.1.1 | Maintenance of E-UTRA Release 8 – 13 | 0 | postponed |
| R1-1721265 | Correction to timing advance for BL/CE UEs | Qualcomm Incorporated | Patrick Merias | 52292 | CR | Agreement | | | 7 | 6.1.1 | Maintenance of E-UTRA Release 8 – 13 | 126500 | postponed |
| R1-1721266 | WF on CBSR for advanced CSI | LG Electronics, Qualcomm, Nokia, NSB, ZTE, CATT, NTT Docomo | Patrick Merias | 52292 | other | Discussion | | | 10 | 6.1.4 | Maintenance of Release 14 Full-Dimension MIMO for LTE | 126600 | noted |
| R1-1721267 | WF on Sub-PRB Subcarriers and Modulation Option1 | Sierra Wireless, Qualcomm, Sony, Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 57 | 6.2.5.6 | Increased PUSCH spectral efficiency | 126700 | noted |
| R1-1721268 | WF on modulation enhancements | Qualcomm, Intel, Verizon, KDDI, Samsung | Patrick Merias | 52292 | other | Discussion | | | 13 | 6.1.7 | Other | 124401 | agreed |
| R1-1721269 | WF on CWS adjustment for AUL with HARQ-ACK reception | Huawei, HiSilicon, Ericsson, Intel, Nokia, Nokia Shanghai Bell, CableLabs, WILUS, Broadcom | Patrick Merias | 52292 | other | Discussion | | | 32 | 6.2.2.2.3 | Channel access for autonomous UL access | 0 | noted |
| R1-1721270 | [Draft] LS on carrier aggregation for V2X | LG Electronics | Patrick Merias | 52292 | LS out | Decision | | | 37 | 6.2.3.1.1 | Mode-4 support | 127000 | revised |
| R1-1721271 | WF on PDCCH transmission within a UE acquired COT | Ericsson, Nokia, Huawei, Intel, LG, KT, Samsung | Patrick Merias | 52292 | other | Discussion | | | 32 | 6.2.2.2.3 | Channel access for autonomous UL access | 0 | noted |
| R1-1721272 | Clarification of carrier indication in DCI format N1 in NB-IoT | Ericsson | Patrick Merias | 52292 | draftCR | Decision | | | 12 | 6.1.6 | Maintenance of Release 14 Enhancements of NB-IoT for LTE | 5642 | agreed |
| R1-1721273 | Offline summary of radio resource pool sharing between UEs using mode 3 and UEs using mode 4 | NTT DOCOMO | Patrick Merias | 52292 | discussion | Decision | | | 45 | 6.2.3.4 | Resource pool sharing between mode-3 and mode-4 users | 127300 | noted |
| R1-1721274 | LS on carrier aggregation for V2X | LG Electronics | Patrick Merias | 52292 | LS out | Approval | | | 37 | 6.2.3.1.1 | Mode-4 support | 127001 | revised |
| R1-1721275 | WF on NPRACH preamble format for short coverage | LG Electronics, Qualcomm, IITH, CEWiT, Reliance Jio | Patrick Merias | 52292 | discussion | Decision | | | 71 | 6.2.6.3.2 | Uplink aspects | 127500 | available |
| R1-1721276 | Text proposal for field measurement results | Ericsson, Nokia, Nokia Shanghai Bell | Patrick Merias | 52292 | other | Discussion | | | 80 | 6.2.7.6 | Field measurement results | 127600 | agreed |
| R1-1721277 | [DRAFT] LS on PUSCH sub-PRB allocation Rel-15 LTE-MTC | Ericsson | Patrick Merias | 52292 | LS out | Decision | | | 57 | 6.2.5.6 | Increased PUSCH spectral efficiency | 127700 | revised |
| R1-1721278 | [DRAFT] LS on Wake-up signal features for Rel-15 LTE-MTC | Ericsson | Patrick Merias | 52292 | LS out | Discussion | | | 54 | 6.2.5.3 | Downlink channel power efficiency | 127800 | revised |
| R1-1721279 | WF on AUL HARQ and Resource Allocation | Nokia, Broadcom, Cablelabs, Ericsson, Huawei, HiSilicon, Intel, LGE, Nokia Shanghai Bell, Qualcomm, Samsung, WILUS | Patrick Merias | 52292 | other | Discussion | | | 27 | 6.2.2 | Enhancements to LTE operation in unlicensed spectrum - WID in RP-170848 | 0 | noted |
| R1-1721280 | Preliminary System Level Evaluations for LTE URLLC | Intel Corporation | Patrick Merias | 52292 | discussion | Decision | | | 83 | 6.2.8.1 | Remaining details of evaluations scenarios | 551 | available |
| R1-1721281 | Draft LS on power consumption reduction progress | Huawei | Patrick Merias | 52292 | LS out | Decision | | Revised to R1-1721316 | 59 | 6.2.6 | Further enhancements of NB-IoT - WID in RP-172063 | 0 | revised |
| R1-1721282 | LS on Wake-up signal features for Rel-15 LTE-MTC | RAN1, Ericsson | Patrick Merias | 52292 | LS out | Discussion | | sent | 54 | 6.2.5.3 | Downlink channel power efficiency | 127801 | approved |
| R1-1721283 | LS on PUSCH sub-PRB allocation Rel-15 LTE-MTC | RAN1, Ericsson | Patrick Merias | 52292 | LS out | Decision | | sent | 57 | 6.2.5.6 | Increased PUSCH spectral efficiency | 127701 | approved |
| R1-1721284 | Text Proposal for DL enhancements for drones | Huawei, HiSilicon | Patrick Merias | 52292 | other | Discussion | | | 76 | 6.2.7.2 | DL Interference Mitigation | 128400 | noted |
| R1-1721285 | LS on carrier aggregation for V2X | RAN1, LG Electronics | Patrick Merias | 52292 | LS out | Approval | | sent | 37 | 6.2.3.1.1 | Mode-4 support | 127002 | approved |
| R1-1721286 | On the interest of more flexible resource allocation for efeMTC | Orange Spain | Patrick Merias | 52292 | discussion | Decision | | | 58 | 6.2.5.7 | Other | 5411 | available |
| R1-1721287 | Text Proposal for uplink interference mitigation | Ericsson | Patrick Merias | 52292 | other | Discussion | | | 77 | 6.2.7.3 | UL Interference Mitigation | 120401 | agreed |
| R1-1721288 | Correction of NRS-CRS power offset configuration for NB-IoT | ZTE, SaneChips | Patrick Merias | 52292 | draftCR | Decision | | | 7 | 6.1.1 | Maintenance of E-UTRA Release 8 – 13 | 3861 | agreed |
| R1-1721289 | Discussion on new scenarios and requirements for URLLC service | Huawei, HiSilicon, Vodafone | Patrick Merias | 52292 | discussion | Decision | | | 85 | 6.2.8.3 | Other | 4431 | noted |
| R1-1721290 | WF on LTE URLLC requirements | Huawei, HiSilicon, Vodafone | Patrick Merias | 52292 | other | Discussion | | | 83 | 6.2.8.1 | Remaining details of evaluations scenarios | 129000 | available |
| R1-1721291 | Void | Void | Patrick Merias | 52292 | other | | | | 9 | 6.1.3 | Maintenance of Release 14 V2V/V2X services based on LTE sidelink | 129100 | withdrawn |
| R1-1721292 | Draft LS on problematic MCS-TBS configurations for PSSCH decoding | Huawei | Patrick Merias | 52292 | LS out | Decision | | | 9 | 6.1.3 | Maintenance of Release 14 V2V/V2X services based on LTE sidelink | 113502 | revised |
| R1-1721293 | Summary of [90b-LTE-02] on the list of MCS-TBS problematic cases for Rel-14 V2X PSSCH decoding | Huawei, HiSilicon | Patrick Merias | 52292 | discussion | Decision | | | 9 | 6.1.3 | Maintenance of Release 14 V2V/V2X services based on LTE sidelink | 113402 | noted |
| R1-1721294 | Text Proposal for Conclusion Section of TR36.777 | Ericsson, NTT DOCOMO, INC., Huawei, HiSilicon | Patrick Merias | 52292 | other | Discussion | | | 74 | 6.2.7 | Enhanced Support for Aerial Vehicles - SID in RP-171050 | 129400 | revised |
| R1-1721295 | Text proposal for reliability evaluation results | Ericsson | Patrick Merias | 52292 | other | Discussion | | | 79 | 6.2.7.5 | Evaluation Results on Reliability | 120201 | agreed |
| R1-1721296 | Text proposal for downlink interference mitigation | Ericsson | Patrick Merias | 52292 | other | Discussion | | | 76 | 6.2.7.2 | DL Interference Mitigation | 111001 | revised |
| R1-1721297 | WF on CBSR for advanced CSI codebook | Huawei, HiSilicon, Samsung, Ericsson, Intel | Patrick Merias | 52292 | other | Discussion | | | 10 | 6.1.4 | Maintenance of Release 14 Full-Dimension MIMO for LTE | 129700 | noted |
| R1-1721298 | Correction of NRS-CRS power offset configuration for NB-IoT | ZTE, Sanechips | Patrick Merias | 52292 | CR | Agreement | | | 7 | 6.1.1 | Maintenance of E-UTRA Release 8 – 13 | 3862 | agreed |
| R1-1721299 | LS on problematic MCS-TBS configurations for PSSCH decoding | RAN1, Huawei | Patrick Merias | 52292 | LS out | Approval | | | 9 | 6.1.3 | Maintenance of Release 14 V2V/V2X services based on LTE sidelink | 113503 | approved |
| R1-1721300 | Clarification of carrier indication in DCI format N1 in NB-IoT | Ericsson | Patrick Merias | 52292 | CR | Agreement | | | 12 | 6.1.6 | Maintenance of Release 14 Enhancements of NB-IoT for LTE | 5643 | agreed |
| R1-1721301 | [Draft] Correction of interference in NB-IoT RACH procedure | Huawei | Patrick Merias | 52292 | LS out | Decision | | | 12 | 6.1.6 | Maintenance of Release 14 Enhancements of NB-IoT for LTE | 130100 | revised |
| R1-1721302 | Correction of interference in NB-IoT RACH procedure | RAN1, Huawei | Patrick Merias | 52292 | LS out | Approval | | | 12 | 6.1.6 | Maintenance of Release 14 Enhancements of NB-IoT for LTE | 130101 | approved |
| R1-1721303 | Clarification on 2 HARQ process applicability to UE-specific search space | Huawei, HiSilicon | Patrick Merias | 52292 | CR | Agreement | | | 12 | 6.1.6 | Maintenance of Release 14 Enhancements of NB-IoT for LTE | 105902 | agreed |
| R1-1721304 | Text proposal for baseline evaluation results | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 75 | 6.2.7.1 | Baseline Evaluation Results | 130400 | agreed |
| R1-1721305 | Draft LS on RAN1 conclusions and TPs approved in RAN1#91 | Ericsson | Patrick Merias | 52292 | LS out | Decision | | | 74 | 6.2.7 | Enhanced Support for Aerial Vehicles - SID in RP-171050 | 130500 | revised |
| R1-1721306 | Text proposal for baseline evaluation results | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 75 | 6.2.7.1 | Baseline Evaluation Results | 130401 | withdrawn |
| R1-1721307 | Text Proposal for Conclusion Section of TR36.777 | Ericsson, NTT DOCOMO, INC., Huawei, HiSilicon | Patrick Merias | 52292 | other | Discussion | | | 74 | 6.2.7 | Enhanced Support for Aerial Vehicles - SID in RP-171050 | 129401 | revised |
| R1-1721308 | Text proposal for downlink interference mitigation | Ericsson | Patrick Merias | 52292 | other | Discussion | | | 76 | 6.2.7.2 | DL Interference Mitigation | 111002 | agreed |
| R1-1721309 | Text Proposal for Conclusion Section of TR36.777 | Ericsson, NTT DOCOMO, INC., Huawei, HiSilicon | Patrick Merias | 52292 | other | Discussion | | | 74 | 6.2.7 | Enhanced Support for Aerial Vehicles - SID in RP-171050 | 129402 | agreed |
| R1-1721310 | LS on RAN1 conclusions and TPs approved in RAN1#91 | RAN1, Ericsson | Patrick Merias | 52292 | LS out | Decision | | sent | 74 | 6.2.7 | Enhanced Support for Aerial Vehicles - SID in RP-171050 | 130501 | approved |
| R1-1721311 | WF on Wake up Signal Details | CMCC | Patrick Merias | 52292 | discussion | Decision | | | 63 | 6.2.6.1.1.2 | Wake-up signal configurations and procedures | 131100 | withdrawn |
| R1-1721312 | RAN1 decisions for WI Shortened TTI and processing time for LTE (LTE_sTTIandPT) | Ericsson | Patrick Merias | 52292 | other | Discussion | | (revision of R1-1719246) | 15 | 6.2.1 | Shortened TTI and processing time for LTE - WID in RP-171468 | 0 | noted |
| R1-1721313 | RAN1 decisions for WI Shortened TTI and processing time for LTE (LTE_sTTIandPT) - per topic | Ericsson | Patrick Merias | 52292 | other | Discussion | | (revision of R1-1719247) | 15 | 6.2.1 | Shortened TTI and processing time for LTE - WID in RP-171468 | 0 | noted |
| R1-1721314 | RAN1 agreements for Rel-15 Further NB-IoT enhancements | Ericsson | Patrick Merias | 52292 | other | | | | 59 | 6.2.6 | Further enhancements of NB-IoT - WID in RP-172063 | 0 | available |
| R1-1721315 | Correction of interference in NB-IoT RACH procedure | Huawei, HiSilicon | Patrick Merias | 52292 | CR | Agreement | | | 12 | 6.1.6 | Maintenance of Release 14 Enhancements of NB-IoT for LTE | 0 | agreed |

| TDoc | Title | Source | Contact | Contact ID | Type | For | Abstract | Secretary Remarks | Agenda item sort order | Agenda item | Agenda item description | TDoc sort order within agenda item | TDoc Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R1-1721316 | LS on power consumption reduction progress | RAN1, Huawei | Kai-Erik Sunell | 74524 | LS out | Approval | | | 59 | 6.2.6 | Further enhancements of NB-IoT - WID in RP-172063 | 0 | approved |
| R1-1721317 | Clarification on 2 HARQ process applicability to UE-specific search space | Huawei, HiSilicon | Kai-Erik Sunell | 74524 | CR | Agreement | | | 12 | 6.1.6 | Maintenance of Release 14 Enhancements of NB-IoT for LTE | 105800 | agreed |
| R1-1721318 | void | ETSI | Patrick Merias | 52292 | other | | | | 5 | 6 | E-UTRA | 0 | withdrawn |
| R1-1721319 | void | ETSI | Patrick Merias | 52292 | other | | | | 5 | 6 | E-UTRA | 0 | withdrawn |
| R1-1721320 | void | ETSI | Patrick Merias | 52292 | other | | | | 5 | 6 | E-UTRA | 0 | withdrawn |
| R1-1721321 | void | ETSI | Patrick Merias | 52292 | other | | | | 5 | 6 | E-UTRA | 0 | withdrawn |
| R1-1721322 | void | ETSI | Patrick Merias | 52292 | other | | | | 5 | 6 | E-UTRA | 0 | withdrawn |
| R1-1721323 | void | ETSI | Patrick Merias | 52292 | other | | | | 5 | 6 | E-UTRA | 0 | withdrawn |
| R1-1721324 | void | ETSI | Patrick Merias | 52292 | other | | | | 5 | 6 | E-UTRA | 0 | withdrawn |
| R1-1721325 | Introduction of shortened processing time and shortened TTI - 36.211 s03-05 | Ericsson | Patrick Merias | 52292 | CR | Agreement | | | 15 | 6.2.1 | Shortened TTI and processing time for LTE - WID in RP-171468 | 0 | agreed |
| R1-1721326 | Introduction of shortened processing time and shortened TTI - 36.211 s06-08 | Ericsson | Patrick Merias | 52292 | CR | Agreement | | | 15 | 6.2.1 | Shortened TTI and processing time for LTE - WID in RP-171468 | 0 | agreed |
| R1-1721327 | Introduction of shortened processing time and shortened TTI into 36.212 | Huawei | Patrick Merias | 52292 | CR | Agreement | | | 15 | 6.2.1 | Shortened TTI and processing time for LTE - WID in RP-171468 | 0 | agreed |
| R1-1721328 | Introduction of shortened processing time and shortened TTI into 36.213, s00-s05 | Motorola Mobility | Patrick Merias | 52292 | CR | Agreement | | | 15 | 6.2.1 | Shortened TTI and processing time for LTE - WID in RP-171468 | 0 | agreed |
| R1-1721329 | Introduction of shortened processing time and shortened TTI into 36.213, s06-s09 | Motorola Mobility | Patrick Merias | 52292 | CR | Agreement | | | 15 | 6.2.1 | Shortened TTI and processing time for LTE - WID in RP-171468 | 0 | agreed |
| R1-1721330 | Introduction of shortened processing time and shortened TTI into 36.213, s10-s13 | Motorola Mobility | Patrick Merias | 52292 | CR | Agreement | | | 15 | 6.2.1 | Shortened TTI and processing time for LTE - WID in RP-171468 | 0 | agreed |
| R1-1721331 | void | ETSI | Patrick Merias | 52292 | other | | | | 5 | 6 | E-UTRA | 0 | withdrawn |
| R1-1721332 | void | ETSI | Patrick Merias | 52292 | other | | | | 5 | 6 | E-UTRA | 0 | withdrawn |
| R1-1721333 | void | ETSI | Patrick Merias | 52292 | other | | | | 5 | 6 | E-UTRA | 0 | withdrawn |
| R1-1721334 | void | ETSI | Patrick Merias | 52292 | other | | | | 5 | 6 | E-UTRA | 0 | withdrawn |
| R1-1721335 | void | ETSI | Patrick Merias | 52292 | other | | | | 5 | 6 | E-UTRA | 0 | withdrawn |
| R1-1721336 | void | ETSI | Patrick Merias | 52292 | other | | | | 5 | 6 | E-UTRA | 0 | withdrawn |
| R1-1721337 | void | ETSI | Patrick Merias | 52292 | other | | | | 5 | 6 | E-UTRA | 0 | withdrawn |
| R1-1721338 | void | ETSI | Patrick Merias | 52292 | other | | | | 5 | 6 | E-UTRA | 0 | withdrawn |
| R1-1721339 | TS38.201 v1.2.0 NR; Physical layer general description | NTT DOCOMO | Patrick Merias | 52292 | draft TS | Endorsement | | | 86 | 7 | NR - WID in RP-172115 | 10460 | endorsed |
| R1-1721340 | TS38.202 v1.2.0 NR; Physical layer services provided by the physical layer | Qualcomm | Patrick Merias | 52292 | draft TS | Endorsement | | | 86 | 7 | NR - WID in RP-172115 | 10470 | endorsed |
| R1-1721341 | TS38.211 v1.3.0 NR; Physical channels and modulation | Ericsson | Patrick Merias | 52292 | draft TS | Endorsement | | | 86 | 7 | NR - WID in RP-172115 | 10480 | endorsed |
| R1-1721342 | TS38.212 v1.2.1 NR; Multiplexing and channel coding | Huawei | Patrick Merias | 52292 | draft TS | Endorsement | | | 86 | 7 | NR - WID in RP-172115 | 0 | endorsed |
| R1-1721343 | TS38.213 v1.3.0 NR; Physical layer procedures for control | Samsung | Patrick Merias | 52292 | draft TS | Endorsement | | | 86 | 7 | NR - WID in RP-172115 | 10500 | endorsed |
| R1-1721344 | TS38.214 v1.3.0 NR; Physical layer procedures for data | Nokia | Patrick Merias | 52292 | draft TS | Endorsement | | | 86 | 7 | NR - WID in RP-172115 | 10510 | endorsed |
| R1-1721345 | TS38.215 v1.3.0 NR; Physical layer measurements | Intel Corporation (UK) Ltd | Patrick Merias | 52292 | draft TS | Endorsement | | | 86 | 7 | NR - WID in RP-172115 | 10520 | endorsed |
| R1-1721346 | LS to RAN2 on Beam Failure Recovery | RAN1, MediaTek | Patrick Merias | 52292 | LS out | Approval | | | 112 | 7.2.2.4 | Remaining details on mechanism to recover from beam failure | 0 | approved |
| R1-1721347 | WF on Length-6 CG sequences for DFT-s-OFDM | ZTE, Sanechip | Patrick Merias | 52292 | discussion | Decision | | | 118 | 7.2.3.3 | Remaining details on DMRS | 0 | available |
| R1-1721348 | WF on Wake up Signal Details | CMCC, Huawei, HiSilicon | Patrick Merias | 52292 | discussion | Decision | | | 63 | 6.2.6.1.1.2 | Wake-up signal configurations and procedures | 134800 | noted |
| R1-1721349 | Offline summary of radio resource pool sharing between UEs using mode 3 and UEs using mode 4 | NTT DOCOMO | Patrick Merias | 52292 | discussion | Decision | | | 45 | 6.2.3.4 | Resource pool sharing between mode-3 and mode-4 users | 134900 | noted |
| R1-1721350 | Paging design consideration | Qualcomm Incorporated | Patrick Merias | 52292 | discussion | Decision | | | 93 | 7.1.3 | Remaining details on Paging design | 6511 | available |
| R1-1721351 | UE Capability for Multi-antenna Transmission | Ericsson | Patrick Merias | 52292 | discussion | Discussion | | | 172 | 7.8 | Other | 135100 | available |
| R1-1721352 | Codebook based UL MIMO remaining details | Ericsson | Patrick Merias | 52292 | discussion | Discussion | | | 104 | 7.2.1.2 | Remaining details on codebook based transmission for UL | 135200 | withdrawn |
| R1-1721353 | Summary of SRS | Sony | Patrick Merias | 52292 | discussion | Decision | | | 120 | 7.2.3.5 | Remaining details on SRS | 135300 | revised |
| R1-1721354 | Summary of 7.3.3.1 (resource allocation) | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 145 | 7.3.3.1 | DL/UL resource allocation | 135400 | available |
| R1-1721355 | Summary of 7.3.1.4 (DCI contents and formats) | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 130 | 7.3.1.4 | DCI contents and formats | 135500 | noted |
| R1-1721356 | Offline summary for AI 7.1.3 on Paging | Huawei, HiSilicon | Patrick Merias | 52292 | discussion | Decision | | | 93 | 7.1.3 | Remaining details on Paging design | 135600 | revised |
| R1-1721357 | Remaining issues on PDCCH structure | Qualcomm Incorporated | Patrick Merias | 52292 | discussion | Decision | | | 127 | 7.3.1.1 | Remaining details on PDCCH structure | 6751 | available |
| R1-1721358 | Remaining details on PT-RS | NTT DOCOMO, INC. | Patrick Merias | 52292 | discussion | Decision | | | 119 | 7.2.3.4 | Remaining details on PT-RS | 8091 | available |
| R1-1721359 | Design details for UCI segmentation | CATT | Patrick Merias | 52292 | discussion | Decision | | | 163 | 7.4.2.2 | Details of conditions for UCI segmentation | 2121 | available |
| R1-1721360 | Summary of RAN1#91 Tdocs on PUCCH resource allocation | OPPO | Patrick Merias | 52292 | discussion | Decision | | | 142 | 7.3.2.4 | Resource allocation for PUCCH | 136000 | noted |
| R1-1721361 | Remaining details related to SS blocks | Nokia, Nokia Shanghai Bell | Patrick Merias | 52292 | discussion | Approval | | | 88 | 7.1.1 | Remaining Details on Synchronization signal | 8791 | available |
| R1-1721362 | On Remaining System Information Delivery | Nokia, Nokia Shanghai Bell | Patrick Merias | 52292 | discussion | Approval | | | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 8811 | available |
| R1-1721363 | Measurements for mobility management | Nokia, Nokia Shanghai Bell | Patrick Merias | 52292 | discussion | Approval | | | 98 | 7.1.5.1 | Remaining details on measurement for mobility management | 8841 | available |
| R1-1721364 | Remaining details on Remaining minimum system information | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 9371 | available |
| R1-1721365 | IMT-2020 self-evaluation: Reliability in NR | Ericsson | Patrick Merias | 52292 | discussion | Information | | | 172 | 7.8 | Other | 9601 | withdrawn |
| R1-1721366 | Remaining details of beam management | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 111 | 7.2.2.3 | Remaining details on beam measurement and reporting | 7301 | available |
| R1-1721367 | Beam management without beam indication | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 114 | 7.2.2.6 | Other | 7221 | available |
| R1-1721368 | Summary - Aspects related to FDD | ZTE, Sanechips | Patrick Merias | 52292 | discussion | Decision | | | 171 | 7.7 | Aspects related to FDD | 136800 | available |
| R1-1721369 | Summary of Discussion for NR Radio Link Monitoring | Intel Corp. | Patrick Merias | 52292 | discussion | Decision | | | 99 | 7.1.5.2 | Remaining details Radio link monitoring for mobility management | 136900 | available |
| R1-1721370 | Summary on CA Aspects | Samsung | Patrick Merias | 52292 | discussion | Decision | | | 154 | 7.3.4.2 | Other aspects on carrier aggregation | 137000 | revised |
| R1-1721371 | Summary of remaining issues on CSI measurement | ZTE, Sanechips | Patrick Merias | 52292 | discussion | Decision | | | 109 | 7.2.2.1 | Remaining details on CSI measurement | 137100 | noted |
| R1-1721372 | Summary of remaining issues on UL power control for A.I. 7.6 | ZTE, Sanechips | Patrick Merias | 52292 | discussion | | | | 167 | 7.6 | UL power control | 8391 | available |
| R1-1721373 | Details of UL beam management | ZTE, Sanechips | Patrick Merias | 52292 | discussion | | | | 114 | 7.2.2.6 | Other | 95391 | available |
| R1-1721374 | Summary of Monday offline discussion for NR Radio Link Monitoring | Intel Corp. | Patrick Merias | 52292 | discussion | Discussion | | | 99 | 7.1.5.2 | Remaining details Radio link monitoring for mobility management | 137400 | noted |
| R1-1721375 | Summary of Tuesday offline discussion for NR Radio Link Monitoring | Intel Corp. | Patrick Merias | 52292 | discussion | Decision | | | 99 | 7.1.5.2 | Remaining details Radio link monitoring for mobility management | 137500 | noted |
| R1-1721376 | Summary of Wednesday offline discussion for NR Radio Link Monitoring | Intel Corp. | Patrick Merias | 52292 | discussion | Decision | | | 99 | 7.1.5.2 | Remaining details Radio link monitoring for mobility management | 137600 | noted |
| R1-1721377 | Summary of Thursday offline discussion for NR Radio Link Monitoring | Intel Corp. | Patrick Merias | 52292 | discussion | Decision | | | 99 | 7.1.5.2 | Remaining details Radio link monitoring for mobility management | 137700 | noted |
| R1-1721378 | Summary of views on CSI reporting | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 110 | 7.2.2.2 | Remaining details on CSI reporting | 137800 | revised |
| R1-1721379 | Discussion on codebook based transmission for UL | LG Electronics | Patrick Merias | 52292 | discussion | Decision | | | 104 | 7.2.1.2 | Remaining details on codebook based transmission for UL | 99021 | available |
| R1-1721380 | Review Summary for AI 7.3.2.2 PUCCH structure in long-duration | Huawei, HiSilicon | Patrick Merias | 52292 | discussion | Decision | | | 137 | 7.3.2.2 | PUCCH structure in long-duration | 138000 | noted |
| R1-1721381 | Summary of 7.1.1 Remaining Details on Synchronization signal | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 88 | 7.1.1 | Remaining Details on Synchronization signal | 138100 | revised |

| TDoc | Title | Source | Contact | Contact ID | Type | For | Abstract | Secretary Remarks | Agenda item sort order | Agenda item | Agenda item description | TDoc sort order within agenda item | TDoc Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R1-1721382 | Summary of 7.1.2.1 Remaining details on NR-PBCH | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 90 | 7.1.2.1 | Remaining details on NR-PBCH | 138200 | revised |
| R1-1721383 | Sequence initialization for DMRS and CSI-RS | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 123 | 7.2.3.8 | Other | 7261 | available |
| R1-1721384 | Remaining details on SRS design | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 120 | 7.2.3.5 | Remaining details on SRS | 7441 | available |
| R1-1721385 | Discussion on SRS frequency hopping in NR | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 123 | 7.2.3.8 | Other | 9841 | available |
| R1-1721386 | Long PUCCH design with more than 2 bits UCI payload | Qualcomm Incorporated | Patrick Merias | 52292 | discussion | Decision | | | 139 | 7.3.2.2.2 | Long-PUCCH for UCI of more than 2 bits | 6831 | available |
| R1-1721387 | Multiplexing of PUCCH and PUSCH | Qualcomm Incorporated | Patrick Merias | 52292 | discussion | Decision | | | 141 | 7.3.2.3 | UCI multiplexing | 6851 | available |
| R1-1721388 | Summary for remaining issues of RS multiplexing | Huawei, HiSilicon | Patrick Merias | 52292 | discussion | Decision | | | 116 | 7.2.3.1 | Remaining details on Multiplexing of different types of RSs | 138800 | noted |
| R1-1721389 | Summary of Remaining details on PRACH formats | Convida Wireless | Patrick Merias | 52292 | discussion | Decision | | | 95 | 7.1.4.1 | Remaining details on PRACH formats | 138900 | revised |
| R1-1721390 | Discussion on MCS and TBS designs | Huawei, HiSilicon | Patrick Merias | 52292 | discussion | | | | 160 | 7.4.1.2 | Other | 7621 | available |
| R1-1721391 | LDPC coded bits interleaving and mapping to modulation symbols for HARQ retransmissions | Huawei, HiSilicon | Patrick Merias | 52292 | discussion | | | | 160 | 7.4.1.2 | Other | 7631 | available |
| R1-1721392 | Some Thoughts for RAN1 Management | RAN1 Chair | Patrick Merias | 52292 | other | Information | | | 3 | 4 | Approval of Minutes from previous meeting | 93021 | noted |
| R1-1721393 | Views on DL DMRS designs | Mitsubishi Electric Co. | Patrick Merias | 52292 | discussion | Decision | | | 118 | 7.2.3.3 | Remaining details on DMRS | 95181 | available |
| R1-1721394 | Summary of Open Issues on Layer Mapping | Samsung | Patrick Merias | 52292 | discussion | Decision | | | 103 | 7.2.1.1 | Remaining details on codeword mapping | 139400 | revised |
| R1-1721395 | Summary of Contributions on PUCCH Structure for Short Duration | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 133 | 7.3.2.1 | PUCCH structure in short-duration | 139500 | revised |
| R1-1721396 | Summary of beam management related issues | Qualcomm | Patrick Merias | 52292 | discussion | Decision | | | 111 | 7.2.2.3 | Remaining details on beam measurement and reporting | 139600 | noted |
| R1-1721397 | Summary for CQI and MCS | AT&T | Patrick Merias | 52292 | discussion | Decision | | | 113 | 7.2.2.5 | Remaining details on CQI and MCS | 139700 | revised |
| R1-1721398 | Beam management for NR | Qualcomm Incorporated | Patrick Merias | 52292 | discussion | Decision | | | 111 | 7.2.2.3 | Remaining details on beam measurement and reporting | 6621 | withdrawn |
| R1-1721399 | Codebook-Based UL Transmission | Samsung | Patrick Merias | 52292 | other | | | | 104 | 7.2.1.2 | Remaining details on codebook based transmission for UL | 2821 | available |
| R1-1721400 | Summary of issues on UL non-codebook based transmission | Nokia, Nokia Shanghai Bell | Patrick Merias | 52292 | discussion | Decision | | | 105 | 7.2.1.3 | Remaining details on non-codebook based transmission for UL | 140000 | noted |
| R1-1721401 | Summary of Remaining Details on RACH Procedure | Qualcomm | Patrick Merias | 52292 | discussion | Decision | | | 96 | 7.1.4.2 | Remaining details on RACH procedure | 140100 | revised |
| R1-1721402 | Email discussion summary for SFI | Qualcomm | Patrick Merias | 52292 | discussion | Decision | | | 129 | 7.3.1.3 | Remaining details on group-common PDCCH | 140200 | noted |
| R1-1721403 | Summary of open issues related to rate-matching in NR | Nokia, Nokia Shanghai Bell | Patrick Merias | 52292 | discussion | Decision | | | 155 | 7.3.5 | Remaining details on rate matching aspects for NR DL and UL | 140300 | revised |
| R1-1721404 | Further consideration on Polar code segmentation | ZTE, Sanechips | Patrick Merias | 52292 | discussion | Decision | | | 163 | 7.4.2.2 | Details of conditions for UCI segmentation | 95221 | available |
| R1-1721405 | Coding scheme for PBCH | ZTE, Sanechips | Patrick Merias | 52292 | discussion | Decision | | | 164 | 7.4.2.3 | Order and mapping of PBCH fields | 95231 | withdrawn |
| R1-1721406 | Remaining details of LDPC coding | ZTE, Sanechips | Patrick Merias | 52292 | discussion | Decision | | | 160 | 7.4.1.2 | Other | 95251 | revised |
| R1-1721407 | Summary of remaining issues on NR RRM | Samsung | Patrick Merias | 52292 | discussion | Decision | | | 98 | 7.1.5.1 | Remaining details on measurement for mobility management | 140700 | noted |
| R1-1721408 | Summary for AI 7.3.3.5 | Intel Corp. | Patrick Merias | 52292 | discussion | Decision | | | 149 | 7.3.3.5 | Soft-buffer management for NR | 140800 | noted |
| R1-1721409 | Final Issues for Rel-15 PDSCH/PUSCH's DM-RS | Qualcomm | Patrick Merias | 52292 | discussion | Decision | | | 118 | 7.2.3.3 | Remaining details on DMRS | 140900 | revised |
| R1-1721410 | Further Offline discussion on NR DM-RS | Qualcomm | Patrick Merias | 52292 | discussion | Decision | | | 118 | 7.2.3.3 | Remaining details on DMRS | 141000 | available |
| R1-1721411 | Support of 60 kHz subcarrier spacing | Huawei, HiSilicon | Patrick Merias | 52292 | other | | | | 151 | 7.3.3.7 | Other | 94031 | available |
| R1-1721412 | Summary on A.I. 7.1.2.3: Remaining details on other system information delivery | Samsung | Patrick Merias | 52292 | discussion | Decision | | | 92 | 7.1.2.3 | Remaining details on other system information delivery | 141200 | revised |
| R1-1721413 | Offline summary for AI 7.3.1.1 Remaining details on PDCCH structure | NTT DOCOMO | Patrick Merias | 52292 | discussion | Decision | | | 127 | 7.3.1.1 | Remaining details on PDCCH structure | 141300 | noted |
| R1-1721414 | Offline summary for AI 7.3.1.2 Remaining details on search space | NTT DOCOMO | Patrick Merias | 52292 | discussion | Decision | | | 128 | 7.3.1.2 | Remaining details on Search space | 141400 | noted |
| R1-1721415 | Offline summary for AI 7.3.3.4 UL data transmission procedure | NTT DOCOMO | Patrick Merias | 52292 | discussion | Decision | | | 148 | 7.3.3.4 | UL data transmission procedure | 141500 | revised |
| R1-1721416 | On PDSCH and PUSCH resource allocation | CATT | Patrick Merias | 52292 | discussion | Decision | | | 145 | 7.3.3.1 | DL/UL resource allocation | 2021 | available |
| R1-1721417 | Summary of DL/UL scheduling and HARQ management | Qualcomm | Patrick Merias | 52292 | discussion | Decision | | | 146 | 7.3.3.2 | DL/UL scheduling and HARQ management | 141700 | revised |
| R1-1721418 | Summary of multiplexing data with different transmission durations | vivo | Patrick Merias | 52292 | discussion | Decision | | | 150 | 7.3.3.6 | Multiplexing data with different transmission durations | 141800 | revised |
| R1-1721419 | Summary of TRS remaining details | MediaTek | Patrick Merias | 52292 | discussion | Decision | | | 121 | 7.2.3.6 | Remaining details on TRS | 141900 | noted |
| R1-1721420 | Summary on remaining issues on DL PRB bundling | vivo | Patrick Merias | 52292 | discussion | Decision | | | 106 | 7.2.1.4 | Remaining details on PRB bundling for DL | 142000 | noted |
| R1-1721421 | On CSI-RS design | LG Electronics | Patrick Merias | 52292 | discussion | Decision | | | 117 | 7.2.3.2 | Remaining details on CSI-RS | 99111 | available |
| R1-1721422 | Offline summary of UL power control – CA aspects | Samsung | Patrick Merias | 52292 | discussion | Decision | | | 169 | 7.6.2 | Remaining details on NR UL power control – CA aspects | 142200 | revised |
| R1-1721423 | Summary of the review on CBG based retransmission | LG Electronics | Patrick Merias | 52292 | discussion | Decision | | | 147 | 7.3.3.3 | CBG-based (re)transmission | 142300 | available |
| R1-1721424 | Remaining coex-related issues | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 166 | 7.5 | NR-LTE co-existence | 4461 | available |
| R1-1721425 | BWP and random access | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 96 | 7.1.4.2 | Remaining details on RACH procedure | 142500 | available |
| R1-1721426 | Summary of e-mail discussion on 90b-NR-25, DCI content | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 130 | 7.3.1.4 | DCI contents and formats | 8521 | noted |
| R1-1721427 | Considerations for short-length uplink control | Qualcomm Incorporated | Patrick Merias | 52292 | discussion | Decision | | | 162 | 7.4.2.1 | Uplink CRCs | 7011 | available |
| R1-1721428 | DCI CRC Initialization and Masking | Qualcomm Incorporated | Patrick Merias | 52292 | discussion | Decision | | | 165 | 7.4.2.4 | Other | 7041 | available |
| R1-1721429 | Summary of QCL | Nokia, Nokia Shanghai Bell | Patrick Merias | 52292 | discussion | Decision | | | 122 | 7.2.3.7 | Remaining details on QCL | 142900 | noted |
| R1-1721430 | Remaining details of TRS design | Nokia, Nokia Shanghai Bell | Patrick Merias | 52292 | discussion | Decision | | | 121 | 7.2.3.6 | Remaining details on TRS | 8981 | available |
| R1-1721431 | Reply LS on CR for Reference Signals for MBSFN with 1.25kHz and 7.5khz sub-carrier spacing | RAN1, Intel Corporation | Patrick Merias | 52292 | LS out | Approval | | sent | 4 | 5 | Incoming Liaison Statements | 191 | approved |
| R1-1721432 | Remaining details on DMRS | Qualcomm Incorporated | Patrick Merias | 52292 | discussion | Decision | | | 118 | 7.2.3.3 | Remaining details on DMRS | 6681 | available |
| R1-1721433 | Remaining details of CQI and MCS design | Huawei, HiSilicon | Patrick Merias | 52292 | other | | | | 113 | 7.2.2.5 | Remaining details on CQI and MCS | 94291 | available |
| R1-1721434 | Remaining details on sync signals | Samsung | Patrick Merias | 52292 | other | | | | 88 | 7.1.1 | Remaining Details on Synchronization signal | 2721 | available |
| R1-1721435 | Offline Discussion Summary on Codebook based transmission for UL | Intel | Patrick Merias | 52292 | discussion | Decision | | | 104 | 7.2.1.2 | Remaining details on codebook based transmission for UL | 143500 | noted |
| R1-1721436 | List of RRC parameters for NR | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 86 | 7 | NR - WID in RP-172115 | 143600 | revised |
| R1-1721437 | [Draft LS] On RRC parameters for NR | Ericsson | Patrick Merias | 52292 | LS out | Decision | | | 86 | 7 | NR - WID in RP-172115 | 143700 | revised |
| R1-1721438 | Comments on UE feature list for scheduling HARQ, CA/DC, BWP, SUL and power control | Ericsson | Patrick Merias | 52292 | discussion | Discussion | | | 172 | 7.8 | Other | 143800 | available |
| R1-1721439 | WF on frequency reference and raster definitions | Qualcomm | Patrick Merias | 52292 | discussion | Decision | | | 90 | 7.1.2.1 | Remaining details on NR-PBCH | 143900 | noted |
| R1-1721440 | Considerations on BG determination | ZTE, Sanechips | Patrick Merias | 52292 | discussion | Decision | | | 159 | 7.4.1.1 | Nominal code rate / BG determination | 95241 | noted |
| R1-1721441 | Summary of PTRS open issues | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 119 | 7.2.3.4 | Remaining details on PT-RS | 144100 | noted |
| R1-1721442 | Summary of Bandwidth Part Operation | MediaTek | Patrick Merias | 52292 | discussion | Decision | | | 153 | 7.3.4.1 | Other aspects on bandwidth Parts | 144200 | revised |
| R1-1721443 | Summary of remaining issues on CSI-RS | Huawei, HiSilicon | Patrick Merias | 52292 | discussion | Decision | | | 117 | 7.2.3.2 | Remaining details on CSI-RS | 144300 | noted |
| R1-1721444 | WF on LTE scheduling/HARQ timing for EN-DC UEs | vivo, OPPO, China Telecom, Xiaomi, ZTE, Orange, CMCC, China Unicom | Patrick Merias | 52292 | discussion | Decision | | | 166 | 7.5 | NR-LTE co-existence | 144400 | noted |
| R1-1721445 | CQI Tables and MCS Tables for NR | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 113 | 7.2.2.5 | Remaining details on CQI and MCS | 95951 | available |
| R1-1721446 | Nominal Code Rate Calculation and Base Graph Determination | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 159 | 7.4.1.1 | Nominal code rate / BG determination | 95981 | noted |
| R1-1721447 | TBS Determination With LDPC Considerations | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 160 | 7.4.1.2 | Other | 96031 | available |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R1-1721448 | Summary of Contributions on PUCCH Structure for Short Duration | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 133 | 7.3.2.1 | PUCCH structure in short-duration | 139501 | revised |
| R1-1721449 | WF on remaining aspects on SUL operations | Huawei, HiSilicon | Patrick Merias | 52292 | discussion | Decision | | | 166 | 7.5 | NR-LTE co-existence | 144900 | revised |
| R1-1721450 | Summary on A.I. 7.1.2.3: Remaining details on other system information delivery | Samsung | Patrick Merias | 52292 | discussion | Decision | | | 92 | 7.1.2.3 | Remaining details on other system information delivery | 141201 | revised |
| R1-1721451 | Summary of views on CSI reporting | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 110 | 7.2.2.2 | Remaining details on CSI reporting | 137801 | noted |
| R1-1721452 | Remaining aspects on pre-emption indication for DL multiplexing of URLLC and eMBB | Huawei, HiSilicon | Patrick Merias | 52292 | other | | | | 150 | 7.3.3.6 | Multiplexing data with different transmission durations | 94021 | available |
| R1-1721453 | Remaining Aspects of NR Power Control | CATT | Patrick Merias | 52292 | discussion | Decision | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 2151 | available |
| R1-1721454 | Offline summary for AI 7.3.3.4 UL data transmission procedure | NTT DOCOMO | Patrick Merias | 52292 | discussion | Decision | | | 148 | 7.3.3.4 | UL data transmission procedure | 141501 | revised |
| R1-1721455 | WF on SRS bandwidth configuration | Samsung, Huawei, ZTE, Ericsson, Intel | Patrick Merias | 52292 | discussion | Decision | | | 120 | 7.2.3.5 | Remaining details on SRS | 145500 | noted |
| R1-1721456 | WF on DMRS for Pi/2 BPSK based PUSCH | Qualcomm | Patrick Merias | 52292 | discussion | Decision | | | 118 | 7.2.3.3 | Remaining details on DMRS | 145600 | revised |
| R1-1721457 | Offline summary of UL power control – non-CA aspects | ZTE, Sanechips | Patrick Merias | 52292 | discussion | Decision | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 145700 | revised |
| R1-1721458 | WF on some remaining issues for ULPC | LG Electronics, Ericsson, Intel Corporation, Nokia, Nokia Shanghai Bell, Samsung, ZTE, Sanechips | Patrick Merias | 52292 | discussion | Decision | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 145800 | noted |
| R1-1721459 | WF on length of rate matching output sequence | Samsung | Patrick Merias | 52292 | other | | | | 160 | 7.4.1.2 | Other | 2361 | revised |
| R1-1721460 | Summary of SRS | Sony | Patrick Merias | 52292 | discussion | Decision | | | 120 | 7.2.3.5 | Remaining details on SRS | 146000 | revised |
| R1-1721461 | Arrangement of PBCH Fields for Polar Codes | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 164 | 7.4.2.3 | Order and mapping of PBCH fields | 96081 | available |
| R1-1721462 | Remaining Issues of Polar Code Construction for UCI | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 165 | 7.4.2.4 | Other | 96111 | available |
| R1-1721463 | Further Study of Bit-level Channel Interleaving for LDPC Codes | Ericsson | Patrick Merias | 52292 | discussion | Discussion | | | 160 | 7.4.1.2 | Other | 146300 | available |
| R1-1721464 | WF on Max Code Rate for BG2 | Ericsson, Samsung, MediaTek | Patrick Merias | 52292 | discussion | Decision | | | 159 | 7.4.1.1 | Nominal code rate / BG determination | 146400 | noted |
| R1-1721465 | Minimum Mother Polar Code Size | Samsung | Patrick Merias | 52292 | discussion | Discussion | | | 165 | 7.4.2.4 | Other | 146500 | available |
| R1-1721466 | Summary of 7.1.1 Remaining Details on Synchronization signal | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 88 | 7.1.1 | Remaining Details on Synchronization signal | 138101 | revised |
| R1-1721467 | Summary of 7.1.2.1 Remaining details on NR-PBCH | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 90 | 7.1.2.1 | Remaining details on NR-PBCH | 138201 | revised |
| R1-1721468 | Summary of Open Issues on Layer Mapping | Samsung | Patrick Merias | 52292 | discussion | Decision | | | 103 | 7.2.1.1 | Remaining details on codeword mapping | 139401 | available |
| R1-1721469 | Power split in TDM cases | Qualcomm | Patrick Merias | 52292 | discussion | Decision | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 146900 | noted |
| R1-1721470 | TBS and Base-graph Determination | Qualcomm Incorporated | Patrick Merias | 52292 | discussion | Decision | | | 159 | 7.4.1.1 | Nominal code rate / BG determination | 6991 | withdrawn |
| R1-1721471 | Summary of Remaining details on PRACH formats | Convida Wireless | Patrick Merias | 52292 | discussion | Decision | | | 95 | 7.1.4.1 | Remaining details on PRACH formats | 138901 | revised |
| R1-1721472 | Summary of DL/UL scheduling and HARQ management | Qualcomm | Patrick Merias | 52292 | discussion | Decision | | | 146 | 7.3.3.2 | DL/UL scheduling and HARQ management | 141701 | revised |
| R1-1721473 | Summary of Offline Discussion on RMSI | CATT | Patrick Merias | 52292 | discussion | Decision | | | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 1691 | revised |
| R1-1721474 | On UL power sharing for coverage enhancement | Orange, OPPO, Huawei | Patrick Merias | 52292 | discussion | Decision | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 147400 | revised |
| R1-1721475 | On the remaining details of long PUCCH for UCI more than 2 bits | Nokia, Nokia Shanghai Bell | Patrick Merias | 52292 | discussion | Decision | | | 139 | 7.3.2.2.2 | Long-PUCCH for UCI of more than 2 bits | 111 | available |
| R1-1721476 | Summary of Remaining Details on RACH Procedure | Qualcomm | Patrick Merias | 52292 | discussion | Decision | | | 96 | 7.1.4.2 | Remaining details on RACH procedure | 140101 | revised |
| R1-1721477 | Summary of offline discussion on PUCCH resource allocation | OPPO | Patrick Merias | 52292 | discussion | Decision | | | 142 | 7.3.2.4 | Resource allocation for PUCCH | 147700 | revised |
| R1-1721478 | Summary for CQI and MCS | AT&T | Patrick Merias | 52292 | discussion | Decision | | | 113 | 7.2.2.5 | Remaining details on CQI and MCS | 139701 | noted |
| R1-1721479 | TBS and Base-graph Determination | Qualcomm Incorporated | Patrick Merias | 52292 | discussion | Decision | | | 159 | 7.4.1.1 | Nominal code rate / BG determination | 6992 | available |
| R1-1721480 | WF on Power Control | Intel, Nokia, NSB, NEC, Spreadtrum, OPPO, InterDigital, ZTE, Sanechip, Qualcomm, MediaTek, Samsung | Patrick Merias | 52292 | discussion | Decision | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 148000 | noted |
| R1-1721481 | WF on RE mapping for DFT-SOFDM with intra-slot frequency hopping | MediaTek | Patrick Merias | 52292 | discussion | Decision | | | 103 | 7.2.1.1 | Remaining details on codeword mapping | 148100 | revised |
| R1-1721482 | Reply LS on QCIs for EPC based ULLC | SA1, Vodafone | Patrick Merias | 52292 | LS in | Discussion | | | 4 | 5 | Incoming Liaison Statements | 148200 | postponed |
| R1-1721483 | WF on CQI calculation | LG Electronics, Huawei, HiSilicon, CATT, Spreadtrum, Nokia, NSB, vivo, ZTE, KT corporation | Patrick Merias | 52292 | discussion | Decision | | | 110 | 7.2.2.2 | Remaining details on CSI reporting | 148300 | revised |
| R1-1721484 | WF on PTRS port indication | ZTE, Sanechips, Samsung, NEC, vivo, Intel, Huawei, HiSilicon, ASTRI, Spreadtrum, LG Electronics, DOCOMO, InterDigital | Patrick Merias | 52292 | discussion | Decision | | | 119 | 7.2.3.4 | Remaining details on PT-RS | 148400 | available |
| R1-1721485 | [draft] LS on RMSI TTI | CATT | Patrick Merias | 52292 | LS out | Decision | | | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 148500 | revised |
| R1-1721486 | On TBS quantization | CATT | Patrick Merias | 52292 | discussion | Discussion | | | 160 | 7.4.1.2 | Other | 148600 | available |
| R1-1721487 | WF on pre-DFT PT-RS pattern for DFTsOFDM | Mitsubishi Electric, Ericsson, Nokia, NSB, IITH, IITM, CeWit, Tejas Networks, Reliance Jio, AT&T, Sharp, Interdigital, DoCoMo, LGE, CATT | Patrick Merias | 52292 | discussion | Decision | | | 119 | 7.2.3.4 | Remaining details on PT-RS | 148700 | noted |
| R1-1721488 | Summary of offline session on 7.3.3.1 (resource allocation) | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 145 | 7.3.3.1 | DL/UL resource allocation | 148800 | noted |
| R1-1721489 | Summary of Offline Discussion on Polar Code: Segmentation and Channel Interleaver | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 163 | 7.4.2.2 | Details of conditions for UCI segmentation | 148900 | noted |
| R1-1721490 | [draft] LS on RMSI TTI | CATT | Patrick Merias | 52292 | LS out | Decision | | | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 148501 | revised |
| R1-1721491 | Summary of multiplexing data with different transmission durations | vivo | Patrick Merias | 52292 | discussion | Decision | | | 150 | 7.3.3.6 | Multiplexing data with different transmission durations | 141801 | noted |
| R1-1721492 | WF on CSI-RS sequence | LG Electronics, Qualcomm, Samsung, Nokia, Nokia Shanghai Bell, ZTE, Sanechips, Mitsubishi Electric, AT&T, Intel Corporation | Patrick Merias | 52292 | discussion | Decision | | | 117 | 7.2.3.2 | Remaining details on CSI-RS | 149200 | noted |
| R1-1721493 | WF on beam management | ZTE | Patrick Merias | 52292 | discussion | Decision | | | 118 | 7.2.3.3 | Remaining details on DMRS | 149300 | available |
| R1-1721494 | Summary for Remaining issues on Beam Failure Recovery | MediaTek | Patrick Merias | 52292 | discussion | Decision | | | 112 | 7.2.2.4 | Remaining details on mechanism to recover from beam failure | 149400 | noted |
| R1-1721495 | LS on RMSI TTI | RAN1, CATT | Patrick Merias | 52292 | LS out | Decision | | | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 148502 | withdrawn |
| R1-1721496 | NR Features and Capabilities | Qualcomm Incorporated | Patrick Merias | 52292 | discussion | Decision | | | 86 | 7 | NR - WID in RP-172115 | 6961 | noted |

| TDoc | Title | Source | Contact | Contact ID | Type | For | Abstract | Secretary Remarks | Agenda item sort order | Agenda item | Agenda item description | TDoc sort order within agenda item | TDoc Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R1-1721497 | OFDM baseband signal generation for initial access | Samsung | Patrick Merias | 52292 | discussion | Discussion | | | 88 | 7.1.1 | Remaining Details on Synchronization signal | 149700 | available |
| R1-1721498 | Summary of Remaining Details on RACH Procedure | Qualcomm | Patrick Merias | 52292 | discussion | Decision | | | 96 | 7.1.4.2 | Remaining details on RACH procedure | 140102 | revised |
| R1-1721499 | WF on length of rate matching output sequence | Samsung | Patrick Merias | 52292 | other | | | | 160 | 7.4.1.2 | Other | 2362 | available |
| R1-1721500 | Summary from offline FDD related aspects | ZTE | Patrick Merias | 52292 | discussion | Decision | | | 171 | 7.7 | Aspects related to FDD | 150000 | noted |
| R1-1721501 | Summary of CSI-RS offline | Huawei, HiSilicon | Patrick Merias | 52292 | discussion | Decision | | | 117 | 7.2.3.2 | Remaining details on CSI-RS | 150100 | noted |
| R1-1721502 | On UL power sharing for coverage enhancement | Orange, NTT Docomo, AT&T, China Telecom, China Unicom, DT, Verizon, Bouygues Telecom, Huawei, ZTE, Ericsson, CATT, OPPO, Vivo, Xiaomi, Apple, HiSilicon | Patrick Merias | 52292 | discussion | Decision | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 147401 | revised |
| R1-1721503 | Way Forward on NR PBCH bit mapping design | MediaTek, Huawei, Hisilicon, CATT, Nokia, InterDigital, ITRI, ZTE, CLX, Ericsson, Intel, Docomo, LG | Patrick Merias | 52292 | discussion | Decision | | | 164 | 7.4.2.3 | Order and mapping of PBCH fields | 150300 | noted |
| R1-1721504 | Summary of Bandwidth Part Operation | MediaTek | Patrick Merias | 52292 | discussion | Decision | | | 153 | 7.3.4.1 | Other aspects on bandwidth Parts | 144201 | noted |
| R1-1721505 | Offline Discussion on DM-RS | Qualcomm | Patrick Merias | 52292 | discussion | Decision | | | 118 | 7.2.3.3 | Remaining details on DMRS | 150500 | noted |
| R1-1721506 | WF on PT-RS for Mini-Slot | NTT DOCOMO, Ericsson, InterDigital, LGE, Nokia, NEC, Samsung, Sharp, vivo, ZTE, Sanechips | Patrick Merias | 52292 | discussion | Decision | | | 119 | 7.2.3.4 | Remaining details on PT-RS | 150600 | noted |
| R1-1721507 | Tuesday summary of PTRS | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 119 | 7.2.3.4 | Remaining details on PT-RS | 150700 | revised |
| R1-1721508 | Summary of potential RRC impact to TRS | MediaTek | Patrick Merias | 52292 | discussion | Decision | | | 121 | 7.2.3.6 | Remaining details on TRS | 150800 | noted |
| R1-1721509 | Summary of Remaining details on PRACH formats | Convida Wireless | Patrick Merias | 52292 | discussion | Decision | | | 95 | 7.1.4.1 | Remaining details on PRACH formats | 138902 | revised |
| R1-1721510 | Offline summary for AI 7.3.3.4 UL data transmission procedure | NTT DOCOMO | Patrick Merias | 52292 | discussion | Decision | | | 148 | 7.3.3.4 | UL data transmission procedure | 141502 | noted |
| R1-1721511 | Offline for PDCCH structure | NTT DOCOMO | Patrick Merias | 52292 | discussion | Decision | | | 127 | 7.3.1.1 | Remaining details on PDCCH structure | 151100 | noted |
| R1-1721512 | Offline for Search space | NTT DOCOMO | Patrick Merias | 52292 | discussion | Decision | | | 128 | 7.3.1.2 | Remaining details on Search space | 151200 | noted |
| R1-1721513 | Summary of offline discussions on QCL | Nokia | Patrick Merias | 52292 | discussion | Decision | | | 122 | 7.2.3.7 | Remaining details on QCL | 151300 | revised |
| R1-1721514 | WF on subcarrier selection for PTRS | Ericsson, ZTE, Sanechips, NEC, LGE, Spreadtrum | Patrick Merias | 52292 | discussion | Decision | | | 119 | 7.2.3.4 | Remaining details on PT-RS | 151400 | noted |
| R1-1721515 | Summary of DL/UL scheduling and HARQ management | Qualcomm | Patrick Merias | 52292 | discussion | Decision | | | 146 | 7.3.3.2 | DL/UL scheduling and HARQ management | 141702 | revised |
| R1-1721516 | WF on Placement for PTRS for DFT-s-OFDM | Huawei, HiSilicon, Spreadtrum, Intel, NEC, ZTE, Sanechips, vivo, Ericsson, Qualcomm, Samsung, LG Electronics, CATT, IITH, CEWiT, IITM, Tejas Networks | Patrick Merias | 52292 | discussion | Decision | | | 119 | 7.2.3.4 | Remaining details on PT-RS | 151600 | noted |
| R1-1721517 | WF on PT-RS power boosting | LG Electronics, Intel, ZTE, Sanechips, Spreadtrum, Huawei, HiSilicon, InterDigital, Nokia, Shanghai-bell-Nokia, Samsung | Patrick Merias | 52292 | discussion | Decision | | | 119 | 7.2.3.4 | Remaining details on PT-RS | 151700 | noted |
| R1-1721518 | Remaining details of LDPC coding | ZTE, Sanechips | Patrick Merias | 52292 | discussion | Decision | | | 160 | 7.4.1.2 | Other | 95252 | revised |
| R1-1721519 | [Draft] Reply LS on SPS and Grant-free | NTT DOCOMO | Patrick Merias | 52292 | LS out | Decision | | | 148 | 7.3.3.4 | UL data transmission procedure | 151900 | revised |
| R1-1721520 | WF on DMRS Scrambling IDs | Huawei, HiSilicon, China Unicom, Ericsson, vivo, NEC, Deutsche Telekom, Sharp, InterDigital, MediaTek, Spreadtrum, Lenovo, Motorola Mobility, CATT, III | Patrick Merias | 52292 | discussion | Decision | | | 118 | 7.2.3.3 | Remaining details on DMRS | 152000 | noted |
| R1-1721521 | Offline summary of UL power control – non-CA aspects | ZTE, Sanechips | Patrick Merias | 52292 | discussion | Decision | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 145701 | revised |
| R1-1721522 | LS on BWP related agreements | RAN2, LG Electronics | Patrick Merias | 52292 | LS in | Decision | | | 4 | 5 | Incoming Liaison Statements | 152200 | treated |
| R1-1721523 | WF on handling partial beam failure | NTT DOCOMO, Samsung, MediaTek, AT&T, ZTE, Intel, Huawei | Patrick Merias | 52292 | discussion | Decision | | | 112 | 7.2.2.4 | Remaining details on mechanism to recover from beam failure | 152300 | available |
| R1-1721524 | LS to RAN1 on beam recovery failure | RAN2, Nokia | Patrick Merias | 52292 | LS in | Decision | | | 4 | 5 | Incoming Liaison Statements | 152400 | treated |
| R1-1721525 | WF on CQI calculation | LG Electronics, Huawei, HiSilicon, CATT, Spreadtrum, Nokia, NSB, vivo, ZTE, KT corporation, ITRI, Samsung, OPPO, NEC | Patrick Merias | 52292 | discussion | Decision | | | 110 | 7.2.2.2 | Remaining details on CSI reporting | 148301 | noted |
| R1-1721526 | Summary of open issues related to rate-matching in NR | Nokia, Nokia Shanghai Bell | Patrick Merias | 52292 | discussion | Decision | | | 155 | 7.3.5 | Remaining details on rate matching aspects for NR DL and UL | 140301 | noted |
| R1-1721527 | WF on CSI timing offset for PUSCH | LG Electronics, Ericsson, InterDigital, Samsung | Patrick Merias | 52292 | discussion | Decision | | | 110 | 7.2.2.2 | Remaining details on CSI reporting | 152700 | noted |
| R1-1721528 | Summary of offline session on 7.3.3.1 part II | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 145 | 7.3.3.1 | DL/UL resource allocation | 152800 | noted |
| R1-1721529 | NZP CSI-RS for interference measurement | Huawei, HiSilicon, Ericsson, Tejas Network, III, Deutsche Telekom, IITH, KDDI, Softbank, CEWiT, IITM, China Unicom, Spreadtrum, Qualcomm, Intel, ZTE, Sanechips, OPPO, Sharp | Patrick Merias | 52292 | discussion | Decision | | | 109 | 7.2.2.1 | Remaining details on CSI measurement | 152900 | agreed |
| R1-1721530 | WF on PT-RS RB offset | InterDigital, Huawei, HiSilicon, Samsung, vivo, Intel, ZTE, Sanechips, Spreadtrum, LGE, NEC, Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 119 | 7.2.3.4 | Remaining details on PT-RS | 153000 | noted |
| R1-1721531 | Summary on PRB Grid Offset Indication | Samsung | Patrick Merias | 52292 | discussion | Decision | | | 88 | 7.1.1 | Remaining Details on Synchronization signal | 153100 | available |

| TDoc | Title | Source | Contact | Contact ID | Type | For | Abstract | Secretary Remarks | Agenda item sort order | Agenda item | Agenda item description | TDoc sort order within agenda item | TDoc Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R1-1721532 | Summary on Frequency Offset Indication for TDM Scenario where SS BW and RMSI BW are Confined within Minimum Carrier Bandwidth | Samsung | Patrick Merias | 52292 | discussion | Decision | | | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 153200 | available |
| R1-1721533 | Summary on Frequency Offset Indication for TDM Scenario where SS BW and RMSI BW are Confined within UE Minimum Bandwidth | Samsung | Patrick Merias | 52292 | discussion | Decision | | | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 153300 | available |
| R1-1721534 | Summary on A.I. 7.1.2.3: Remaining details on other system information delivery | Samsung | Patrick Merias | 52292 | discussion | Decision | | | 92 | 7.1.2.3 | Remaining details on other system information delivery | 141202 | noted |
| R1-1721535 | Offline summary for AI 7.1.3 on Paging | Huawei, HiSilicon | Patrick Merias | 52292 | discussion | Decision | | | 93 | 7.1.3 | Remaining details on Paging design | 135601 | revised |
| R1-1721536 | WF on UE Capability Report for PT-RS | Samsung, ZTE, Sanechips, vivo, Intel, NEC, LG, IITH, CEWiT, IITM, Tejas Neworks, Spreadtrum, Huawei, HiSilicon | Patrick Merias | 52292 | discussion | Decision | | | 119 | 7.2.3.4 | Remaining details on PT-RS | 153600 | noted |
| R1-1721537 | Wednesday morning summary of PTRS | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 119 | 7.2.3.4 | Remaining details on PT-RS | 153700 | noted |
| R1-1721538 | [Draft] LS on NR TDD UL/DL configurations and support of HPUE | SoftBank, Sprint | Patrick Merias | 52292 | LS out | Decision | | | 129 | 7.3.1.3 | Remaining details on group-common PDCCH | 2481 | revised |
| R1-1721539 | WF on DMRS Scrambling ID | Qualcomm, Samsung, ZTE, Sanechips, Nokia, NSB, LGE, Intel | Patrick Merias | 52292 | discussion | Decision | | | 118 | 7.2.3.3 | Remaining details on DMRS | 153900 | noted |
| R1-1721540 | WF on DMRS for Pi/2 BPSK based PUSCH | Qualcomm | Patrick Merias | 52292 | discussion | Decision | | | 118 | 7.2.3.3 | Remaining details on DMRS | 145601 | available |
| R1-1721541 | Further Consideration on DCI Loading | Coherent Logix | Patrick Merias | 52292 | discussion | Discussion | | | 165 | 7.4.2.4 | Other | 7481 | available |
| R1-1721542 | WF on the granularity of backhaul signaling to consider LTE LR for single UL Tx and UL DL TDM | LG Electronics | Patrick Merias | 52292 | discussion | Decision | | | 166 | 7.5 | NR-LTE co-existence | 154200 | available |
| R1-1721543 | On the issues of BG selection | MediaTek Inc. | Patrick Merias | 52292 | discussion | | | | 159 | 7.4.1.1 | Nominal code rate / BG determination | 95781 | available |
| R1-1721544 | On TBS determination formula | MediaTek Inc. | Patrick Merias | 52292 | discussion | | | | 160 | 7.4.1.2 | Other | 95791 | revised |
| R1-1721545 | Summary of email discussion [90b-NR-02] on eV2X evaluation methodology | LG Electronics | Patrick Merias | 52292 | discussion | Decision | | | 172 | 7.8 | Other | 154500 | noted |
| R1-1721546 | RRC Parameters for CSI measurement | ZTE, Sanechips | Patrick Merias | 52292 | discussion | Discussion | | | 109 | 7.2.2.1 | Remaining details on CSI measurement | 154600 | noted |
| R1-1721547 | Summary of remaining Issues on NR RRM | Samsung | Patrick Merias | 52292 | discussion | Decision | | | 98 | 7.1.5.1 | Remaining details on measurement for mobility management | 154700 | revised |
| R1-1721548 | Offline summary of UL power control – CA aspects | Samsung | Patrick Merias | 52292 | discussion | Decision | | | 169 | 7.6.2 | Remaining details on NR UL power control – CA aspects | 142201 | noted |
| R1-1721549 | Offline Summary for Remaining issues on Beam Failure Recovery | MediaTek | Patrick Merias | 52292 | discussion | Decision | | | 112 | 7.2.2.4 | Remaining details on mechanism to recover from beam failure | 154900 | noted |
| R1-1721550 | Summary of 7.1.1 Remaining Details on Synchronization signal | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 88 | 7.1.1 | Remaining Details on Synchronization signal | 138102 | revised |
| R1-1721551 | Summary of 7.1.2.1 Remaining details on NR-PBCH | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 90 | 7.1.2.1 | Remaining details on NR-PBCH | 138202 | revised |
| R1-1721552 | void | MediaTek | Patrick Merias | 52292 | other | | | | 153 | 7.3.4.1 | Other aspects on bandwidth Parts | 156100 | withdrawn |
| R1-1721553 | Summary of Remaining Details on RACH Procedure | Qualcomm | Patrick Merias | 52292 | discussion | Decision | | | 96 | 7.1.4.2 | Remaining details on RACH procedure | 140103 | revised |
| R1-1721554 | Summary of Offline Discussion on RMSI | CATT | Patrick Merias | 52292 | discussion | Decision | | | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 1692 | revised |
| R1-1721555 | On UL power sharing for coverage enhancement | Orange, NTT Docomo, AT&T, China Telecom, China Unicom, DT, Verizon, Bouygues Telecom, Huawei, ZTE, Ericsson, CATT, OPPO, Vivo, Xiaomi, Apple, HiSilicon | Patrick Merias | 52292 | discussion | Decision | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 147402 | noted |
| R1-1721556 | On PUCCH collisions with explicit PUCCH resource allocation | Nokia, Nokia Shanghai Bell | Patrick Merias | 52292 | discussion | Discussion | | | 143 | 7.3.2.5 | Other | 156200 | available |
| R1-1721557 | LS on NR RMSI TTI | RAN1, CATT | Patrick Merias | 52292 | LS out | Approval | | sent | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 156200 | approved |
| R1-1721558 | Summary of Beam Mgmt | Qualcomm | Patrick Merias | 52292 | discussion | Decision | | | 111 | 7.2.2.3 | Remaining details on beam measurement and reporting | 156200 | revised |
| R1-1721559 | Summary of offline discussion on PUCCH resource allocation | OPPO | Patrick Merias | 52292 | discussion | Decision | | | 142 | 7.3.2.4 | Resource allocation for PUCCH | 147701 | revised |
| R1-1721560 | LS on NR TDD UL/DL configurations and support of HPUE | RAN1, SoftBank, Sprint | Patrick Merias | 52292 | LS out | Decision | | sent | 129 | 7.3.1.3 | Remaining details on group-common PDCCH | 2482 | approved |
| R1-1721561 | [Draft] LS on PRACH with ON-OFF time mask | Intel | Patrick Merias | 52292 | LS out | Decision | | | 95 | 7.1.4.1 | Remaining details on PRACH formats | 156100 | revised |
| R1-1721562 | WF on sequence re-ordering for length-12 CGS | ZTE, Sanechips, Huawei, HiSilicon | Patrick Merias | 52292 | discussion | Decision | | | 134 | 7.3.2.1.1 | Short-PUCCH for UCI of up to 2 bits | 156200 | available |
| R1-1721563 | Summary of offline discussions on QCL | Nokia | Patrick Merias | 52292 | discussion | Decision | | | 122 | 7.2.3.7 | Remaining details on QCL | 151301 | noted |
| R1-1721564 | Summary of SRS | Sony | Patrick Merias | 52292 | discussion | Decision | | | 120 | 7.2.3.5 | Remaining details on SRS | 146001 | revised |
| R1-1721565 | WF on Length-6 and Length-24 CG sequences for DFT-s-OFDM | Qualcomm | Patrick Merias | 52292 | discussion | Decision | | | 118 | 7.2.3.3 | Remaining details on DMRS | 156500 | available |
| R1-1721566 | Updated offline proposals on PHR | NTT DOCOMO, ZTE | Patrick Merias | 52292 | discussion | Decision | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 156600 | noted |
| R1-1721567 | Offline summary of UL power control – non-CA aspects | ZTE, Sanechips | Patrick Merias | 52292 | discussion | Decision | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 145702 | revised |
| R1-1721568 | WF on remaining issues on SRS field | LG Electronics, Intel Corporation | Patrick Merias | 52292 | discussion | Decision | | | 104 | 7.2.1.2 | Remaining details on codebook based transmission for UL | 156800 | noted |
| R1-1721569 | Summary of CSI-RS offline | Huawei, HiSilicon | Patrick Merias | 52292 | discussion | Decision | | | 117 | 7.2.3.2 | Remaining details on CSI-RS | 156900 | noted |
| R1-1721570 | [Draft] LS on RAN1 agreement on UL power sharing for LTE/NR NSA operation | Intel | Patrick Merias | 52292 | LS out | Decision | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 157000 | revised |
| R1-1721571 | Summary of Beam Mgmt | Qualcomm | Patrick Merias | 52292 | discussion | Decision | | | 111 | 7.2.2.3 | Remaining details on beam measurement and reporting | 156201 | revised |
| R1-1721572 | Summary of offline discussions on nFAR for uplink polar coding | Huawei, HiSilicon | Patrick Merias | 52292 | discussion | Decision | | | 162 | 7.4.2.1 | Uplink CRCs | 157200 | noted |
| R1-1721573 | Summary of Remaining details on PRACH formats | Convida Wireless | Patrick Merias | 52292 | discussion | Decision | | | 95 | 7.1.4.1 | Remaining details on PRACH formats | 138903 | revised |
| R1-1721574 | Reply LS on SPS and Grant-free | RAN1, NTT DOCOMO | Patrick Merias | 52292 | LS out | Approval | | sent | 148 | 7.3.3.4 | UL data transmission procedure | 151901 | approved |
| R1-1721575 | WF on SRS resource configuration | vivo | Patrick Merias | 52292 | discussion | Decision | | | 105 | 7.2.1.3 | Remaining details on non-codebook based transmission for UL | 157500 | noted |
| R1-1721576 | Implicit rule for PRB bundling | InterDigital, LGE, vivo, Ericsson, Qualcomm, Convida Wireless, Sharp, IITM, TEJAS Networks, Panasonic | Patrick Merias | 52292 | discussion | Decision | | | 106 | 7.2.1.4 | Remaining details on PRB bundling for DL | 157600 | noted |
| R1-1721577 | WF on the default value for SRS-SequenceId | Mitsubishi Electric, SONY, LG Electronics | Patrick Merias | 52292 | discussion | Decision | | | 120 | 7.2.3.5 | Remaining details on SRS | 157700 | available |
| R1-1721578 | Draft Reply LS on PRB grid in the NR | Huawei | Patrick Merias | 52292 | LS out | Decision | | | 153 | 7.3.4.1 | Other aspects on bandwidth Parts | 157800 | revised |
| R1-1721579 | WF on UCI mapping for CSI reporting | NTT DOCOMO, ZTE, Intel, LGE, MediaTek | Patrick Merias | 52292 | discussion | Decision | | | 165 | 7.4.2.4 | Other | 157900 | available |
| R1-1721580 | WF on a peak rate calculation parameter | Intel, Qualcomm | Patrick Merias | 52292 | discussion | Decision | | | 172 | 7.8 | Other | 158000 | noted |
| R1-1721581 | List of RRC parameters for NR | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 86 | 7 | NR - WID in RP-172115 | 158100 | endorsed |
| R1-1721582 | [Draft LS] On RRC parameters for NR | Ericsson | Patrick Merias | 52292 | LS out | Decision | | | 86 | 7 | NR - WID in RP-172115 | 158200 | revised |
| R1-1721583 | Summary of Offline Discussion on LDPC Codes | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 158 | 7.4.1 | Remaining details of LDPC coding | 158300 | noted |
| R1-1721584 | Summary of Offline Discussion on Polar Codes | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 161 | 7.4.2 | Remaining details of Polar coding | 158400 | noted |
| R1-1721585 | Summary of Remaining Details on RACH Procedure | Qualcomm | Patrick Merias | 52292 | discussion | Decision | | | 96 | 7.1.4.2 | Remaining details on RACH procedure | 140104 | revised |
| R1-1721586 | WF on remaining issues on SRS field | LG Electronics, Intel Corporation | Patrick Merias | 52292 | discussion | Decision | | | 105 | 7.2.1.3 | Remaining details on non-codebook based transmission for UL | 154701 | available |

| TDoc | Title | Source | Contact | Contact ID | Type | For | Abstract | Secretary Remarks | Agenda item sort order | Agenda item | Agenda item description | TDoc sort order within agenda item | TDoc Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R1-1721587 | Summary of remaining Issues on NR RRM | Samsung | Patrick Merias | 52292 | discussion | Decision | | | 98 | 7.1.5.1 | Remaining details on measurement for mobility management | 154701 | revised |
| R1-1721588 | Summary of 7.1.1 Remaining Details on Synchronization signal | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 88 | 7.1.1 | Remaining Details on Synchronization signal | 138103 | noted |
| R1-1721589 | Summary of 7.1.2.1 Remaining details on NR-PBCH | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 90 | 7.1.2.1 | Remaining details on NR-PBCH | 138203 | noted |
| R1-1721590 | LS to RAN1 on HARQ agreements | RAN1, Samsung | Patrick Merias | 52292 | LS in | Discussion | | | 4 | 5 | Incoming Liaison Statements | 159000 | treated |
| R1-1721591 | LS to RAN1 on GF/SPS agreements | RAN2, Huawei | Patrick Merias | 52292 | LS in | Discussion | | | 4 | 5 | Incoming Liaison Statements | 159100 | treated |
| R1-1721592 | WF on ZP CSI-RS | LG Electronics, Ericsson, CATT, Samsung | Patrick Merias | 52292 | discussion | Decision | | | 117 | 7.2.3.2 | Remaining details on CSI-RS | 159200 | noted |
| R1-1721593 | Further discussion on the TRS remaining issues | MediaTek | Patrick Merias | 52292 | discussion | Discussion | | | 121 | 7.2.3.6 | Remaining details on TRS | 159300 | withdrawn |
| R1-1721594 | WF on subband CQI | Samsung, Ericsson, CATT, Interdigital, Huawei, HiSilicon, LG Electronics, MediaTek, NTT DOCOMO, AT&T | Patrick Merias | 52292 | discussion | Decision | | | 113 | 7.2.2.5 | Remaining details on CQI and MCS | 159400 | available |
| R1-1721595 | WF on 4 port CSI-RS | ZTE, Sanechips | Patrick Merias | 52292 | discussion | Decision | | | 117 | 7.2.3.2 | Remaining details on CSI-RS | 159500 | available |
| R1-1721596 | Summary on offline discussion for rate matching output sequence | Samsung, MediaTek, Qualcomm, Ericsson, Huawei, HiSilicon, LGE, Nokia, ZTE, Interdigital, NTT Docomo | Patrick Merias | 52292 | discussion | Decision | | | 160 | 7.4.1.2 | Other | 159600 | available |
| R1-1721597 | WF on CSI-RS sequence initialization | LG Electronics, Qualcomm, ZTE, Sanechips, Mediatek, NEC, Sony, Vivo, CATT, Sharp, KT | Patrick Merias | 52292 | discussion | Decision | | | 117 | 7.2.3.2 | Remaining details on CSI-RS | 159700 | noted |
| R1-1721598 | WF on 4Tx UL codebook for CP-OFM | MediaTek, ZTE, Sanechips, Intel, AT&T, Huawei, HiSilicon, NTT DoCoMo, Lenovo, Motorola Mobility | Patrick Merias | 52292 | discussion | Decision | | | 104 | 7.2.1.2 | Remaining details on codebook based transmission for UL | 159800 | noted |
| R1-1721599 | WF on RE mapping for DFT-SOFDM with intra-slot frequency hopping | MediaTek, Ericsson, Lenovo, Motorola Mobility, Samsung, Qualcomm, CATT, Nokia, NSB, ETRI, KT Corporation, WILUS Inc, Acorn Technologies, Intel, Panasonic | Patrick Merias | 52292 | discussion | Decision | | | 103 | 7.2.1.1 | Remaining details on codeword mapping | 159900 | noted |
| R1-1721600 | Way Forward on NR 4 Port UL MIMO Codebook For CP-OFDM | Ericsson, Samsung, LGE, AT&T, KDDI, British Telecom, NEC, Qualcomm, Bouygues Telecom, IITH, CEWiT, IITM, Tejas Networks, Sprint, Deutsche Telekom, Orange, Verizon | Patrick Merias | 52292 | discussion | Decision | | | 104 | 7.2.1.2 | Remaining details on codebook based transmission for UL | 160000 | noted |
| R1-1721601 | Correcting NR OFDM symbol generation | Intel Corp. | Patrick Merias | 52292 | discussion | Discussion | | | 88 | 7.1.1 | Remaining Details on Synchronization signal | 160100 | noted |
| R1-1721602 | LS on required information for NSA on X2 | RAN3, Nokia | Patrick Merias | 52292 | LS in | Discussion | | | 4 | 5 | Incoming Liaison Statements | 160200 | treated |
| R1-1721603 | Remaining details of LDPC coding | ZTE, Sanechips | Patrick Merias | 52292 | discussion | Decision | | | 160 | 7.4.1.2 | Other | 95253 | revised |
| R1-1721604 | Discussion on DCI content | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 130 | 7.3.1.4 | DCI contents and formats | 160400 | available |
| R1-1721605 | Summary of Offline Discussion on RMSI | CATT | Patrick Merias | 52292 | discussion | Decision | | | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 1693 | revised |
| R1-1721606 | LS on RAN1 agreement on UL power sharing for LTE/NR NSA operation | RAN1, Intel Corporation | Patrick Merias | 52292 | LS out | Approval | | sent | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 160600 | approved |
| R1-1721607 | void | Samsung | Patrick Merias | 52292 | other | | | | 101 | 7.2 | MIMO | 160700 | withdrawn |
| R1-1721608 | LS reply to RAN4 on P_0 ranges on UL power control | RAN1, ZTE | Patrick Merias | 52292 | LS out | Decision | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 160902 | approved |
| R1-1721609 | [Draft]LS reply to RAN4 on P_0 ranges on UL power control | ZTE | Patrick Merias | 52292 | LS out | Decision | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 160900 | revised |
| R1-1721610 | Summary on CA Aspects | Samsung | Patrick Merias | 52292 | discussion | Decision | | | 154 | 7.3.4.2 | Other aspects on carrier aggregation | 137001 | noted |
| R1-1721611 | On TBS determination formula | MediaTek Inc. | Patrick Merias | 52292 | discussion | | | | 160 | 7.4.1.2 | Other | 95792 | available |
| R1-1721612 | Summary on offline discussion for Rinit | Samsung | Patrick Merias | 52292 | discussion | Decision | | | 159 | 7.4.1.1 | Nominal code rate / BG determination | 161200 | noted |
| R1-1721613 | Observations on UCI segmentation | Huawei, HiSilicon | Patrick Merias | 52292 | discussion | Discussion | | | 163 | 7.4.2.2 | Details of conditions for UCI segmentation | 161300 | withdrawn |
| R1-1721614 | Summary of Contributions on PUCCH Structure for Short Duration | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 133 | 7.3.2.1 | PUCCH structure in short-duration | 139502 | noted |
| R1-1721615 | WF on new beam identification for beam failure recovery | LG Electronics, InterDigital, Huawei, HiSilicon, AT&T | Patrick Merias | 52292 | discussion | Decision | | | 112 | 7.2.2.4 | Remaining details on mechanism to recover from beam failure | 161500 | noted |
| R1-1721616 | LS on RRC parameters for NR | RAN1, Ericsson | Patrick Merias | 52292 | LS out | Approval | | sent | 86 | 7 | NR - WID in RP-172115 | 158201 | approved |
| R1-1721617 | [Draft]LS reply to RAN4 on P_0 ranges on UL power control | ZTE | Patrick Merias | 52292 | LS out | Decision | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 160901 | revised |
| R1-1721618 | Status of offline discussion on remaining issues on PTRS for DFTSOFDM | Mitsubishi Electric | Patrick Merias | 52292 | discussion | Decision | | | 119 | 7.2.3.4 | Remaining details on PT-RS | 161800 | noted |
| R1-1721619 | Summary of offline discussion on PUCCH resource allocation | OPPO | Patrick Merias | 52292 | discussion | Decision | | | 142 | 7.3.2.4 | Resource allocation for PUCCH | 147702 | revised |
| R1-1721620 | Seed design for PRBS generators | Ericsson | Patrick Merias | 52292 | discussion | Discussion | | | 115 | 7.2.3 | Remaining details on Reference signals and QCL | 162000 | withdrawn |
| R1-1721621 | WF on group hopping and sequence hopping | LG Electronics, Mitsubishi, Qualcomm, KT Corp. | Patrick Merias | 52292 | discussion | Decision | | | 120 | 7.2.3.5 | Remaining details on SRS | 162100 | available |
| R1-1721622 | [Draft] LS on PRACH with ON-OFF time mask | Intel | Patrick Merias | 52292 | LS out | Decision | | | 95 | 7.1.4.1 | Remaining details on PRACH formats | 156101 | revised |
| R1-1721623 | Summary of Remaining Details on RACH Procedure | Qualcomm | Patrick Merias | 52292 | discussion | Decision | | | 96 | 7.1.4.2 | Remaining details on RACH procedure | 140105 | revised |
| R1-1721624 | Summary of Offline Discussion on channel coding | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 157 | 7.4 | Channel coding | 162400 | available |
| R1-1721625 | Offline Discussion of TBS Determination | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 160 | 7.4.1.2 | Other | 162500 | available |
| R1-1721626 | WF on PTRS | Huawei, HiSilicon, ZTE, Sanechips, Spreadtrum, vivo, Intel, NEC, ASTRI, NTT DOCOMO | Patrick Merias | 52292 | discussion | Decision | | | 119 | 7.2.3.4 | Remaining details on PT-RS | 162600 | noted |
| R1-1721627 | Summary of Offline Discussion on Frequency Offset Indication | Samsung | Patrick Merias | 52292 | discussion | Decision | | | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 162700 | noted |
| R1-1721628 | Offline Summary on Frequency Offset Indication for TDM Scenario where SS BW and RMSI BW are Confined within Minimum Carrier Bandwidth | Samsung | Patrick Merias | 52292 | discussion | Decision | | | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 162800 | available |
| R1-1721629 | Offline Summary on Frequency Offset Indication for TDM Scenario where SS BW and RMSI BW are Confined within UE Minimum Bandwidth | Samsung | Patrick Merias | 52292 | discussion | Decision | | | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 162900 | available |
| R1-1721630 | LS on PRACH with ON-OFF time mask | RAN1, Intel Corporation | Patrick Merias | 52292 | LS out | Decision | | | 95 | 7.1.4.1 | Remaining details on PRACH formats | 156102 | approved |
| R1-1721631 | Summary of remaining Issues on NR RRM | Samsung | Patrick Merias | 52292 | discussion | Decision | | | 98 | 7.1.5.1 | Remaining details on measurement for mobility management | 154702 | revised |

| TDoc | Title | Source | Contact | Contact ID | Type | For | Abstract | Secretary Remarks | Agenda item sort order | Agenda item | Agenda item description | TDoc sort order within agenda item | TDoc Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R1-1721632 | Offline summary for AI 7.1.3 on Paging | Huawei, HiSilicon | Patrick Merias | 52292 | discussion | Decision | | | 93 | 7.1.3 | Remaining details on Paging design | 135602 | revised |
| R1-1721633 | Reply LS on Supportable RNTI Length on DCI | RAN2, Ericsson | Patrick Merias | 52292 | LS in | Discussion | | | 4 | 5 | Incoming Liaison Statements | 163300 | treated |
| R1-1721634 | Summary of remaining issues on CSI measurement | ZTE, Sanechips | Patrick Merias | 52292 | discussion | Discussion | | | 109 | 7.2.2.1 | Remaining details on CSI measurement | 163400 | noted |
| R1-1721635 | Summary of RS multiplexing remaining issues | Huawei, HiSilicon | Patrick Merias | 52292 | discussion | Decision | | | 116 | 7.2.3.1 | Remaining details on Multiplexing of different types of RSs | 163500 | noted |
| R1-1721636 | WF on multiplexing between CSI-RS and CORSET/SSB | Samsung Erricssion, ZTE, Sanechips, vivo | Patrick Merias | 52292 | discussion | Decision | | | 116 | 7.2.3.1 | Remaining details on Multiplexing of different types of RSs | 163600 | noted |
| R1-1721637 | Thursday evening summary of PTRS | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 119 | 7.2.3.4 | Remaining details on PT-RS | 163700 | noted |
| R1-1721638 | Offline discussion summary on CBG based retransmission | LG Electronics | Patrick Merias | 52292 | discussion | Decision | | | 147 | 7.3.3.3 | CBG-based (re)transmission | 163800 | noted |
| R1-1721639 | Summary of Remaining details on PRACH formats | Convida Wireless | Patrick Merias | 52292 | discussion | Decision | | | 95 | 7.1.4.1 | Remaining details on PRACH formats | 138904 | revised |
| R1-1721640 | Summary of Beam Mgmt | Qualcomm | Patrick Merias | 52292 | discussion | Decision | | | 111 | 7.2.2.3 | Remaining details on beam measurement and reporting | 156202 | revised |
| R1-1721641 | Final Issues for Rel-15 PDSCH/PUSCH's DM-RS | Qualcomm | Patrick Merias | 52292 | discussion | Decision | | | 118 | 7.2.3.3 | Remaining details on DMRS | 140901 | revised |
| R1-1721642 | Outcome of offline discussion on DCI format | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 130 | 7.3.1.4 | DCI contents and formats | 164200 | noted |
| R1-1721643 | Reply LS on Minimum Bandwidth | RAN4, CATT, NTT DOCOMO | Patrick Merias | 52292 | LS in | Discussion | | | 4 | 5 | Incoming Liaison Statements | 164300 | treated |
| R1-1721644 | [DRAFT] LS reply on UE Power Control and PHR Calculation | Intel Corp. | Patrick Merias | 52292 | LS out | Decision | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 164400 | revised |
| R1-1721645 | Offline summary on remaining issues on Beam Failure Recovery | MediaTek | Patrick Merias | 52292 | discussion | Decision | | | 112 | 7.2.2.4 | Remaining details on mechanism to recover from beam failure | 164500 | noted |
| R1-1721646 | [DRAFT] Response LS on required information for NSA on X2 | Nokia | Patrick Merias | 52292 | LS out | Decision | | | 4 | 5 | Incoming Liaison Statements | 164600 | revised |
| R1-1721647 | [Draft] LS on MAC CE parameters for NR MIMO | NTT DOCOMO | Patrick Merias | 52292 | LS out | Decision | | | 101 | 7.2 | MIMO | 164700 | revised |
| R1-1721648 | List of MAC CE parameters for NR MIMO | NTT DOCOMO | Patrick Merias | 52292 | other | Discussion | | | 101 | 7.2 | MIMO | 164800 | revised |
| R1-1721649 | [Draft] LS on SRS PHR reporting | Huawei | Patrick Merias | 52292 | LS out | Decision | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 164900 | revised |
| R1-1721650 | Summary of remaining issues on CSI-RS | Huawei, HiSilicon | Patrick Merias | 52292 | discussion | Decision | | | 117 | 7.2.3.2 | Remaining details on CSI-RS | 165000 | available |
| R1-1721651 | Remaining details of LDPC coding | ZTE, Sanechips | Patrick Merias | 52292 | discussion | Decision | | | 160 | 7.4.1.2 | Other | 95254 | withdrawn |
| R1-1721652 | Summary of DL/UL scheduling and HARQ management | Qualcomm | Patrick Merias | 52292 | discussion | Decision | | | 146 | 7.3.3.2 | DL/UL scheduling and HARQ management | 141703 | revised |
| R1-1721653 | WF on multiplexing between CSI-RS and CORSET/SSB | Samsung | Patrick Merias | 52292 | discussion | Decision | | | 116 | 7.2.3.1 | Remaining details on Multiplexing of different types of RSs | 165300 | available |
| R1-1721654 | Remaining issues for 7.3.3.4 | NTT DOCOMO | Patrick Merias | 52292 | discussion | Discussion | | | 148 | 7.3.3.4 | UL data transmission procedure | 165400 | noted |
| R1-1721655 | Chairman's notes of AI 7.4 Channel coding | Ad-hoc chair (Ericsson) | Patrick Merias | 52292 | other | Endorsement | | | 157 | 7.4 | Channel coding | 165500 | endorsed |
| R1-1721656 | Chairman's notes of AI 7.6 UL Power control) | Ad-Hoc chair (Samsung) | Patrick Merias | 52292 | other | Endorsement | | | 167 | 7.6 | UL power control | 165600 | endorsed |
| R1-1721657 | Chairman's notes of AI 7.2 NR MIMO | Ad-Hoc chair (Samsung) | Patrick Merias | 52292 | other | Endorsement | | | 101 | 7.2 | MIMO | 165700 | endorsed |
| R1-1721658 | Chairman's notes of AI 7.5 NR-LTE co-existence | Ad-hoc chair (Ericsson) | Patrick Merias | 52292 | other | Endorsement | | | 166 | 7.5 | NR-LTE co-existence | 165800 | endorsed |
| R1-1721659 | Chairman's notes of AI 7.8 on NR - Other | Ad-hoc chair (Ericsson) | Patrick Merias | 52292 | other | Endorsement | | | 172 | 7.8 | Other | 165900 | endorsed |
| R1-1721660 | WF on relation between DMRS and PTRS | LG Electronics, Ericsson, Qualcomm, ZTE, Sanechips, NEC, KT Corp., Spreadtrum, OPPO | Patrick Merias | 52292 | discussion | Decision | | | 119 | 7.2.3.4 | Remaining details on PT-RS | 166000 | noted |
| R1-1721661 | List of MAC CE parameters for NR MIMO | NTT DOCOMO | Patrick Merias | 52292 | other | Discussion | | | 101 | 7.2 | MIMO | 164801 | endorsed |
| R1-1721662 | [Draft] LS on MAC CE parameters for NR MIMO | NTT DOCOMO | Patrick Merias | 52292 | LS out | Decision | | | 101 | 7.2 | MIMO | 164701 | revised |
| R1-1721663 | LS on MAC CE parameters for NR MIMO | RAN1, NTT DOCOMO | Patrick Merias | 52292 | LS out | Decision | | sent | 101 | 7.2 | MIMO | 164702 | approved |
| R1-1721664 | WF on UL PTRS port indication | vivo, NEC, Spreadtrum, ZTE, Sanechips, Intel, Huawei, HiSilicon | Patrick Merias | 52292 | discussion | Decision | | | 119 | 7.2.3.4 | Remaining details on PT-RS | 166400 | noted |
| R1-1721665 | WF for BFR Candidate Beam Selection | Huawei, HiSilicon, Mediatek, LGE, Intel, NEC, Lenovo, Motorola Mobility, Spreadtrum, ATT, Fujitsu, Sharp, Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 112 | 7.2.2.4 | Remaining details on mechanism to recover from beam failure | 166500 | revised |
| R1-1721666 | LS on VoIP packet sizes and transport blocks | RAN2, Ericsson | Patrick Merias | 52292 | LS in | Discussion | | | 4 | 5 | Incoming Liaison Statements | 166600 | treated |
| R1-1721667 | [Draft] LS on RAN1 agreement on bandwidth part transition time | Intel | Patrick Merias | 52292 | LS out | Decision | | | 153 | 7.3.4.1 | Other aspects on bandwidth Parts | 166700 | revised |
| R1-1721668 | Draft LS on BWP timer operation | Qualcomm | Patrick Merias | 52292 | LS out | Decision | | | 153 | 7.3.4.1 | Other aspects on bandwidth Parts | 166800 | revised |
| R1-1721669 | Reply LS on PRB grid in the NR | RAN1, Huawei | Patrick Merias | 52292 | LS out | Decision | | | 153 | 7.3.4.1 | Other aspects on bandwidth Parts | 157801 | approved |
| R1-1721670 | WF for BFR Candidate Beam Selection | Huawei, HiSilicon, Mediatek, LGE, Intel, NEC, Lenovo, Motorola Mobility, Spreadtrum, ATT, Fujitsu, Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 112 | 7.2.2.4 | Remaining details on mechanism to recover from beam failure | 166501 | noted |
| R1-1721671 | Way Forward on Formula for TBS Determination | Qualcomm, Ericsson, ZTE, Samsung, Nokia, MediaTek | Patrick Merias | 52292 | discussion | Decision | | | 160 | 7.4.1.2 | Other | 167100 | noted |
| R1-1721672 | Offline notes CSI reporting | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 110 | 7.2.2.2 | Remaining details on CSI reporting | 167200 | noted |
| R1-1721673 | WF for handling partial beam failure | NTT DOCOMO, Intel, Huawei, NEC, Spreadtrum, MediaTek, China Telecom, AT&T | Patrick Merias | 52292 | discussion | Decision | | | 112 | 7.2.2.4 | Remaining details on mechanism to recover from beam failure | 167300 | noted |
| R1-1721674 | Offline discussion summary for SFI | Qualcomm | Patrick Merias | 52292 | discussion | Decision | | | 129 | 7.3.1.3 | Remaining details on group-common PDCCH | 167400 | revised |
| R1-1721675 | WF on PHR triggering | Motorola Mobility, Lenovo, Nokia, NTT DOCOMO | Patrick Merias | 52292 | discussion | Decision | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 167500 | noted |
| R1-1721676 | Offline summary of UL power control – non-CA aspects | ZTE, Sanechips | Patrick Merias | 52292 | discussion | Decision | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 145703 | noted |
| R1-1721677 | WF on CSI timing offset for PUSCH | LG Electronics, Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 110 | 7.2.2.2 | Remaining details on CSI reporting | 167700 | available |
| R1-1721678 | [Draft LS] LS on CSI reporting periodicities for NR | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 110 | 7.2.2.2 | Remaining details on CSI reporting | 167800 | revised |
| R1-1721679 | Way Forward on Table for TBS Determination | MediaTek | Patrick Merias | 52292 | discussion | Decision | | | 160 | 7.4.1.2 | Other | 167900 | available |
| R1-1721680 | LS on SRS PHR reporting | RAN1, Huawei | Patrick Merias | 52292 | LS out | Approval | | sent | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 168000 | approved |
| R1-1721681 | LS reply on UE Power Control and PHR Calculation | RAN1, Intel Corporation | Patrick Merias | 52292 | LS out | Decision | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 164401 | approved |
| R1-1721682 | LS on CSI reporting periodicities for NR | RAN1, Ericsson | Patrick Merias | 52292 | LS out | Approval | | | 110 | 7.2.2.2 | Remaining details on CSI reporting | 168200 | approved |
| R1-1721683 | Summary of SRS | Sony | Patrick Merias | 52292 | discussion | Decision | | | 120 | 7.2.3.5 | Remaining details on SRS | 146002 | noted |
| R1-1721684 | WF on RMSI presence flag | Qualcomm | Patrick Merias | 52292 | discussion | Decision | | | 90 | 7.1.2.1 | Remaining details on NR-PBCH | 168400 | noted |
| R1-1721685 | Summary of offline discussion on PUCCH resource allocation | OPPO | Patrick Merias | 52292 | discussion | Decision | | | 142 | 7.3.2.4 | Resource allocation for PUCCH | 168500 | noted |
| R1-1721686 | Final Issues for Rel-15 PDSCH/PUSCH's DM-RS | Qualcomm | Patrick Merias | 52292 | discussion | Decision | | | 118 | 7.2.3.3 | Remaining details on DMRS | 140902 | noted |
| R1-1721687 | Offline summary for AI 7.1.3 on Paging | Huawei, HiSilicon | Patrick Merias | 52292 | discussion | Decision | | | 93 | 7.1.3 | Remaining details on Paging design | 135603 | noted |
| R1-1721688 | Summary of Offline Discussion on RMSI | CATT | Patrick Merias | 52292 | discussion | Decision | | | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 1694 | revised |
| R1-1721689 | Summary of Remaining Details on RACH Procedure | Qualcomm | Patrick Merias | 52292 | discussion | Decision | | | 96 | 7.1.4.2 | Remaining details on RACH procedure | 140106 | noted |

| TDoc | Title | Source | Contact | Contact ID | Type | For | Abstract | Secretary Remarks | Agenda item sort order | Agenda item | Agenda item description | TDoc sort order within agenda item | TDoc Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R1-1721690 | Outcome of offline discussion on transport block sizes | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 145 | 7.3.3.1 | DL/UL resource allocation | 169000 | noted |
| R1-1721691 | LS reply on SSTD measurements for EN-DC | RAN4, Ericsson | Patrick Merias | 52292 | LS in | Discussion | | | 4 | 5 | Incoming Liaison Statements | 169100 | treated |
| R1-1721692 | Summary of Remaining details on PRACH formats | Convida Wireless | Patrick Merias | 52292 | discussion | Decision | | | 95 | 7.1.4.1 | Remaining details on PRACH formats | 138905 | noted |
| R1-1721693 | WF on remaining aspects on SUL operations | Huawei, HiSilicon, CMCC, Ericsson, Intel | Patrick Merias | 52292 | other | Discussion | | | 166 | 7.5 | NR-LTE co-existence | 169300 | noted |
| R1-1721694 | [DRAFT] LS on RLM in active DL BWP | Intel | Patrick Merias | 52292 | LS out | Decision | | | 99 | 7.1.5.2 | Remaining details Radio link monitoring for mobility management | 169400 | revised |
| R1-1721695 | LS on cells not broadcasting SIB1 | RAN2, Ericsson | Patrick Merias | 52292 | LS in | Discussion | | | 4 | 5 | Incoming Liaison Statements | 169500 | treated |
| R1-1721696 | Summary of Beam Mgmt | Qualcomm | Patrick Merias | 52292 | discussion | Decision | | | 111 | 7.2.2.3 | Remaining details on beam measurement and reporting | 156203 | noted |
| R1-1721697 | WF on UL Fallback DCI in SUL cell | CMCC, Huawei, HiSilicon, Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 166 | 7.5 | NR-LTE co-existence | 169700 | noted |
| R1-1721698 | Draft RAN1 input to 38.300 | Nokia, Nokia Shanghai Bell | Patrick Merias | 52292 | discussion | Discussion | | | 86 | 7 | NR - WID in RP-172115 | 169800 | revised |
| R1-1721699 | Offline discussion summary on remaining issues on Beam Failure Recovery | MediaTek | Patrick Merias | 52292 | discussion | Decision | | | 112 | 7.2.2.4 | Remaining details on mechanism to recover from beam failure | 169900 | noted |
| R1-1721700 | [DRAFT] LS to RAN2 on Beam Failure Recovery | MediaTek | Patrick Merias | 52292 | LS out | Decision | | | 112 | 7.2.2.4 | Remaining details on mechanism to recover from beam failure | 170000 | noted |
| R1-1721701 | WF on aperiodic TRS | Qualcomm, Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 121 | 7.2.3.6 | Remaining details on TRS | 170100 | noted |
| R1-1721702 | Offline discussion summary for SFI | Qualcomm | Patrick Merias | 52292 | discussion | Decision | | | 129 | 7.3.1.3 | Remaining details on group-common PDCCH | 167401 | noted |
| R1-1721703 | Summary of DL/UL scheduling and HARQ management | Qualcomm | Patrick Merias | 52292 | discussion | Decision | | | 146 | 7.3.3.2 | DL/UL scheduling and HARQ management | 141704 | noted |
| R1-1721704 | [DRAFT] Response LS on required information for NSA on X2 | Nokia | Patrick Merias | 52292 | LS out | Decision | | | 4 | 5 | Incoming Liaison Statements | 164601 | revised |
| R1-1721705 | Proposals for 7.3.3.4 | NTT DOCOMO | Patrick Merias | 52292 | discussion | Decision | | | 148 | 7.3.3.4 | UL data transmission procedure | 170500 | revised |
| R1-1721706 | WF on Accumulative Closed-Loop TPC Command | Qualcomm | Patrick Merias | 52292 | discussion | Decision | | | 168 | 7.6.1 | Remaining details on NR UL power control – non-CA aspects | 170600 | available |
| R1-1721707 | NR UE feature list | NTT DOCOMO, AT&T | Patrick Merias | 52292 | discussion | Discussion | | | 86 | 7 | NR - WID in RP-172115 | 7881 | noted |
| R1-1721708 | Offline discussion on 7.3.3.1 | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 145 | 7.3.3.1 | DL/UL resource allocation | 170800 | available |
| R1-1721709 | Summary of offline discussion on RMSI CORESET configuration | Samsung | Patrick Merias | 52292 | discussion | Decision | | | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 170900 | available |
| R1-1721710 | WF on beam recovery | ZTE | Patrick Merias | 52292 | discussion | Decision | | | 112 | 7.2.2.4 | Remaining details on mechanism to recover from beam failure | 171000 | withdrawn |
| R1-1721711 | WF on relation between DMRS and PTRS | LG Electronics, Ericsson, Qualcomm, ZTE, Sanechips, NEC, KT Corp., Spreadtrum, OPPO, Panasonic, vivo, NTT Docomo, CATT | Patrick Merias | 52292 | discussion | Decision | | | 118 | 7.2.3.3 | Remaining details on DMRS | 171100 | revised |
| R1-1721712 | LS on RAN1 agreement on bandwidth part transition time | RAN1, Intel Corporation | Patrick Merias | 52292 | LS out | Approval | | | 153 | 7.3.4.1 | Other aspects on bandwidth Parts | 166701 | approved |
| R1-1721713 | Summary of RS multiplexing further remaining issues | Huawei, HiSilicon | Patrick Merias | 52292 | discussion | Decision | | | 116 | 7.2.3.1 | Remaining details on Multiplexing of different types of RSs | 171300 | available |
| R1-1721714 | LS on BWP timer operation | RAN1, Qualcomm | Patrick Merias | 52292 | LS out | Decision | | | 153 | 7.3.4.1 | Other aspects on bandwidth Parts | 166801 | approved |
| R1-1721715 | WF on relation between DMRS and PTRS | LG Electronics, Ericsson, Qualcomm, ZTE, Sanechips, NEC, KT Corp., Spreadtrum, OPPO, Panasonic, vivo, NTT Docomo, CATT | Patrick Merias | 52292 | discussion | Decision | | | 118 | 7.2.3.3 | Remaining details on DMRS | 171101 | available |
| R1-1721716 | Response LS on required information for NSA on X2 | RAN1, Nokia | Patrick Merias | 52292 | LS out | Decision | | | 4 | 5 | Incoming Liaison Statements | 164602 | approved |
| R1-1721717 | Draft LS reply on formula or table for L1 data rate | Ericsson, Intel | Patrick Merias | 52292 | LS out | Decision | | | 172 | 7.8 | Other | 171700 | revised |
| R1-1721718 | Proposals for 7.3.3.4 | NTT DOCOMO | Patrick Merias | 52292 | discussion | Decision | | | 148 | 7.3.3.4 | UL data transmission procedure | 170501 | noted |
| R1-1721719 | Outcome of offline discussion on 7.3.3.1 | Ericsson | Patrick Merias | 52292 | discussion | Decision | | | 145 | 7.3.3.1 | DL/UL resource allocation | 171900 | noted |
| R1-1721720 | [Draft] LS reply to RAN4 on UE timing advance adjustment step size | Qualcomm | Patrick Merias | 52292 | LS out | Decision | | | 96 | 7.1.4.2 | Remaining details on RACH procedure | 172000 | revised |
| R1-1721721 | LS on RLM in active DL BWP | RAN1, Intel Corporation | Patrick Merias | 52292 | LS out | Approval | | | 99 | 7.1.5.2 | Remaining details Radio link monitoring for mobility management | 169401 | approved |
| R1-1721722 | LS reply to RAN4 on UE timing advance adjustment step size | RAN1, Qualcomm | Patrick Merias | 52292 | LS out | Approval | | | 96 | 7.1.4.2 | Remaining details on RACH procedure | 172001 | approved |
| R1-1721723 | LS reply on formula or table for L1 data rate | RAN1, Ericsson, Intel | Patrick Merias | 52292 | LS out | Decision | | | 172 | 7.8 | Other | 171701 | approved |
| R1-1721724 | Summary of remaining Issues on NR RRM | Samsung | Patrick Merias | 52292 | discussion | Decision | | | 98 | 7.1.5.1 | Remaining details on measurement for mobility management | 154703 | noted |
| R1-1721725 | Summary of Offline Discussion on RMSI | CATT | Patrick Merias | 52292 | discussion | Decision | | | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 1695 | noted |
| R1-1721726 | [draft] LS on NR RMSI CORESET bandwidth | CATT | Patrick Merias | 52292 | LS out | Decision | | | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 172600 | revised |
| R1-1721727 | LS on NR RMSI CORESET bandwidth | RAN1, CATT | Patrick Merias | 52292 | LS out | Approval | | | 91 | 7.1.2.2 | Remaining details on Remaining minimum system information | 172700 | approved |
| R1-1721728 | Draft RAN1 input to 38.300 | Nokia, Nokia Shanghai Bell | Patrick Merias | 52292 | discussion | Endorsement | | | 86 | 7 | NR - WID in RP-172115 | 0 | endorsed |
| R1-1721729 | LS on RAN1 input to 38.300 | RAN1, Nokia | Patrick Merias | 52292 | LS out | Approval | | | 86 | 7 | NR - WID in RP-172115 | 0 | approved |
| R1-1721730 | List of RRC parameters for high capacity stationary wireless link and introduction of 1024 QAM for LTE | Huawei | Patrick Merias | 52292 | discussion | Decision | | | 48 | 6.2.4 | Enhancements for high capacity stationary wireless link and introduction of 1024 QAM for LTE - WID in RP-171738 | 0 | endorsed |
| R1-1721731 | LS on RRC parameters for high capacity stationary wireless link and introduction of 1024 QAM for LTE | RAN1, Huawei | Patrick Merias | 52292 | LS out | Approval | | | 48 | 6.2.4 | Enhancements for high capacity stationary wireless link and introduction of 1024 QAM for LTE - WID in RP-171738 | 0 | approved |
| R1-1721732 | Reply to LS on NR UE Category | RAN1, Ericsson, Intel | Patrick Merias | 52292 | LS out | Approval | | | 172 | 7.8 | Other | 0 | approved |
| R1-1721733 | LS reply on formula or table for L1 data rate | RAN1, Ericsson, Intel | Patrick Merias | 52292 | LS out | Approval | | | 172 | 7.8 | Other | 0 | approved |
| R1-1721734 | LS on updates to RRC parameters related to NR MIMO | RAN1, Qualcomm | Patrick Merias | 52292 | LS out | Approval | | | 108 | 7.2.2 | Remaining details on CSI acquisition and beam management | 0 | endorsed |
| R1-1721735 | SINR calibration for the link evaluations of URLLC for LTE | Ericsson | Patrick Merias | 52292 | discussion | Decision | | Version11 of the speadsheet is agreed except for the PUSCH part | 82 | 6.2.8 | Ultra Reliable Low Latency Communication for LTE - WID in RP-171489 | 0 | agreed |

| Reservation date | Uploaded | Is revision of | Revised to | Release | Spec | Version | Related WIs | CR | CR revision | CR category | TSG CR Pack | Reply to | To | Cc | Original LS | Reply in |
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| 2017-11-08 15:21:50 | 2017-11-08 15:25:19 | | | | | | | | | | | | | | | |
| 2017-11-08 15:21:50 | 2017-11-24 23:13:11 | | | | | | | | | | | | | | | |
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| 2017-11-08 15:21:50 | 2017-11-08 15:25:19 | | | | | | | | | | | | RAN, 3GPP ITU-R ad hoc, RAN1, RAN2, RAN4 | | 5D/TEMP/441 | |
| 2017-11-08 15:21:50 | 2017-11-08 15:25:19 | | | Rel-15 | | | FS_feD2D_IoT_relay_wearable | | | | | S2-176446 | SA2 | RAN, RAN1, RAN3, SA3, CT1 | R2-1711861 | |
| 2017-11-08 15:21:50 | 2017-11-08 15:25:19 | | | Rel-15 | | | LTE_eMTC4-Core, NB_IOTenh2-Core | | | | | | RAN1 | | R2-1711977 | |
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| 2017-11-08 15:21:50 | 2017-11-08 15:25:19 | | | Rel-15 | | | NR_newRAT-Core | | | | | | RAN1 | | R2-1712026 | |
| 2017-11-08 15:21:50 | 2017-11-08 15:25:19 | | | Rel-15 | | | NR_newRAT-Core | | | | | R4-1708864 | RAN4 | RAN1 | R2-1712027 | |
| 2017-11-08 15:21:50 | 2017-11-08 15:25:19 | | | Rel-15 | | | NR_newRAT-Core | | | | | | RAN4, RAN1 | RAN3 | R2-1712028 | |
| 2017-11-08 15:21:50 | 2017-11-08 15:25:19 | | | Rel-15 | | | NR_newRAT-Core | | | | | | RAN4 | RAN1 | R2-1712029 | |
| 2017-11-08 15:21:50 | 2017-11-08 15:25:19 | | | Rel-15 | | | LTE_eV2X-Core | | | | | | RAN1 | | R2-1712032 | |
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| 2017-11-08 15:21:50 | 2017-11-08 15:25:19 | | | Rel-15 | | | LTE_unlic-Core | | | | | | RAN1 | | R2-1712059 | |
| 2017-11-08 15:21:50 | 2017-11-08 15:25:19 | | | Rel-15 | | | NR_newRAT-Core | | | | | | RAN1 | | R2-1712061 | |
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| 2017-11-08 15:21:50 | 2017-11-08 15:25:19 | | | Rel-15 | | | NR_newRAT-Core | | | | | | RAN2 | RAN1 | R3-174199 | |
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| 2017-11-08 15:21:51 | 2017-11-08 15:25:19 | | | Rel-15 | | | NR_newRAT-Core | | | | | R1-1716743 | RAN1 | | R4-1711624 | |
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| Reservation date | Uploaded | Is revision of | Revised to | Release | Spec | Version | Related WIs | CR | CR revision | CR category | TSG CR Pack | Reply to | To | Cc | Original LS | Reply in |
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| Reservation date | Uploaded | Is revision of | Revised to | Release | Spec | Version | Related WIs | CR | CR revision | CR category | TSG CR Pack | Reply to | To | Cc | Original LS | Reply in |
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| 2017-11-15 07:49:19 | 2017-11-17 22:31:57 | | | | | | | | | | | | | | | |
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| 2017-11-15 07:49:19 | 2017-11-17 22:31:57 | | | | | | | | | | | | | | | |
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| 2017-11-15 07:49:19 | 2017-11-17 22:31:57 | R1-1715719 | | | | | | | | | | | | | | |
| 2017-11-15 07:49:19 | 2017-11-17 22:31:57 | | | | | | | | | | | | | | | |
| 2017-11-15 07:49:19 | 2017-11-18 02:35:36 | | | | | | | | | | | | | | | |
| 2017-11-15 07:49:19 | 2017-11-17 23:31:30 | | | | | | | | | | | | | | | |
| 2017-11-15 07:49:19 | 2017-11-17 23:31:30 | | | | | | | | | | | | | | | |
| 2017-11-15 07:49:19 | 2017-11-17 23:31:30 | R1-1718247 | | | | | | | | | | | | | | |
| 2017-11-15 07:49:19 | 2017-11-17 23:31:30 | | | | | | | | | | | | | | | |
| 2017-11-15 07:49:19 | 2017-11-17 23:31:30 | | | | | | | | | | | | | | | |
| 2017-11-15 07:49:19 | 2017-11-17 23:31:30 | | | | | | | | | | | | | | | |
| 2017-11-15 08:40:43 | 2017-11-17 12:57:26 | | | | | | | | | | | | | | | |
| 2017-11-15 08:45:19 | 2017-11-18 03:15:19 | | | | | | | | | | | | | | | |
| 2017-11-15 08:45:19 | 2017-11-18 03:15:19 | | | | | | | | | | | | | | | |
| 2017-11-15 08:45:19 | 2017-11-18 03:15:19 | R1-1715715 | | | | | | | | | | | | | | |
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| 2017-11-15 08:45:20 | 2017-11-18 03:15:19 | | | | | | | | | | | | | | | |
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| 2017-11-15 08:45:20 | 2017-11-18 03:15:19 | | | | | | | | | | | | | | | |
| 2017-11-15 08:45:20 | 2017-11-18 03:15:19 | | | | | | | | | | | | | | | |
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| 2017-11-15 08:45:20 | 2017-11-18 03:16:33 | R1-1717911 | | | | | | | | | | | | | | |
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| 2017-11-15 08:45:20 | 2017-11-18 06:22:33 | | R1-1800041 | | | | | | | | | | | | | |
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| 2017-11-15 09:58:57 | 2017-11-17 14:24:31 | | | Rel-15 | | | LTE_unlic-Core | | | | | | | | | |
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| 2017-11-15 10:33:01 | 2017-11-18 06:08:15 | | | | | | | | | | | | | | | |
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| 2017-11-15 10:33:02 | 2017-11-18 06:08:15 | | | Rel-15 | | | LTE_eV2X-Core | | | | | | | | | |
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| 2017-11-15 10:33:02 | 2017-11-18 06:08:15 | | | Rel-15 | | | LTE_eV2X-Core | | | | | | | | | |
| 2017-11-15 10:33:02 | 2017-11-18 06:08:15 | | | Rel-15 | | | LTE_eV2X-Core | | | | | | | | | |
| 2017-11-15 10:33:02 | 2017-11-18 06:08:15 | | | Rel-15 | | | LTE_eV2X-Core | | | | | | | | | |
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| 2017-11-15 10:33:02 | 2017-11-18 06:08:15 | | R1-1802161 | Rel-15 | | | LTE_eMTC4-Core | | | | | | | | | |
| 2017-11-15 10:33:02 | 2017-11-18 06:08:15 | | | Rel-15 | | | LTE_eMTC4-Core | | | | | | | | | |
| 2017-11-15 10:33:02 | 2017-11-18 06:08:15 | | | Rel-15 | | | LTE_eMTC4-Core | | | | | | | | | |

| Reservation date | Uploaded | Is revision of | Revised to | Release | Spec | Version | Related WIs | CR | CR revision | CR category | TSG CR Pack | Reply to | To | Cc | Original LS | Reply in |
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| 2017-11-15 10:33:02 | 2017-11-18 06:08:15 | R1-1717283 | R1-1802169 | Rel-15 | | | NB_IOTenh2-Core | | | | | | | | | |
| 2017-11-15 10:33:02 | 2017-11-18 06:08:15 | R1-1717284 | R1-1802173 | Rel-15 | | | NB_IOTenh2-Core | | | | | | | | | |
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| 2017-11-15 10:33:02 | 2017-11-18 06:11:17 | | | | | | | | | | | | | | | |
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| 2017-11-15 10:33:02 | 2017-11-18 06:11:17 | | | | | | | | | | | | | | | |
| 2017-11-15 10:33:02 | 2017-11-18 06:11:17 | | | | | | | | | | | | | | | |
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| 2017-11-15 10:33:02 | 2017-11-18 06:11:17 | | | | | | | | | | | | | | | |
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| 2017-11-15 10:33:03 | 2017-11-18 06:11:18 | | | | | | | | | | | | | | | |
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| 2017-11-15 10:33:03 | 2017-11-18 06:11:18 | | | | | | | | | | | | | | | |
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| 2017-11-15 10:33:03 | 2017-11-18 06:12:31 | R1-1717969 | | | | | | | | | | | | | | |
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| Reservation date | Uploaded | Is revision of | Revised to | Release | Spec | Version | Related WIs | CR | CR revision | CR category | TSG CR Pack | Reply to | To | Cc | Original LS | Reply in |
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| 2017-11-15 11:48:09 | 2017-11-17 21:05:48 | | | Rel-15 | | | LTE_sTTIandPT-Core | | | | | | | | | |
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| Reservation date | Uploaded | Is revision of | Revised to | Release | Spec | Version | Related WIs | CR | CR revision | CR category | TSG CR Pack | Reply to | To | Cc | Original LS | Reply in |
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| Reservation date | Uploaded | Is revision of | Revised to | Release | Spec | Version | Related WIs | CR | CR revision | CR category | TSG CR Pack | Reply to | To | Cc | Original LS | Reply in |
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| 2017-11-16 13:14:27 | 2017-11-17 12:19:30 | R1-1718284 | | | | | | | | | | | | | | |
| 2017-11-16 13:14:27 | 2017-11-17 12:19:30 | | | | | | | | | | | | | | | |
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| 2017-11-16 13:14:27 | 2017-11-17 10:34:30 | R1-1718287 | | | | | | | | | | | | | | |
| 2017-11-16 13:14:27 | 2017-11-17 12:19:30 | | | | | | | | | | | | | | | |
| 2017-11-16 13:14:27 | 2017-11-17 12:19:30 | | | | | | | | | | | | | | | |
| 2017-11-16 13:14:27 | 2017-11-17 12:19:30 | | | | | | | | | | | | | | | |
| 2017-11-16 13:17:18 | 2017-11-17 17:21:54 | | | | | | | | | | | | | | | |
| 2017-11-16 13:19:39 | | | | | | | | | | | | | | | | |
| 2017-11-16 13:19:53 | | | | | | | | | | | | | | | | |
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| 2017-11-16 13:49:51 | 2017-11-17 22:21:00 | | | | | | | | | | | | | | | |
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| 2017-11-16 14:24:31 | 2017-11-18 03:43:16 | | | Rel-15 | | | FS_LTE_Aerial | | | | | | | | | |
| 2017-11-16 14:25:39 | 2017-11-18 03:43:16 | | | Rel-15 | | | FS_LTE_Aerial | | | | | | | | | |
| 2017-11-16 14:26:16 | 2017-11-18 03:43:16 | | R1-1721057 | Rel-15 | | | FS_LTE_Aerial | | | | | | | | | |
| 2017-11-16 14:58:10 | 2017-11-17 14:49:14 | | | | | | | | | | | | | | | |
| 2017-11-16 14:58:35 | 2017-11-17 14:02:55 | | | Rel-15 | 38.811 | | FS_NR_nonterr_nw | | | | | | | | | |
| 2017-11-16 15:10:03 | 2017-11-17 14:53:00 | | | | | | | | | | | | | | | |
| 2017-11-16 15:11:01 | 2017-11-17 17:23:38 | R1-1717156 | | Rel-15 | | | LTE_sTTIandPT-Core | | | | | | | | | |
| 2017-11-16 15:11:01 | 2017-11-17 17:23:38 | R1-1717160 | | Rel-15 | | | LTE_sTTIandPT-Core | | | | | | | | | |
| 2017-11-16 15:11:01 | 2017-11-17 17:23:38 | R1-1717162 | | Rel-15 | | | LTE_sTTIandPT-Core | | | | | | | | | |
| 2017-11-16 15:11:01 | 2017-11-17 17:23:38 | R1-1717160 | | Rel-15 | | | LTE_sTTIandPT-Core | | | | | | | | | |
| 2017-11-16 15:11:01 | 2017-11-17 17:23:38 | | | Rel-15 | | | LTE_sTTIandPT-Core | | | | | | | | | |
| 2017-11-16 15:11:01 | 2017-11-17 17:23:38 | | | Rel-15 | | | LTE_sTTIandPT-Core | | | | | | | | | |
| 2017-11-16 15:11:02 | 2017-11-17 17:23:38 | R1-1717174 | | Rel-15 | | | LTE_sTTIandPT-Core | | | | | | | | | |
| 2017-11-16 15:11:02 | 2017-11-17 17:23:38 | R1-1717164 | | Rel-15 | | | LTE_sTTIandPT-Core | | | | | | | | | |
| 2017-11-16 15:11:02 | 2017-11-17 17:23:38 | R1-1717167 | | Rel-15 | | | LTE_sTTIandPT-Core | | | | | | | | | |
| 2017-11-16 15:11:02 | 2017-11-17 17:23:38 | R1-1717176 | | Rel-15 | | | LTE_sTTIandPT-Core | | | | | | | | | |
| 2017-11-16 15:11:02 | 2017-11-17 17:31:42 | | | Rel-15 | | | LTE_sTTIandPT-Core | | | | | | | | | |
| 2017-11-16 15:11:02 | 2017-11-17 17:05:33 | R1-1717452 | R1-1721062 | Rel-15 | | | LTE_HRLLC-Core | | | | | | | | | |
| 2017-11-16 15:11:02 | 2017-11-17 17:05:33 | | | Rel-15 | | | LTE_HRLLC-Core | | | | | | | | | |
| 2017-11-16 15:11:02 | 2017-11-17 17:05:33 | | | Rel-15 | | | LTE_HRLLC-Core | | | | | | | | | |
| 2017-11-16 15:11:02 | 2017-11-17 17:05:33 | | R1-1721063 | Rel-15 | | | LTE_HRLLC-Core | | | | | | | | | |
| 2017-11-16 15:11:02 | 2017-11-17 17:05:33 | | | Rel-15 | | | LTE_HRLLC-Core | | | | | | | | | |
| 2017-11-16 15:34:40 | | | | Rel-15 | | | LTE_sTTIandPT-Core | | | | | | | | | |
| 2017-11-16 16:00:28 | 2017-11-17 14:03:28 | | | Rel-15 | 38.811 | | FS_NR_nonterr_nw | | | | | | | | | |
| 2017-11-16 16:15:39 | 2017-11-17 17:04:55 | | | Rel-15 | | | LTE_unlic-Core | | | | | | | | | |
| 2017-11-16 17:30:13 | 2017-11-17 11:34:49 | | R1-1721286 | Rel-15 | | | LTE_eMTC4-Core | | | | | | | | | |
| 2017-11-16 17:41:26 | 2017-11-17 20:09:47 | | | | | | | | | | | | | | | |
| 2017-11-16 17:41:26 | 2017-11-17 20:09:47 | | | | | | | | | | | | | | | |
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| 2017-11-16 19:18:00 | 2017-11-18 07:18:52 | | R1-1721080 | Rel-13 | 36.300 | 13.9.0 | LTE_MTCe2_L1-Core | | | F | | | | | | |
| 2017-11-16 19:59:25 | 2017-11-18 01:28:17 | | | | | | | | | | | | | | | |
| 2017-11-16 21:07:07 | 2017-11-17 23:02:49 | | | Rel-15 | | | NR_newRAT-Core | | | | | | | | | |
| 2017-11-16 21:07:07 | 2017-11-17 23:02:49 | | | Rel-15 | | | NR_newRAT-Core | | | | | | | | | |
| 2017-11-16 21:07:07 | 2017-11-17 23:02:49 | | | Rel-15 | | | NR_newRAT-Core | | | | | | | | | |
| 2017-11-16 21:07:07 | 2017-11-17 23:02:49 | R1-1718359 | R1-1800598 | Rel-15 | | | NR_newRAT-Core | | | | | | | | | |
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| Reservation date | Uploaded | Is revision of | Revised to | Release | Spec | Version | Related WIs | CR | CR revision | CR category | TSG CR Pack | Reply to | To | Cc | Original LS | Reply in |
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| 2017-11-16 21:07:07 | 2017-11-17 23:02:49 | R1-1718360 | R1-1800600 | Rel-15 | | | NR_newRAT-Core | | | | | | | | | |
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| 2017-11-16 21:07:07 | 2017-11-17 23:02:49 | | | Rel-15 | | | NR_newRAT-Core | | | | | | | | | |
| 2017-11-16 21:07:07 | 2017-11-18 01:58:52 | | R1-1800603 | Rel-15 | | | NR_newRAT-Core | | | | | | | | | |
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| 2017-11-16 23:59:58 | 2017-11-17 00:22:01 | R1-1718468 | | | | | | | | | | | | | | |
| 2017-11-17 00:28:44 | 2017-11-17 10:15:36 | | | | | | | | | | | | | | | |
| 2017-11-17 01:07:57 | 2017-11-17 07:01:20 | | | | | | | | | | | | | | | |
| 2017-11-17 01:57:04 | 2017-11-17 04:50:49 | | | Rel-14 | | | NB_IOTenh-Core | | | | | | | | | |
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| 2017-11-17 02:01:15 | 2017-11-17 08:12:40 | | | | | | | | | | | | | | | |
| 2017-11-17 02:05:46 | 2017-11-17 10:01:46 | | | | | | | | | | | | | | | |
| 2017-11-17 02:08:22 | 2017-11-17 10:02:09 | R1-1716551 | R1-1800623 | | | | | | | | | | | | | |
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| 2017-11-17 02:21:59 | 2017-11-18 01:38:56 | | | | | | | | | | | | | | | |
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| 2017-11-17 02:21:59 | 2017-11-18 01:38:56 | | | | | | | | | | | | | | | |
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| 2017-11-17 02:21:59 | 2017-11-18 01:38:56 | | | Rel-15 | | | LTE_sTTIandPT-Core | | | | | | | | | |
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| 2017-11-17 02:38:34 | 2017-11-18 04:04:34 | | | | | | | | | | | | | | | |
| 2017-11-17 02:43:32 | 2017-11-18 04:04:34 | R1-1718458 | | | | | | | | | | | | | | |
| 2017-11-17 02:53:40 | 2017-11-17 08:48:53 | | | | | | | | | | | | | | | |
| 2017-11-17 02:54:30 | 2017-11-18 03:16:33 | | | | | | | | | | | | | | | |

| Reservation date | Uploaded | Is revision of | Revised to | Release | Spec | Version | Related WIs | CR | CR revision | CR category | TSG CR Pack | Reply to | To | Cc | Original LS | Reply in |
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| 2017-11-17 03:12:07 | 2017-11-18 01:38:56 | | | | | | | | | | | | | | | |
| 2017-11-17 03:48:37 | 2017-11-18 05:02:46 | | | | | | | | | | | | | | | |
| 2017-11-17 03:49:34 | 2017-11-18 01:48:39 | | | Rel-15 | | | NB_IOTenh2-Core | | | | | | | | | |
| 2017-11-17 03:49:36 | 2017-11-18 05:02:46 | | | | | | | | | | | | | | | |
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| 2017-11-17 03:56:37 | 2017-11-18 05:03:50 | | | | | | | | | | | | | | | |
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| 2017-11-17 04:12:21 | 2017-11-18 05:03:50 | | | | | | | | | | | | | | | |
| 2017-11-17 04:13:38 | 2017-11-18 05:04:28 | | | | | | | | | | | | | | | |
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| 2017-11-17 04:20:44 | 2017-11-18 05:05:22 | | | | | | | | | | | | | | | |
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| 2017-11-17 04:23:03 | 2017-11-20 18:05:41 | | | | | | | | | | | | | | | |
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| Reservation date | Uploaded | Is revision of | Revised to | Release | Spec | Version | Related WIs | CR | CR revision | CR category | TSG CR Pack | Reply to | To | Cc | Original LS | Reply in |
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| 2017-11-17 04:26:43 | 2017-11-18 06:52:38 | | | | | | | | | | | | | | | |
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| 2017-11-17 04:37:32 | 2017-11-18 07:02:40 | R1-1718741 | R1-1800703 | | | | | | | | | | | | | |
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| Reservation date | Uploaded | Is revision of | Revised to | Release | Spec | Version | Related WIs | CR | CR revision | CR category | TSG CR Pack | Reply to | To | Cc | Original LS | Reply in |
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| 2017-11-17 06:40:16 | 2017-11-18 07:00:08 | | | | | | | | | | | | | | | |
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| 2017-11-17 06:42:51 | 2017-11-17 17:25:15 | | R1-1721065 | | | | | | | | | | | | | |
| 2017-11-17 06:44:37 | 2017-11-18 06:52:22 | | | | | | | | | | | | | | | |
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| 2017-11-17 07:20:44 | 2017-11-18 05:24:14 | | R1-1721358 | | | | | | | | | | | | | |
| 2017-11-17 07:20:44 | 2017-11-18 05:24:14 | | | | | | | | | | | | | | | |
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| 2017-11-17 07:20:44 | 2017-11-18 06:08:00 | | | | | | | | | | | | | | | |
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| 2017-11-17 07:20:45 | 2017-11-18 02:59:50 | | | | | | | | | | | | | | | |
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| 2017-11-17 08:06:47 | 2017-11-18 07:35:53 | | R1-1721372 | | | | | | | | | | | | | |
| 2017-11-17 08:07:24 | 2017-11-17 08:10:15 | R1-1718626 | | | | | | | | | | | | | | |
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| 2017-11-17 08:15:21 | 2017-11-17 10:11:31 | R1-1713988 | | | | | | | | | | | | | | |
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| 2017-11-17 08:21:39 | 2017-11-17 10:11:31 | R1-1713984 | | | | | | | | | | | | | | |
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| 2017-11-17 08:46:33 | 2017-11-17 08:57:32 | R1-1718600 | R1-1800766 | | | | | | | | | | | | | |
| 2017-11-17 08:48:05 | 2017-11-17 08:56:56 | R1-1718610 | | | | | | | | | | | | | | |

| Reservation date | Uploaded | Is revision of | Revised to | Release | Spec | Version | Related WIs | CR | CR revision | CR category | TSG CR Pack | Reply to | To | Cc | Original LS | Reply in |
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| 2017-11-17 10:25:07 | 2017-11-18 06:46:01 | R1-1717153 | | Rel-15 | | | NR_newRAT-Core | | | | | | | | | |
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| Reservation date | Uploaded | Is revision of | Revised to | Release | Spec | Version | Related WIs | CR | CR revision | CR category | TSG CR Pack | Reply to | To | Cc | Original LS | Reply in |
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| 2017-11-17 11:40:13 | 2017-11-17 21:08:47 | R1-1718707 | | | | | | | | | | | | | | |
| 2017-11-17 12:53:16 | 2017-11-17 17:19:29 | | | Rel-15 | | | LTE_unlic-Core | | | | | | | | | |
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| 2017-11-17 14:04:15 | 2017-11-17 14:06:39 | R1-1717180 | | Rel-15 | | | LTE_sTTIandPT-Core | | | | | | | | | |
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| 2017-11-17 14:12:18 | 2017-11-17 14:40:30 | | | | | | | | | | | | | | | |
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| Reservation date | Uploaded | Is revision of | Revised to | Release | Spec | Version | Related WIs | CR | CR revision | CR category | TSG CR Pack | Reply to | To | Cc | Original LS | Reply in |
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| 2017-11-17 15:45:22 | 2017-11-18 07:12:32 | | | | | | | | | | | | | | | |
| 2017-11-17 15:45:22 | 2017-11-18 07:12:32 | | | | | | | | | | | | | | | |

| Reservation date | Uploaded | Is revision of | Revised to | Release | Spec | Version | Related WIs | CR | CR revision | CR category | TSG CR Pack | Reply to | To | Cc | Original LS | Reply in |
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| 2017-11-17 15:45:22 | 2017-11-18 07:12:32 | | | | | | | | | | | | | | | |
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| 2017-11-17 15:45:22 | 2017-11-18 07:08:41 | | R1-1800987 | | | | | | | | | | | | | |
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| 2017-11-17 16:34:29 | 2017-11-17 16:36:59 | | | Rel-15 | | | | | | | | | | | | |
| 2017-11-17 17:57:54 | 2017-11-18 04:30:22 | | | Rel-15 | | | LTE_unlic-Core | | | | | | | | | |
| 2017-11-17 22:16:28 | | | | Rel-15 | | | | | | | | | | | | |
| 2017-11-17 22:17:50 | | | | Rel-15 | | | | | | | | | | | | |
| 2017-11-19 17:36:49 | 2017-11-20 08:32:44 | | | Rel-15 | | | NB_IOTenh2-Core | | | | | | | | | |
| 2017-11-19 17:41:08 | 2017-11-29 06:47:56 | | | Rel-15 | | | LTE_HRLLC-Core | | | | | | | | | |
| 2017-11-20 17:31:16 | 2017-11-29 06:47:56 | R1-1720794 | | | | | | | | | | | | | | |
| 2017-11-20 17:32:42 | 2017-11-29 06:47:56 | R1-1719555 | | | | | | | | | | | | | | |
| 2017-11-21 09:09:09 | 2017-11-29 06:47:56 | R1-1719242 | R1-1721339 | Rel-15 | 38.201 | 1.1.0 | NR_newRAT-Core | | | | | | | | | |
| 2017-11-21 09:09:12 | 2017-11-23 07:33:46 | R1-1719229 | R1-1721340 | Rel-15 | 38.202 | 1.1.0 | NR_newRAT-Core | | | | | | | | | |
| 2017-11-21 09:09:16 | 2017-11-21 09:15:00 | R1-1720850 | R1-1721341 | Rel-15 | 38.211 | 1.2.0 | NR_newRAT-Core | | | | | | | | | |
| 2017-11-21 09:09:30 | 2017-11-21 09:15:01 | R1-1719245 | R1-1721342 | Rel-15 | 38.212 | 1.2.0 | NR_newRAT-Core | | | | | | | | | |
| 2017-11-21 09:09:33 | 2017-11-21 09:15:02 | R1-1719243 | R1-1721343 | Rel-15 | 38.213 | 1.2.0 | NR_newRAT-Core | | | | | | | | | |
| 2017-11-21 09:09:35 | 2017-11-21 09:15:03 | R1-1720114 | R1-1721344 | Rel-15 | 38.214 | 1.2.0 | NR_newRAT-Core | | | | | | | | | |
| 2017-11-21 09:09:37 | 2017-11-21 09:15:04 | R1-1719244 | R1-1721345 | Rel-15 | 38.215 | 1.2.0 | NR_newRAT-Core | | | | | | | | | |
| 2017-11-21 13:40:47 | 2017-11-23 07:33:46 | R1-1720774 | | Rel-15 | | | | | | | | | | | | |
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| 2017-11-27 09:24:27 | 2017-11-27 09:24:27 | | R1-1721259 | Rel-14 | 36.213 | 14.4.0 | NB_IOTenh-Core | | | F | | | | | | |
| 2017-11-27 09:24:27 | 2017-11-27 09:24:27 | R1-1719594 | R1-1721064 | Rel-14 | 36.213 | 14.4.0 | LTE_UL_CAP_enh-Core | | | F | | | | | | |
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| 2017-11-27 10:22:43 | 2017-11-27 10:22:43 | R1-1720764 | | | | | | | | | | | | | | |
| 2017-11-27 19:52:49 | 2017-11-27 19:52:49 | R1-1720384 | R1-1721086 | Rel-13 | 36.212 | 13.6.0 | LTE_CA_enh_b5C-Core | | | F | | | | | | |
| 2017-11-27 10:22:43 | 2017-11-27 10:22:43 | R1-1720236 | | Rel-15 | | | LTE_sTTIandPT-Core | | | | | | | | | |
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| 2017-11-27 10:22:43 | 2017-11-27 10:22:43 | R1-1719502 | | Rel-15 | | | LTE_HRLLC-Core | | | | | | | | | |
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| 2017-11-28 15:31:34 | 2017-11-28 15:31:34 | | | Rel-15 | | | LTE_unlic-Core | | | | | | | | | |
| 2017-11-27 19:52:49 | 2017-11-27 19:52:49 | R1-1719484 | R1-1721210 | Rel-15 | | | NB_IOTenh2-Core | | | | | | | | | |
| 2017-11-29 08:34:20 | 2017-11-29 08:34:20 | R1-1720378 | | Rel-13 | 36.211 | 13.7.1 | LTE_MTCe2_L1-Core | 0401 | | F | RP-172680 | | | | | |
| 2017-11-29 08:34:20 | 2017-11-29 08:34:20 | | | Rel-14 | 36.211 | 14.4.0 | LTE_MTCe2_L1-Core | 0402 | | A | RP-172680 | | | | | |
| 2017-12-07 09:29:11 | | R1-1720545 | | Rel-13 | 36.300 | 13.9.0 | LTE_MTCe2_L1-Core | | | F | | | | | | |
| 2017-11-29 08:34:20 | 2017-11-29 08:34:20 | | | Rel-13 | 36.211 | 13.7.1 | LTE_MTCe2_L1-Core | 0403 | | F | RP-172680 | | | | | |
| 2017-11-29 08:34:20 | 2017-11-29 08:34:20 | | | Rel-14 | 36.211 | 14.4.0 | LTE_MTCe2_L1-Core | 0404 | | A | RP-172680 | | | | | |
| 2017-12-07 09:29:19 | 2017-12-08 10:35:44 | | | Rel-13 | 36.213 | 13.7.0 | NB_IOT-Core | 0996 | | F | RP-172681 | | | | | |

| Reservation date | Uploaded | Is revision of | Revised to | Release | Spec | Version | Related WIs | CR | CR revision | CR category | TSG CR Pack | Reply to | To | Cc | Original LS | Reply in |
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| 2017-12-07 09:29:27 | | | | | | | | | | | | | | | | |
| 2017-12-07 09:29:27 | 2017-12-08 10:35:44 | R1-1721066 | | Rel-13 | 36.212 | 13.6.0 | LTE_CA_enh_b5C-Core | 0269 | | F | RP-172678 | | | | | |
| 2017-12-07 09:29:30 | 2017-12-08 10:35:44 | | | Rel-14 | 36.212 | 14.4.0 | LTE_CA_enh_b5C-Core | 0270 | | A | RP-172678 | | | | | |
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| 2017-11-29 12:41:00 | 2017-11-29 12:41:00 | R1-1720220 | | Rel-14 | 36.213 | 14.4.0 | LTE_V2X-Core | 1000 | | F | RP-172684 | | | | | |
| 2017-12-07 09:29:44 | 2017-12-08 10:35:44 | R1-1720388 | | Rel-14 | 36.213 | 14.4.0 | LTE_feMTC-Core | 1001 | | F | RP-172685 | | | | | |
| 2017-11-28 20:53:52 | 2017-11-28 20:53:52 | R1-1719707 | | Rel-14 | 36.212 | 14.4.0 | LTE_feMTC-Core | 0271 | | F | RP-172685 | | | | | |
| 2017-11-28 18:55:03 | 2017-11-28 18:55:03 | R1-1719507 | | Rel-14 | 36.213 | 14.4.0 | LTE_VoLTE_ViLTE_enh-Core | 1002 | | F | RP-172692 | | | | | |
| 2017-11-28 20:53:52 | 2017-11-28 20:53:52 | R1-1719710 | | Rel-14 | 36.212 | 14.4.0 | LTE_VoLTE_ViLTE_enh-Core | 0272 | | F | RP-172692 | | | | | |
| 2017-12-07 09:29:57 | 2017-12-08 10:35:44 | R1-1720389 | | Rel-14 | 36.213 | 14.4.0 | LTE_SRS_switch-Core | 1003 | | F | RP-172691 | | | | | |
| 2017-12-07 09:30:01 | | | | | | | | | | | | | | | | |
| 2017-11-29 08:34:20 | 2017-11-29 08:34:20 | R1-1720596 | | Rel-14 | 36.213 | 14.4.0 | LTE_UL_CAP_enh-Core | 1004 | | F | RP-172677 | | | | | |
| 2017-11-28 15:31:34 | 2017-11-28 15:31:34 | R1-1720597 | | Rel-14 | 36.211 | 14.4.0 | LTE_UL_CAP_enh-Core | 0405 | | F | RP-172677 | | | | | |
| 2017-11-27 19:52:49 | 2017-11-27 19:52:49 | R1-1721071 | | Rel-15 | 36.213 | 14.4.0 | feCOMP_LTE-Core | 0995 | 1 | B | RP-172689 | | | | | |
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| 2017-11-30 20:04:07 | 2017-11-30 20:04:07 | | R1-1721304 | Rel-15 | | | FS_LTE_Aerial | | | | | | | | | |
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| 2017-11-30 11:23:10 | 2017-11-30 11:23:10 | R1-1720020 | | Rel-13 | 36.213 | 13.7.0 | LTE_MTCe2_L1-Core | | | F | | | | | | |
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| 2017-11-28 15:31:34 | 2017-11-28 15:31:34 | R1-1721106 | | Rel-12 | 36.212 | 12.8.0 | LTE_CA-Core, TEI12 | 0274 | | F | RP-172690 | | | | | |
| 2017-11-28 15:31:34 | 2017-11-28 15:31:34 | R1-1721107 | | Rel-13 | 36.212 | 13.6.0 | LTE_CA-Core, TEI12 | 0275 | | A | RP-172690 | | | | | |
| 2017-11-28 15:31:34 | 2017-11-28 15:31:34 | R1-1721108 | | Rel-14 | 36.212 | 14.4.0 | LTE_CA-Core, TEI12 | 0276 | | A | RP-172690 | | | | | |
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| Reservation date | Uploaded | Is revision of | Revised to | Release | Spec | Version | Related WIs | CR | CR revision | CR category | TSG CR Pack | Reply to | To | Cc | Original LS | Reply in |
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| 2017-11-28 12:50:35 | 2017-11-28 12:50:35 | | | Rel-15 | | | NB_IOTenh2-Core | | | | | | | | | |
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| 2017-11-28 15:31:34 | 2017-11-28 15:31:34 | | R1-1721225 | Rel-15 | | | LTE_eMTC4-Core | | | | | | | | | |
| 2017-11-28 15:31:34 | 2017-11-28 15:31:34 | | | Rel-15 | | | LTE_eMTC4-Core | | | | | | | | | |
| 2017-11-28 18:55:03 | 2017-11-28 18:55:03 | | | Rel-15 | | | NB_IOTenh2-Core | | | | | | | | | |
| 2017-11-30 11:23:10 | 2017-11-30 11:23:10 | | | Rel-15 | | | LTE_eMTC4-Core | | | | | | | | | |
| 2017-11-30 20:04:07 | 2017-11-30 20:04:07 | | | Rel-15 | | | NB_IOTenh2-Core | | | | | | | | | |
| 2017-11-29 08:34:20 | 2017-11-29 08:34:20 | | R1-1721201 | Rel-14 | 36.213 | 14.4.0 | LTE_eFDMIMO-Core | | | F | | | | | | |
| 2017-11-29 08:34:20 | 2017-11-29 08:34:20 | R1-1721100 | R1-1721200 | Rel-14 | 36.211 | 14.4.0 | LTE_SRS_switch-Core | | | F | | | | | | |
| 2017-11-29 17:40:40 | 2017-11-29 17:40:40 | | | Rel-15 | | | NB_IOTenh2-Core | | | | | | | | | |
| 2017-11-28 18:55:03 | 2017-11-28 18:55:03 | | | Rel-15 | | | NB_IOTenh2-Core | | | | | | | | | |
| 2017-12-07 09:31:01 | | | | Rel-15 | | | NB_IOTenh2-Core | | | | | | | | | |
| 2017-11-28 18:55:03 | 2017-11-28 18:55:03 | | | Rel-15 | | | NB_IOTenh2-Core | | | | | | | | | |
| 2017-11-28 18:55:03 | 2017-11-28 18:55:03 | | | Rel-15 | | | NB_IOTenh2-Core | | | | | | | | | |
| 2017-11-28 18:55:03 | 2017-11-28 18:55:03 | | | Rel-15 | | | NB_IOTenh2-Core | | | | | | | | | |
| 2017-11-30 11:23:10 | 2017-11-30 11:23:10 | | R1-1721254 | Rel-15 | | | LTE_eMTC4-Core | | | | | | RAN2 | | | |
| 2017-11-28 18:55:03 | 2017-11-28 18:55:03 | | | Rel-15 | | | NB_IOTenh2-Core | | | | | | | | | |
| 2017-11-28 18:55:03 | 2017-11-28 18:55:03 | | | Rel-15 | | | NB_IOTenh2-Core | | | | | | | | | |
| 2017-11-28 20:53:52 | 2017-11-28 20:53:52 | | | Rel-15 | | | NB_IOTenh2-Core | | | | | | | | | |
| 2017-11-28 20:53:52 | 2017-11-28 20:53:52 | | | Rel-15 | | | NB_IOTenh2-Core | | | | | | | | | |
| 2017-11-29 08:34:20 | 2017-11-29 08:34:20 | R1-1720834 | R1-1721264 | Rel-13 | 36.213 | 13.7.0 | LTE_MTCe2_L1-Core | | | F | | | | | | |
| 2017-11-29 08:34:20 | 2017-11-29 08:34:20 | | | Rel-15 | | | FS_LTE_Aerial | | | | | | | | | |
| 2017-11-30 20:04:07 | 2017-11-30 20:04:07 | | | Rel-15 | | | NB_IOTenh2-Core | | | | | | | | | |
| 2017-11-30 11:23:10 | 2017-11-30 11:23:10 | | R1-1721241 | Rel-15 | | | NB_IOTenh2-Core | | | | | | RAN2, RAN4 | | | |
| 2017-11-30 20:04:07 | 2017-11-30 20:04:07 | | | Rel-15 | | | NB_IOTenh2-Core | | | | | | | | | |
| 2017-12-07 09:31:09 | | | | | | | | | | | | | | | | |
| 2017-12-01 12:44:41 | 2017-12-01 12:44:41 | R1-1720514 | | Rel-15 | | | FS_LTE_Aerial | | | | | | | | | |
| 2017-11-30 20:04:07 | 2017-11-30 20:04:07 | R1-1720515 | | Rel-15 | | | FS_LTE_Aerial | | | | | | | | | |
| 2017-11-30 11:23:10 | 2017-11-30 11:23:10 | | | Rel-15 | | | | | | | | | | | | |

| Reservation date | Uploaded | Is revision of | Revised to | Release | Spec | Version | Related WIs | CR | CR revision | CR category | TSG CR Pack | Reply to | To | Cc | Original LS | Reply in |
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| 2017-11-30 11:23:10 | 2017-11-30 11:23:10 | | | Rel-14 | | | LTE_V2X-Core | | | | | | RAN2 | | | |
| 2017-11-30 11:23:10 | 2017-11-30 11:23:10 | R1-1721178 | | Rel-14 | 36.211 | 14.4.0 | LTE_SRS_switch-Core | 0406 | | F | RP-172691 | | | | | |
| 2017-11-30 11:23:10 | 2017-11-30 11:23:10 | R1-1721177 | R1-1721260 | Rel-14 | 36.213 | 14.4.0 | LTE_eFDMIMO-Core | | | F | | | | | | |
| 2017-11-30 20:04:07 | 2017-11-30 20:04:07 | | R1-1721295 | Rel-15 | | | FS_LTE_Aerial | | | | | | | | | |
| 2017-11-29 12:41:00 | 2017-11-29 12:41:00 | | R1-1721276 | Rel-15 | | | FS_LTE_Aerial | | | | | | | | | |
| 2017-11-30 11:23:10 | 2017-11-30 11:23:10 | R1-1721111 | R1-1721287 | Rel-15 | | | FS_LTE_Aerial | | | | | | | | | |
| 2017-12-07 09:58:53 | 2017-12-07 10:07:55 | | R1-1800980 | Rel-15 | | | | | | | | | | | | |
| 2017-12-07 09:31:17 | | R1-1720783 | | Rel-15 | | | FS_LTE_Aerial | | | | | | | | | |
| 2017-11-30 11:23:10 | 2017-11-30 11:23:10 | | | Rel-15 | | | NB_IOTenh2-Core | | | | | | | | | |
| 2017-11-30 11:23:10 | 2017-11-30 11:23:10 | R1-1721135 | R1-1721292 | Rel-14 | | | LTE_V2X-Core | | | | | | RAN2 | | | |
| 2017-11-30 11:23:10 | 2017-11-30 11:23:10 | R1-1721135 | R1-1721293 | | | | | | | | | | | | | |
| 2017-11-29 17:40:40 | 2017-11-29 17:40:40 | R1-1721077 | | Rel-15 | | | NB_IOTenh2-Core | | | | | | | | | |
| 2017-11-30 11:23:10 | 2017-11-30 11:23:10 | R1-1721124 | | | | | | | | | | | | | | |
| 2017-11-29 17:40:40 | 2017-11-29 17:40:40 | | | Rel-15 | | | NB_IOTenh2-Core | | | | | | | | | |
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| 2017-11-29 17:40:40 | 2017-11-29 17:40:40 | | | Rel-15 | | | NB_IOTenh2-Core | | | | | | | | | |
| 2017-11-29 17:40:40 | 2017-11-29 17:40:40 | | | Rel-15 | | | LTE_sTTIandPT-Core | | | | | | RAN2 | | | |
| 2017-11-29 17:40:40 | 2017-11-29 17:40:40 | | | Rel-15 | | | LTE_sTTIandPT-Core | | | | | | RAN2 | | | |
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| 2017-12-07 09:31:23 | | | | Rel-15 | | | LTE_sTTIandPT-Core | | | | | | | | | |
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| 2017-11-30 11:23:10 | 2017-11-30 11:23:10 | | R1-1721242 | Rel-15 | | | NB_IOTenh2-Core, LTE_eMTC4-Core | | | | | R2-1711977 | RAN2 | | | |
| 2017-11-30 11:23:10 | 2017-11-30 11:23:10 | | | Rel-15 | | | TEI15 | | | | | | | | | |
| 2017-11-30 11:23:10 | 2017-11-30 11:23:10 | | | Rel-15 | 36.213 | 14.4.0 | TEI15 | | | B | | | | | | |
| 2017-11-30 11:23:10 | 2017-11-30 11:23:10 | | | Rel-15 | | | NB_IOTenh2-Core | | | | | | | | | |
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| 2017-12-01 12:44:41 | 2017-12-01 12:44:41 | | | Rel-15 | | | LTE_1024QAM_DL-Core | | | | | | | | | |
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| 2017-12-01 12:44:41 | 2017-12-01 12:44:41 | | | | | | | | | | | | | | | |
| 2017-12-01 12:44:41 | 2017-12-01 12:44:41 | | | Rel-15 | | | LTE_HRLLC-Core | | | | | | | | | |
| 2017-11-30 11:23:10 | 2017-11-30 11:23:10 | R1-1721193 | | Rel-15 | | | NB_IOTenh2-Core | | | | | | RAN2, RAN4 | | | |
| 2017-11-30 11:23:10 | 2017-11-30 11:23:10 | R1-1721227 | R1-1721255 | Rel-15 | | | NB_IOTenh2-Core, LTE_eMTC4-Core | | | | | R2-1711977 | RAN2 | | | |
| 2017-11-30 11:23:10 | 2017-11-30 11:23:10 | R1-1721117 | | Rel-15 | | | FS_LTE_Aerial | | | | | | | | | |
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| 2017-11-30 11:23:10 | 2017-11-30 11:23:10 | | | Rel-15 | | | | | | | | | | | | |
| 2017-11-30 11:23:10 | 2017-11-30 11:23:10 | R1-1719709 | R1-1721272 | Rel-14 | 36.213 | 14.4.0 | NB_IOTenh-Core | | | | | | | | | |
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| 2017-12-07 09:31:37 | | | | | | | | | | | | | | | | |
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| 2017-11-30 11:23:10 | 2017-11-30 11:23:10 | | | Rel-15 | | | LTE_eV2X-Core | | | | | | | | | |
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| 2017-11-30 11:23:10 | 2017-11-30 11:23:10 | R1-1719486 | | Rel-14 | 36.213 | 14.4.0 | NB_IOTenh-Core | | | F | | | | | | |
| 2017-11-30 11:23:10 | 2017-11-30 11:23:10 | | R1-1721273 | Rel-15 | | | LTE_eV2X-Core | | | | | | | | | |
| 2017-11-30 11:23:10 | 2017-11-30 11:23:10 | R1-1721185 | | Rel-15 | | | LTE_eMTC4-Core | | | | | | RAN2 | | | |
| 2017-11-30 11:23:10 | 2017-11-30 11:23:10 | R1-1721242 | | Rel-15 | | | NB_IOTenh2-Core, LTE_eMTC4-Core | | | | | R2-1711977 | RAN2 | | | |
| 2017-11-30 11:23:10 | 2017-11-30 11:23:10 | | | Rel-15 | | | LTE_eV2X-Core | | | | | | | | | |
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| 2017-11-30 11:23:10 | 2017-11-30 11:23:10 | | | Rel-15 | | | LTE_eV2X-Core | | | | | | | | | |
| 2017-11-30 11:23:10 | 2017-11-30 11:23:10 | R1-1721059 | R1-1721303 | Rel-14 | 36.213 | 14.4.0 | NB_IOTenh-Core | | | F | | | | | | |

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| 2017-11-30 20:04:07 | 2017-11-30 20:04:07 | R1-1721201 | | Rel-14 | 36.213 | 14.4.0 | LTE_eFDMIMO-Core | 1005 | | F | RP-172679 | | | | | |
| 2017-11-30 20:04:07 | 2017-11-30 20:04:07 | R1-1720387 | | Rel-14 | 36.211 | 14.4.0 | LTE_eFDMIMO-Core | 0407 | | F | RP-172679 | | | | | |
| 2017-12-01 12:44:41 | 2017-12-01 12:44:41 | R1-1721161 | | Rel-13 | 36.211 | 13.7.1 | LTE_MTCe2_L1-Core | 0408 | | F | RP-172680 | | | | | |
| 2017-12-01 12:44:41 | 2017-12-01 12:44:41 | R1-1721162 | | Rel-14 | 36.211 | 14.4.0 | LTE_MTCe2_L1-Core | 0409 | | A | RP-172680 | | | | | |
| 2017-12-07 09:31:56 | | R1-1721190 | R1-1721265 | Rel-13 | 36.213 | 13.7.0 | LTE_MTCe2_L1-Core | 1006 | | F | | | | | | |
| 2017-12-07 09:31:59 | | R1-1721264 | | Rel-14 | 36.213 | 14.4.0 | LTE_MTCe2_L1-Core | 1007 | | A | | | | | | |
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| 2017-12-01 12:44:41 | 2017-12-01 12:44:41 | R1-1721244 | | Rel-15 | | | | | | | | | | | | |
| 2017-11-30 12:18:09 | 2017-11-30 12:18:09 | | | | | | | | | | | | | | | |
| 2017-11-30 11:23:10 | 2017-11-30 11:23:10 | | R1-1721274 | Rel-15 | | | LTE_eV2X-Core | | | | | | RAN4 | | | |
| 2017-11-30 20:04:07 | 2017-11-30 20:04:07 | | | | | | | | | | | | | | | |
| 2017-12-01 12:44:41 | 2017-12-01 12:44:41 | R1-1721246 | R1-1721300 | Rel-14 | 36.213 | 14.4.0 | NB_IOTenh-Core | | | | | | | | | |
| 2017-11-30 12:18:09 | 2017-11-30 12:18:09 | R1-1721253 | R1-1721349 | Rel-15 | | | LTE_eV2X-Core | | | | | | | | | |
| 2017-11-30 20:04:07 | 2017-11-30 20:04:07 | R1-1721270 | R1-1721285 | Rel-15 | | | LTE_eV2X-Core | | | | | | RAN4 | | | |
| 2017-11-30 20:04:07 | 2017-11-30 20:04:07 | | | Rel-15 | | | NB_IOTenh2-Core | | | | | | | | | |
| 2017-11-30 20:04:07 | 2017-11-30 20:04:07 | R1-1721203 | | Rel-15 | | | FS_LTE_Aerial | | | | | | | | | |
| 2017-11-30 20:04:07 | 2017-11-30 20:04:07 | | R1-1721283 | Rel-15 | | | LTE_eMTC4-Core | | | | | | RAN2 | | | |
| 2017-11-30 20:04:07 | 2017-11-30 20:04:07 | | R1-1721282 | Rel-15 | | | LTE_eMTC4-Core | | | | | | RAN4 | | | |
| 2017-11-30 20:04:07 | 2017-11-30 20:04:07 | | | | | | | | | | | | | | | |
| 2017-11-30 20:04:07 | 2017-11-30 20:04:07 | R1-1720055 | | Rel-15 | | | LTE_HRLLC-Core | | | | | | | | | |
| 2017-12-01 12:44:41 | 2017-12-01 12:44:41 | | R1-1721316 | Rel-15 | | | NB_IOTenh2-Core | | | | | | RAN | | | |
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| 2017-11-30 20:04:07 | 2017-11-30 20:04:07 | R1-1721277 | | Rel-15 | | | LTE_eMTC4-Core | | | | | | RAN2 | | | |
| 2017-11-30 20:04:07 | 2017-11-30 20:04:07 | | | Rel-15 | | | FS_LTE_Aerial | | | | | | | | | |
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| 2017-12-01 12:44:41 | 2017-12-01 12:44:41 | R1-1720218 | R1-1721298 | Rel-14 | 36.213 | 14.4.0 | NB_IOTenh-Core | | | F | | | | | | |
| 2017-12-01 12:44:41 | 2017-12-01 12:44:41 | R1-1720443 | | Rel-15 | | | LTE_HRLLC-Core | | | | | | | | | |
| 2017-12-01 12:44:41 | 2017-12-01 12:44:41 | | | | | | | | | | | | | | | |
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| 2017-12-01 12:44:41 | 2017-12-01 12:44:41 | R1-1721209 | | | | | | | | | | | | | | |
| 2017-12-01 12:44:41 | 2017-12-01 12:44:41 | | R1-1721307 | Rel-15 | | | | | | | | | | | | |
| 2017-12-01 12:44:41 | 2017-12-01 12:44:41 | R1-1721202 | | Rel-15 | | | FS_LTE_Aerial | | | | | | | | | |
| 2017-12-01 12:44:41 | 2017-12-01 12:44:41 | R1-1721110 | R1-1721308 | Rel-15 | | | FS_LTE_Aerial | | | | | | | | | |
| 2017-12-01 12:44:41 | 2017-12-01 12:44:41 | | | | | | | | | | | | | | | |
| 2017-12-01 12:44:41 | 2017-12-01 12:44:41 | R1-1721288 | | Rel-14 | 36.213 | 14.4.0 | NB_IOTenh-Core | 1008 | | F | RP-172686 | | | | | |
| 2017-12-01 12:44:41 | 2017-12-01 12:44:41 | R1-1721292 | | Rel-14 | | | LTE_V2X-Core | | | | | | RAN2 | | | |
| 2017-12-01 12:44:41 | 2017-12-01 12:44:41 | R1-1721272 | | Rel-14 | 36.213 | 14.4.0 | NB_IOTenh-Core | 1009 | | F | RP-172686 | | | | | |
| 2017-12-01 12:44:41 | 2017-12-01 12:44:41 | | R1-1721302 | Rel-14 | | | NB_IOTenh-Core | | | | | | RAN2 | | | |
| 2017-12-01 12:44:41 | 2017-12-01 12:44:41 | R1-1721301 | | Rel-14 | | | NB_IOTenh-Core | | | | | | RAN2 | | | |
| 2017-12-07 09:32:28 | 2017-12-07 09:37:54 | R1-1721259 | | Rel-14 | 36.213 | 14.4.0 | NB_IOTenh-Core | 1010 | | F | RP-172686 | | | | | |
| 2017-12-01 12:44:41 | 2017-12-01 12:44:41 | R1-1721109 | R1-1721306 | Rel-15 | | | | | | | | | | | | |
| 2017-12-01 12:44:41 | 2017-12-01 12:44:41 | | R1-1721310 | Rel-15 | | | FS_LTE_Aerial | | | | | | RAN2 | | | |
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| 2017-12-01 12:44:41 | 2017-12-01 12:44:41 | R1-1721294 | R1-1721309 | Rel-15 | | | | | | | | | | | | |
| 2017-12-07 09:32:33 | 2017-12-07 09:37:54 | R1-1721296 | | Rel-15 | | | FS_LTE_Aerial | | | | | | | | | |
| 2017-12-07 09:32:33 | 2017-12-07 09:37:54 | R1-1721307 | | Rel-15 | | | | | | | | | | | | |
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| 2017-12-07 09:32:37 | 2017-12-08 10:35:44 | | | Rel-14 | 36.213 | 14.4.0 | NB_IOTenh-Core | 1011 | | F | RP-172686 | | | | | |

| Reservation date | Uploaded | Is revision of | Revised to | Release | Spec | Version | Related WIs | CR | CR revision | CR category | TSG CR Pack | Reply to | To | Cc | Original LS | Reply in |
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| 2017-12-07 09:32:37 | 2017-12-08 10:35:44 | R1-1721281 | | Rel-15 | | | NB_IOTenh2-Core | | | | | | RAN | | | |
| 2017-11-27 09:24:27 | 2017-11-27 09:24:27 | | | Rel-14 | 36.212 | 14.4.0 | NB_IOTenh-Core | 0277 | | F | RP-172686 | | | | | |
| 2017-12-07 09:32:38 | | | | | | | | | | | | | | | | |
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| 2017-12-07 09:32:40 | | | | | | | | | | | | | | | | |
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| 2017-12-07 09:32:41 | 2017-12-15 21:06:15 | | | Rel-15 | 36.211 | 14.4.0 | LTE_sTTIandPT-Core | 0385 | 4 | B | RP-172693 | | | | | |
| 2017-12-07 09:32:42 | 2017-12-15 21:06:15 | | | Rel-15 | 36.211 | 14.4.0 | LTE_sTTIandPT-Core | 0399 | 2 | B | RP-172693 | | | | | |
| 2017-12-07 09:32:42 | 2017-12-15 21:06:15 | | | Rel-15 | 36.212 | 14.4.0 | LTE_sTTIandPT-Core | 0278 | | B | RP-172693 | | | | | |
| 2017-12-07 09:32:43 | 2017-12-15 21:06:15 | | | Rel-15 | 36.213 | 14.4.0 | LTE_sTTIandPT-Core | 0992 | 1 | B | RP-172693 | | | | | |
| 2017-12-07 09:32:43 | 2017-12-15 21:06:15 | | | Rel-15 | 36.213 | 14.4.0 | LTE_sTTIandPT-Core | 0993 | 1 | B | RP-172693 | | | | | |
| 2017-12-07 09:32:44 | 2017-12-15 21:06:15 | | | Rel-15 | 36.213 | 14.4.0 | LTE_sTTIandPT-Core | 0994 | 1 | B | RP-172693 | | | | | |
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| 2017-12-07 09:32:50 | 2017-12-15 07:48:12 | R1-1721049 | | Rel-15 | 38.212 | 1.2.1 | NR_newRAT-Core | | | | | | | | | |
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| 2017-12-07 09:32:51 | 2017-12-15 07:48:10 | R1-1721051 | | Rel-15 | 38.214 | 1.3.0 | NR_newRAT-Core | | | | | | | | | |
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| Reservation date | Uploaded | Is revision of | Revised to | Release | Spec | Version | Related WIs | CR | CR revision | CR category | TSG CR Pack | Reply to | To | Cc | Original LS | Reply in |
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| 2017-11-28 20:21:24 | 2017-11-28 20:21:24 | | | | | | | | | | | | | | | |
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| 2017-11-28 20:21:24 | 2017-11-28 20:21:24 | R1-1721381 | R1-1721550 | | | | | | | | | | | | | |
| 2017-11-28 20:21:24 | 2017-11-28 20:21:24 | R1-1721382 | R1-1721551 | | | | | | | | | | | | | |
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| 2017-12-01 22:35:24 | 2017-12-01 22:35:24 | R1-1721470 | | Rel-15 | | | | | | | | | | | | |
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| 2017-11-29 08:02:35 | 2017-11-29 08:02:35 | | | | | | | | | | | | | | | |
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| 2017-12-02 15:48:23 | 2017-12-02 15:48:23 | | | | | | | | | | | | | | | |
| 2017-12-02 15:48:23 | 2017-12-02 15:48:23 | | | | | | | | | | | | | | | |
| 2017-12-01 17:54:04 | 2017-12-01 17:54:04 | | R1-1721711 | | | | | | | | | | | | | |
| 2017-12-01 17:54:04 | 2017-12-01 17:54:04 | R1-1721648 | | Rel-15 | | | NR_newRAT-Core | | | | | | | | | |
| 2017-12-01 17:54:04 | 2017-12-01 17:54:04 | R1-1721647 | R1-1721663 | Rel-15 | | | NR_newRAT-Core | | | | | | RAN2 | | | |
| 2017-12-01 17:54:04 | 2017-12-01 17:54:04 | R1-1721662 | | Rel-15 | | | NR_newRAT-Core | | | | | | RAN2 | | | |
| 2017-12-01 22:35:25 | 2017-12-01 22:35:25 | | | | | | | | | | | | | | | |
| 2017-12-01 17:54:04 | 2017-12-01 17:54:04 | | R1-1721670 | | | | | | | | | | | | | |
| 2017-12-01 22:35:25 | 2017-12-01 22:35:25 | | | Rel-15 | | | NR_newRAT-Core | | | | | | RAN1 | | R2-1714070 | |
| 2017-12-01 17:54:04 | 2017-12-01 17:54:04 | | R1-1721712 | Rel-15 | | | NR_newRAT-Core | | | | | | RAN4 | | | |
| 2017-12-01 22:35:25 | 2017-12-01 22:35:25 | | R1-1721714 | Rel-15 | | | NR_newRAT-Core | | | | | | RAN2 | | | |
| 2017-12-01 17:54:04 | 2017-12-01 17:54:04 | R1-1721578 | | Rel-15 | | | NR_newRAT-Core | | | | | R4-1711972 | RAN4 | RAN2, RAN3 | | |
| 2017-12-01 17:54:04 | 2017-12-01 17:54:04 | R1-1721665 | | | | | | | | | | | | | | |
| 2017-12-01 17:54:04 | 2017-12-01 17:54:04 | | | | | | | | | | | | | | | |
| 2017-12-01 17:54:04 | 2017-12-01 17:54:04 | | | | | | | | | | | | | | | |
| 2017-12-01 17:54:04 | 2017-12-01 17:54:04 | | | | | | | | | | | | | | | |
| 2017-12-01 22:35:25 | 2017-12-01 22:35:25 | | R1-1721702 | | | | | | | | | | | | | |
| 2017-12-01 17:54:04 | 2017-12-01 17:54:04 | | | | | | | | | | | | | | | |
| 2017-12-01 17:54:04 | 2017-12-01 17:54:04 | R1-1721567 | | | | | | | | | | | | | | |
| 2017-12-02 15:48:24 | 2017-12-02 15:48:24 | | | | | | | | | | | | | | | |
| 2017-12-01 22:35:25 | 2017-12-01 22:35:25 | | R1-1721682 | Rel-15 | | | NR_newRAT-Core | | | | | | | | | |
| 2017-12-01 22:35:25 | 2017-12-01 22:35:25 | | | | | | | | | | | | | | | |
| 2017-12-01 17:54:04 | 2017-12-01 17:54:04 | R1-1721649 | | Rel-15 | | | NR_newRAT-Core | | | | | | RAN2 | | | |
| 2017-12-01 22:35:25 | 2017-12-01 22:35:25 | R1-1721644 | | Rel-15 | | | NR_newRAT-Core | | | | | R4-1711624 | RAN4 | | | |
| 2017-12-01 22:35:25 | 2017-12-01 22:35:25 | R1-1721678 | | Rel-15 | | | NR_newRAT-Core | | | | | | RAN2 | | | |
| 2017-12-01 22:35:25 | 2017-12-01 22:35:25 | R1-1721564 | | | | | | | | | | | | | | |
| 2017-12-01 22:35:25 | 2017-12-01 22:35:25 | | | | | | | | | | | | | | | |
| 2017-12-01 22:35:25 | 2017-12-01 22:35:25 | R1-1721619 | | | | | | | | | | | | | | |
| 2017-12-02 15:48:24 | 2017-12-02 15:48:24 | R1-1721641 | | | | | | | | | | | | | | |
| 2017-12-01 22:35:25 | 2017-12-01 22:35:25 | R1-1721632 | | | | | | | | | | | | | | |
| 2017-12-02 15:48:24 | 2017-12-02 15:48:24 | R1-1721605 | R1-1721725 | | | | | | | | | | | | | |
| 2017-12-01 22:35:25 | 2017-12-01 22:35:25 | R1-1721623 | | | | | | | | | | | | | | |

| Reservation date | Uploaded | Is revision of | Revised to | Release | Spec | Version | Related WIs | CR | CR revision | CR category | TSG CR Pack | Reply to | To | Cc | Original LS | Reply in |
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| 2017-12-01 22:35:25 | 2017-12-01 22:35:25 | | | | | | | | | | | | | | | |
| 2017-12-01 22:35:25 | 2017-12-01 22:35:25 | | | Rel-15 | | | NR_newRAT-Core | | | | | R2-1712029 | RAN2, RAN1 | | R4-1714289 | |
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| 2017-12-01 22:35:25 | 2017-12-01 22:35:25 | R1-1721449 | | | | | | | | | | | | | | |
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| 2017-12-02 15:48:24 | 2017-12-02 15:48:24 | R1-1721640 | | | | | | | | | | | | | | |
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| 2017-12-02 15:48:24 | 2017-12-02 15:48:24 | | | | | | | | | | | | | | | |
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| 2017-12-01 22:35:25 | 2017-12-01 22:35:25 | | | | | | | | | | | | | | | |
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| 2017-12-02 15:48:24 | 2017-12-02 15:48:24 | R1-1721652 | | | | | | | | | | | | | | |
| 2017-12-02 15:48:24 | 2017-12-02 15:48:24 | R1-1721646 | R1-1721716 | Rel-15 | | | NR_newRAT-Core | | | | | R3-174964 | RAN3 | RAN2, RAN4 | | |
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| 2017-12-07 09:36:25 | | | | | | | | | | | | | | | | |
| 2017-12-02 15:48:24 | 2017-12-02 15:48:24 | R1-1721660 | R1-1721715 | | | | | | | | | | | | | |
| 2017-12-02 15:48:24 | 2017-12-02 15:48:24 | R1-1721667 | | Rel-15 | | | NR_newRAT-Core | | | | | | RAN4 | | | |
| 2017-12-02 15:48:24 | 2017-12-02 15:48:24 | | | | | | | | | | | | | | | |
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| 2017-12-02 15:48:24 | 2017-12-02 15:48:24 | | R1-1721723 | Rel-15 | | | NR_newRAT-Core | | | | | R2-1712026 | RAN2 | | | |
| 2017-12-02 15:48:24 | 2017-12-02 15:48:24 | R1-1721705 | | | | | | | | | | | | | | |
| 2017-12-02 15:48:24 | 2017-12-02 15:48:24 | | | | | | | | | | | | | | | |
| 2017-12-02 15:48:24 | 2017-12-02 15:48:24 | | R1-1721722 | Rel-15 | | | NR_newRAT-Core | | | | | R4-1709899 | RAN4 | | | |
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| 2017-12-07 09:36:33 | 2017-12-07 09:37:54 | R1-1721717 | | Rel-15 | | | NR_newRAT-Core | | | | | R2-1712026 | RAN2 | | | |
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| 2017-12-02 15:48:24 | 2017-12-02 15:48:24 | R1-1721688 | | | | | | | | | | | | | | |
| 2017-12-02 15:48:24 | 2017-12-02 15:48:24 | | R1-1721727 | Rel-15 | | | NR_newRAT-Core | | | | | | RAN4 | | | |
| 2017-12-02 15:48:24 | 2017-12-02 15:48:24 | R1-1721726 | | Rel-15 | | | NR_newRAT-Core | | | | | | RAN4 | | | |
| 2017-12-08 10:34:37 | 2017-12-08 10:35:44 | R1-1721698 | | Rel-15 | 38.300 | | NR_newRAT-Core | | | | | | | | | |
| 2017-12-08 10:34:37 | 2017-12-08 10:35:44 | | | Rel-15 | | | NR_newRAT-Core | | | | | | RAN2 | | | |
| 2017-12-12 17:04:47 | 2017-12-12 17:06:43 | | | Rel-15 | | | LTE_1024QAM_DL-Core | | | | | | | | | |
| 2017-12-12 17:02:41 | 2017-12-14 12:50:01 | R1-1719506 | | Rel-15 | | | LTE_1024QAM_DL-Core | | | | | | RAN2 | | | |
| 2017-12-12 17:02:41 | 2017-12-12 17:06:43 | | | Rel-15 | | | NR_newRAT-Core | | | | | RP-172113 | RAN | RAN2, RAN4 | | |
| 2017-12-12 17:02:41 | 2017-12-12 17:06:43 | | | Rel-15 | | | NR_newRAT-Core | | | | | R2-1712026 | RAN2 | | | |
| 2017-12-12 17:02:41 | 2017-12-15 21:07:39 | | | Rel-15 | | | NR_newRAT-Core | | | | | | RAN2 | | | |
| 2018-02-14 16:25:06 | 2018-02-14 16:25:22 | | | Rel-15 | | | LTE_HRLLC-Core | | | | | | | | | |

3GPP_TSG_RAN_WG2 Archives
January 2018, Week 1



3GPP_TSG_RAN_WG2@LIST.ETSI.ORG



**Subject:** New NR specs as available as Rel-15 versions
**From:** Juha Korhonen <Juha.Korhonen@ETSI.ORG>
**Reply To:** Juha Korhonen <Juha.Korhonen@ETSI.ORG>
**Date:** Thu, 4 Jan 2018 11:39:52 +0000
**Content-Type:** multipart/alternative
**Parts/Attachments:** text/plain (1565 bytes) , text/html (4 kB)

Dear All,

I have prepared and uploaded to 3GU the Rel-15 versions of the following RAN#78-approved NR specifications:
37.340
38.300
38.306
38.321
38.322
38.323
38.331

Some of these specifications were in excellent order before any checks by me, and some…. were not.
I would encourage new (and existing) rapporteurs to have a look at 21.801 (3GPP specifications drafting rules).
Moreover you should have the 3GPP template (3gpp_70.dot) attached into your draft spec skeleton before starting any work with your new specification. Otherwise it all goes wrong from the beginning.

I do understand that the NR specs were put together in a hurry, and they are to be updated in future meetings. But still…. please make an attempt to produce proper specifications.

Of the specifications above, 38.306 has some references to "[X]". These should be fixed. Also, there are lots of Editor's Notes in red.

38.331 was heavily edited by me to make it drafting rules compliant, but there are still obvious problems in it (such as references to [X] and huge amount of Editor's Notes and FFS'). Also, ASN.1 descriptions are often lacking the associated textual field descriptions in a table. Moreover, there was no change history at all for this spec so I added it afterwards though I left the comment fields empty.

When it comes to TR 36.777, I have repaired it now for two days and reached about the half-way point. However, this is not an NR spec, and thus I believe it is not urgent to make it available this week. I hope I can upload the Rel-15 version of it next week.

BR,
Juha