**3GPP TSG-RAN WG1 Meeting #51** ⌘*R1-075116*
**Jeju, Korea, November 5-9, 2007**

*CR-Form-v9.3*

# DRAFT CHANGE REQUEST

⌘ **36.213** **CR** **1** ⌘**rev** **2** ⌘ Current version: **8.0.0** ⌘

*For **HELP** on using this form look at the pop-up text over the ⌘ symbols. Comprehensive instructions on how to use this form can be found at http://www.3gpp.org/specs/CR.htm.*

***Proposed change affects:*** UICC apps⌘ [ ] ME [X] Radio Access Network [X] Core Network [ ]

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Update of 36.213 |
| ***Source to WG:*** | ⌘ | Editor (Motorola) |
| ***Source to TSG:*** | ⌘ | R1 |
| ***Work item code:*** | ⌘ | LTE-Phys |
| ***Date:*** | ⌘ | 22/11/2007 |
| ***Category:*** | ⌘ | **F** |
| ***Release:*** | ⌘ | Rel-8 |

*Use one of the following categories:*
***F*** *(correction)*
***A*** *(corresponds to a correction in an earlier release)*
***B*** *(addition of feature),*
***C*** *(functional modification of feature)*
***D*** *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

*Use one of the following releases:*
*R97 (Release 1997)*
*R98 (Release 1998)*
*R99 (Release 1999)*
*Rel-4 (Release 4)*
*Rel-5 (Release 5)*
*Rel-6 (Release 6)*
*Rel-7 (Release 7)*
*Rel-8 (Release 8)*

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | Decisions taken at RAN1#50bis and RAN1#51 need to be reflected in 36.213 |
| ***Summary of change:*** | ⌘ | Inclusion of decisions from RAN1#50bis and RAN1#51 which include uplink power control, control channel resource allocation, downlink power boosting, CQI reporting for single TX antenna and Tx Diversity as well as subband size details for frequency selective CQI and PMI reporting. Updates to PRACH to harmonize with RAN2 specification. PHICH duration agreements captured for unicast and MBSFN subframes. Refinement of text concerning timing adjustment (e.g. eliminating unnecessary text on eNodeB behavior). Text added reflecting RAN1#47bis working assumption regarding puncturing PUSCH allocated cell edge PRB by PUCCH resource slot when odd number of PRBs in system BW and only a single PUCCH resource is allocated. |
| ***Consequences if not approved:*** | ⌘ | Incomplete LTE physical layer procedures specifications |

| | | |
|---|---|---|
| ***Clauses affected:*** | ⌘ | 2, 3.1, 3.2, 4.1, 4.2.4, 5, 5.1, 5.1.1.1, 5.1.2.1, 5.1.3.1, 5.2, 6, 6.1, 7.1, 7.1.1, 7.1.2, 7.1.3, 7.2, 7.2.1, 7.2.2, 7.2.3, 7.2.4, 8, 8.1, 8.2, 9.1, 10.1, 10.2 |

| | Y | N | | | |
|---|---|---|---|---|---|
| ***Other specs affected:*** ⌘ | | | Other core specifications | ⌘ | |
| | | | Test specifications | | |
| | | | O&M Specifications | | |

***Other comments:*** ⌘

# Foreword

This Technical Specification (TS) has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of this present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

3 or greater indicates TSG approved document under change control.

y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z the third digit is incremented when editorial only changes have been incorporated in the document.

# 1 Scope

The present document specifies and establishes the characteristics of the physicals layer procedures in the FDD and TDD modes of E-UTRA.

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifica"tions".

[2] 3GPP TS 36.201: "~~LTE Physical Layer~~Evolved Universal Terrestrial Radio Access (E-UTRA); Long Term Evolution (LTE) physical layer – General Descrip"tion-".

[3] 3GPP TS 36.211: "Evolved Universal Terrestrial Radio Access (E-UTRA); Physical channels and modul"ation".

[4] 3GPP TS 36.212: " Evolved Universal Terrestrial Radio Access (E-UTRA); Multiplexing and channel c"oding".

[5] 3GPP TS 36.214: ""Evolved Universal Terrestrial Radio Access (E-UTRA); Physical layer – Measure"ments".

# 3 Definitions, symbols, and abbreviations

## ~~3.1 Definitions~~

~~For the purposes of the present document, the terms and definitions given in TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [1].~~

~~*Definition format*~~

~~***<defined term>**: <definition>.*~~

~~**example:** text used to clarify abstract rules by applying them liter.~~

## 3.~~2~~1 Symbols

For the purposes of the present document, the following symbols apply:

## 3.~~3~~2 Abbreviations

For the purposes of the present document, the following abbreviations ~~given in TR 21.905 [1] and the following~~ apply. ~~An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905 [1].~~

| | |
|---|---|
| ACK | Acknowledgement |
| BCH | Broadcast Channel |
| CCE | Control Channel Element |
| CCPCH | Common Control Physical Channel |
| CQI | Channel Quality Indicator |
| CRC | Cyclic Redundancy Check |
| DL | Downlink |
| DTX | Discontinuous Transmission |
| EPRE | Energy Per Resource Element |
| MCS | Modulation and Coding Scheme |
| NACK | Negative Acknowledgement |
| PCFICH | Physical C~~e~~ontrol F~~f~~ormat I~~i~~ndicator C~~e~~hannel |
| PDSCH | Physical Downlink Shared Channel |
| PHICH | Physical Hybrid ARQ Indicator Channel |
| PRACH | Physical R~~r~~andom A~~a~~ccess C~~e~~hannel |
| PRB | Physical Resource Block |
| PUCCH | Physical Uplink Control Channel |
| PUSCH | Physical Uplink Shared Channel |
| QoS | Quality of Service |
| RBG | Resource Block Group |
| RE | Resource Element |
| RPF | Repetition Factor |
| RS | Reference Signal |
| SIR | Signal-to-Interference Ratio |
| SINR | Signal to Interference plus Noise Ratio |
| SRS | Sounding Reference Symbol |
| TA | Time alignment |
| TTI | Transmission Time Interval |
| UE | User Equipment |
| UL | Uplink |
| VRB | Virtual Resource Block |

# 4 Synchronisation procedures

## 4.1 Cell search

Cell search is the procedure by which a UE acquires time and frequency synchronization with a cell and detects the physical layer Cell ID of that cell. E-UTRA cell search supports a scalable overall transmission bandwidth corresponding to 6 resource blocks~~72 sub-carriers~~ and upwards.

The following signals are transmitted in the downlink to facilitate cell search: the primary and secondary synchronization signals~~, and the downlink reference signals.~~

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