

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Samsung Electronics Co., Ltd., and,
Samsung Electronics America, Inc.,

Petitioners

v.

Evolved Wireless LLC,

Patent Owner

DECLARATION OF Sangbum Kim

Case No. IPR2016-01345

1. My name is Sangbum Kim. I am currently a senior engineer at Samsung Electronics Co., Ltd. (“Samsung”), and have been employed by Samsung since 2007.
2. I have served as one of Samsung’s delegates to the Third Generation Partnership Project (“3GPP”) for 7 years, since 2009. Specifically, I served in the subgroup of 3GPP’s Technical Specification Group - Radio Access Network (“TSG-RAN”) known as Working Group 2 (“WG2”).
3. In 2009, I attended WG2’s meetings and subscribed to WG2’s reflector list (3GPP_TSG_RAN_WG2@list.etsi.org), through which I both sent and received e-mails. In general, before each Working Group meeting that I attended, I received e-mails from other companies’ delegates through that group’s reflector list, providing technical documents, called contributions, for discussion at the meeting. Some of those e-mails provided the technical documents as e-mail attachments, while other e-mails provided hyperlinks to the locations where the technical documents were stored on 3GPP’s publicly available website <<http://www.3gpp.org>>. These technical documents were always uploaded to, and freely available for download at, 3GPP’s publicly available website, regardless of whether the documents were emailed through WG2’s reflector-list as attachments or hyperlinks.

4. As a 3GPP delegate, I sent e-mail messages submitting technical documents on Samsung's behalf to WG2's reflector lists before the meeting for which the documents were submitted for discussion. I also uploaded technical documents to 3GPP's publicly available website before the meeting for which the technical documents were submitted for discussion.

5. As a delegate for WG2, I have also regularly accessed the location on 3GPP's website storing technical documents submitted to WG2. That location is freely available to the public at the uniform resource identifier <http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/>, which I refer to in this declaration as "WG2's public directory." Since 2009, I have accessed WG2's public directory in several ways. For example, I accessed to 3GPP's homepage <http://www.3gpp.org> from which I navigated WG2's public directory. I could also access the public directory directly by entering its uniform resource identifier into my web browser. Regardless of which method I used to access WG2's public directory, I never encountered a password requirement or any other restriction that would prevent me or a member of the general public from accessing WG2's public directory or any intermediate location. Based on my 7 years of experience as a 3GPP delegate, at least since 2009 to the present, any member of the public could freely access WG2's public directory, browse it, and download technical documents stored to it without restriction.

6. As a delegate for WG2, I also routinely consulted 3GPP technical specifications. In my experience, since I started as a delegate in 2009, specifications have been made freely available on 3GPP's website to any member of the public without any restrictions. In preparing this declaration, I accessed the location on 3GPP's website where different versions of the technical specification TS 36.321 are made available. That location is currently available at the uniform resource identifier <<http://www.3gpp.org/dynareport/36321.htm>>, which I refer to in this declaration as "3GPP's public specification site." Like any other individual, I accessed 3GPP's public specification site without any password or any other restriction. Attached as Exhibit 1 is a true and correct copy of a printout of 3GPP's public specification site. Exhibit 1 provides links to the different versions of TS 36.321, along with dates on which those versions were made available to the public. For example, Exhibit 1 provides a link to version 8.2.0 of TS 36.321 and shows that this version was made available on June 17, 2008. Based on my 7 years of experience as a 3GPP delegate, having routinely accessed versions of 3GPP technical specifications shortly after they became available to me and members of the public, I understand the June 17, 2008 date on Exhibit 1 to be accurate and have no reason to dispute its accuracy.

7. In preparing this declaration, I selected the link to version 8.2.0, which initiated a download of a ZIP file titled "36321-820.zip." I opened that ZIP file

and found a single Word file titled “36321-820.doc.” Attached as Exhibit 2 is a true and correct copy of that Word file.

8. In preparing this declaration, I accessed the uniform resource identifier <www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_61bis/Docs/> without any password or any other restriction, just like any other member of the public could. Attached as Exhibit 3 is a true and correct copy of a printout from that website. Exhibit 3 lists several ZIP files, including R2-081764.zip, as shown in the following excerpt.

3/24/2008	7:45 PM	16259	R2-081762.zip
3/25/2008	5:35 AM	34197	R2-081763.zip
3/24/2008	10:39 PM	137378	R2-081764.zip
3/25/2008	5:38 AM	8158	R2-081765.zip
3/24/2008	10:41 PM	39028	R2-081766.zip

(Ex. 3 at 6.) The text “R2-081764.zip” provides a link to a ZIP file titled R1-081764.zip. I downloaded and opened this ZIP file and found that it contains a single Microsoft Word file, a true and correct copy of which is attached as Exhibit 4.

9. In the excerpt from the 3GPP website printout shown above, there is also a date stamp (3/24/2008) to the left of the link to R2-081764.zip. Based on my 7 years of experience as a 3GPP delegate, having uploaded ZIP files to 3GPP’s publicly available server, I understand this date stamp to mean that R2-081764.zip was uploaded to 3GPP’s publicly available website on March 24, 2008 (before Meeting #61bis), and that any member of the public could have downloaded the ZIP file, extracted the Word document it enclosed, and viewed the contents of that

Word document without restriction on March 24, 2008 and thereafter. I have no reason to believe this date stamp is inaccurate.

10. In preparing this declaration, I accessed the uniform resource identifier <www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_62bis/Docs/> without any password or any other restriction. Attached as Exhibit 5 is a true and correct copy of a printout from that website. Exhibit 5 lists several ZIP files, including R2-083727.zip, as shown in the following excerpt.

7/4/2008	4:38 PM	19245	R2-083725.zip
7/4/2008	7:48 AM	50047	R2-083726.zip
7/4/2008	4:38 PM	47298	R2-083727.zip
7/2/2008	8:28 AM	73381	R2-083731.zip
7/2/2008	8:28 AM	9005	R2-083732.zip

(Ex. 5 at 11.) The text “R2-083727.zip” provides a link to a ZIP file titled R1-083727.zip. I downloaded and opened this ZIP file and found that it contains a single Microsoft Word file, a true and correct copy of which is attached as Exhibit 6.

11. In the excerpt from the 3GPP website printout shown above, there is also a date stamp (7/4/2008) to the left of the link to R2-083727.zip. Based on my 7 years of experience as a 3GPP delegate, having uploaded one hundred of ZIP files to 3GPP’s publicly available server, I understand this date stamp to mean that R2-083727.zip was uploaded to 3GPP’s publicly available website on July 4, 2008 (during Meeting #62bis), and that any member of the public could have downloaded the ZIP file, extracted the Word document it enclosed, and viewed the

contents of that Word document without restriction on July 4, 2008 and thereafter.

I have no reason to believe this date stamp is inaccurate.

12. I declare under penalty of perjury under the laws of the United States of America that the statements made herein are believed to be true based upon either my personal knowledge or to the best of my knowledge, information, and belief.

Date: June 30, 2016


Sangbum Kim

EXHIBIT 1

The Mobile Broadband Standard



3GPP Specification detail

[Go to spec numbering scheme page](#)
[Back to series index](#)

3GPP TS 36.321 (click spec number to see fileserver directory for this spec)

Evolved Universal Terrestrial Radio Access (E-UTRA); Medium Access Control (MAC) protocol specification

TSG / WG responsible: R2 (click TSG/WG to see its home page)

Work item which gave rise to this spec: LTE-L23 (click WI code to see Work Item details in the Work Plan)

Work items which may have impacted this spec: [click here](#)

Rapporteur: **STATTIN, Magnus**

Specification required for: **E-UTRAN-based systems**

In the table below ...

... click meeting number for meeting details;

... click spec version number to download that version;

... click SDO publication reference to download SDO transposed document.

Release	Freeze meeting	Freeze date	::	remarks	SDO publications
Rel-13	SP-70	2015-12-11	::	..	ETSI
	event	version	available	remarks	click ref to download
	RP-70	13.0.0	2016-01-14		-
Rel-12	SP-65	2014-09-17	::	..	ETSI
	event	version	available	remarks	click ref to download
	RP-70	12.8.0	2016-01-04		RTS/TSGR-0236321vc80
	RP-69	12.7.0	2015-09-25		RTS/TSGR-0236321vc70
	RP-68	12.6.0	2015-07-08		RTS/TSGR-0236321vc60
	RP-67	12.5.0	2015-03-27		RTS/TSGR-0236321vc50
	RP-66	12.4.0	2015-01-05		RTS/TSGR-0236321vc40
	RP-65	12.3.0	2014-09-23		RTS/TSGR-0236321vc30
	RP-64	12.2.1	2014-07-10	editorial	RTS/TSGR-0236321vc21
	RP-64	12.2.0	2014-07-02		-
	RP-63	12.1.0	2014-03-20		-
	RP-62	12.0.0	2014-01-07		-
Rel-11	SP-57	2012-09-12	::	..	ETSI
	event	version	available	remarks	click ref to download
	RP-67	11.6.0	2015-03-27		RTS/TSGR-0236321vb60
	RP-63	11.5.0	2014-03-20		RTS/TSGR-0236321vb50
	RP-62	11.4.0	2014-01-07		RTS/TSGR-0236321vb40

	RP-60	11.3.0	2013-07-03		RTS/TSGR-0236321vb30
	RP-59	11.2.0	2013-03-18		RTS/TSGR-0236321vb20
	RP-58	11.1.0	2013-01-03		RTS/TSGR-0236321vb10
	RP-57	11.0.0	2012-09-24		RTS/TSGR-0236321vb00
Rel-10	SP-51	2011-03-23	::	..	ETSI
	event	version	available	remarks	click ref to download
	RP-62	10.10.0	2014-01-07		RTS/TSGR-0236321vaa0
	RP-60	10.9.0	2013-07-03		RTS/TSGR-0236321va90
	RP-59	10.8.0	2013-03-18		RTS/TSGR-0236321va80
	RP-58	10.7.0	2013-01-03		RTS/TSGR-0236321va70
	RP-57	10.6.0	2012-09-21		RTS/TSGR-0236321va60
	RP-55	10.5.0	2012-03-16		RTS/TSGR-0236321va50
	RP-54	10.4.0	2011-12-21		RTS/TSGR-0236321va40
	RP-53	10.3.0	2011-10-03		RTS/TSGR-0236321va30
	RP-52	10.2.0	2011-06-24		RTS/TSGR-0236321va20
	RP-51	10.1.0	2011-04-06		RTS/TSGR-0236321va10
	RP-50	10.0.0	2010-12-21		RTS/TSGR-0236321va00
Rel-9	SP-46	2009-12-10	::	.	ETSI
	event	version	available	remarks	click ref to download
	RP-55	9.6.0	2012-03-16		RTS/TSGR-0236321v960
	RP-54	9.5.0	2011-12-21		RTS/TSGR-0236321v950
	RP-53	9.4.0	2011-10-03		RTS/TSGR-0236321v940
	RP-48	9.3.0	2010-06-18		RTS/TSGR-0236321v930
	RP-47	9.2.0	2010-04-21		RTS/TSGR-0236321v920
	RP-46	9.1.0	2010-01-05		RTS/TSGR-0236321v910
	RP-45	9.0.0	2009-09-28		RTS/TSGR-0236321v900
Rel-8	SP-42	2008-12-11	::	.	ETSI
	event	version	available	remarks	click ref to download
	RP-55	8.12.0	2012-03-16		RTS/TSGR-0236321v8c0
	RP-54	8.11.0	2011-12-21		RTS/TSGR-0236321v8b0
	RP-53	8.10.0	2011-10-03		RTS/TSGR-0236321v8a0
	RP-48	8.9.0	2010-06-18		RTS/TSGR-0236321v890
	RP-46	8.8.0	2010-01-05		RTS/TSGR-0236321v880
	RP-45	8.7.0	2009-09-28		RTS/TSGR-0236321v870
	RP-44	8.6.0	2009-06-18		RTS/TSGR-0236321v860
	RP-43	8.5.0	2009-03-23		RTS/TSGR-0236321v850
	RP-42	8.4.0	2009-01-05		RTS/TSGR-0236321v840
	RP-41	8.3.0	2008-09-23		RTS/TSGR-0236321v830

	RP-40	8.2.0	2008-06-17		DTS/TSGR-0236321v820
	RP-39	8.1.0	2008-03-20		-
	RP-38	8.0.0	2007-12-20		-
	RP-38	2.0.0	2007-12-11	RP-070917	-
	R2-60	1.3.0	-	R2-075488	-
	R2-60	1.2.0	-	R2-075243	-
	R2-60	1.1.1	-	R2-075093	-
	R2-59b	1.1.0	2014-12-18	R2-074530	-
	RP-37	1.0.0	2007-09-24	RP-070688	-
	R2-59	0.2.1	-	R2-073885	-
	R2-59	0.2.0	-	R2-073715	-
	R2-58b	0.1.1	-	R2-072994	-
	R2-58b	0.1.0	-	R2-072912	-
	R2-58b	0.0.0	-	R2-072710	-

Change Requests for this spec: [click here](#).

Genealogy of this spec:

antecedent(s)	this spec	descendant(s)
	36.321	

page generated from database: 2016-01-19 17:46:51

ABOUT RELEASES

Release 14
Release 13
Release 12
Release 11
Release 10
Release 9
Release 8
Release 7
Release 6
Release 5
Release 4
Release 1999

BROWSE TECHNOLOGIES

LTE-Advanced
LTE
Carrier Aggregation Explained
HetNet/Small Cells
NAS
The Evolved Packet Core
HSPA
UMTS
W-CDMA
GPRS & EDGE

EXHIBIT 2

3GPP TS 36.321 V8.2.0 (2008-05)

Technical Specification

**3rd Generation Partnership Project;
Technical Specification Group Radio Access Network;
Evolved Universal Terrestrial Radio Access (E-UTRA)
Medium Access Control (MAC) protocol specification
(Release 8)**



The present document has been developed within the 3rd Generation Partnership Project (3GPPTM) and may be further elaborated for the purposes of 3GPP.

This Specification is provided for future development work within 3GPP only. The Organizational Partners accept no liability for any use of this Specification. Specifications and reports for implementation of the 3GPPTM system should be obtained via the 3GPP Organizational Partners' Publications Offices.

Keywords

UMTS, radio

3GPP

Postal address

3GPP support office address

650 Route des Lucioles - Sophia Antipolis
Valbonne - FRANCE
Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Internet

<http://www.3gpp.org>

Copyright Notification

No part may be reproduced except as authorized by written permission.
The copyright and the foregoing restriction extend to reproduction in all media.

© 2008, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TTA, TTC).
All rights reserved.

Contents

Foreword	5
1 Scope	6
2 References	6
3 Definitions and abbreviations	6
3.1 Definitions	6
3.2 Abbreviations	7
4 General	8
4.1 Introduction	8
4.2 MAC architecture	8
4.2.1 MAC Entities	8
4.3 Services	8
4.3.1 Services provided to upper layers	8
4.3.2 Services expected from physical layer	8
4.4 Functions	9
4.5 Channel structure	9
4.5.1 Transport Channels	9
4.5.2 Logical Channels	10
4.5.3 Mapping of Transport Channels to Logical Channels	10
4.5.3.1 Uplink mapping	10
4.5.3.2 Downlink mapping	11
5 MAC procedures	11
5.1 Random Access procedure	11
5.1.1 Random Access Procedure initialization	11
5.1.2 Random Access Resource selection	12
5.1.3 Random Access Preamble transmission	12
5.1.4 Random Access Response reception	13
5.1.5 Contention Resolution	14
5.1.6 Completion of the Random Access procedure	15
5.2 Maintenance of Uplink Time Alignment	15
5.3 DL-SCH data transfer	16
5.3.1 DL Assignment reception	16
5.3.2 HARQ operation	16
5.3.2.1 HARQ Entity	16
5.3.2.2 HARQ process	17
5.3.3 Disassembly and demultiplexing	17
5.4 UL-SCH data transfer	18
5.4.1 UL Grant reception	18
5.4.2 HARQ operation	18
5.4.2.1 HARQ entity	18
5.4.2.2 HARQ process	19
5.4.3 Multiplexing and assembly	20
5.4.3.1 Logical channel prioritization	20
5.4.3.2 Multiplexing of MAC SDUs	21
5.4.4 Scheduling Request	21
5.4.5 Buffer Status Reporting	21
5.4.6 Power Headroom Reporting	22
5.5 PCH reception	22
5.6 BCH reception	23
5.7 Discontinuous Reception (DRX)	23
5.8 MAC reconfiguration	24
5.9 MAC Reset	24
5.X Handling of unknown, unforeseen and erroneous protocol data	24

6	Protocol Data Units, formats and parameters.....	24
6.1	Protocol Data Units.....	24
6.1.1	General.....	24
6.1.2	MAC PDU (DL-SCH and UL-SCH).....	24
6.1.3	MAC Control Elements.....	26
6.1.3.1	Buffer Status Report MAC Control Elements.....	26
6.1.3.2	C-RNTI MAC Control Element.....	26
6.1.3.3	DRX Command MAC Control Element.....	26
6.1.3.4	UE Contention Resolution Identity MAC Control Element.....	27
6.1.3.5	Timing Advance MAC Control Element.....	27
6.1.3.6	Power Headroom MAC Control Element.....	27
6.1.4	MAC PDU (transparent MAC).....	28
6.1.5	MAC PDU (Random Access Response).....	28
6.2	Formats and parameters.....	29
6.2.1	MAC header for DL-SCH and UL-SCH.....	29
6.2.2	MAC header for Random Access Response.....	30
6.2.3	MAC payload for Random Access Response.....	30
7	Variables and constants.....	31
7.1	RNTI values.....	32
7.2	Backoff Parameter values.....	32
Annex A (informative): Change history		33

Foreword

This Technical Specification 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 the 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 the E-UTRA MAC protocol.

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 Specifications".
- [2] 3GPP TR 36.213: "Evolved Universal Terrestrial Radio Access (E-UTRA); Physical Layer Procedures".
- [3] 3GPP TS 36.322: "Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Link Control (RLC) protocol specification".
- [4] 3GPP TS 36.323: "Evolved Universal Terrestrial Radio Access (E-UTRA); Packet Data Convergence Protocol (PDCP) Specification".
- [5] 3GPP TS 36.212: "Evolved Universal Terrestrial Radio Access (E-UTRA); Multiplexing and channel coding".
- [6] 3GPP TS 36.214: "Evolved Universal Terrestrial Radio Access (E-UTRA); Physical layer; Measurements".
-

3 Definitions 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].

Active Time: time during which the UE monitors the PDCCH for a PDCCH-subframe. Section 5.7 defines the conditions for which a subframe is included as part of Active Time.

Contention Resolution Timer: Specifies the number of consecutive PDCCH-subframe(s) during which the UE shall monitor the PDCCH after the uplink message containing the C-RNTI MAC control element or the uplink message associated with UE Contention Resolution Identity submitted from higher layer is transmitted.

DRX Cycle: Specifies the periodic repetition of the On Duration followed by a possible period of inactivity (see figure 3.1-1 below).

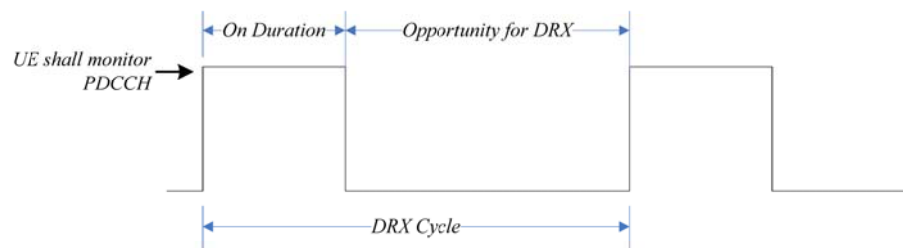


Figure 3.1-1: DRX Cycle

DRX Inactivity Timer: Specifies the number of consecutive PDCCH-subframe(s) after successfully decoding a PDCCH indicating an initial UL or DL user data transmission for this UE.

DRX Retransmission Timer: Specifies the maximum number of consecutive PDCCH-subframe(s) for as soon as a DL retransmission is expected by the UE.

DRX Short Cycle Timer: This parameter specifies the number of consecutive subframe(s) the UE shall follow the short DRX cycle after the DRX Inactivity Timer has expired.

HARQ RTT Timer: This parameter specifies the minimum amount of subframe(s) before a DL HARQ retransmission is expected by the UE.

On Duration Timer: Specifies the number of consecutive PDCCH-subframe(s) at the beginning of a DRX Cycle.

RA-RNTI: The Random Access RNTI is used on the PDCCH when Random Access Response messages are transmitted. It unambiguously identifies which time-frequency resource was utilized by the UE to transmit the Random Access preamble.

PDCCH-subframe: For FDD UE operation, this represents any subframe; for TDD, only downlink subframes.

NOTE: A timer is running once it is started, until it is stopped or until it expires.

NOTE: When defining On Duration Timer, DRX Inactivity Timer, DRX Retransmission Timer and Contention Resolution Timer, PDCCH-subframes and subframes including DwPTS are considered as subframes where the timer, if running, shall be updated.

3.2 Abbreviations

For the purposes of the present document, the 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].

BSR	Buffer Status Report
C-RNTI	Cell RNTI
CQI	Channel Quality Indicator
E-UTRA	Evolved UMTS Terrestrial Radio Access
E-UTRAN	Evolved UMTS Terrestrial Radio Access Network
MAC	Medium Access Control
PHR	Power Headroom Report
P-RNTI	Paging RNTI
RA-RNTI	Random Access RNTI
RNTI	Radio Network Temporary Identifier
SI-RNTI	System Information RNTI
SR	Scheduling Request
SRS	Sounding Reference Symbols
TB	Transport Block

4 General

4.1 Introduction

The objective is to describe the MAC architecture and the MAC entity from a functional point of view.

4.2 MAC architecture

The description in this sub clause is a model and does not specify or restrict implementations.

RRC is in control of configuration of MAC.

4.2.1 MAC Entities

E-UTRA defines two MAC entities; one in the UE and one in the E-UTRAN. These MAC entities handle the following transport channels:

- Broadcast Channel (BCH);
- Downlink Shared Channel (DL-SCH);
- Paging Channel (PCH);
- Uplink Shared Channel (UL-SCH);
- Random Access Channel(s) (RACH).

The exact functions performed by the MAC entities are different in the UE from those performed in the E-UTRAN.

4.3 Services

4.3.1 Services provided to upper layers

This clause describes the different services provided by MAC sublayer to upper layers.

- data transfer
- radio resource allocation

4.3.2 Services expected from physical layer

The physical layer provides the following services to MAC:

- data transfer services;
- signalling of HARQ feedback;
- signalling of Scheduling Request;
- measurements (e.g. Channel Quality Indication (CQI)).

The access to the data transfer services is through the use of transport channels. The characteristics of a transport channel are defined by its transport format (or format set), specifying the physical layer processing to be applied to the transport channel in question, such as channel coding and interleaving, and any service-specific rate matching as needed.

4.4 Functions

The following functions are supported by MAC sublayer:

- mapping between logical channels and transport channels;
- multiplexing of MAC SDUs from one or different logical channels onto transport blocks (TB) to be delivered to the physical layer on transport channels;
- demultiplexing of MAC SDUs from one or different logical channels from transport blocks (TB) delivered from the physical layer on transport channels;
- scheduling information reporting;
- error correction through HARQ;
- priority handling between UEs by means of dynamic scheduling;
- priority handling between logical channels of one UE;
- Logical Channel prioritisation;
- transport format selection.

NOTE: How the multiplexing relates to the QoS of the multiplexed logical channels is FFS.

The location of the different functions and their relevance for uplink and downlink respectively is illustrated in Table 4.4-1.

Table 4.4-1: MAC function location and link direction association.

MAC function	UE	eNB	Downlink	Uplink
Mapping between logical channels and transport channels	X		X	X
Multiplexing	X	X	X	X
Demultiplexing	X	X	X	
Error correction through HARQ	X	X	X	X
Transport Format Selection		X	X	X
Priority handling between UEs		X	X	X
Priority handling between logical channels of one UE		X	X	X
Logical Channel prioritisation	X			X
Scheduling information reporting	X			X

4.5 Channel structure

The MAC sublayer operates on the channels defined below; transport channels are SAPs between MAC and Layer 1, logical channels are SAPs between MAC and RLC.

4.5.1 Transport Channels

The transport channels used by MAC are described in Table 4.5.1-1 below.

Table 4.5.1-1: Transport channels used by MAC

Transport channel name	Acronym	Downlink	Uplink
Broadcast Channel	BCH	X	
Downlink Shared Channel	DL-SCH	X	
Paging Channel	PCH	X	
Uplink Shared Channel	UL-SCH		X
Random Access Channel	RACH		X

4.5.2 Logical Channels

The MAC layer provides data transfer services on logical channels. A set of logical channel types is defined for different kinds of data transfer services as offered by MAC.

Each logical channel type is defined by what type of information is transferred.

MAC provides the control and traffic channels listed in Table 4.5.2-1 below. When MAC uses the PDCCH to indicate radio resource allocation, the RNTI that is mapped on the PDCCH depends on the logical channel type:

- C-RNTI, Temporary C-RNTI and Semi-Persistent Scheduling C-RNTI for DCCH and DTCH;
- P-RNTI for PCCH;
- RA-RNTI for Random Access Response on DL-SCH;
- Temporary C-RNTI for CCCH during the random access procedure;
- SI-RNTI for BCCH.

Table 4.5.2-1: Logical channels provided by MAC.

Logical channel name	Acronym	Control channel	Traffic channel
Broadcast Control Channel	BCCH	X	
Paging Control Channel	PCCH	X	
Common Control Channel	CCCH	X	
Dedicated Control Channel	DCCH	X	
Dedicated Traffic Channel	DTCH		X

4.5.3 Mapping of Transport Channels to Logical Channels

The mapping of logical channels on transport channels depends on the multiplexing that is configured by RRC.

4.5.3.1 Uplink mapping

The MAC entity is responsible for mapping logical channels for the uplink onto uplink transport channels. The uplink logical channels can be mapped as described in Figure 4.5.3.1-1 and Table 4.5.3.1-1.

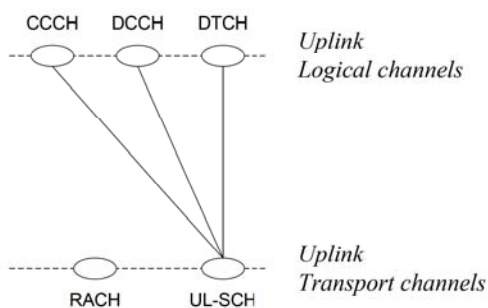


Figure 4.5.3.1-1

Table 4.5.3.1-1: Uplink channel mapping.

Logical channel	Transport channel	UL-SCH	RACH
CCCH		X	
DCCH		X	
DTCH		X	

4.5.3.2 Downlink mapping

The MAC entity is responsible for mapping the downlink logical channels to downlink transport channels. The downlink logical channels can be mapped as described in Figure 4.5.3.2-1 and Table 4.5.3.2-1.

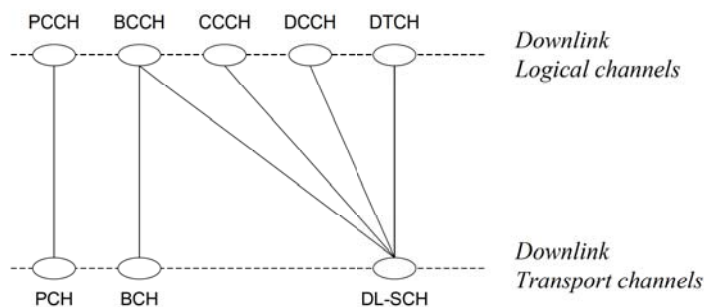


Figure 4.5.3.2-1

Table 4.5.3.2-1: Downlink channel mapping.

Logical channel	Transport channel	BCH	PCH	DL-SCH
BCCH		X		X
PCCH			X	
CCCH				X
DCCH				X
DTCH				X

5 MAC procedures

5.1 Random Access procedure

5.1.1 Random Access Procedure initialization

The Random Access procedure described in this subclause is initiated by a PDCCH order or by the MAC sublayer itself. The PDCCH order or RRC optionally indicate a Random Access Preamble and PRACH resource.

Before the procedure can be initiated, the following information is assumed to be available:

- the available set of PRACH resources for the transmission of the Random Access Preamble and their corresponding RA-RNTIs.
- the groups of Random Access Preambles and the set of available Random Access Preambles in each group.
- the thresholds required for selecting one of the two groups of Random Access Preambles.
- the parameters required to derive the TTI window described in subclause 5.1.4.
- the power-ramping factor POWER_RAMP_STEP.
- the parameter PREAMBLE_TRANS_MAX [integer > 0].
- the initial preamble power PREAMBLE_INITIAL_RECEIVED_TARGET_POWER.
- the parameter Maximum number of Message3 HARQ transmissions.

[Note that the above parameters may be updated from higher layers before each Random Access procedure is initiated.]

The Random Access procedure shall be performed as follows:

- Flush the [Message3] buffer;
- set the PREAMBLE_TRANSMISSION_COUNTER to 1;
- set the backoff parameter value in the UE to 0 ms;
- proceed to the selection of the Random Access Resource (see subclause 5.1.2).

NOTE: There is only one Random Access procedure ongoing at any point in time. If the UE receives a request for a new Random Access procedure while another is already ongoing, it is up to UE implementation whether to continue with the ongoing procedure or start with the new procedure.

5.1.2 Random Access Resource selection

The Random Access Resource procedure shall be performed as follows:

- If the Random Access Preamble and PRACH resource have been explicitly signalled and the Random Access Preamble expiration time, if configured, has not expired:
 - the UE can directly proceed to the transmission of the Random Access Preamble (see subclause 5.1.3).
- else the Random Access Preamble shall be selected by the UE as follows:
 - If the uplink message containing the C-RNTI MAC control element or the uplink message including the CCCH SDU has not yet been transmitted, the UE shall:
 - depending on the size of the message to be transmitted on the UL or the requested resource blocks [FFS] [the selection also depends on radio conditions], select one of the two groups of Random Access Preambles configured by RRC.
 - else, if the uplink message containing the C-RNTI MAC control element or the uplink message including the CCCH SDU is being retransmitted, the UE shall:
 - select the same group of Random Access Preambles as was used for the preamble transmission attempt corresponding to the first transmission of the uplink message containing the C-RNTI MAC control element or the uplink message including the CCCH SDU.
 - randomly select a Random Access Preamble within the selected group. The random function shall be such that each of the allowed selections can be chosen with equal probability;
 - if more than one PRACH resources are available in the same subframe (TDD), randomly select one. The random function shall be such that each of the allowed selections can be chosen with equal probability;
- proceed to the transmission of the Random Access Preamble (see subclause 5.1.3).

5.1.3 Random Access Preamble transmission

The random-access procedure shall be performed as follows:

- If PREAMBLE_TRANSMISSION_COUNTER = PREAMBLE_TRANS_MAX + 1:
 - indicate a Random Access problem to upper layers.
- [- set the parameter PREAMBLE_RECEIVED_TARGET_POWER to PREAMBLE_INITIAL_RECEIVED_TARGET_POWER + (PREAMBLE_TRANSMISSION_COUNTER-1) * POWER_RAMP_STEP;]
- determine the next available Random Access occasion;
- instruct the physical layer to transmit a preamble using the selected PRACH resource, corresponding RA-RNTI, preamble index and PREAMBLE_RECEIVED_TARGET_POWER.

5.1.4 Random Access Response reception

Once the Random Access Preamble is transmitted, the UE shall monitor the PDCCH associated with the RA-RNTI defined below in the TTI window [RA_WINDOW_BEGIN—RA_WINDOW_END] for Random Access Response(s) identified by the RA-RNTI. The RA-RNTI associated with the PRACH resource in which the Random Access Preamble is transmitted, is computed as:

$$\text{RA-RNTI} = t_id + 10 * f_id$$

Where t_id is the index of the first subframe of the specified PRACH resource ($0 \leq t_id < 10$), and f_id is the index of the specified PRACH resource within that subframe, in ascending order of frequency domain ($0 \leq f_id < 6$). The UE may stop monitoring for Random Access Response(s) after successful reception of a Random Access Response corresponding to the Random Access Preamble transmission.

- If notification of a reception of the Random Access Response is received from lower layers, the UE shall:
 - if the Random Access Response contains a Backoff Indicator subheader:
 - set the backoff parameter value in the UE as indicated by the BI field of the Backoff Indicator subheader and Table 7.2-1.
 - else, set the backoff parameter value in the UE to 0 ms.
- if the Random Access Response contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble (see subclause 5.1.3), the UE shall:
 - consider this Random Access Response reception successful;
 - process the received Timing Alignment value (see subclause 5.2);
 - process the received UL grant value;
 - if the Random Access Preamble was explicitly signalled (i.e., not selected by MAC):
 - consider the Random Access procedure successfully completed.
 - else, if the Random Access Preamble was selected by UE MAC:
 - set the Temporary C-RNTI to the value received in the Random Access Response message no later than at the time of the first transmission corresponding to the UL grant provided in the Random Access Response message;
 - if this is the first successfully received Random Access Response within this Random Access procedure:
 - if the UE is in RRC_CONNECTED state [except for RLF], indicate to the Multiplexing and assembly entity to include a C-RNTI MAC control element in the subsequent uplink transmission;
 - obtain the MAC PDU to transmit from the "Multiplexing and assembly" entity and store it in the [Message3] buffer.

NOTE: When an uplink transmission is required, e.g., for contention resolution, the eNB should not provide a grant smaller than 80 bits in the Random Access Response.

NOTE: If within a Random Access procedure, an uplink grant provided in the Random Access Response for the same group of Random Access Preambles has a different size than the first uplink grant allocated during that Random Access procedure, the UE behavior is not defined.

If no Random Access Response is received within the TTI window [RA_WINDOW_BEGIN—RA_WINDOW_END], or if all received Random Access Responses contain Random Access Preamble identifiers that do not match the transmitted Random Access Preamble, the Random Access Response reception is considered not successful and the UE shall:

- if the Random Access procedure was initiated by the MAC sublayer itself; or

- if the Random Access procedure was initiated by a PDCCH order and the PREAMBLE_TRANSMISSION_COUNTER is less than PREAMBLE_TRANS_MAX:
 - increment PREAMBLE_TRANSMISSION_COUNTER by 1;
- if in this Random Access procedure:
 - the Random Access Preamble was selected by MAC; or
 - the Random Access Preamble and PRACH resource were explicitly signalled and will expire before the next available Random Access occasion:
 - based on the backoff parameter in the UE, compute and apply a backoff value indicating when a new Random Access transmission shall be attempted;
- proceed to the selection of a Random Access Resource (see subclause 5.1.2).

Editor's note: Whether error conditions are specified is FFS.

5.1.5 Contention Resolution

Contention Resolution is based on C-RNTI on PDCCH and UE Contention Resolution Identity on DL-SCH..

Once the uplink message containing the C-RNTI MAC control element or the uplink message including the CCCH SDU is transmitted, the UE shall:

- start the Contention Resolution Timer;
- monitor the PDCCH until the Contention Resolution Timer expires;
- if notification of a reception of a PDCCH transmission is received from lower layers, the UE shall:
 - if the C-RNTI MAC control element was included in uplink message:
 - if the Random Access procedure was initiated by the MAC sublayer itself and the PDCCH transmission is addressed to the C-RNTI and contains an UL grant; or
 - if the Random Access procedure was initiated by a PDCCH order and the PDCCH transmission is addressed to the C-RNTI:
 - consider this Contention Resolution successful;
 - stop the Contention Resolution Timer;
 - discard the Temporary C-RNTI;
 - consider this Random Access procedure successfully completed.
 - else if the uplink message includes the CCCH SDU and the PDCCH transmission is addressed to its Temporary C-RNTI:
 - if the MAC PDU is successfully decoded:
 - stop the Contention Resolution Timer;
 - if the MAC PDU contains a UE Contention Resolution Identity MAC control element; and
 - if the UE Contention Resolution Identity included in the MAC control element matches the CCCH SDU transmitted in the uplink message:
 - consider this Contention Resolution successful and finish the disassembly and demultiplexing of the MAC PDU;
 - set the C-RNTI to the value of the Temporary C-RNTI;
 - consider this Random Access procedure successfully completed.

- else
 - consider this Contention Resolution not successful and discard the successfully decoded MAC PDU.
 - discard the Temporary C-RNTI.
- if the Contention Resolution Timer expires:
 - consider the Contention Resolution not successful.
- if the Contention Resolution is considered not successful the UE shall:
 - if the Random Access procedure was initiated by the MAC sublayer itself; or
 - if the Random Access procedure was initiated by a PDCCH order and the PREAMBLE_TRANSMISSION_COUNTER is less than PREAMBLE_TRANS_MAX:
 - increment PREAMBLE_TRANSMISSION_COUNTER by 1;
 - based on the backoff parameter in the UE, compute and apply a backoff value indicating when a new Random Access transmission shall be attempted;
 - proceed to the selection of a Random Access Resource (see subclause 5.1.2).
 - discard the Temporary C-RNTI.

5.1.6 Completion of the Random Access procedure

At successful completion of the Random Access procedure, the UE shall:

- if the PREAMBLE_TRANSMISSION_COUNTER is greater than PREAMBLE_TRANS_MAX:
 - indicate recovery from a Random Access problem to upper layers.

5.2 Maintenance of Uplink Time Alignment

The UE has a configurable Time Alignment Timer. The Time Alignment Timer is valid only in the cell for which it was configured and started.

If the Time Alignment Timer has been configured, the UE shall:

- when a Timing Advance MAC control element is received:
 - apply the Timing Advance Command;
 - start the Time Alignment Timer (if not running) or restart the Time Alignment Timer (if already running).
- when a Time Alignment Command is received in a Random Access Response message:
 - if the Random Access Preamble and PRACH resource were explicitly signalled:
 - apply the Time Alignment Command;
 - start the Time Alignment Timer (if not running) or restart the Time Alignment Timer (if already running).
 - else, if the Time Alignment Timer is not running or has expired:
 - apply the Time Alignment Command;
 - start the Time Alignment Timer;
 - when the contention resolution is considered not successful as described in subclause 5.1.5, stop the Time Alignment Timer.
- else:

- ignore the received Time Alignment Command.
- when the Time Alignment Timer has expired or is not running:
 - prior to any uplink transmission, use the Random Access procedure (see subclause 5.1) in order to obtain uplink Time Alignment.
- when the Time Alignment Timer expires:
 - release all PUCCH resources;
 - release any assigned SRS resources.

5.3 DL-SCH data transfer

Editor's note: Current text applies to, at least, FDD.

5.3.1 DL Assignment reception

Editor's note: A downlink assignment can relate to one or two (MIMO) TBs. It is FFS how this information is presented to MAC.

When the UE has a C-RNTI, Semi-Persistent Scheduling C-RNTI, Temporary C-RNTI or RA-RNTI, the UE shall for each TTI during Active Time, for each TTI when a Random Access Response or Contention Resolution is expected and for each TTI for which a DL assignment has been configured:

- if a downlink assignment for this TTI has been received on the PDCCH for the UE's C-RNTI, Temporary C-RNTI or RA-RNTI:
 - indicate a downlink assignment and the associated HARQ information to the HARQ entity for this TTI.
- else, if a downlink assignment for this TTI has been configured:
 - indicate a downlink assignment, for a new transmission, and the associated HARQ information to the HARQ entity for this TTI.

When the UE needs to read BCCH, the UE shall:

- if a downlink assignment for this TTI has been received on the PDCCH for the SI-RNTI;
 - indicate a downlink assignment for the dedicated broadcast HARQ process to the HARQ entity for this TTI.

NOTE: Downlink assignments for both C-RNTI and SI-RNTI can be received in the same TTI.

Editor's note: L1 is configured, as needed, by upper layers or MAC [FFS] to monitor PDCCH for C-RNTI, and by MAC to monitor PDCCH for Temporary C-RNTI and RA-RNTI.

5.3.2 HARQ operation

5.3.2.1 HARQ Entity

There is one HARQ entity at the UE which processes the HARQ process identifiers indicated by the HARQ information associated with TBs received on the DL-SCH and directs the received data to the corresponding HARQ process for reception operations (see subclause 5.3.2.2).

A number of parallel HARQ processes are used in the UE to support the HARQ entity. [The number of HARQ processes is FFS].

If a downlink assignment has been indicated or configured for this TTI, the UE shall:

- allocate the received TB to the HARQ process indicated by the associated HARQ information.

If a downlink assignment has been indicated for the broadcast HARQ process, the UE shall:

- allocate the received TB to the broadcast HARQ process.

NOTE: In case of BCCH a dedicated broadcast HARQ process is used.

5.3.2.2 HARQ process

For each received TB:

- if the NDI, when provided, has been incremented compared to the value of the previous received transmission for this HARQ process; or
- if the HARQ process is equal to the broadcast process and the physical layer indicates a new transmission; or
- if this is the very first received transmission for this HARQ process:
 - a new transmission is indicated for this HARQ process.
- else, a retransmission is indicated for this HARQ process.

The UE then shall:

- if a new transmission is indicated for this HARQ process:
 - replace the data currently in the soft buffer for this HARQ process with the received data.
- if a retransmission is indicated for this HARQ process:
 - if the data has not yet been successfully decoded:
 - combine the received data with the data currently in the soft buffer for this HARQ process.
 - if the TB size is different from the last valid TB size signalled for this HARQ process:
 - the UE may replace the data currently in the soft buffer for this HARQ process with the received data.
- attempt to decode the data in the soft buffer;
- if the data in the soft buffer was successfully decoded:
 - if the HARQ process is equal to the broadcast process, deliver the decoded MAC PDU to RRC.
 - else, deliver the decoded MAC PDU to the disassembly and demultiplexing entity.
 - generate a positive acknowledgement (ACK) of the data in this HARQ process.
- else:
 - generate a negative acknowledgement (NACK) of the data in this HARQ process.
- if the HARQ process is associated with a transmission indicated with an RA-RNTI; or
- if the HARQ process is associated with a transmission indicated with a Temporary C-RNTI and a UE Contention Resolution Identity match is not indicated; or
- if the HARQ process is equal to the broadcast process:
 - do not indicate the generated positive or negative acknowledgement to the physical layer.
- else:
 - indicate the generated positive or negative acknowledgement to the physical layer.

5.3.3 Disassembly and demultiplexing

Editor's note: This section describes the disassembly and demultiplexing of MAC PDUs into MAC SDUs.

5.4 UL-SCH data transfer

Editor's note: Current text applies to, at least, FDD.

5.4.1 UL Grant reception

When the UE has a C-RNTI, Semi-Persistent Scheduling C-RNTI, or Temporary C-RNTI, the UE shall for each TTI:

- if an uplink grant for this TTI has been received on the PDCCH for the UE's C-RNTI or Temporary C-RNTI; or
- if an uplink grant for this TTI has been received in a Random Access Response:
 - indicate a valid uplink grant and the associated HARQ information to the HARQ entity for this TTI.
- else, if an uplink grant for this TTI has been configured:
 - indicate an uplink grant, valid for new transmission, and the associated HARQ information to the HARQ entity for this TTI.

NOTE: The period of configured uplink grants is expressed in TTIs.

NOTE: If the UE receives both a grant for its RA-RNTI and a grant for its C-RNTI, the UE may choose to continue with either the grant for its RA-RNTI or the grant for its C-RNTI.

5.4.2 HARQ operation

5.4.2.1 HARQ entity

There is one HARQ entity at the UE. A number of parallel HARQ processes are used in the UE to support the HARQ entity, allowing transmissions to take place continuously while waiting for the feedback on the successful or unsuccessful reception of previous transmissions.

At a given TTI, if an uplink grant is indicated for the TTI, the HARQ entity identifies the HARQ process for which a transmission should take place. It also routes the receiver feedback (ACK/NACK information), MCS and resource, relayed by the physical layer, to the appropriate HARQ process.

If TTI bundling is configured, the parameter TTI_BUNDLE_SIZE provides the number of TTIs of a TTI bundle. If a transmission is indicated for the TTI, the HARQ entity identifies the HARQ process for which a transmission should take place. The next TTI_BUNDLE_SIZE uplink TTIs are subsequently used for transmissions for the identified HARQ process. HARQ retransmissions within a bundle shall be performed without waiting for feedback from previous transmissions according to TTI_BUNDLE_SIZE. The UE expects feedback only for the last transmission of a bundle.

For transmission of an uplink message containing the C-RNTI MAC control element or an uplink message including a CCCH SDU during Random Access (see section 5.1.5) TTI bundling does not apply.

The number of HARQ processes is equal to $[X] \lceil \text{FFS} \rceil$. Each process is associated with a number from 0 to $[X-1]$.

At the given TTI, the HARQ entity shall:

- if an uplink grant indicating that the NDI has been incremented compared to the value in the previous transmission of this HARQ process is indicated for this TTI or if this is the very first transmission for this HARQ process (i.e. a new transmission takes place for this HARQ process):
 - if there is an ongoing Random Access procedure and there is a MAC PDU in the [Message3] buffer:
 - obtain the MAC PDU to transmit from the [Message3] buffer.
 - else, if the "uplink prioritisation" entity indicates the need for a new transmission:
 - obtain the MAC PDU to transmit from the "Multiplexing and assembly" entity;
 - instruct the HARQ process corresponding to this TTI to trigger a new transmission using the identified parameters.

- else:
 - flush the HARQ buffer.
- else, if an uplink grant, indicating that the NDI is identical to the value in the previous transmission of this HARQ process (i.e. a retransmission takes place for this HARQ process), is indicated for this TTI:
 - instruct the HARQ process to generate an adaptive retransmission.
- else, if the HARQ buffer of the HARQ process corresponding to this TTI is not empty:
 - instruct the HARQ process to generate a non-adaptive retransmission.

NOTE: A retransmission triggered by the HARQ entity should be cancelled by the corresponding HARQ process if it collides with a measurement gap or if a non-adaptive retransmission is not allowed.

5.4.2.2 HARQ process

Each HARQ process is associated with a HARQ buffer.

Each HARQ process shall maintain a state variable CURRENT_TX_NB, which indicates the number of transmissions that have taken place for the MAC PDU currently in the buffer. When the HARQ process is established, CURRENT_TX_NB shall be initialized to 0.

The sequence of redundancy versions is defined to be 0, 2, 3, 1. The variable CURRENT_IRV provides a pointer to a redundancy version in the defined set. This variable is up-dated modulo 4.

New transmissions and adaptive retransmissions are performed on the resource and with the MCS indicated on PDCCH, while a non-adaptive retransmission is performed on the same resource and with the same MCS as was used for the last made transmission attempt,

The UE is configured with a Maximum number of HARQ transmissions and a Maximum number of Message3 HARQ transmissions by RRC. For transmissions on all HARQ processes and all logical channels except for transmission of a MAC PDU stored in the [Message3] buffer, maximum number of transmissions shall be set to Maximum number of HARQ transmissions. For transmission of a MAC PDU stored in the [Message3] buffer, maximum number of transmissions shall be set to Maximum number of Message3 HARQ transmissions.

If the HARQ entity requests a new transmission, the HARQ process shall:

- set CURRENT_TX_NB to 0;
- set CURRENT_IRV to 0;
- store the MAC PDU in the associated HARQ buffer;
- generate a transmission as described below.

If the HARQ entity requests a retransmission, the HARQ process shall:

- increment CURRENT_TX_NB by 1;
- if there is no measurement gap at the time of the retransmission:
 - for an adaptive retransmission:
 - set CURRENT_IRV to the value corresponding to the redundancy version indicated on PDCCH;
 - generate a transmission as described below.
 - for a non-adaptive retransmission:
 - if the last feedback for this HARQ process is a HARQ NACK:
 - generate a transmission as described below.

NOTE: When receiving a HARQ ACK alone, the UE keeps the data in the HARQ buffer.

To generate a transmission, the HARQ process shall:

- instruct the physical layer to generate a transmission with the redundancy version corresponding to the CURRENT_IRV value and the transmission timing;
- increment CURRENT_IRV by 1;
- if there is a measurement gap at the time of the feedback for this transmission, consider the feedback coinciding with the measurement gap to be a HARQ ACK.

The HARQ process shall:

- if CURRENT_TX_NB = maximum number of transmissions:
 - flush the HARQ buffer;
- if the transmission corresponds to a transmission of CCCH; and
 - if the last feedback received (i.e., the feedback received for the last transmission of this process) is a HARQ NACK:
 - notify RRC that the transmission of the corresponding MAC SDU failed.

The HARQ process may:

- if CURRENT_TX_NB = maximum number of transmissions configured; and
- if the last feedback received (i.e., the feedback received for the last transmission of this process) is a HARQ NACK:
 - notify the relevant ARQ entities in the upper layer that the transmission of the corresponding RLC PDUs failed.

5.4.3 Multiplexing and assembly

Editor's note: This subclause describes the procedure for creation of MAC SDUs including multiplexing of MAC SDUs and creating the MAC header.

5.4.3.1 Logical channel prioritization

The Logical Channel Prioritization procedure is applied when a new transmission is performed.

RRC can control the scheduling of uplink data by giving each logical channel a priority where increasing priority values indicate lower priority levels. In addition, each logical channel is given a Prioritized Bit Rate (PBR).

The UE shall perform the following Logical Channel Prioritization procedure when a new transmission is performed:

- The UE shall allocate resources to the logical channels in the following sequence:
 - all the logical channels are allocated resources in a decreasing priority order up to a value such that on average, the served data rate for radio bearers that have data for transmission equals the configured PBR for the radio bearer. If the PBR of a radio bearer is set to "infinity", the UE shall allocate resources for all the data that is available for transmission on the radio bearer before meeting the PBR of the lower priority radio bearer(s);
 - if any resources remain, all the logical channels are served in a strict decreasing priority order until either the data for that logical channel or the UL grant is exhausted, whichever comes first.
- The UE shall also follow the rules below during the scheduling procedures above:
 - the UE should not segment an RLC SDU (or partially transmitted SDU or retransmitted RLC PDU) if the whole SDU (or partially transmitted SDU or retransmitted RLC PDU) fits into the remaining resources;
 - if the UE segments an RLC SDU from the logical channel, it shall maximize the size of the segment to fill the grant as much as possible;

- the UE shall serve as much data as it can to fill the grant in general. However, if the remaining resources require the UE to segment an RLC SDU with size smaller than x bytes or smaller than the L2 header size (FFS), the UE may use padding to fill the remaining resources instead of segmenting the RLC SDU and sending the segment.

Logical channels configured with the same priority shall be served equally by the UE.

MAC control elements for BSR, with exception of Padding BSR, have higher priority than U-plane Logical Channels.

At serving cell change, the first UL-DCCH MAC SDU to be transmitted in the new cell has higher priority than MAC control elements for BSR.

5.4.3.2 Multiplexing of MAC SDUs

Editor's note: This subclause describes the construction of MAC PDUs from MAC SDUs as prioritised and selected by the Logical channel prioritisation entity.

5.4.4 Scheduling Request

The Scheduling Request (SR) is for requesting UL-SCH resources.

If an SR has been triggered, the UE shall for each TTI, until UL-SCH resources are granted for a new transmission:

- if no UL-SCH resources are available in this TTI:
 - if a PUCCH is configured for the UE to send an SR in this TTI, instruct the physical layer to signal the SR on PUCCH;
 - if no PUCCH for SR is configured for the UE in any TTI, initiate a Random Access procedure (see subclause 5.1).

NOTE: A triggered SR is considered pending and is repeated until UL-SCH resources are granted for a new transmission.

5.4.5 Buffer Status Reporting

The Buffer Status reporting procedure is used to provide the serving eNB with information about the amount of data in the UL buffers of the UE.

A Buffer Status Report (BSR) shall be triggered if any of the following events occur:

- UL data arrives in the UE transmission buffer and the data belongs to a logical channel with higher priority than those for which data already existed in the UE transmission buffer, in which case the BSR is referred below to as "Regular BSR";
- UL resources are allocated and number of padding bits is larger than the size of the Buffer Status Report MAC control element, in which case the BSR is referred below to as "Padding BSR";
- a serving cell change occurs, in which case the BSR is referred below to as "Regular BSR";
- the PERIODIC BSR TIMER expires, in which case the BSR is referred below to as "Periodic BSR".

For Regular and Periodic BSR:

- if only one LCG has buffered data in the TTI where the BSR is transmitted: report short BSR;
- else if more than one LCG has buffered data in the TTI where the BSR is transmitted: report long BSR.

For padding BSR:

- if the number of padding bits is equal to or larger than the size of the Short BSR but smaller than the size of the Long BSR, report Short BSR of the LCG with the highest priority logical channel with buffered data;
- else if the number of padding bits is equal to or larger than the size of the Long BSR, report Long BSR.

If the Buffer Status reporting procedure determines that a BSR has been triggered since the last transmission of a BSR:

- if the UE has UL resources allocated for new transmission for this TTI:
 - instruct the Multiplexing and Assembly procedure to generate a BSR MAC control element;
 - restart the PERIODIC BSR TIMER.
- else if a Regular BSR has been triggered since the last transmission of a BSR:
 - a Scheduling Request shall be triggered.

NOTE: Even if multiple events occur by the time a BSR can be transmitted, only one BSR will be included in the MAC PDU.

A pending BSR shall be cancelled in case the UL grant can accommodate all pending data but is not sufficient to accommodate the BSR MAC control element in addition.

5.4.6 Power Headroom Reporting

The Power Headroom reporting procedure is used to provide the serving eNB with information about the difference between the UE TX power and the maximum UE TX power (for the positive values of the power headroom) and about the difference between the maximum UE TX power and the calculated UE TX power, according to the UL power control formula, when it exceeds the maximum UE TX power (for the negative values of the power headroom).

A Power Headroom Report (PHR) shall be triggered if any of the following events occur:

- the PROHIBIT_PHR_TIMER expires or has expired and the path loss has changed more than *DL_PathlossChange* dB since the last power headroom report;
- the PERIODIC PHR TIMER expires, in which case the PHR is referred below to as “Periodic PHR”.

If the Power Headroom reporting procedure determines that a PHR has been triggered since the last transmission of a PHR:

- if the UE has UL resources allocated for new transmission for this TTI:
 - obtain the value of the power headroom from the physical layer;
 - instruct the Multiplexing and Assembly procedure to generate a PHR MAC control element based on the value reported by the physical layer;
 - if the PHR is a “Periodic PHR”, restart the PERIODIC PHR TIMER;
 - restart the PROHIBIT_PHR_TIMER.

NOTE: Even if multiple events occur by the time a PHR can be transmitted, only one PHR is included in the MAC PDU.

Editor’s note: When periodic Power Headroom Reporting is configured, the first report should be included immediately when the UE has a grant for a new transmission.

5.5 PCH reception

When in RRC_IDLE, the UE shall at its paging occasions:

- if a PCH assignment has been received on the PDCCH for the P-RNTI:
 - attempt to decode the TB on the PCH as indicated by the PDCCH information.
- if a TB on the PCH has been successfully decoded:
 - deliver the decoded MAC PDU to higher layers.

5.6 BCH reception

When the UE needs to receive BCH, the UE shall:

- receive and attempt to decode the BCH;
- if a TB on the BCH has been successfully decoded:
 - deliver the decoded MAC PDU to higher layers.

5.7 Discontinuous Reception (DRX)

The UE may be configured by RRC with a DRX functionality that allows it to not continuously monitor the PDCCH. The DRX functionality consists of a Long DRX cycle, a DRX Inactivity Timer, a DRX Retransmission Timer and optionally a Short DRX Cycle and a DRX Short Cycle Timer, all defined in subclause 3.1.

When a DRX cycle is configured, the Active Time includes the time while:

- the On Duration Timer or the DRX Inactivity Timer or a DRX Retransmission Timer or the Contention Resolution Timer is running; or
- a Scheduling Request is pending (as described in subclause 5.4.4); or
- an uplink grant for a retransmission can occur; or
- a PDCCH indicating a new transmission addressed to the C-RNTI or Temporary C-RNTI of the UE has not been received after successful reception of a Random Access Response (as described in subclause 5.1.4).

When a DRX cycle is configured, the UE shall for each subframe:

- start the On Duration Timer when $[(SFN * 10) + \text{subframe number}] \bmod (\text{current DRX Cycle}) = \text{DRX Start Offset}$;
- if a HARQ RTT Timer expires in this subframe and the data in the soft buffer of the corresponding HARQ process was not successfully decoded:
 - start the DRX Retransmission Timer for the corresponding HARQ process.
- if a DRX Command MAC control element is received:
 - stop the On Duration Timer;
 - stop the DRX Inactivity Timer.
- if the DRX Inactivity Timer expires or a DRX Command MAC control element is received in this subframe:
 - if the short DRX cycle is configured:
 - start the DRX Short Cycle Timer and use the Short DRX Cycle.
 - else:
 - use the Long DRX cycle.
- if the DRX Short Cycle Timer expires in this subframe:
 - use the long DRX cycle.
- during the Active Time, for a PDCCH-subframe except if the subframe is required for uplink transmission for half-duplex FDD UE operation:
 - monitor the PDCCH;
 - if the PDCCH indicates a DL transmission:
 - start the HARQ RTT Timer for the corresponding HARQ process;

- stop the DRX Retransmission Timer for the corresponding HARQ process.
- if the PDCCH indicates a new transmission (DL or UL):
 - start or restart the DRX Inactivity Timer.
- if a DL assignment has been configured for this subframe and no PDCCH indicating a DL transmission was successfully decoded:
 - start the HARQ RTT Timer for the corresponding HARQ process.
- when not in active time, CQI and SRS shall not be reported.

Regardless of whether the UE is monitoring PDCCH or not the UE receives and transmits HARQ feedback when such is expected.

5.8 MAC reconfiguration

Editor's note: This subclause describes the procedure for handling reconfiguration of MAC parameters during normal operation.

5.9 MAC Reset

Editor's note: This subclause describes the procedure for resetting MAC [FFS]; e.g. at handover.

5.X Handling of unknown, unforeseen and erroneous protocol data

Editor's note: This subclause describes how MAC treats and acts on unexpected data.

Editor's note: The subclause on "Handling of unknown, unforeseen and erroneous protocol data" should be the last subsection of Section "MAC procedures".

6 Protocol Data Units, formats and parameters

6.1 Protocol Data Units

6.1.1 General

A MAC PDU is a bit string that is byte aligned (i.e. multiple of 8 bits) in length. In the figures in subclause 6.1, bit strings are represented by tables in which the most significant bit is the leftmost bit of the first line of the table, the least significant bit is the rightmost bit on the last line of the table, and more generally the bit string is to be read from left to right and then in the reading order of the lines. The bit order of each parameter field within a MAC PDU is represented with the first and most significant bit in the leftmost bit and the last and least significant bit in the rightmost bit.

MAC SDUs are bit strings that are byte aligned (i.e. multiple of 8 bits) in length. An SDU is included into a MAC PDU from the first bit onward.

6.1.2 MAC PDU (DL-SCH and UL-SCH)

A MAC PDU consists of a MAC header, zero or more MAC Service Data Units (MAC SDU), zero, or more MAC control elements, and optionally padding; as described in Figure 6.1.2-3.

Both the MAC header and the MAC SDUs are of variable sizes.

A MAC PDU header consists of one or more MAC PDU sub-headers; each subheader corresponding to either a MAC SDU, a MAC control element or padding.

A MAC PDU subheader consists of the six header fields R/R/E/LCID/F/L but for the last subheader in the MAC PDU and for fixed sized MAC control elements. The last subheader in the MAC PDU and sub-headers for fixed sized MAC control elements consist solely of the four header fields R/R/E/LCID. It follows that a MAC PDU subheader corresponding to padding consists of the four header fields R/R/E/LCID.

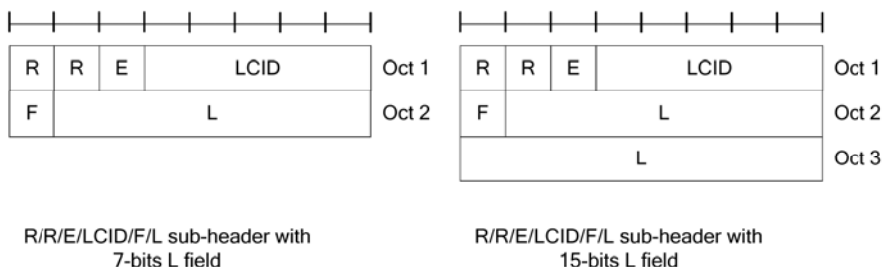


Figure 6.1.2-1: R/R/E/LCID/F/L MAC subheader

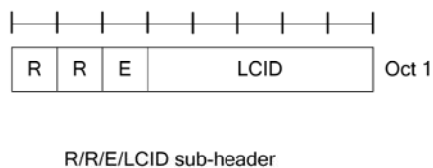


Figure 6.1.2-2: R/R/E/LCID MAC subheader

MAC PDU sub-headers have the same order as the corresponding MAC SDUs, MAC control elements and padding.

MAC control elements, except Padding BSR, are always placed before any MAC SDU. Padding BSR occurs at the end of the MAC PDU.

Padding occurs at the end of the MAC PDU, except when single-byte or two-byte padding is required but cannot be achieved by padding at the end of the MAC PDU.

When single-byte or two-byte padding is required but cannot be achieved by padding at the end of the MAC PDU, one or two MAC PDU sub-headers corresponding to padding are inserted before the first MAC PDU subheader corresponding to a MAC SDU; or if such subheader is not present, before the last MAC PDU subheader corresponding to a MAC control element.

A maximum of one MAC PDU can be transmitted per TB per UE. [Depending on the physical layer category], one or two TBs can be transmitted per TTI per UE.

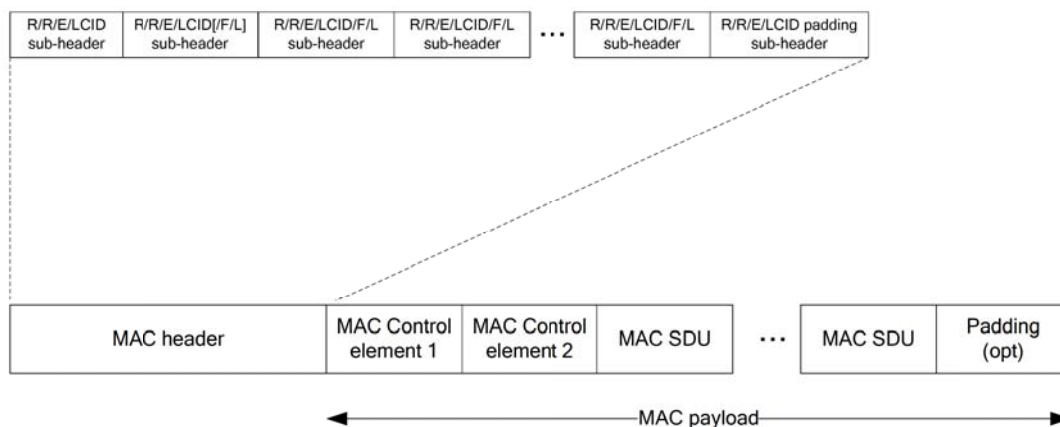


Figure 6.1.2-3: MAC PDU consisting of MAC header, MAC control elements, MAC SDUs and padding

Editor's note: It is FFS whether this MAC PDU applies only to DL/UL SCH or also to other transport channels

6.1.3 MAC Control Elements

6.1.3.1 Buffer Status Report MAC Control Elements

Buffer Status Report (BSR) MAC control elements consist of either:

- Short BSR format: one LCG ID field and one corresponding BS field (figure 6.1.3.1-1); or
- Long BSR format: four Buffer Size fields, corresponding to LCG IDs #1 through #4 (figure 6.1.3.1-2).

The BSR formats are identified by MAC PDU subheaders with LCIDs as specified in table 6.2.1-1.

The fields LCG ID and BS are defined as follow:

- LCG ID: The Logical Channel Group ID field identifies the group of logical channel(s) which buffer status is being reported. The length of the field is 2 bits;
- Buffer Size: The Buffer Size field identifies the total amount of data available across all logical channels of a logical channel group after the MAC PDU has been built. The amount of data is indicated in number of bytes. It shall include all data that is available for transmission in the RLC layer and in the PDCP layer; the definition of what data shall be considered as available for transmission is specified in [3] and [4] respectively. The size of the RLC and MAC headers are not considered in the buffer size computation. The length of this field is 6 bits. The values taken by the Buffer Size field are shown in [Table 6.1.2.1-1].

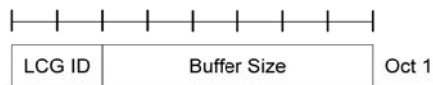


Figure 6.1.3.1-1: Short Buffer Status MAC control element

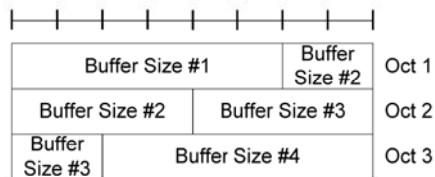


Figure 6.1.3.1-2: Long Buffer Status MAC control element

6.1.3.2 C-RNTI MAC Control Element

The C-RNTI MAC control element is identified by MAC PDU subheader with LCID as specified in table 6.2.1-2.

It has a fixed size and consists of a single field defined as follows (figure 6.1.3.2-1):

- C-RNTI: This field contains the C-RNTI of the UE. The length of the field is 16 bits.

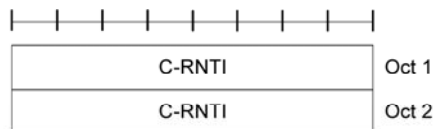


Figure 6.1.3.2-1: C-RNTI MAC control element

6.1.3.3 DRX Command MAC Control Element

The DRX Command MAC control element is identified by a MAC PDU subheader with LCID as specified in table 6.2.1-1.

It has a fixed size of zero bits.

6.1.3.4 UE Contention Resolution Identity MAC Control Element

The UE Contention Resolution Identity MAC control element is identified by MAC PDU subheader with LCID as specified in table 6.2.1-1. This control element has a fixed 48-bit size and consists of a single field defined as follows (figure 6.1.3.4-1)

- UE Contention Resolution Identity: This field contains the uplink CCCH SDU transmitted by MAC.

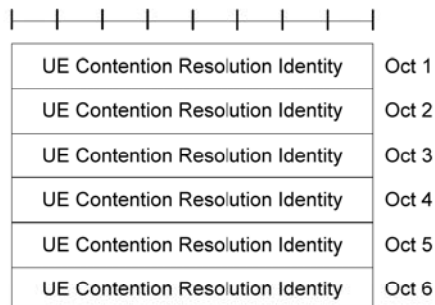


Figure 6.1.3.4-1: UE Contention Resolution Identity MAC control element

6.1.3.5 Timing Advance MAC Control Element

The Timing Advance MAC control element is identified by MAC PDU subheader with LCID as specified in table 6.2.1-1.

It has a fixed size and consists of a single field defined as follows (figure 6.1.3.4-1):

- Timing Advance: This field indicates the amount of timing adjustment in 0.5 μ s that UE has to apply. The length of the field is [8] bits.

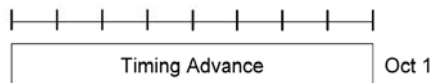


Figure 6.1.3.5-1: Timing Advance MAC control element

Editor's note: Whether all 8 bits are needed and what the value range is are FFS.

6.1.3.6 Power Headroom MAC Control Element

The Power Headroom MAC control element is identified by a MAC PDU subheader with LCID as specified in table 6.2.1-1. It has a fixed size and consists of a single octet defined as follows (figure 6.1.3.6-1):

- R: reserved bits;
- Power Headroom: this field indicates the power headroom. The length of the field is 6 bits.

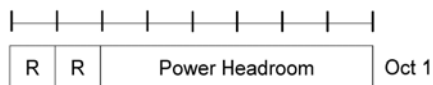


Figure 6.1.3.6-1: Power Headroom MAC control element

6.1.4 MAC PDU (transparent MAC)

A MAC PDU consists solely of a MAC Service Data Unit (MAC SDU) whose size is aligned to a TB; as described in figure 6.1.4-1.

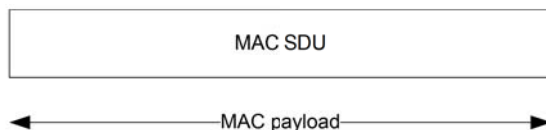


Figure 6.1.4-1: MAC PDU (transparent MAC)

6.1.5 MAC PDU (Random Access Response)

A MAC PDU consists of a MAC header and one or more MAC Random Access Responses (MAC RAR) as described in figure 6.1.5-4.

The MAC header is of variable size.

A MAC PDU header consists of one or more MAC PDU sub-headers; each subheader corresponding to a MAC RAR except for the Backoff Indicator sub-header.

A MAC PDU subheader consists of the three header fields E/T/RAPID (as described in figure 6.1.5-1) but for the Backoff Indicator subheader which consists of the five header field E/T/R/R/BI (as described in figure 6.1.5-2).

A MAC RAR consists of the three fields TA/UL Grant/Temporary C-RNTI (as described in figure 6.1.5-3)

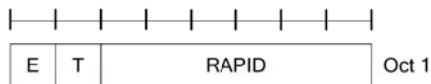


Figure 6.1.5-1: E/T/RAPID MAC sub-header

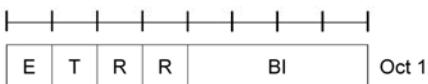


Figure 6.1.5-2: E/T/R/R/BI MAC sub-header

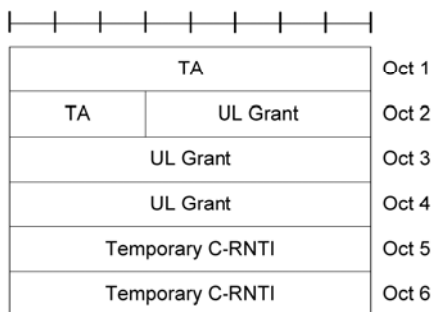


Figure 6.1.5-3: MAC RAR

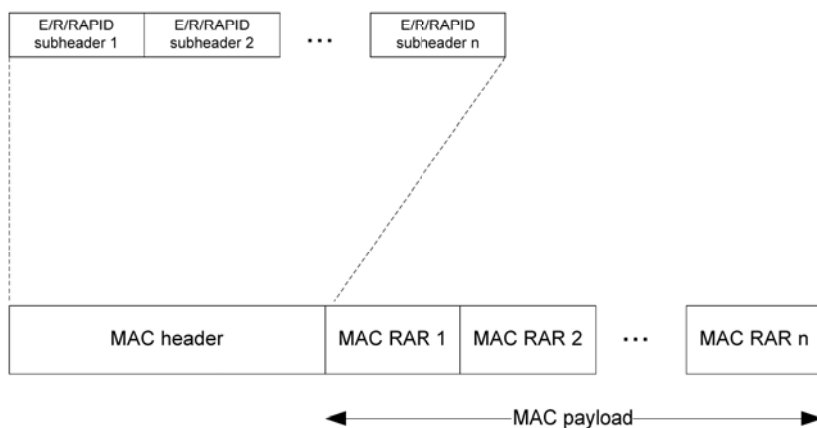


Figure 6.1.5-4: MAC PDU consisting of a MAC header and MAC RARs

6.2 Formats and parameters

6.2.1 MAC header for DL-SCH and UL-SCH

The MAC header is of variable size and consists of the following fields:

- LCID: The Logical Channel ID field identifies the logical channel instance of the corresponding MAC SDU or the type of the corresponding MAC control element or padding as described in tables 6.2.1-1 and 6.2.1-2 for the DL and UL-SCH respectively. There is one LCID field for each MAC SDU, MAC control element or padding included in the MAC PDU. The LCID field size is 5 bits;
- L: The Length field indicates the length of the corresponding MAC SDU or MAC control element in bytes. There is one L field per MAC PDU subheader except for the last subheader and sub-headers corresponding to fixed-sized MAC control elements. The size of the L field is indicated by the F field;
- F: The Format field indicates the size of the Length field as indicated in table 6.2.1-3. There is one F field per MAC PDU subheader except for the last subheader and sub-headers corresponding to fixed-sized MAC control elements. The size of the F field is 1 bit. If the size of the MAC SDU or MAC control element is less than 128 bytes, the UE shall set the value of the F field to 0, otherwise the UE shall set it to 1;
- E: The Extension field is a flag indicating if more fields are present in the MAC header or not. The E field is set to "1" to indicate another set of at least R/R/E/LCID fields. The E field is set to "0" to indicate that either a MAC SDU, a MAC control element or padding starts at the next byte;
- R: Reserved bits.

The MAC header and sub-headers are octet aligned.

Table 6.2.1-1 Values of LCID for DL-SCH

Index	LCID values
00000	CCCH
00001-xxxxx	Identity of the logical channel
xxxxx-11011	Reserved
11100	UE Contention Resolution Identity
11101	Timing Advance
11110	DRX Command
11111	Padding

Table 6.2.1-2 Values of LCID for UL-SCH

Index	LCID values
00000	CCCH
00001-yyyyy	Identity of the logical channel
yyyyy-11010	Reserved
11011	Power Headroom Report
11100	C-RNTI
11101	Short Buffer Status Report
11110	Long Buffer Status Report
11111	Padding

Table 6.2.1-3 Values of F field:

Index	Size of Length field (in bits)
0	7
1	15

Editor's note: It is FFS whether this MAC header applies only to DL/UL SCH or also to other transport channels.

Editor's note: xxxxx and yyyyy are FFS

6.2.2 MAC header for Random Access Response

The MAC header is of variable size and consists of the following fields:

- E: The Extension field is a flag indicating if more fields are present in the MAC header or not. The E field is set to "1" to indicate another set of at least E/T/RAPID or E/T/R/R/BI fields. The E field is set to "0" to indicate that a MAC RAR starts at the next byte;
- T: The Type field is a flag indicating whether the MAC subheader contains a Random Access ID or a Backoff Indicator. The T field is set to "0" to indicate the presence of a Backoff Indicator field in the subheader (BI). The T field is set to "1" to indicate the presence of a Random Access Preamble ID field in the subheader (RAPID);
- R: Reserved bit;
- BI: The Backoff Indicator field identifies the overload condition in the cell. The size of the BI field is 4 bits;
- RAPID: The Random Access Preamble IDentifier field identifies the transmitted Random Access Preamble (see subclause 5.1.3). The size of the RAPID field is 6 bits.

The MAC header and sub-headers are octet aligned.

6.2.3 MAC payload for Random Access Response

The MAC RAR is of [fixed] size and consists of the following fields:

- TA: The Timing Advance field indicates the required adjustment to the uplink transmission timing to be used for timing synchronisation (see subclause 4.2.4 of [2]). The size of the TA field is [11] bits;
- UL Grant: The UpLink Grant field indicates the resources to be used on the uplink. The size of the UL Grant field is [21] bits;
- Temporary C-RNTI: The Temporary C-RNTI field indicates the temporary identity that is used by the UE during Random Access. The size of the Temporary C-RNTI field is 16 bits.

The MAC RAR is octet aligned.

Editor's note: The size of the TA and UL Grant field is FFS

7 Variables and constants

Editor's note: This subclause defines the variables and constants used by MAC.

7.1 RNTI values

RNTI values are presented in Table 7.1-1.

Table 7.1-1: RNTI values.

Value (hexa-decimal)		RNTI
FDD	TDD	
0000-0009	0000-003B	RA-RNTI
000A-FFF2	003C-FFF2	C-RNTI, Semi-Persistent Scheduling C-RNTI and Temporary C-RNTI
FFF3-FFFC		Reserved for future use
FFFE		P-RNTI
FFFF		SI-RNTI

7.2 Backoff Parameter values

Backoff Parameter values are presented in Table 7.2-1.

Table 7.2-1: Backoff Parameter values.

Index	Backoff Parameter value (ms)
0	0
1	10
2	20
3	30
4	40
5	60
6	80
7	120
8	160
9	240
10	320
11	480
12	960

Annex A (informative): Change history

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
2007-06	RAN2#58 bis	R2-072710			MAC Protocol Specification Baseline	-	
2007-06	RAN2#58 bis	R2-072912			Text Proposal for UL HARQ (Tdoc R2-072708) Text Proposal for DL HARQ (Tdoc R2-072707) Text Proposal for RACH procedure (Tdoc R2-072640) Text Proposal for Logical Channel prioritization (Tdoc R2-072643)		0.1.0
2007-06	RAN2#58 bis	R2-072994			Basic MAC PDU structure (Tdoc R2-072983) with updates Agreements on time-frequency resource configuration (Tdoc R2-072993) Agreement on RA-RNTI association (Tdoc R2-072993) Clarification on RA Response reception (Tdoc R2-072993)	0.1.0	0.1.1
2007-08	RAN2#59	R2-073715			Removed reference to non-existing table (Tdoc R2-073473) Incorrect mapping of logical to transport channel (Tdoc R2-073473) Un-necessary error checking in HARQ process procedure (Tdoc R2-073473) Removal of reference to timing relation for HARQ feedback (Tdoc R2-073473) Correction of Internal variable name (Tdoc R2-073473) Correction of procedure in case of successful HARQ reception (Tdoc R2-073473)	0.1.1	0.2.0
2007-09	RAN2#59	R2-073885			Text proposal for Random Access procedure Text proposal on HARQ clarification for TDD Text proposal on HARQ for grants	0.2.0	0.2.1
2007-09	RAN#37	RP-070688			Clean version for information	0.2.1	1.0.0
2007-10	RAN2#59 bis	R2-074530			Editorial update with Editor's notes (Tdoc R2-074211).	1.0.0	1.1.0
2007-11	RAN2#60	R2-075093			Agreements on MAC PDU format (R2-074536) Corrections on Random Access Procedure (R2-074536)	1.1.0	1.1.1
2007-11	RAN2#60	R2-075243			Endorsement of v1.1.1 Removal of FFS on DL CCCH existence	1.1.1	1.2.0
2007-11	RAN2#60	R2-075488			Agreement on identity used Random Access Response (R2-075038) Agreement on Local Nack1 (R2-074949) PUCCH Resource handling (R2-075432) UL HARQ agreements (R2-075432) Agreements on semi-persistent scheduling (R2-075432, 36.300) Agreements on BSR/SR triggers (R2-075432) Agreements on BSR contents (R2-075432) Agreements on Timing Advance principles (36.300) Agreements on DRX control (36.300) Handling of P-BCH, D-BCH, PCH (R2-075246)	1.2.0	1.3.0
2007-11	RAN #38	RP-070917			Clean version, presented at TSG RAN-38 for approval	1.3.0	2.0.0
2007-12	RAN #38	-			Approved at TSG RAN-38 and placed under change control	2.0.0	8.0.0
2008-03	RAN #39	RP-080162	0001	2	CR to 36.321 with E-UTRA MAC protocol specification update	8.0.0	8.1.0
2008-05	RAN #40	RP-080410	0002	1	36.321 CR covering agreements of RAN2 #61bis and RAN2#62	8.1.0	8.2.0

EXHIBIT 3

www.3gpp.org - /ftp/tsg_ran/WG2_RL2/TSGR2_61bis/Docs/

[\[To Parent Directory\]](#)

3/19/2008	8:56 AM	22400	R2-081400.zip
4/4/2008	4:25 PM	350347	R2-081401.zip
3/19/2008	10:30 AM	24234	R2-081402.zip
3/19/2008	8:59 AM	7398	R2-081403.zip
3/19/2008	9:00 AM	20440	R2-081404.zip
3/19/2008	9:00 AM	10588	R2-081405.zip
3/19/2008	9:00 AM	7848	R2-081406.zip
3/19/2008	9:00 AM	67842	R2-081407.ZIP
3/19/2008	9:00 AM	36122	R2-081408.ZIP
3/19/2008	9:00 AM	8286	R2-081409.zip
3/19/2008	9:00 AM	40386	R2-081410.zip
3/19/2008	9:00 AM	9544	R2-081411.zip
3/19/2008	9:00 AM	112634	R2-081412.zip
3/19/2008	9:00 AM	12594	R2-081413.zip
3/19/2008	9:00 AM	335483	R2-081414.zip
3/19/2008	9:00 AM	13118	R2-081415.zip
3/19/2008	9:00 AM	18441	R2-081416.zip
3/19/2008	9:00 AM	9018	R2-081417.zip
3/19/2008	9:00 AM	8661	R2-081418.zip
3/19/2008	9:00 AM	51383	R2-081419.zip
3/19/2008	9:00 AM	75025	R2-081420.zip
3/19/2008	9:00 AM	5398	R2-081421.ZIP
3/19/2008	9:00 AM	35210	R2-081422.ZIP
3/19/2008	9:00 AM	59646	R2-081423.zip
3/19/2008	9:00 AM	10562	R2-081424.ZIP
3/19/2008	9:00 AM	11093	R2-081425.ZIP
3/19/2008	9:00 AM	9066	R2-081426.zip
3/19/2008	9:00 AM	11034	R2-081427.ZIP
3/19/2008	9:00 AM	11750	R2-081428.ZIP
3/19/2008	9:00 AM	9581	R2-081429.zip
3/19/2008	9:00 AM	9419	R2-081430.zip
3/19/2008	9:00 AM	10080	R2-081431.zip
3/19/2008	9:00 AM	10189	R2-081432.zip
3/19/2008	9:00 AM	10642	R2-081433.zip
3/19/2008	9:00 AM	9650	R2-081434.zip
3/19/2008	9:00 AM	24047	R2-081435.zip
3/19/2008	9:00 AM	8076	R2-081436.zip
3/19/2008	9:01 AM	7903	R2-081437.zip
3/19/2008	9:01 AM	9538	R2-081438.zip
3/19/2008	9:01 AM	487180	R2-081439.zip
3/19/2008	9:01 AM	52270	R2-081440.zip
4/4/2008	4:25 PM	490478	R2-081441.zip
4/11/2008	9:12 AM	468602	R2-081445.zip
3/25/2008	8:31 AM	234943	R2-081446.zip
3/25/2008	8:33 AM	93496	R2-081447.zip
3/25/2008	9:34 AM	30520	R2-081448.zip
3/20/2008	2:25 PM	199470	R2-081449.zip
3/25/2008	5:32 AM	24980	R2-081450.zip
3/25/2008	5:32 AM	17397	R2-081451.zip
3/25/2008	5:32 AM	17672	R2-081452.zip
3/20/2008	7:28 PM	55690	R2-081453.zip

3/20/2008	7:29 PM	14633	R2-081454.zip
3/25/2008	7:42 AM	16027	R2-081455.zip
3/25/2008	7:11 AM	17249	R2-081456.zip
3/24/2008	10:01 PM	39006	R2-081457.zip
3/24/2008	10:03 PM	52193	R2-081458.zip
3/25/2008	12:39 PM	25279	R2-081459.zip
3/24/2008	10:04 PM	67345	R2-081460.zip
3/27/2008	10:36 AM	15029	R2-081461.zip
3/24/2008	10:07 PM	284366	R2-081462.zip
3/24/2008	10:07 PM	30168	R2-081463.zip
3/29/2008	10:58 AM	441762	R2-081464.zip
3/25/2008	7:31 AM	102012	R2-081465.zip
3/25/2008	7:31 AM	36326	R2-081466.zip
3/25/2008	7:28 AM	12474	R2-081467.zip
3/25/2008	1:09 PM	15633	R2-081468.zip
3/20/2008	7:30 PM	10155	R2-081469.zip
3/20/2008	7:30 PM	16428	R2-081470.zip
3/25/2008	7:38 AM	19798	R2-081471.zip
3/25/2008	7:38 AM	25808	R2-081472.zip
3/24/2008	10:35 PM	15743	R2-081473.zip
3/24/2008	10:35 PM	407052	R2-081474.zip
3/24/2008	10:54 PM	16261	R2-081475.zip
3/24/2008	7:29 PM	16945	R2-081476.zip
3/25/2008	7:12 AM	83667	R2-081477.zip
3/24/2008	10:36 PM	31162	R2-081478.zip
3/24/2008	10:40 PM	29327	R2-081479.zip
3/24/2008	10:41 PM	30342	R2-081480.zip
3/24/2008	10:43 PM	31336	R2-081481.zip
3/24/2008	7:29 PM	37431	R2-081482.zip
3/22/2008	5:15 AM	24434	R2-081483.zip
3/22/2008	5:15 AM	36666	R2-081484.zip
3/22/2008	5:15 AM	14528	R2-081485.zip
3/24/2008	10:57 PM	66782	R2-081486.zip
3/29/2008	6:09 AM	25756	R2-081487.zip
3/24/2008	10:57 PM	11345	R2-081488.zip
3/24/2008	7:30 PM	27169	R2-081489.zip
3/25/2008	7:44 AM	17799	R2-081490.zip
3/22/2008	5:14 AM	14289	R2-081491.zip
3/22/2008	5:14 AM	19585	R2-081492.zip
3/24/2008	10:58 PM	34952	R2-081493.zip
3/24/2008	10:58 PM	11482	R2-081494.zip
3/20/2008	7:31 PM	16100	R2-081495.zip
3/20/2008	7:31 PM	15997	R2-081496.zip
3/20/2008	7:31 PM	21159	R2-081497.zip
3/20/2008	7:32 PM	17838	R2-081498.zip
3/24/2008	10:41 PM	28562	R2-081499.zip
3/25/2008	7:53 AM	22924	R2-081500.zip
3/25/2008	1:49 PM	17787	R2-081501.zip
3/25/2008	9:03 AM	15266	R2-081502.zip
3/24/2008	7:31 PM	22897	R2-081503.zip
3/24/2008	10:36 PM	24690	R2-081504.zip
3/24/2008	7:31 PM	28496	R2-081505.zip
3/24/2008	7:31 PM	23770	R2-081506.zip
3/25/2008	7:51 AM	26375	R2-081507.zip
3/25/2008	7:51 AM	25619	R2-081508.zip
3/25/2008	7:01 AM	27811	R2-081509.zip
3/25/2008	7:48 AM	25454	R2-081511.zip
3/25/2008	7:02 AM	35600	R2-081512.zip
3/25/2008	1:32 AM	35890	R2-081513.zip
3/24/2008	10:10 PM	81510	R2-081514.zip
3/24/2008	10:14 PM	73890	R2-081515.zip

3/24/2008	10:14 PM	41050	R2-081516.zip
3/24/2008	10:14 PM	73555	R2-081517.zip
3/24/2008	10:05 PM	41057	R2-081518.zip
3/24/2008	10:14 PM	38523	R2-081519.zip
3/24/2008	8:30 PM	11227	R2-081520.zip
3/25/2008	9:47 AM	10663	R2-081521.zip
3/22/2008	5:17 AM	62187	R2-081522.zip
3/25/2008	7:42 AM	21571	R2-081523.zip
3/25/2008	5:38 AM	24611	R2-081524.zip
3/25/2008	5:38 AM	25645	R2-081525.zip
3/25/2008	1:59 AM	16870	R2-081526.zip
3/25/2008	3:52 AM	21809	R2-081527.zip
3/25/2008	2:01 AM	200864	R2-081528.zip
3/25/2008	2:08 AM	17105	R2-081529.zip
3/25/2008	2:04 AM	22361	R2-081530.zip
3/25/2008	2:10 AM	17669	R2-081531.zip
3/25/2008	2:36 AM	27311	R2-081532.zip
3/25/2008	2:31 AM	68972	R2-081533.zip
3/25/2008	5:23 AM	58994	R2-081534.zip
3/25/2008	5:23 AM	73780	R2-081535.zip
3/25/2008	2:31 AM	73488	R2-081536.zip
3/25/2008	5:24 AM	27322	R2-081537.zip
3/25/2008	5:24 AM	27893	R2-081538.zip
3/25/2008	5:25 AM	25039	R2-081539.zip
3/25/2008	2:32 AM	30599	R2-081540.zip
3/24/2008	11:39 PM	18100	R2-081541.zip
3/24/2008	11:41 PM	70369	R2-081542.zip
3/24/2008	11:42 PM	46369	R2-081543.zip
3/21/2008	1:16 PM	43085	R2-081544.zip
3/21/2008	1:17 PM	90216	R2-081545.zip
3/21/2008	1:17 PM	89739	R2-081546.zip
3/21/2008	1:17 PM	112168	R2-081547.zip
3/21/2008	1:18 PM	112186	R2-081548.zip
3/25/2008	3:30 AM	19795	R2-081549.zip
3/25/2008	3:30 AM	46351	R2-081550.zip
3/25/2008	3:30 AM	71588	R2-081551.zip
3/25/2008	3:30 AM	74471	R2-081552.zip
3/25/2008	3:31 AM	18226	R2-081553.zip
3/21/2008	2:16 PM	41619	R2-081554.zip
3/21/2008	2:21 PM	8655	R2-081555.zip
3/24/2008	1:22 PM	17792	R2-081556.zip
3/24/2008	10:09 PM	154210	R2-081557.zip
3/25/2008	4:59 AM	7935	R2-081558.zip
3/25/2008	5:14 AM	66011	R2-081559.zip
3/25/2008	7:04 AM	91195	R2-081560.zip
3/25/2008	7:07 AM	62858	R2-081561.zip
3/25/2008	7:08 AM	70514	R2-081562.zip
3/25/2008	7:09 AM	13896	R2-081563.zip
3/25/2008	7:11 AM	13354	R2-081564.zip
3/25/2008	4:59 AM	36759	R2-081565.zip
3/25/2008	5:39 AM	62649	R2-081566.zip
3/25/2008	6:34 AM	127919	R2-081567.zip
3/25/2008	6:34 AM	21975	R2-081568.zip
3/25/2008	4:14 AM	27544	R2-081569.zip
3/25/2008	4:15 AM	50902	R2-081570.zip
3/25/2008	6:13 AM	31692	R2-081571.zip
3/25/2008	5:34 AM	16843	R2-081572.zip
3/25/2008	4:17 AM	14785	R2-081573.zip
3/25/2008	7:56 AM	81110	R2-081574.zip
3/25/2008	9:57 AM	31123	R2-081575.zip
3/25/2008	4:18 AM	13931	R2-081576.zip

3/25/2008	4:19 AM	35913	R2-081577.zip
3/25/2008	6:49 AM	17825	R2-081578.zip
3/25/2008	4:21 AM	15226	R2-081579.zip
3/25/2008	5:37 AM	21712	R2-081580.zip
3/25/2008	6:35 AM	26598	R2-081581.zip
3/24/2008	6:38 PM	22353	R2-081582.zip
3/28/2008	5:28 PM	31795	R2-081584.zip
3/27/2008	10:01 AM	118277	R2-081585.zip
3/25/2008	5:33 AM	24438	R2-081586.zip
3/25/2008	5:45 AM	100348	R2-081587.zip
3/24/2008	11:49 PM	32427	R2-081588.zip
3/25/2008	12:00 AM	21403	R2-081589.zip
3/24/2008	11:51 PM	99632	R2-081590.zip
3/25/2008	12:01 AM	25891	R2-081591.zip
3/24/2008	11:52 PM	109454	R2-081592.zip
3/24/2008	11:53 PM	521213	R2-081593.zip
3/24/2008	11:54 PM	111706	R2-081594.zip
3/24/2008	11:54 PM	24874	R2-081595.zip
3/25/2008	12:01 AM	32120	R2-081596.zip
3/24/2008	11:55 PM	154865	R2-081597.zip
3/24/2008	11:58 PM	85108	R2-081598.zip
3/25/2008	5:40 AM	332530	R2-081599.zip
3/25/2008	12:02 AM	30879	R2-081600.zip
3/24/2008	11:56 PM	22910	R2-081601.zip
3/25/2008	6:32 AM	86277	R2-081602.zip
3/25/2008	6:33 AM	49601	R2-081603.zip
3/25/2008	6:36 AM	45533	R2-081605.zip
3/25/2008	6:37 AM	95136	R2-081606.zip
3/25/2008	6:39 AM	78722	R2-081607.zip
3/25/2008	6:40 AM	115606	R2-081608.zip
3/25/2008	6:42 AM	77538	R2-081609.zip
3/25/2008	6:43 AM	43836	R2-081610.zip
3/25/2008	4:14 AM	30944	R2-081613.zip
3/25/2008	4:14 AM	17272	R2-081614.zip
3/25/2008	4:18 AM	51860	R2-081615.zip
3/25/2008	4:15 AM	51860	R2-081616.zip
3/25/2008	4:19 AM	31519	R2-081617.zip
3/25/2008	4:19 AM	75303	R2-081618.zip
3/25/2008	6:36 AM	59130	R2-081619.zip
3/25/2008	4:21 AM	30868	R2-081620.zip
3/27/2008	6:35 AM	16765	R2-081621.zip
3/25/2008	4:21 AM	101545	R2-081622.zip
3/25/2008	4:23 AM	39754	R2-081623.zip
3/25/2008	4:23 AM	134098	R2-081624.zip
3/25/2008	4:23 AM	22050	R2-081625.zip
3/25/2008	4:24 AM	34210	R2-081626.zip
3/25/2008	4:34 AM	100019	R2-081627.zip
3/25/2008	4:24 AM	16568	R2-081628.zip
3/25/2008	4:24 AM	93145	R2-081629.zip
3/25/2008	5:34 AM	31238	R2-081630.zip
3/25/2008	8:29 AM	21249	R2-081631.zip
3/25/2008	8:37 AM	250749	R2-081632.zip
3/26/2008	9:46 AM	48020	R2-081633.zip
3/25/2008	6:15 AM	35490	R2-081634.zip
3/25/2008	1:19 AM	34136	R2-081635.zip
3/25/2008	6:43 AM	44660	R2-081636.zip
3/25/2008	1:21 AM	19978	R2-081637.zip
3/25/2008	1:22 AM	20978	R2-081638.zip
3/25/2008	6:38 AM	15820	R2-081640.zip
3/25/2008	6:44 AM	33493	R2-081641.zip
3/25/2008	6:45 AM	51273	R2-081642.zip

3/25/2008	6:46 AM	17490	R2-081643.zip
3/25/2008	6:47 AM	70479	R2-081644.zip
3/25/2008	6:48 AM	18565	R2-081645.zip
3/25/2008	6:49 AM	16672	R2-081646.zip
3/25/2008	6:51 AM	19213	R2-081647.zip
3/25/2008	6:52 AM	16376	R2-081648.zip
3/25/2008	6:52 AM	14570	R2-081649.zip
3/25/2008	6:54 AM	39862	R2-081650.zip
3/25/2008	6:58 AM	44734	R2-081651.zip
3/25/2008	6:59 AM	80347	R2-081652.zip
3/25/2008	7:01 AM	85382	R2-081653.zip
3/25/2008	7:02 AM	53036	R2-081654.zip
3/25/2008	7:04 AM	81626	R2-081655.zip
3/25/2008	7:05 AM	14363	R2-081656.zip
3/25/2008	7:15 AM	14831	R2-081657.zip
3/25/2008	7:08 AM	28324	R2-081658.zip
3/25/2008	7:48 AM	24702	R2-081659.zip
3/25/2008	7:10 AM	28696	R2-081660.zip
3/25/2008	7:12 AM	106659	R2-081661.zip
3/25/2008	7:22 AM	558299	R2-081662.zip
3/25/2008	6:13 AM	53734	R2-081663.zip
3/25/2008	4:06 AM	19345	R2-081665.zip
3/25/2008	5:26 AM	68733	R2-081666.zip
3/25/2008	7:07 AM	48918	R2-081667.zip
3/25/2008	7:10 AM	32603	R2-081668.zip
3/25/2008	6:01 AM	18801	R2-081669.zip
3/25/2008	6:02 AM	18733	R2-081670.zip
3/25/2008	6:09 AM	52412	R2-081671.zip
3/25/2008	7:59 AM	65130	R2-081672.zip
3/25/2008	8:00 AM	58992	R2-081673.zip
3/25/2008	8:02 AM	173030	R2-081674.zip
3/25/2008	8:03 AM	16986	R2-081675.zip
3/25/2008	8:04 AM	17134	R2-081676.zip
3/25/2008	6:07 AM	14144	R2-081677.zip
3/25/2008	6:08 AM	12130	R2-081678.zip
3/25/2008	12:02 AM	30503	R2-081679.zip
3/25/2008	4:56 AM	19890	R2-081680.zip
3/25/2008	12:03 AM	32782	R2-081681.zip
3/25/2008	4:56 AM	19400	R2-081682.zip
3/25/2008	7:02 AM	16237	R2-081683.zip
3/24/2008	8:40 PM	28452	R2-081684.zip
3/24/2008	8:42 PM	39118	R2-081685.zip
3/24/2008	8:45 PM	23382	R2-081686.zip
3/24/2008	8:45 PM	30956	R2-081687.zip
3/24/2008	8:47 PM	25675	R2-081688.zip
3/24/2008	8:48 PM	46299	R2-081689.zip
3/25/2008	9:10 PM	416570	R2-081690.zip
3/24/2008	8:49 PM	11829	R2-081691.zip
3/24/2008	8:50 PM	23350	R2-081692.zip
3/25/2008	7:24 AM	346492	R2-081693.zip
3/25/2008	7:25 AM	69427	R2-081694.zip
3/25/2008	7:27 AM	39663	R2-081695.zip
3/25/2008	7:28 AM	30550	R2-081696.zip
3/25/2008	7:29 AM	44374	R2-081697.zip
3/25/2008	7:47 AM	53830	R2-081698.zip
3/24/2008	8:00 PM	19871	R2-081699.zip
3/25/2008	8:14 AM	109162	R2-081700.zip
3/26/2008	6:44 AM	65933	R2-081701.zip
3/25/2008	12:25 PM	21879	R2-081702.zip
3/25/2008	12:26 PM	21798	R2-081703.zip
3/25/2008	2:11 AM	15252	R2-081704.zip

3/25/2008	11:53 AM	23056	R2-081705.zip
3/25/2008	11:55 AM	31694	R2-081706.zip
3/25/2008	11:56 AM	17319	R2-081707.zip
3/25/2008	12:02 PM	35958	R2-081708.zip
3/26/2008	1:57 AM	101616	R2-081709.zip
3/25/2008	10:53 AM	14290	R2-081710.zip
3/25/2008	7:29 AM	9512	R2-081712.zip
3/25/2008	7:32 AM	34172	R2-081713.zip
3/25/2008	7:40 AM	42204	R2-081714.zip
3/25/2008	6:57 AM	490124	R2-081715.zip
3/25/2008	6:57 AM	197547	R2-081716.zip
3/25/2008	7:40 AM	20326	R2-081717.zip
3/25/2008	7:05 AM	32193	R2-081718.zip
3/25/2008	7:07 AM	334986	R2-081719.zip
3/25/2008	7:08 AM	99993	R2-081720.zip
3/25/2008	7:09 AM	11792	R2-081721.zip
3/25/2008	7:09 AM	12720	R2-081722.zip
3/25/2008	7:10 AM	13496	R2-081723.zip
3/25/2008	7:11 AM	12489	R2-081724.zip
3/25/2008	7:13 AM	12998	R2-081725.zip
3/25/2008	7:12 AM	18701	R2-081726.zip
3/25/2008	8:04 AM	144378	R2-081727.zip
3/25/2008	7:28 AM	29138	R2-081729.zip
3/25/2008	7:36 AM	24417	R2-081730.zip
3/25/2008	7:09 AM	71191	R2-081731.zip
3/25/2008	7:26 AM	27527	R2-081732.zip
3/25/2008	7:11 AM	18501	R2-081733.zip
3/25/2008	7:14 AM	14506	R2-081734.zip
3/25/2008	7:35 AM	26800	R2-081735.zip
3/25/2008	11:45 AM	27031	R2-081736.zip
3/25/2008	7:16 AM	263188	R2-081737.zip
3/25/2008	7:58 AM	20903	R2-081738.zip
3/25/2008	7:19 AM	24320	R2-081739.zip
3/25/2008	7:22 AM	173594	R2-081740.zip
3/25/2008	7:58 AM	30258	R2-081741.zip
3/25/2008	7:31 AM	18725	R2-081742.zip
3/25/2008	7:33 AM	17823	R2-081743.zip
3/25/2008	7:24 AM	22932	R2-081744.zip
3/25/2008	10:52 AM	21941	R2-081745.zip
3/25/2008	10:53 AM	77602	R2-081746.zip
3/25/2008	7:42 AM	24000	R2-081747.zip
3/25/2008	7:43 AM	27185	R2-081748.zip
3/25/2008	7:45 AM	25340	R2-081749.zip
3/25/2008	11:31 AM	25472	R2-081750.zip
3/25/2008	11:32 AM	21973	R2-081751.zip
3/25/2008	11:33 AM	24351	R2-081752.zip
3/25/2008	9:36 AM	30987	R2-081753.zip
3/25/2008	9:37 AM	25222	R2-081754.zip
3/25/2008	9:38 AM	32283	R2-081755.zip
3/25/2008	8:05 AM	40529	R2-081756.zip
3/24/2008	10:38 PM	29686	R2-081758.zip
3/25/2008	5:25 AM	20824	R2-081759.zip
3/24/2008	7:47 PM	15706	R2-081760.zip
3/25/2008	5:30 AM	19279	R2-081761.zip
3/24/2008	7:45 PM	16259	R2-081762.zip
3/25/2008	5:35 AM	34197	R2-081763.zip
3/24/2008	10:39 PM	137378	R2-081764.zip
3/25/2008	5:38 AM	8158	R2-081765.zip
3/24/2008	10:41 PM	39028	R2-081766.zip
3/24/2008	10:42 PM	7998	R2-081767.zip
3/24/2008	10:43 PM	78889	R2-081768.zip

3/25/2008	12:09 PM	47963	R2-081769.zip
3/25/2008	7:33 AM	34227	R2-081770.zip
3/25/2008	7:36 AM	1343620	R2-081771.zip
3/24/2008	10:42 PM	26265	R2-081772.zip
3/25/2008	7:37 AM	771094	R2-081773.zip
3/25/2008	7:39 AM	1614878	R2-081774.zip
3/25/2008	7:42 AM	488043	R2-081775.zip
3/25/2008	7:43 AM	23448	R2-081776.zip
3/25/2008	12:20 AM	30838	R2-081777.zip
3/25/2008	12:23 AM	12897	R2-081778.zip
3/26/2008	7:47 AM	29153	R2-081779.zip
3/25/2008	8:54 AM	8703	R2-081780.zip
3/25/2008	7:15 AM	17557	R2-081781.zip
3/24/2008	8:17 PM	26340	R2-081783.zip
3/25/2008	12:00 AM	26516	R2-081784.zip
3/25/2008	12:02 AM	14623	R2-081785.zip
3/25/2008	8:35 AM	17154	R2-081786.zip
3/25/2008	12:03 AM	31447	R2-081787.zip
3/25/2008	12:04 AM	14688	R2-081788.zip
3/25/2008	12:05 AM	7818	R2-081789.zip
3/25/2008	12:06 AM	116114	R2-081790.zip
3/25/2008	12:06 AM	9690	R2-081791.zip
3/25/2008	9:33 AM	26897	R2-081792.zip
3/25/2008	12:07 AM	5521	R2-081793.zip
3/25/2008	12:07 AM	166904	R2-081794.zip
3/25/2008	8:02 AM	21637	R2-081795.zip
3/25/2008	8:05 AM	14767	R2-081797.zip
3/25/2008	6:39 AM	11014	R2-081799.zip
3/25/2008	6:40 AM	12957	R2-081800.zip
3/25/2008	6:41 AM	30613	R2-081801.zip
3/25/2008	9:00 AM	13411	R2-081802.zip
3/25/2008	8:42 AM	83465	R2-081803.zip
3/25/2008	9:10 AM	10111	R2-081804.zip
3/25/2008	8:37 AM	36878	R2-081805.zip
3/25/2008	8:38 AM	64289	R2-081806.zip
3/25/2008	8:39 AM	145419	R2-081807.zip
3/25/2008	8:40 AM	14078	R2-081808.zip
3/25/2008	8:34 AM	18432	R2-081809.zip
3/25/2008	8:35 AM	18346	R2-081810.zip
3/25/2008	3:08 PM	16927	R2-081811.zip
3/25/2008	8:51 AM	12738	R2-081812.zip
3/24/2008	11:02 PM	31326	R2-081813.zip
3/25/2008	2:21 PM	18499	R2-081814.zip
3/25/2008	9:19 AM	14018	R2-081815.zip
3/25/2008	6:42 AM	23648	R2-081816.zip
3/25/2008	6:42 AM	11439	R2-081817.zip
3/25/2008	6:43 AM	19677	R2-081818.zip
3/25/2008	6:44 AM	19736	R2-081819.zip
3/25/2008	6:45 AM	14199	R2-081820.zip
3/25/2008	3:56 AM	14089	R2-081821.zip
3/25/2008	5:13 AM	7344	R2-081822.zip
3/25/2008	3:31 AM	21689	R2-081823.zip
3/25/2008	7:06 AM	33444	R2-081824.zip
3/25/2008	3:31 AM	53657	R2-081825.zip
3/25/2008	3:31 AM	6046	R2-081826.zip
3/25/2008	5:00 AM	9218	R2-081827.zip
3/25/2008	5:10 AM	19930	R2-081828.zip
3/25/2008	8:03 AM	278184	R2-081829.zip
3/25/2008	8:05 AM	30874	R2-081830.zip
3/25/2008	5:25 AM	71102	R2-081831.zip
3/25/2008	1:28 AM	17983	R2-081832.zip

3/25/2008	1:30 AM	15747	R2-081833.zip
3/25/2008	1:41 AM	13173	R2-081834.zip
3/25/2008	4:01 AM	83375	R2-081835.zip
3/25/2008	6:02 AM	16408	R2-081836.zip
3/25/2008	6:03 AM	18469	R2-081837.zip
3/25/2008	5:52 AM	18780	R2-081838.zip
3/25/2008	6:46 AM	18691	R2-081839.zip
3/25/2008	5:50 AM	20309	R2-081840.zip
3/25/2008	6:48 AM	11580	R2-081841.zip
3/25/2008	6:49 AM	30078	R2-081843.zip
3/25/2008	6:49 AM	17594	R2-081844.zip
3/25/2008	3:27 AM	17093	R2-081845.zip
3/25/2008	6:59 AM	82298	R2-081846.zip
3/25/2008	7:56 AM	20961	R2-081847.zip
3/25/2008	4:45 AM	25365	R2-081848.zip
3/25/2008	5:52 AM	20061	R2-081849.zip
3/25/2008	5:29 AM	20785	R2-081850.zip
3/25/2008	5:33 AM	20956	R2-081851.zip
3/25/2008	6:01 AM	25262	R2-081852.zip
3/25/2008	6:02 AM	39136	R2-081853.zip
3/25/2008	6:03 AM	39284	R2-081854.zip
3/25/2008	6:05 AM	26280	R2-081855.zip
3/25/2008	7:31 AM	25726	R2-081856.zip
3/25/2008	3:10 PM	160353	R2-081857.zip
3/25/2008	6:06 AM	39902	R2-081858.zip
3/25/2008	8:00 AM	25368	R2-081859.zip
3/25/2008	6:51 AM	90829	R2-081860.zip
3/25/2008	5:36 AM	28990	R2-081861.zip
3/25/2008	5:40 AM	22434	R2-081862.zip
3/25/2008	7:57 AM	246823	R2-081863.zip
3/25/2008	7:53 AM	68134	R2-081864.zip
3/25/2008	7:59 AM	41891	R2-081865.zip
3/25/2008	5:46 AM	56284	R2-081866.zip
3/25/2008	5:46 AM	42627	R2-081867.zip
3/25/2008	5:46 AM	11662	R2-081868.zip
3/25/2008	5:47 AM	6038	R2-081869.zip
3/25/2008	5:47 AM	20715	R2-081870.zip
3/25/2008	5:48 AM	120296	R2-081871.zip
3/25/2008	8:07 AM	94592	R2-081872.zip
3/25/2008	8:08 AM	238158	R2-081873.zip
3/25/2008	8:09 AM	92110	R2-081874.zip
3/25/2008	8:09 AM	185861	R2-081875.zip
3/25/2008	6:51 AM	16588	R2-081876.zip
3/25/2008	7:35 AM	22447	R2-081877.zip
3/25/2008	7:35 AM	19859	R2-081878.zip
3/25/2008	8:11 AM	247736	R2-081879.zip
3/25/2008	8:12 AM	29499	R2-081880.zip
3/25/2008	8:13 AM	166939	R2-081881.zip
3/25/2008	8:15 AM	81498	R2-081882.zip
3/25/2008	6:30 AM	20961	R2-081883.zip
3/25/2008	7:02 AM	25794	R2-081884.zip
3/25/2008	10:07 AM	17791	R2-081887.zip
3/25/2008	6:52 AM	146194	R2-081888.zip
3/25/2008	7:20 AM	19835	R2-081892.zip
3/27/2008	8:20 PM	24045	R2-081893.zip
3/25/2008	7:19 AM	32299	R2-081894.zip
3/25/2008	7:09 AM	30276	R2-081895.zip
3/25/2008	8:51 AM	235760	R2-081896.zip
3/25/2008	7:19 AM	17419	R2-081897.zip
3/25/2008	7:12 AM	35520	R2-081898.zip
3/25/2008	7:37 AM	17496	R2-081899.zip

3/25/2008	8:20 AM	15209	R2-081900.zip
3/25/2008	10:25 AM	43086	R2-081901.zip
3/25/2008	8:19 AM	15041	R2-081902.zip
3/25/2008	8:17 AM	14765	R2-081903.zip
3/26/2008	4:16 AM	21704	R2-081904.zip
3/25/2008	8:16 AM	20893	R2-081905.zip
3/25/2008	8:14 AM	35249	R2-081906.zip
3/25/2008	8:42 AM	15884	R2-081907.zip
3/25/2008	10:00 AM	14732	R2-081908.zip
3/25/2008	11:34 AM	24137	R2-081910.zip
3/25/2008	11:34 AM	27214	R2-081911.zip
3/25/2008	11:35 AM	25525	R2-081912.zip
3/25/2008	2:02 PM	1553299	R2-081913.zip
3/25/2008	1:56 PM	204190	R2-081914.zip
3/25/2008	12:49 PM	14128	R2-081915.zip
3/26/2008	4:33 PM	9456	R2-081916.zip
3/26/2008	4:33 PM	9629	R2-081917.zip
3/26/2008	4:33 PM	10229	R2-081918.zip
3/26/2008	4:33 PM	11250	R2-081919.zip
3/26/2008	4:33 PM	8499	R2-081920.zip
3/26/2008	4:33 PM	137327	R2-081921.zip
3/27/2008	8:48 AM	28368	R2-081922.zip
3/27/2008	10:41 PM	26318	R2-081923.zip
3/30/2008	8:49 AM	71848	R2-081924.zip
3/30/2008	8:49 AM	61156	R2-081925.zip
4/4/2008	4:25 PM	8151	R2-081926.zip
4/4/2008	4:25 PM	15135	R2-081930.zip
4/4/2008	4:25 PM	11257	R2-081931.zip
4/4/2008	4:25 PM	20324	R2-081932.zip
4/4/2008	4:26 PM	5868	R2-081933.zip
4/4/2008	4:26 PM	457326	R2-081934.zip
4/4/2008	4:26 PM	108646	R2-081935.zip
4/4/2008	4:26 PM	108594	R2-081936.zip
4/4/2008	4:26 PM	89308	R2-081937.zip
4/4/2008	4:26 PM	88775	R2-081938.zip
4/4/2008	4:26 PM	30587	R2-081939.zip
4/4/2008	4:27 PM	81791	R2-081940.zip
4/4/2008	4:27 PM	25614	R2-081941.zip
4/4/2008	4:27 PM	31642	R2-081942.zip
4/4/2008	4:27 PM	24436	R2-081943.zip
4/4/2008	4:27 PM	32596	R2-081944.zip
4/4/2008	4:27 PM	24337	R2-081945.zip
4/4/2008	4:27 PM	27190	R2-081946.zip
4/4/2008	4:27 PM	25593	R2-081947.zip
4/4/2008	4:27 PM	27741	R2-081948.zip
4/4/2008	4:27 PM	66156	R2-081949.zip
4/4/2008	4:27 PM	22078	R2-081950.zip
4/4/2008	4:27 PM	21901	R2-081951.zip
4/4/2008	4:28 PM	9265	R2-081952.zip
4/4/2008	4:28 PM	11288	R2-081953.zip
4/4/2008	4:28 PM	44435	R2-081954.zip
4/4/2008	4:28 PM	7521	R2-081955.zip
4/4/2008	4:28 PM	7591	R2-081956.zip
4/4/2008	4:28 PM	39338	R2-081957.zip
4/4/2008	4:28 PM	9397	R2-081958.zip
4/4/2008	4:28 PM	9119	R2-081959.zip
4/4/2008	4:28 PM	8370	R2-081960.zip
4/4/2008	4:28 PM	15350	R2-081961.zip
4/4/2008	4:28 PM	44325	R2-081962.zip
4/4/2008	4:28 PM	85039	R2-081963.zip
4/11/2008	7:12 PM	11991	R2-081964.zip

4/4/2008	4:28 PM	39125	R2-081965.zip
4/4/2008	4:29 PM	172101	R2-081966.zip
4/4/2008	4:29 PM	28607	R2-081967.zip
4/4/2008	4:29 PM	10078	R2-081968.zip
4/4/2008	4:29 PM	11026	R2-081969.zip
4/4/2008	4:29 PM	9285	R2-081970.zip
4/4/2008	4:29 PM	5855	R2-081971.zip
4/4/2008	4:29 PM	17857	R2-081972.zip
4/4/2008	4:29 PM	10363	R2-081973.zip
4/4/2008	4:29 PM	10424	R2-081974.zip
4/4/2008	4:29 PM	23717	R2-081986.zip
4/4/2008	4:29 PM	17756	R2-081987.zip
4/4/2008	4:29 PM	17837	R2-081989.zip
4/4/2008	4:29 PM	9002	R2-081990.zip
4/4/2008	4:29 PM	16495	R2-081991.zip
4/4/2008	4:29 PM	20482	R2-081992.zip
4/4/2008	4:29 PM	24470	R2-081993.zip
4/4/2008	4:30 PM	235024	R2-081995.zip
4/4/2008	4:30 PM	88181	R2-081996.zip
4/4/2008	4:30 PM	43097	R2-081997.zip
4/4/2008	4:30 PM	53352	R2-081998.zip
4/4/2008	4:30 PM	112073	R2-081999.zip
4/4/2008	4:30 PM	24755	R2-082000.zip
4/4/2008	4:30 PM	27201	R2-082003.zip
4/4/2008	4:30 PM	38203	R2-082004.zip
4/4/2008	4:30 PM	17319	R2-082005.zip
4/4/2008	4:30 PM	42976	R2-082007.zip
4/4/2008	4:30 PM	37142	R2-082008.zip
4/4/2008	4:30 PM	31360	R2-082011.zip
4/4/2008	4:31 PM	29079	R2-082012.zip
4/4/2008	4:31 PM	29808	R2-082013.zip
4/4/2008	4:31 PM	12450	R2-082014.zip
4/4/2008	4:31 PM	131111	R2-082015.zip
4/4/2008	4:31 PM	23098	R2-082016.zip
4/4/2008	4:31 PM	30321	R2-082017.zip
4/4/2008	4:31 PM	29368	R2-082018.zip
4/4/2008	4:31 PM	48895	R2-082019.zip
4/4/2008	4:31 PM	109683	R2-082020.zip
4/11/2008	7:57 AM	130694	R2-082021.zip
4/4/2008	4:31 PM	180130	R2-082022.zip
4/4/2008	4:31 PM	12949	R2-082024.zip
4/4/2008	4:31 PM	11485	R2-082025.zip
4/4/2008	4:31 PM	82639	R2-082026.zip
4/4/2008	4:31 PM	10167	R2-082027.zip
4/4/2008	4:32 PM	39129	R2-082028.zip
4/4/2008	4:32 PM	16465	R2-082029.zip
4/4/2008	4:32 PM	18413	R2-082030.zip
4/4/2008	4:32 PM	8160	R2-082031.zip
4/4/2008	4:32 PM	15103	R2-082032.zip
4/4/2008	4:32 PM	7556	R2-082033.zip
4/4/2008	4:32 PM	7533	R2-082034.zip
4/4/2008	4:32 PM	9692	R2-082035.zip
4/4/2008	4:32 PM	8974	R2-082036.zip
4/4/2008	4:32 PM	9400	R2-082037.zip
4/11/2008	7:53 AM	9535	R2-082038.zip
4/4/2008	4:32 PM	17752	R2-082039.zip
4/11/2008	7:56 AM	163487	R2-082040.zip
4/11/2008	7:09 PM	11327	R2-082041.zip
4/11/2008	7:13 PM	86299	R2-082042.zip
4/11/2008	7:23 PM	180692	R2-082043.zip
4/11/2008	7:25 PM	49684	R2-082044.zip

4/4/2008	4:32 PM	8600	R2-082045.zip
4/4/2008	4:32 PM	9362	R2-082046.zip
4/4/2008	4:32 PM	8481	R2-082047.zip
4/29/2008	9:26 AM	9058	R2-082048.zip
4/17/2008	2:14 PM	388148	R2-082049.zip
4/17/2008	2:14 PM	875788	R2-082050.zip

EXHIBIT 4

Agenda item: 5.1.1.10
Source: Philips, NXP Semiconductors
Title: Control of HARQ for RACH message 3
Document for: Discussion and Decision

1. Introduction

The current contention based RACH procedure is as shown in figure 1:

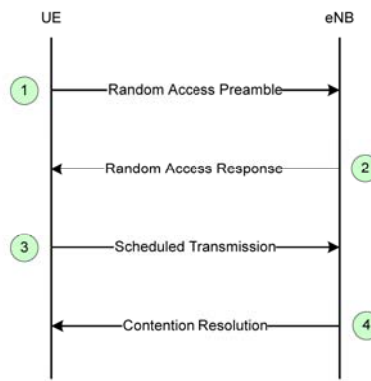


Figure 1 RACH Procedure

RACH message 1 comprises the transmission of a randomly selected signature ("preamble"). A "collision" is said to have occurred if more than one UE transmits the same preamble signature in the same time-frequency resource.

In case of a collision, all the colliding UEs interpret message 2 (which is transmitted by the eNB in response to a preamble and contains an identifier of the preamble, an UL resource grant for the transmission of message 3, and a Temporary C-RNTI) as being for them, and all transmit a message 3 (conveying at least a NAS UE Identifier) in the same UL resources.

The eNB will transmit "ACK" if it successfully decodes message 3, while if it fails to decode message 3 it will transmit "NACK" and the UE(s) will retransmit up to the configured maximum number of retransmissions.

2. HARQ for Message 3

If the eNB succeeds in decoding message 3, HARQ ACK is sent and any collision is resolved when message 4 is received.

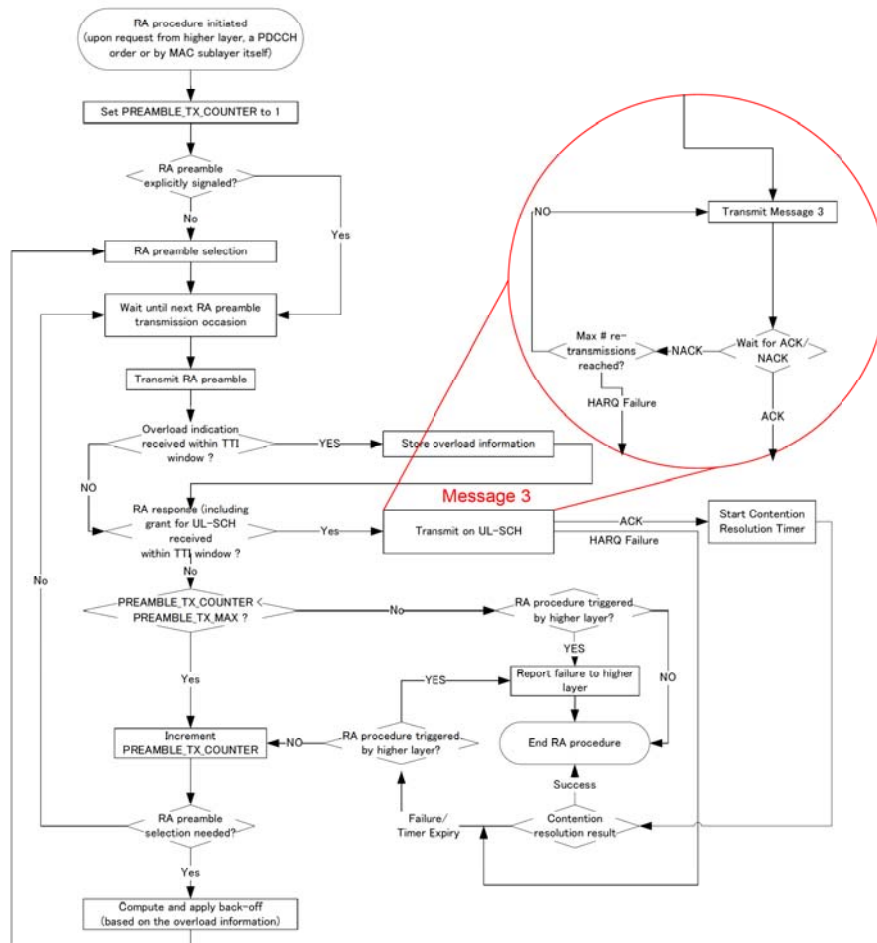


Figure 2 MAC Random Access Procedure

Figure 2 shows how the HARQ procedure for Message 3 is included in the random access procedure. In this diagram we assume the contention resolution timer is not started until after an ACK has been received for message 3. HARQ failure in message 3 leads to the same result as contention resolution timer expiry.

However, in practice if a collision occurs, the likelihood is that no number of retransmissions will succeed, as all the colliding UEs will retransmit at the same time. The maximum number of HARQ retransmissions of message 3 should therefore be tightly limited, as a high maximum number of retransmissions will simply increase the delay before the collided UEs can start again.

Moreover, if the transmit power is set appropriately after the last power-ramped preamble transmission, a large number of retransmissions should be unnecessary.

2.1 RRC_IDLE and Connection Re-establishment cases

UEs which are RRC_CONNECTED already have a valid C-RNTI for transmission in message 3.

For UEs which are repeatedly or regularly accessing the network, it is undesirable for them to have to start the RACH access procedure again from the beginning every time a collision occurs. Some delay can be avoided for these UEs by allowing a larger number of HARQ retransmissions for message 3 if the UE already has a C-RNTI. In this case the eNB could flush its message 3 reception buffer when it reaches the maximum number of retransmissions for UEs which do *not* have a C-RNTI, and then still receive the message 3 from the UE with a C-RNTI. This would mean that the Node B would in any case NACK the first retransmission, but UE's with only a temporary C-RNTI would not be allowed to retransmit, while UEs with a C-RNTI would retransmit again.

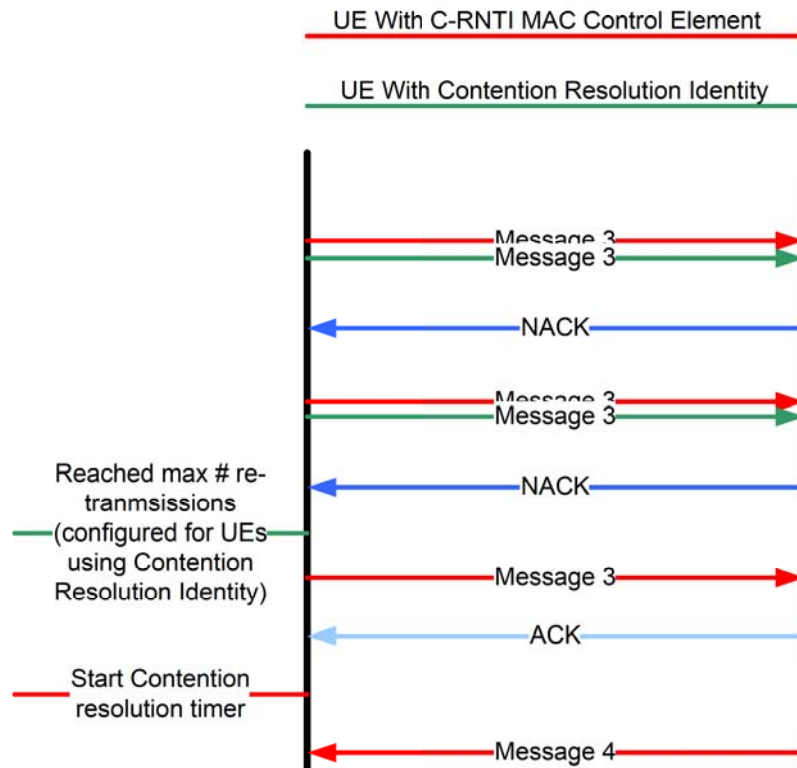


Figure 3 HARQ control for UEs with and without C-RNTI

Figure 3 shows a case of 2 collided UEs transmitting message 3, one including a C-RNTI MAC control element and one with RRC UE Contention resolution Identity. In this example, the eNB sends back NACK twice, then the maximum number of re-transmissions is reached for the UE using the Contention Resolution Identity (as it does not yet have a C-RNTI). The Message 3 from the UE using C-RNTI is then received successfully at the eNB and the eNB sends ACK to the UE. The UE then starts the contention resolution timer and, in this example, successfully receives message 4.

Although setting a different maximum number of retransmissions would not help in the case of a collision between two UEs both with C-RNTIs, it would effectively give priority to the UE with a C-RNTI in the case of a collision with a UE without a C-RNTI.

5. Conclusions

In this contribution, we have presented our views on HARQ control for message 3.

- the maximum number of HARQ retransmissions should be kept reasonably low, in order to limit the delay in case of a collision;
- it should configure a higher maximum number of message-3 HARQ retransmissions for UEs which already have a C-RNTI than for UEs which do not already have a C-RNTI.

6. References

[1] TS36.321 3GPP TS 36.321 V8.1.0 (2008-03) MAC Protocol Specification

7. Text Proposal for 36.321

5.4.2.2 HARQ process

Each HARQ process is associated with a HARQ buffer.

Each HARQ process shall maintain a state variable CURRENT_TX_NB, which indicates the number of transmissions that have taken place for the MAC PDU currently in the buffer. When the HARQ process is established, CURRENT_TX_NB shall be initialized to 0.

The UE is configured with a maximum number of transmissions that is identical across all HARQ Processes and all Logical Channels.

If the HARQ entity provides a new PDU, the HARQ process shall:

- set CURRENT_TX_NB to 0;
- set CURRENT_IRV to 0;
- store the MAC PDU in the associated HARQ buffer;
- generate a transmission as described below.

If the HARQ entity requests a re-transmission, the HARQ process shall:

- if there is a measurement gap at the time of the re-transmission:
 - increment CURRENT_TX_NB by 1;
 - else:
- if an uplink grant for this was received on [PDCCH]:
 - set CURRENT_IRV to the value indicated in the uplink grant;
 - generate a transmission as described below;
- if no uplink grant for this was received on [PDCCH]:
 - if a HARQ ACK was received for the last preceding transmission of the same data:
 - increment CURRENT_TX_NB by 1.
 - if no HARQ ACK was received for the last preceding transmission of the same data:
 - generate a transmission as described below.

To generate a transmission, the HARQ process shall:

- instruct the physical layer to generate a transmission with the redundancy version corresponding to the CURRENT_IRV value and the transmission timing;
- if CURRENT_IRV < [Y] [FFS]:
 - increment CURRENT_IRV by 1;
- increment CURRENT_TX_NB by 1;

The HARQ process shall:

- if CURRENT_TX_NB = maximum number of transmissions configured (where in the case of the uplink grant having been received in a Random Access Response, the maximum number of transmissions depends on whether the UE already has a C-RNTI):
 - flush the HARQ buffer;
 - if the transmission corresponds to a transmission of CCCH and no HARQ ACK is received for this process:
 - notify RRC that the transmission of the corresponding MAC SDU failed.

The HARQ process may:

- if CURRENT_TX_NB = maximum number of transmissions configured (where in the case of the uplink grant having been received in a Random Access Response, the maximum number of transmissions depends on whether the UE already has a C-RNTI) and no HARQ ACK is received for this process:
 - notify the relevant ARQ entities in the upper layer that the transmission of the corresponding RLC PDUs failed.

Editor's note: Demultiplexing of multiple positive or negative acknowledgements and the time of reception relative to the transmission of data in a HARQ process is handled by L1.

EXHIBIT 5

www.3gpp.org - /ftp/tsg_ran/WG2_RL2/TSGR2_62bis/docs/

[\[To Parent Directory\]](#)

6/14/2008 10:03 PM	21626	R2-083040.zip
7/2/2008 8:27 AM	556058	R2-083041.zip
7/2/2008 8:27 AM	145646	R2-083042.zip
6/14/2008 10:03 PM	10488	R2-083043.zip
6/14/2008 10:03 PM	23601	R2-083044.zip
6/14/2008 10:03 PM	10211	R2-083045.zip
6/14/2008 10:03 PM	26231	R2-083046.zip
6/14/2008 10:03 PM	11430	R2-083047.zip
6/14/2008 10:03 PM	68535	R2-083048.zip
6/14/2008 10:03 PM	68307	R2-083049.zip
6/14/2008 10:03 PM	11066	R2-083050.zip
6/14/2008 10:03 PM	74814	R2-083051.zip
6/14/2008 10:03 PM	12919	R2-083052.zip
6/14/2008 10:03 PM	1697419	R2-083053.zip
6/14/2008 10:03 PM	10472	R2-083054.zip
6/14/2008 10:03 PM	17189	R2-083055.zip
6/14/2008 10:03 PM	46362	R2-083056.zip
6/14/2008 10:03 PM	15911	R2-083057.zip
6/14/2008 10:03 PM	13894	R2-083058.zip
6/14/2008 10:03 PM	11236	R2-083059.zip
6/14/2008 10:03 PM	16075	R2-083060.zip
6/14/2008 10:03 PM	11957	R2-083061.zip
6/14/2008 10:03 PM	10645	R2-083062.zip
6/14/2008 10:03 PM	12481	R2-083063.zip
6/14/2008 10:03 PM	9553	R2-083064.zip
6/14/2008 10:03 PM	8653	R2-083065.zip
6/14/2008 10:03 PM	9738	R2-083066.ZIP
6/14/2008 10:03 PM	11539	R2-083067.zip
6/14/2008 10:03 PM	8438	R2-083068.ZIP
6/14/2008 10:04 PM	287458	R2-083069.zip
6/14/2008 10:04 PM	8320	R2-083070.zip
6/14/2008 10:04 PM	55818	R2-083071.ZIP
6/14/2008 10:04 PM	12016	R2-083072.zip
6/14/2008 10:04 PM	28164	R2-083073.zip
6/14/2008 10:04 PM	12945	R2-083074.zip
6/14/2008 10:04 PM	9551	R2-083075.zip
6/14/2008 10:04 PM	12546	R2-083076.zip
6/14/2008 10:04 PM	34377	R2-083077.zip
6/14/2008 10:04 PM	124714	R2-083078.ZIP
6/14/2008 10:04 PM	11757	R2-083079.ZIP
6/14/2008 10:04 PM	9337	R2-083080.zip
6/14/2008 10:04 PM	50771	R2-083081.zip
6/14/2008 10:04 PM	25055	R2-083082.zip
6/14/2008 10:04 PM	431251	R2-083083.zip
6/14/2008 10:04 PM	170192	R2-083084.zip
6/14/2008 10:04 PM	281191	R2-083085.zip
6/14/2008 10:04 PM	35110	R2-083086.zip
6/14/2008 10:04 PM	9943	R2-083087.zip
6/14/2008 10:04 PM	41877	R2-083088.zip
6/14/2008 10:04 PM	84179	R2-083089.zip
6/14/2008 10:04 PM	9519	R2-083090.zip
6/14/2008 10:05 PM	232796	R2-083091.zip
6/14/2008 10:05 PM	118196	R2-083092.zip
6/14/2008 10:05 PM	9240	R2-083093.zip
6/14/2008 10:05 PM	9774	R2-083094.zip

6/14/2008	10:05 PM	11835	R2-083095.zip
6/18/2008	2:18 PM	116104	R2-083100.zip
6/23/2008	1:08 PM	26324	R2-083101.zip
6/23/2008	1:10 PM	56374	R2-083102.zip
6/23/2008	1:12 PM	23831	R2-083103.zip
6/23/2008	1:16 PM	25465	R2-083104.zip
6/23/2008	1:19 PM	14272	R2-083105.zip
6/23/2008	1:20 PM	26264	R2-083106.zip
6/24/2008	1:21 AM	204699	R2-083107.zip
6/24/2008	1:22 AM	26798	R2-083108.zip
6/23/2008	1:26 PM	63740	R2-083109.zip
6/23/2008	1:29 PM	311953	R2-083110.zip
6/24/2008	1:27 AM	29529	R2-083111.zip
6/24/2008	1:28 AM	24017	R2-083112.zip
6/24/2008	7:12 AM	27740	R2-083113.zip
6/24/2008	7:13 AM	158495	R2-083114.zip
6/24/2008	7:14 AM	198883	R2-083115.zip
6/24/2008	7:14 AM	74239	R2-083116.zip
6/24/2008	7:15 AM	30799	R2-083117.zip
6/24/2008	7:15 AM	210247	R2-083118.zip
6/24/2008	7:16 AM	22206	R2-083119.zip
6/24/2008	7:16 AM	25389	R2-083120.zip
6/24/2008	7:17 AM	23100	R2-083121.zip
6/23/2008	2:01 PM	26144	R2-083122.zip
6/23/2008	2:03 PM	18189	R2-083123.zip
6/23/2008	5:46 PM	20991	R2-083124.zip
6/23/2008	7:10 PM	111334	R2-083125.zip
6/23/2008	9:58 PM	62034	R2-083126.zip
6/24/2008	7:38 AM	29807	R2-083127.zip
6/24/2008	7:11 AM	51082	R2-083128.zip
6/23/2008	7:53 PM	25562	R2-083129.zip
6/23/2008	7:10 PM	55258	R2-083130.zip
6/23/2008	7:10 PM	24737	R2-083131.zip
6/24/2008	12:46 AM	9512	R2-083132.zip
6/24/2008	7:40 AM	107133	R2-083133.zip
6/24/2008	8:16 AM	15095	R2-083135.zip
6/24/2008	8:17 AM	16390	R2-083136.zip
6/24/2008	7:46 AM	65083	R2-083137.zip
6/24/2008	7:42 AM	23116	R2-083138.zip
6/24/2008	8:20 AM	25669	R2-083139.zip
6/26/2008	6:42 AM	21430	R2-083140.zip
6/24/2008	7:54 AM	25330	R2-083141.zip
6/24/2008	5:48 AM	15879	R2-083142.zip
6/24/2008	5:48 AM	27602	R2-083143.zip
6/26/2008	9:40 AM	19070	R2-083144.zip
6/24/2008	7:29 AM	13374	R2-083145.zip
6/24/2008	7:29 AM	26420	R2-083146.zip
6/24/2008	8:17 AM	14026	R2-083147.zip
6/24/2008	7:55 AM	15528	R2-083148.zip
6/24/2008	7:25 AM	26158	R2-083149.zip
6/24/2008	7:24 AM	19296	R2-083150.zip
6/24/2008	7:24 AM	41915	R2-083151.zip
6/24/2008	7:25 AM	41692	R2-083152.zip
6/24/2008	7:25 AM	20718	R2-083153.zip
6/24/2008	7:58 AM	16717	R2-083154.zip
6/24/2008	7:59 AM	26246	R2-083155.zip
6/24/2008	7:29 AM	21003	R2-083156.zip
6/23/2008	7:41 PM	24555	R2-083157.zip
6/23/2008	7:15 PM	14323	R2-083158.zip
6/23/2008	7:16 PM	30386	R2-083159.zip
6/24/2008	6:48 AM	21726	R2-083160.zip
6/23/2008	9:46 PM	56553	R2-083161.zip
6/23/2008	9:47 PM	23146	R2-083162.zip
6/23/2008	9:47 PM	24681	R2-083163.zip
6/23/2008	9:47 PM	24850	R2-083164.zip

6/23/2008	3:44 PM	37903	R2-083165.zip
6/23/2008	3:46 PM	42861	R2-083166.zip
6/23/2008	3:48 PM	43049	R2-083167.zip
6/24/2008	8:48 AM	16683	R2-083168.zip
6/24/2008	12:47 AM	27122	R2-083169.zip
6/20/2008	6:06 PM	159943	R2-083170.zip
6/20/2008	6:07 PM	18073	R2-083171.zip
6/24/2008	5:43 AM	35024	R2-083172.zip
6/24/2008	5:43 AM	56644	R2-083173.zip
6/23/2008	9:45 PM	25239	R2-083174.zip
6/24/2008	7:45 AM	46162	R2-083175.zip
6/23/2008	7:26 PM	19751	R2-083176.zip
6/23/2008	7:26 PM	37386	R2-083177.zip
6/23/2008	7:27 PM	12244	R2-083178.zip
6/24/2008	7:26 AM	28008	R2-083179.zip
6/24/2008	7:11 AM	30283	R2-083180.zip
6/23/2008	9:48 PM	16294	R2-083181.zip
6/24/2008	7:45 AM	38519	R2-083183.zip
6/24/2008	6:48 AM	13062	R2-083184.zip
6/23/2008	7:48 PM	17705	R2-083185.zip
6/23/2008	9:49 PM	11669	R2-083186.zip
6/24/2008	6:48 AM	13710	R2-083187.zip
6/24/2008	6:49 AM	48214	R2-083188.zip
6/24/2008	7:47 AM	15727	R2-083189.zip
6/24/2008	7:47 AM	20075	R2-083190.zip
6/23/2008	8:56 AM	19522	R2-083191.zip
6/23/2008	8:57 AM	11046	R2-083192.zip
6/23/2008	9:19 AM	21701	R2-083193.zip
6/27/2008	4:25 PM	163426	R2-083194.zip
6/24/2008	5:30 AM	21808	R2-083195.zip
6/24/2008	5:31 AM	25178	R2-083196.zip
6/24/2008	6:12 AM	19821	R2-083197.zip
6/24/2008	6:12 AM	23996	R2-083198.zip
6/24/2008	6:13 AM	91681	R2-083199.zip
6/24/2008	6:14 AM	140614	R2-083200.zip
6/24/2008	6:14 AM	34666	R2-083201.zip
6/24/2008	1:29 AM	259139	R2-083202.zip
6/24/2008	7:57 AM	26898	R2-083203.zip
6/24/2008	7:58 AM	15431	R2-083204.zip
6/24/2008	6:15 AM	29765	R2-083205.zip
6/24/2008	4:24 AM	30054	R2-083206.zip
6/24/2008	4:26 AM	23924	R2-083207.zip
6/23/2008	8:06 PM	81007	R2-083208.zip
6/23/2008	8:08 PM	93387	R2-083209.zip
6/23/2008	8:08 PM	55187	R2-083210.zip
6/23/2008	8:08 PM	67138	R2-083211.zip
6/24/2008	6:40 AM	38254	R2-083212.zip
6/23/2008	8:17 PM	55918	R2-083213.zip
6/24/2008	6:40 AM	22516	R2-083214.zip
6/24/2008	6:41 AM	22456	R2-083216.zip
6/24/2008	6:45 AM	167134	R2-083217.zip
6/24/2008	6:45 AM	142222	R2-083218.zip
6/24/2008	6:42 AM	42503	R2-083219.zip
6/23/2008	7:28 PM	14098	R2-083220.zip
6/23/2008	7:29 PM	10489	R2-083221.zip
6/23/2008	7:30 PM	19888	R2-083222.zip
6/20/2008	9:56 AM	29324	R2-083223.zip
6/23/2008	8:11 PM	82920	R2-083224.zip
6/24/2008	5:45 AM	15349	R2-083225.zip
6/24/2008	5:47 AM	23413	R2-083226.zip
6/23/2008	8:13 PM	9860	R2-083227.zip
6/24/2008	5:40 AM	25335	R2-083228.zip
6/23/2008	8:13 PM	56454	R2-083229.zip
6/24/2008	1:14 AM	35621	R2-083230.zip
6/24/2008	1:15 AM	38504	R2-083231.zip

6/24/2008	1:16 AM	26784	R2-083232.zip
6/23/2008	3:57 PM	64932	R2-083233.zip
6/23/2008	3:58 PM	45190	R2-083234.zip
6/24/2008	1:17 AM	27957	R2-083236.zip
6/23/2008	3:59 PM	49126	R2-083237.zip
6/23/2008	4:01 PM	29906	R2-083238.zip
6/24/2008	7:52 AM	27101	R2-083240.zip
6/23/2008	5:18 PM	34889	R2-083241.zip
6/24/2008	7:55 AM	17412	R2-083242.zip
6/23/2008	7:15 PM	11281	R2-083243.zip
6/24/2008	8:51 AM	12638	R2-083244.zip
6/24/2008	8:54 AM	11966	R2-083245.zip
6/23/2008	5:08 PM	31701	R2-083246.zip
6/23/2008	5:12 PM	31600	R2-083247.zip
6/23/2008	5:19 PM	20079	R2-083249.zip
6/23/2008	5:24 PM	14170	R2-083250.zip
6/23/2008	7:17 PM	30866	R2-083251.zip
6/24/2008	3:49 AM	15605	R2-083252.zip
6/23/2008	9:57 PM	52178	R2-083253.zip
6/23/2008	10:06 PM	63099	R2-083255.zip
6/24/2008	1:14 AM	9038	R2-083256.zip
6/24/2008	1:15 AM	10821	R2-083257.zip
6/24/2008	1:16 AM	69238	R2-083258.zip
6/24/2008	1:47 AM	23719	R2-083259.zip
6/24/2008	1:47 AM	13288	R2-083260.zip
6/24/2008	1:48 AM	15903	R2-083261.zip
6/24/2008	1:48 AM	16490	R2-083262.zip
6/24/2008	2:32 AM	17015	R2-083263.zip
6/24/2008	2:32 AM	109535	R2-083264.zip
6/24/2008	2:32 AM	22917	R2-083265.zip
6/24/2008	2:32 AM	10673	R2-083266.zip
6/24/2008	2:33 AM	37643	R2-083267.zip
6/24/2008	2:33 AM	76050	R2-083268.zip
6/23/2008	10:48 PM	20867	R2-083269.zip
6/24/2008	3:33 AM	317178	R2-083270.zip
6/24/2008	3:33 AM	53073	R2-083271.zip
6/24/2008	3:35 AM	118851	R2-083272.zip
6/24/2008	3:35 AM	27716	R2-083273.zip
6/24/2008	3:35 AM	28539	R2-083274.zip
6/24/2008	3:36 AM	26498	R2-083275.zip
6/24/2008	3:37 AM	31743	R2-083276.zip
6/25/2008	3:17 AM	451913	R2-083277.zip
6/24/2008	3:38 AM	292564	R2-083278.zip
6/24/2008	3:39 AM	33082	R2-083279.zip
6/24/2008	3:40 AM	33724	R2-083280.zip
6/24/2008	3:43 AM	25718	R2-083281.zip
6/24/2008	3:42 AM	26071	R2-083282.zip
6/24/2008	4:16 AM	59501	R2-083283.zip
6/24/2008	4:17 AM	63674	R2-083284.zip
6/24/2008	6:46 AM	37711	R2-083285.zip
6/24/2008	4:18 AM	56780	R2-083286.zip
6/24/2008	4:19 AM	153676	R2-083287.zip
6/24/2008	4:19 AM	31533	R2-083288.zip
6/24/2008	4:20 AM	22425	R2-083289.zip
6/24/2008	4:21 AM	17391	R2-083290.zip
6/24/2008	4:21 AM	21532	R2-083291.zip
6/24/2008	3:45 AM	28596	R2-083292.zip
6/24/2008	3:45 AM	25593	R2-083293.zip
6/24/2008	3:47 AM	78498	R2-083294.zip
6/23/2008	10:11 AM	21107	R2-083295.zip
6/23/2008	7:50 AM	20673	R2-083297.zip
6/23/2008	8:12 PM	18253	R2-083298.zip
6/24/2008	7:36 AM	25497	R2-083299.zip
6/24/2008	7:39 AM	30462	R2-083300.zip
6/24/2008	7:41 AM	75729	R2-083301.zip

6/23/2008	11:41 AM	27450	R2-083302.zip
6/24/2008	7:24 AM	27641	R2-083303.zip
6/24/2008	6:13 AM	19786	R2-083304.zip
6/24/2008	7:52 AM	19665	R2-083305.zip
6/24/2008	7:47 AM	25441	R2-083306.zip
6/24/2008	4:47 AM	43978	R2-083307.zip
6/24/2008	6:12 AM	81661	R2-083308.zip
6/24/2008	6:15 AM	14261	R2-083309.zip
6/24/2008	4:48 AM	14503	R2-083310.zip
6/24/2008	7:20 AM	59541	R2-083311.zip
6/24/2008	4:50 AM	21008	R2-083312.zip
6/24/2008	4:51 AM	12848	R2-083313.zip
6/24/2008	4:52 AM	30838	R2-083314.zip
6/24/2008	8:26 AM	105518	R2-083316.zip
6/24/2008	6:19 AM	22683	R2-083317.zip
6/24/2008	5:06 AM	11785	R2-083318.zip
6/24/2008	4:53 AM	11785	R2-083319.zip
6/24/2008	7:31 AM	28483	R2-083320.zip
6/24/2008	7:32 AM	27245	R2-083321.zip
6/24/2008	7:58 AM	22221	R2-083322.zip
6/24/2008	12:48 AM	8780	R2-083323.zip
6/24/2008	3:11 AM	17546	R2-083324.zip
6/23/2008	11:56 AM	37910	R2-083326.zip
6/24/2008	7:36 PM	114739	R2-083327.zip
6/23/2008	4:45 PM	13112	R2-083328.zip
6/23/2008	4:53 PM	211536	R2-083329.zip
6/24/2008	1:54 AM	19330	R2-083330.zip
6/24/2008	1:55 AM	13603	R2-083331.zip
6/24/2008	1:56 AM	32499	R2-083332.zip
6/24/2008	1:56 AM	27425	R2-083333.zip
6/24/2008	1:57 AM	16840	R2-083334.zip
6/24/2008	1:58 AM	10381	R2-083335.zip
6/24/2008	1:58 AM	15707	R2-083336.zip
6/24/2008	1:59 AM	17783	R2-083337.zip
6/24/2008	1:59 AM	80822	R2-083338.zip
6/23/2008	7:14 PM	18953	R2-083339.zip
6/23/2008	7:15 PM	59010	R2-083340.zip
6/23/2008	7:18 PM	22450	R2-083341.zip
6/24/2008	8:16 AM	29854	R2-083342.zip
6/24/2008	7:07 AM	130551	R2-083343.zip
6/23/2008	7:25 PM	821883	R2-083344.zip
6/23/2008	7:23 PM	379280	R2-083345.zip
6/23/2008	7:21 PM	216266	R2-083346.zip
6/23/2008	7:19 PM	39080	R2-083347.zip
6/24/2008	7:54 AM	15894	R2-083348.zip
6/24/2008	7:55 AM	15336	R2-083349.zip
6/24/2008	7:57 AM	59509	R2-083350.zip
6/24/2008	8:00 AM	45042	R2-083351.zip
6/24/2008	8:01 AM	24420	R2-083352.zip
6/23/2008	8:01 PM	21049	R2-083353.zip
6/24/2008	7:26 AM	19423	R2-083354.zip
6/24/2008	7:27 AM	28242	R2-083355.zip
6/24/2008	7:27 AM	21233	R2-083357.zip
6/24/2008	1:19 AM	38054	R2-083359.zip
6/24/2008	2:21 AM	12042	R2-083360.zip
6/24/2008	10:10 AM	11224	R2-083361.zip
6/24/2008	10:17 AM	205761	R2-083362.zip
6/24/2008	2:23 AM	18536	R2-083363.zip
6/24/2008	2:24 AM	12619	R2-083364.zip
6/24/2008	1:30 AM	30056	R2-083365.zip
6/24/2008	6:16 AM	31122	R2-083366.zip
6/24/2008	6:17 AM	31740	R2-083367.zip
6/23/2008	1:33 PM	120794	R2-083368.zip
6/24/2008	3:50 AM	120793	R2-083369.zip
6/24/2008	3:49 AM	103306	R2-083370.zip

6/24/2008	2:29 AM	18560	R2-083371.zip
6/24/2008	2:31 AM	18562	R2-083372.zip
6/24/2008	2:32 AM	30877	R2-083373.zip
6/24/2008	2:34 AM	18860	R2-083374.zip
6/24/2008	8:11 AM	81022	R2-083375.zip
6/24/2008	8:13 AM	90338	R2-083376.zip
6/24/2008	8:14 AM	45366	R2-083377.zip
6/24/2008	8:14 AM	20001	R2-083378.zip
6/24/2008	10:53 AM	26350	R2-083379.zip
6/24/2008	8:15 AM	20942	R2-083380.zip
6/24/2008	8:16 AM	22979	R2-083381.zip
6/24/2008	5:10 AM	11111	R2-083382.zip
6/24/2008	5:11 AM	7956	R2-083383.zip
6/24/2008	6:49 AM	26176	R2-083384.zip
6/24/2008	6:49 AM	36987	R2-083385.zip
6/24/2008	6:42 AM	31466	R2-083386.zip
6/24/2008	6:42 AM	38721	R2-083387.zip
6/24/2008	6:19 AM	60257	R2-083388.zip
6/23/2008	6:38 PM	28103	R2-083389.zip
6/24/2008	6:22 AM	216810	R2-083390.zip
6/24/2008	6:16 AM	22760	R2-083391.zip
6/24/2008	6:15 AM	28366	R2-083392.zip
6/24/2008	6:51 AM	26194	R2-083393.zip
6/24/2008	7:12 AM	54153	R2-083394.zip
6/24/2008	6:06 AM	498574	R2-083395.zip
6/24/2008	6:50 AM	43484	R2-083398.zip
6/24/2008	6:26 AM	46075	R2-083399.zip
6/23/2008	9:58 PM	23947	R2-083400.zip
6/23/2008	9:58 PM	17932	R2-083401.zip
6/23/2008	9:58 PM	19629	R2-083402.zip
6/27/2008	5:26 PM	27358	R2-083403.zip
6/23/2008	3:27 PM	416087	R2-083404.zip
6/24/2008	6:40 AM	24842	R2-083405.zip
6/23/2008	3:28 PM	14730	R2-083406.zip
7/2/2008	8:27 AM	31128	R2-083407.zip
6/23/2008	3:29 PM	23914	R2-083408.zip
6/24/2008	6:40 AM	14099	R2-083409.zip
6/24/2008	1:30 AM	330359	R2-083410.zip
6/23/2008	3:29 PM	23609	R2-083411.zip
6/24/2008	1:32 AM	33100	R2-083412.zip
6/24/2008	6:56 AM	96783	R2-083413.zip
6/24/2008	1:32 AM	60457	R2-083414.zip
6/24/2008	6:57 AM	242208	R2-083415.zip
6/23/2008	3:31 PM	38279	R2-083416.zip
6/27/2008	5:27 PM	25237	R2-083417.zip
6/24/2008	9:41 AM	75404	R2-083418.zip
6/24/2008	8:03 AM	14255	R2-083419.zip
6/24/2008	8:02 AM	17420	R2-083420.zip
6/24/2008	6:27 AM	29627	R2-083421.zip
6/24/2008	6:29 AM	113630	R2-083422.zip
6/23/2008	3:34 PM	53544	R2-083423.zip
6/24/2008	1:33 AM	25232	R2-083424.zip
6/24/2008	8:03 AM	10918	R2-083425.zip
6/24/2008	7:55 AM	34972	R2-083426.zip
6/24/2008	3:08 AM	72854	R2-083427.zip
6/24/2008	7:57 AM	343845	R2-083428.zip
6/24/2008	7:12 AM	667410	R2-083430.zip
6/24/2008	7:59 AM	37083	R2-083431.zip
6/24/2008	12:55 AM	18129	R2-083432.zip
6/24/2008	12:56 AM	39606	R2-083433.zip
6/24/2008	12:56 AM	24870	R2-083434.zip
6/23/2008	3:35 PM	84504	R2-083435.zip
6/24/2008	3:09 AM	45322	R2-083436.zip
6/24/2008	12:56 AM	40536	R2-083437.zip
6/24/2008	7:01 AM	49895	R2-083438.zip

6/24/2008	3:10 AM	28593	R2-083439.zip
6/24/2008	7:49 AM	65874	R2-083441.zip
6/24/2008	3:11 AM	28421	R2-083442.zip
6/24/2008	1:39 PM	45592	R2-083443.zip
6/23/2008	9:57 AM	45087	R2-083444.zip
6/24/2008	8:05 AM	10771	R2-083445.zip
6/24/2008	7:51 AM	37349	R2-083446.zip
6/24/2008	3:12 AM	38704	R2-083447.zip
6/23/2008	4:11 PM	14394	R2-083448.zip
6/24/2008	3:12 AM	103781	R2-083449.zip
6/24/2008	7:37 AM	64238	R2-083450.zip
6/24/2008	7:04 AM	56989	R2-083451.zip
6/24/2008	3:15 AM	27409	R2-083452.zip
6/24/2008	8:14 AM	30568	R2-083453.zip
6/24/2008	6:48 AM	124307	R2-083454.zip
6/24/2008	7:52 AM	16388	R2-083455.zip
6/24/2008	7:53 AM	26368	R2-083457.zip
6/23/2008	3:36 PM	52724	R2-083459.zip
6/24/2008	7:54 AM	24897	R2-083460.zip
6/24/2008	7:57 AM	212913	R2-083461.zip
6/24/2008	6:42 AM	10677	R2-083462.zip
6/24/2008	8:01 AM	162025	R2-083463.zip
6/25/2008	9:58 AM	23613	R2-083464.zip
6/24/2008	6:25 AM	16816	R2-083466.zip
6/23/2008	11:20 PM	29554	R2-083467.zip
6/26/2008	5:49 AM	20588	R2-083468.zip
6/24/2008	6:48 AM	246405	R2-083469.zip
6/24/2008	6:43 AM	24830	R2-083470.zip
6/24/2008	6:08 AM	19372	R2-083471.zip
6/23/2008	11:23 PM	139470	R2-083472.zip
6/24/2008	4:33 AM	28939	R2-083473.zip
6/24/2008	6:27 AM	23262	R2-083474.zip
6/24/2008	4:36 AM	29660	R2-083475.zip
6/24/2008	6:09 AM	52824	R2-083476.zip
6/23/2008	11:29 PM	32314	R2-083477.zip
6/24/2008	6:11 AM	16921	R2-083478.zip
6/24/2008	6:52 AM	134082	R2-083479.zip
6/24/2008	6:13 AM	13873	R2-083480.zip
6/24/2008	6:00 AM	18368	R2-083481.zip
6/24/2008	7:18 AM	17029	R2-083483.zip
6/24/2008	7:58 AM	16417	R2-083484.zip
6/24/2008	11:03 AM	57256	R2-083486.zip
6/24/2008	1:33 AM	23839	R2-083487.zip
6/24/2008	11:05 AM	14686	R2-083488.zip
6/24/2008	5:07 AM	20969	R2-083489.zip
6/24/2008	5:12 AM	23170	R2-083490.zip
6/24/2008	5:20 AM	25915	R2-083491.zip
6/24/2008	11:08 AM	31305	R2-083492.zip
6/24/2008	8:01 AM	17228	R2-083493.zip
6/24/2008	5:22 AM	24046	R2-083494.zip
6/24/2008	11:09 AM	12822	R2-083495.zip
6/25/2008	11:39 AM	27811	R2-083496.zip
6/23/2008	5:28 PM	9210	R2-083497.zip
6/24/2008	3:24 AM	105865	R2-083498.zip
6/24/2008	3:25 AM	27495	R2-083499.zip
6/24/2008	6:54 AM	134193	R2-083500.zip
6/24/2008	6:54 AM	71126	R2-083501.zip
6/24/2008	3:25 AM	17371	R2-083502.zip
6/24/2008	3:25 AM	41227	R2-083503.zip
6/24/2008	3:25 AM	30223	R2-083504.zip
6/24/2008	3:26 AM	145246	R2-083505.zip
6/24/2008	8:16 AM	36677	R2-083506.zip
6/24/2008	6:43 AM	21840	R2-083508.zip
6/24/2008	9:01 AM	26584	R2-083509.zip
6/23/2008	9:44 PM	11992	R2-083511.zip

6/23/2008	9:50 AM	17728	R2-083512.zip
6/24/2008	6:15 AM	48913	R2-083513.zip
6/24/2008	7:55 AM	20361	R2-083514.zip
6/24/2008	7:56 AM	30026	R2-083515.zip
6/24/2008	7:57 AM	16521	R2-083516.zip
6/24/2008	7:58 AM	74625	R2-083517.zip
6/24/2008	7:59 AM	216130	R2-083518.zip
6/24/2008	8:00 AM	20881	R2-083519.zip
6/24/2008	8:10 AM	50824	R2-083520.zip
6/24/2008	8:02 AM	116872	R2-083521.zip
6/24/2008	8:03 AM	70691	R2-083523.zip
6/24/2008	8:08 AM	135906	R2-083524.zip
6/24/2008	8:09 AM	16010	R2-083525.zip
6/24/2008	8:13 AM	23559	R2-083526.zip
6/24/2008	8:05 AM	22798	R2-083527.zip
7/25/2008	10:49 AM	65696	R2-083528.zip
6/24/2008	8:06 AM	22005	R2-083529.zip
6/24/2008	8:07 AM	27346	R2-083530.zip
6/24/2008	8:12 AM	65841	R2-083531.zip
6/23/2008	8:48 PM	177750	R2-083532.zip
6/24/2008	11:41 AM	29318	R2-083533.zip
6/24/2008	11:41 AM	27508	R2-083534.zip
6/24/2008	11:41 AM	31823	R2-083535.zip
6/24/2008	11:41 AM	180589	R2-083536.zip
6/24/2008	11:41 AM	24507	R2-083537.zip
6/24/2008	11:41 AM	44476	R2-083538.zip
6/24/2008	11:41 AM	35229	R2-083539.zip
6/24/2008	11:41 AM	27307	R2-083540.zip
6/24/2008	11:41 AM	43283	R2-083541.zip
6/24/2008	11:41 AM	67198	R2-083542.zip
6/24/2008	11:41 AM	15027	R2-083543.zip
6/24/2008	11:41 AM	61217	R2-083544.zip
6/24/2008	11:41 AM	15308	R2-083545.zip
6/24/2008	11:41 AM	31259	R2-083546.zip
6/24/2008	11:41 AM	30164	R2-083547.zip
6/24/2008	11:41 AM	21338	R2-083548.zip
6/24/2008	11:41 AM	43502	R2-083549.zip
6/24/2008	11:41 AM	22292	R2-083550.zip
6/24/2008	11:41 AM	51001	R2-083551.zip
7/4/2008	7:47 AM	28374	R2-083552.zip
6/24/2008	11:41 AM	45062	R2-083553.zip
6/24/2008	11:41 AM	31683	R2-083554.zip
6/24/2008	11:41 AM	24726	R2-083555.zip
6/24/2008	11:41 AM	316871	R2-083556.zip
6/24/2008	11:55 AM	18551	R2-083558.zip
6/24/2008	11:55 AM	16649	R2-083559.zip
6/24/2008	11:55 AM	284158	R2-083560.zip
6/24/2008	11:55 AM	15388	R2-083561.zip
6/24/2008	11:55 AM	81655	R2-083562.zip
6/24/2008	11:55 AM	25738	R2-083566.zip
6/24/2008	11:55 AM	17769	R2-083567.zip
6/24/2008	11:52 AM	25333	R2-083568.zip
6/24/2008	11:52 AM	17730	R2-083569.zip
6/24/2008	11:52 AM	90214	R2-083570.zip
6/24/2008	11:52 AM	60149	R2-083571.zip
6/24/2008	11:52 AM	99914	R2-083572.zip
6/24/2008	11:52 AM	67514	R2-083573.zip
6/24/2008	11:53 AM	14776	R2-083574.zip
6/24/2008	2:27 PM	22427	R2-083575.zip
6/24/2008	2:27 PM	38689	R2-083576.zip
6/24/2008	2:27 PM	49499	R2-083577.zip
6/24/2008	2:27 PM	138979	R2-083578.zip
6/24/2008	2:27 PM	39278	R2-083579.zip
6/24/2008	2:27 PM	27898	R2-083580.zip
6/24/2008	2:27 PM	54198	R2-083581.zip

6/24/2008	7:36 PM	21338	R2-083582.zip
6/24/2008	7:36 PM	7885	R2-083583.zip
6/24/2008	2:56 PM	37478	R2-083584.zip
6/27/2008	8:48 AM	45153	R2-083585.zip
6/27/2008	8:48 AM	18590	R2-083586.zip
6/27/2008	8:48 AM	16973	R2-083587.zip
7/2/2008	8:27 AM	123613	R2-083588.zip
6/27/2008	8:48 AM	16057	R2-083589.zip
6/27/2008	12:11 PM	73202	R2-083590.zip
6/27/2008	12:11 PM	66929	R2-083591.zip
6/27/2008	8:48 AM	452029	R2-083592.zip
6/27/2008	8:48 AM	19877	R2-083593.zip
6/27/2008	4:25 PM	22498	R2-083594.zip
6/27/2008	4:25 PM	51129	R2-083595.zip
6/27/2008	1:04 PM	30883	R2-083596.zip
6/27/2008	4:25 PM	45364	R2-083597.zip
6/27/2008	4:25 PM	196753	R2-083598.zip
6/27/2008	4:25 PM	13402	R2-083599.zip
6/27/2008	4:25 PM	12693	R2-083600.zip
7/4/2008	4:38 PM	11281	R2-083601.zip
7/4/2008	7:47 AM	8881	R2-083602.zip
7/4/2008	4:38 PM	13475	R2-083603.zip
7/4/2008	7:47 AM	8713	R2-083606.zip
7/4/2008	4:38 PM	10075	R2-083607.zip
7/2/2008	8:27 AM	223118	R2-083609.zip
7/2/2008	8:27 AM	17284	R2-083610.zip
7/2/2008	8:27 AM	24575	R2-083611.zip
7/2/2008	8:27 AM	27383	R2-083612.zip
7/2/2008	8:27 AM	37673	R2-083614.zip
7/2/2008	8:27 AM	21929	R2-083617.zip
7/4/2008	7:47 AM	30977	R2-083618.zip
7/2/2008	8:27 AM	22556	R2-083619.zip
7/2/2008	8:27 AM	39134	R2-083620.zip
7/2/2008	8:27 AM	48881	R2-083621.zip
7/2/2008	8:27 AM	41930	R2-083622.zip
7/4/2008	7:47 AM	9103	R2-083623.zip
7/4/2008	7:47 AM	23386	R2-083624.zip
7/4/2008	7:47 AM	22534	R2-083625.zip
7/4/2008	7:47 AM	35294	R2-083626.zip
7/4/2008	7:47 AM	25094	R2-083627.zip
7/4/2008	7:47 AM	52048	R2-083628.zip
7/4/2008	7:47 AM	14061	R2-083629.zip
7/4/2008	7:48 AM	9390	R2-083630.zip
7/4/2008	7:48 AM	9325	R2-083632.zip
7/4/2008	7:48 AM	23200	R2-083633.zip
7/4/2008	7:48 AM	23960	R2-083634.zip
7/4/2008	4:38 PM	6016	R2-083661.zip
7/4/2008	4:38 PM	9922	R2-083662.zip
7/4/2008	7:48 AM	7213	R2-083663.zip
7/2/2008	8:27 AM	10770	R2-083664.zip
7/2/2008	8:27 AM	60109	R2-083666 .zip
7/4/2008	4:38 PM	6505	R2-083667.zip
7/4/2008	7:48 AM	49389	R2-083668.zip
7/2/2008	8:27 AM	8223	R2-083669.zip
7/2/2008	8:27 AM	8388	R2-083670.zip
7/2/2008	8:27 AM	21691	R2-083671.zip
7/2/2008	8:27 AM	10151	R2-083672.zip
7/2/2008	8:27 AM	12639	R2-083673.zip
7/2/2008	8:27 AM	20414	R2-083674.zip
7/2/2008	8:27 AM	9247	R2-083675.zip
7/2/2008	8:27 AM	47807	R2-083676.zip
7/2/2008	8:27 AM	11584	R2-083677.zip
7/2/2008	8:27 AM	11801	R2-083678.zip
7/2/2008	8:27 AM	11783	R2-083679.zip
7/2/2008	8:27 AM	10468	R2-083680.zip

7/2/2008	8:27 AM	12554	R2-083681.zip
7/2/2008	8:27 AM	32272	R2-083682.zip
7/2/2008	8:27 AM	17252	R2-083683.zip
7/2/2008	8:28 AM	11289	R2-083684.zip
7/2/2008	8:28 AM	43365	R2-083685.zip
7/2/2008	8:28 AM	14526	R2-083687.zip
7/2/2008	8:28 AM	21580	R2-083688.zip
7/4/2008	4:38 PM	19012	R2-083689.zip
7/4/2008	4:38 PM	22326	R2-083690.zip
7/4/2008	7:48 AM	17079	R2-083691.zip
7/4/2008	4:38 PM	7112	R2-083692.zip
7/4/2008	7:48 AM	95052	R2-083693.zip
7/4/2008	4:38 PM	18618	R2-083694.zip
7/4/2008	7:48 AM	19488	R2-083696.zip
7/4/2008	7:48 AM	30050	R2-083697.zip
7/2/2008	8:28 AM	9807	R2-083698.zip
7/4/2008	7:48 AM	19078	R2-083699.zip
7/4/2008	7:48 AM	15947	R2-083700.zip
7/4/2008	7:48 AM	48356	R2-083701.zip
7/4/2008	7:48 AM	19123	R2-083702.zip
7/4/2008	7:48 AM	29647	R2-083703.zip
7/4/2008	7:48 AM	27139	R2-083704.zip
7/4/2008	7:48 AM	18013	R2-083705.zip
7/4/2008	7:48 AM	18140	R2-083706.zip
7/4/2008	7:48 AM	57032	R2-083707.zip
7/4/2008	7:48 AM	26233	R2-083708.zip
7/4/2008	7:48 AM	49872	R2-083709.zip
7/4/2008	7:48 AM	73783	R2-083710.zip
7/4/2008	4:38 PM	10564	R2-083711.zip
7/4/2008	7:48 AM	87188	R2-083712.zip
7/4/2008	4:38 PM	31988	R2-083713.zip
7/4/2008	7:48 AM	25708	R2-083715.zip
7/4/2008	7:48 AM	27794	R2-083716.zip
7/4/2008	7:48 AM	29559	R2-083717.zip
7/4/2008	7:48 AM	20852	R2-083718.zip
7/4/2008	7:48 AM	23471	R2-083719.zip
7/4/2008	4:38 PM	52665	R2-083720.zip
7/4/2008	4:38 PM	27998	R2-083721.zip
7/4/2008	7:48 AM	25582	R2-083722.zip
7/4/2008	4:38 PM	29863	R2-083723.zip
7/4/2008	7:48 AM	27154	R2-083724.zip
7/4/2008	4:38 PM	19245	R2-083725.zip
7/4/2008	7:48 AM	50047	R2-083726.zip
7/4/2008	4:38 PM	47298	R2-083727.zip
7/2/2008	8:28 AM	73381	R2-083731.zip
7/2/2008	8:28 AM	9005	R2-083732.zip
7/2/2008	8:28 AM	9855	R2-083733.zip
7/4/2008	7:48 AM	167249	R2-083734.zip
7/4/2008	7:48 AM	20256	R2-083735.zip
7/4/2008	7:48 AM	19737	R2-083736.zip
7/4/2008	7:48 AM	13273	R2-083737.zip
7/4/2008	7:48 AM	376559	R2-083738.zip
7/4/2008	7:48 AM	71698	R2-083739.zip
7/4/2008	7:48 AM	31476	R2-083740.zip
7/4/2008	7:48 AM	26500	R2-083741.zip
7/4/2008	7:48 AM	29619	R2-083742.zip
7/4/2008	7:48 AM	14163	R2-083743.zip
7/4/2008	7:48 AM	31076	R2-083744.zip
7/4/2008	7:48 AM	27421	R2-083745.zip
7/4/2008	4:38 PM	31331	R2-083746.zip
7/4/2008	7:48 AM	23326	R2-083747.zip
7/4/2008	7:48 AM	582535	R2-083748.zip
7/4/2008	7:48 AM	16800	R2-083749.zip
7/4/2008	7:48 AM	25807	R2-083750.zip
7/4/2008	7:48 AM	33278	R2-083751.zip

7/4/2008	7:48 AM	29540	R2-083752.zip
7/4/2008	7:48 AM	43411	R2-083753.zip
7/4/2008	7:48 AM	45063	R2-083754.zip
7/4/2008	7:48 AM	18220	R2-083755.zip
7/4/2008	7:48 AM	8452	R2-083756.zip
7/4/2008	4:38 PM	102340	R2-083757.zip
7/4/2008	4:38 PM	28723	R2-083758.zip
7/4/2008	7:48 AM	8527	R2-083759.zip
7/4/2008	4:38 PM	159496	R2-083760.zip
7/4/2008	4:38 PM	21223	R2-083761.zip
7/4/2008	4:38 PM	33774	R2-083762.zip
7/4/2008	7:48 AM	14073	R2-083763.zip
7/4/2008	4:38 PM	166085	R2-083764.zip
7/4/2008	4:38 PM	36278	R2-083765.zip
7/4/2008	7:48 AM	88308	R2-083766.zip
7/8/2008	6:46 PM	564534	R2-083767.zip
7/8/2008	6:46 PM	145735	R2-083768.zip
7/4/2008	4:38 PM	12993	R2-083769.zip
8/12/2008	12:47 PM	36425	R2-083770.zip
7/4/2008	4:38 PM	159822	R2-083771.zip
7/4/2008	4:38 PM	33917	R2-083772.zip
7/4/2008	4:38 PM	25742	R2-083773.zip
7/4/2008	4:38 PM	21257	R2-083774.zip
7/4/2008	4:38 PM	38595	R2-083775.zip
7/4/2008	4:38 PM	8810	R2-083776.zip
7/4/2008	4:38 PM	13468	R2-083777.zip
7/4/2008	4:38 PM	8711	R2-083778.zip
7/4/2008	4:38 PM	10645	R2-083779.zip
7/4/2008	4:38 PM	31161	R2-083780.zip
7/4/2008	4:38 PM	5851	R2-083781.zip
7/4/2008	4:38 PM	13023	R2-083782.zip
7/4/2008	4:38 PM	30806	R2-083783.zip
7/4/2008	4:38 PM	6215	R2-083784.zip
7/4/2008	4:38 PM	6930	R2-083785.zip
7/4/2008	4:38 PM	11263	R2-083786.zip
7/4/2008	4:38 PM	6320	R2-083787.zip
7/4/2008	4:38 PM	10297	R2-083788.zip
7/4/2008	4:38 PM	7538	R2-083789.zip
7/4/2008	4:38 PM	30507	R2-083790.zip
7/4/2008	4:38 PM	10328	R2-083791.zip
7/8/2008	5:48 PM	14448	R2-083792.zip
7/8/2008	5:48 PM	8508	R2-083793.zip
8/11/2008	8:10 AM	44411	R2-083794.zip
7/15/2008	9:02 AM	499654	R2-083795.zip
5/31/2016	9:37 PM	135424	TDoc List Meeting RAN2#62-BIS.xlsx

EXHIBIT 6

CHANGE REQUEST

36.321 CR CRNum rev - Current version: 8.2.0

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 Radio Access Network Core Network

Title:	Clarification of DL- and UL-SCH Data Transfer		
Source to WG:	Ericsson		
Source to TSG:	R2		
Work item code:	LTE-L23	Date:	23/06/08
Category:	F	Release:	Rel-8
	Use <u>one</u> 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 <u>one</u> of the following releases: R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6) Rel-7 (Release 7) Rel-8 (Release 8) Rel-9 (Release 9)

Reason for change:	1) Definition of HARQ information is missing. 2) The UE does not send the intended empty BSR if given an uplink grant when there is no data available for transmission. 3) Non-pseudo code descriptions pertaining to HARQ operation are unclear. 4) HARQ timing, which is specified in L1 should not be indicated by L2.
Summary of change:	1) Clarification of interface towards physical layer (e.g. which information is provided by L1 to MAC (HARQ information) and where it is stored.) 2) Mandate the UE to initiate a new transmission whenever it has a valid uplink grant even if it has no data to transmit. In such cases the MAC PDU shall contain only a BSR and padding. 3) Updated introduction text of several sub-clauses. 4) Removed need to signal timing information from UL HARQ process to L1 as physical layer is assumed to handle timing issues.
Consequences if not approved:	Increased probability of erroneous UE implementations. Unclear interface to L1.

Clauses affected:	3.1, 5.3, and 5.4						
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Y</td> <td style="padding: 2px;">N</td> </tr> <tr> <td style="padding: 2px;"><input type="checkbox"/></td> <td style="padding: 2px;"><input checked="" type="checkbox"/></td> </tr> </table>	Y	N	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Other core specifications	
	Y	N					
	<input type="checkbox"/>	<input checked="" type="checkbox"/>					
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Test specifications					
<input type="checkbox"/>	<input checked="" type="checkbox"/>	O&M Specifications					
Other comments:							

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].

Active Time: time during which the UE monitors the PDCCH for a PDCCH-subframe. Section 5.7 defines the conditions for which a subframe is included as part of Active Time.

Contention Resolution Timer: Specifies the number of consecutive PDCCH-subframe(s) during which the UE shall monitor the PDCCH after the uplink message containing the C-RNTI MAC control element or the uplink message associated with UE Contention Resolution Identity submitted from higher layer is transmitted.

DRX Cycle: Specifies the periodic repetition of the On Duration followed by a possible period of inactivity (see figure 3.1-1 below).

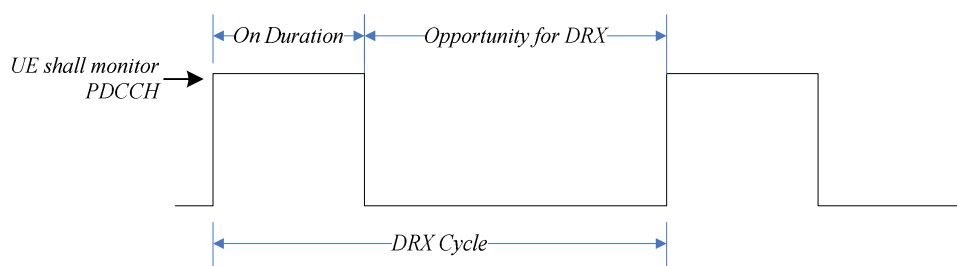


Figure 3.1-1: DRX Cycle

DRX Inactivity Timer: Specifies the number of consecutive PDCCH-subframe(s) after successfully decoding a PDCCH indicating an initial UL or DL user data transmission for this UE.

DRX Retransmission Timer: Specifies the maximum number of consecutive PDCCH-subframe(s) for as soon as a DL retransmission is expected by the UE.

DRX Short Cycle Timer: This parameter specifies the number of consecutive subframe(s) the UE shall follow the short DRX cycle after the DRX Inactivity Timer has expired.

HARQ information: HARQ information consists of New Data Indicator (NDI), Redundancy Version (RV), Transport Block (TB) size. For DL-SCH transmissions the HARQ info also includes HARQ process ID.

HARQ RTT Timer: This parameter specifies the minimum amount of subframe(s) before a DL HARQ retransmission is expected by the UE.

On Duration Timer: Specifies the number of consecutive PDCCH-subframe(s) at the beginning of a DRX Cycle.

RA-RNTI: The Random Access RNTI is used on the PDCCH when Random Access Response messages are transmitted. It unambiguously identifies which time-frequency resource was utilized by the UE to transmit the Random Access preamble.

PDCCH-subframe: For FDD UE operation, this represents any subframe; for TDD, only downlink subframes.

NOTE: A timer is running once it is started, until it is stopped or until it expires.

NOTE: When defining On Duration Timer, DRX Inactivity Timer, DRX Retransmission Timer and Contention Resolution Timer, PDCCH-subframes and subframes including DwPTS are considered as subframes where the timer, if running, shall be updated.

5.3 DL-SCH data transfer

Editor's note: Current text applies to, at least, FDD.

5.3.1 DL Assignment reception

Downlink assignments transmitted on the PDCCH indicate if there is a transmission on the DL-SCH for a particular UE and provide the relevant HARQ information.

Editor's note: A downlink assignment can relate to one or two (MIMO) TBs. It is FFS how this information is presented to MAC.

When the UE has a C-RNTI, Semi-Persistent Scheduling C-RNTI, Temporary C-RNTI or RA-RNTI, the UE shall for each TTI during Active Time, for each TTI when a Random Access Response or Contention Resolution is expected and for each TTI for which a DL assignment has been configured:

- if a downlink assignment for this TTI has been received on the PDCCH for the UE's C-RNTI, Temporary C-RNTI or RA-RNTI:
 - indicate the presence of a downlink assignment and deliver the associated HARQ information to the HARQ entity for this TTI.
- else, if a downlink assignment for this TTI has been configured:
 - indicate a downlink assignment, for a new transmission, and deliver the associated HARQ information to the HARQ entity for this TTI.

When the UE needs to read BCCH, the UE shall:

- if a downlink assignment for this TTI has been received on the PDCCH for the SI-RNTI;
 - indicate a downlink assignment for the dedicated broadcast HARQ process to the HARQ entity for this TTI.

NOTE: Downlink assignments for both C-RNTI and SI-RNTI can be received in the same TTI.

Editor's note: L1 is configured, as needed, by upper layers or MAC [FFS] to monitor PDCCH for C-RNTI, and by MAC to monitor PDCCH for Temporary C-RNTI and RA-RNTI.

5.3.2 HARQ operation

5.3.2.1 HARQ Entity

There is one HARQ entity at the UE which maintains a number of parallel HARQ processes. Each -the HARQ process is associated with a HARQ process identifier. The HARQ entity directs HARQ information and associated identifiers indicated by the HARQ information associated with TBs received on the DL-SCH and directs the received data to the corresponding HARQ processes for reception operations (see subclause 5.3.2.2).

~~A number of parallel HARQ processes are used in the UE to support the HARQ entity.~~ [The number of HARQ processes is FFS].

The UE shall:

- ~~If a downlink assignment has been indicated or configured for this TTI, the UE shall:~~
- allocate the TBs received from the physical layer and the associated HARQ information to the HARQ processes indicated by the associated HARQ information.
- ~~If a downlink assignment has been indicated for the broadcast HARQ process, the UE shall:~~

- allocate the received TB to the broadcast HARQ process.

NOTE: In case of BCCH a dedicated broadcast HARQ process is used.

5.3.2.2 HARQ process

For each received TB and associated HARQ information, the HARQ process shall:

- if the NDI, when provided, has been toggled/incremented compared to the value of the previous received transmission for this HARQ process; or
- if the HARQ process is equal to the broadcast process and the physical layer indicates a new transmission; or
- if this is the very first received transmission for this HARQ process:
- ~~a new transmission is indicated for this HARQ process.~~

~~—else, a retransmission is indicated for this HARQ process.~~

~~The UE then shall:~~

~~—if a new transmission is indicated for this HARQ process:~~

- replace the data currently in the soft buffer for this HARQ process with the received data.
- ~~elseif a retransmission is indicated for this HARQ process:~~
 - if the data has not yet been successfully decoded:
 - combine the received data with the data currently in the soft buffer for this HARQ process.
 - if the TB size is different from the last valid TB size signalled for this HARQ process:
 - the UE may replace the data currently in the soft buffer for this HARQ process with the received data.

- attempt to decode the data in the soft buffer;

- if the data in the soft buffer was successfully decoded:

- if the HARQ process is equal to the broadcast process:

~~—~~ deliver the decoded MAC PDU to RRC.

- else:

~~—~~ deliver the decoded MAC PDU to the disassembly and demultiplexing entity.

- generate a positive acknowledgement (ACK) of the data in this HARQ process.

- else:

- generate a negative acknowledgement (NACK) of the data in this HARQ process.

- if the HARQ process is associated with a transmission indicated with an RA-RNTI; or

- if the HARQ process is associated with a transmission indicated with a Temporary C-RNTI and a UE Contention Resolution Identity match is not indicated (see subclause 5.1.5); or

- if the HARQ process is equal to the broadcast process:

- do not indicate the generated positive or negative acknowledgement to the physical layer.

- else:

- indicate the generated positive or negative acknowledgement to the physical layer.

5.3.3 Disassembly and demultiplexing

Editor's note: This section describes the disassembly and demultiplexing of MAC PDUs into MAC SDUs.

5.4 UL-SCH data transfer

Editor's note: Current text applies to, at least, FDD.

5.4.1 UL Grant reception

In order to transmit on the UL-SCH the UE must have a valid uplink grant (except for non-adaptive HARQ retransmissions) which it may receive dynamically on the PDCCH or in a Random Access Response or which may be configured semi-persistently. To perform requested transmissions, the MAC layer receives HARQ information from lower layers.

When the UE has a C-RNTI, Semi-Persistent Scheduling C-RNTI, or Temporary C-RNTI, the UE shall for each TTI:

- if an uplink grant for this TTI has been received on the PDCCH for the UE's C-RNTI or Temporary C-RNTI; or
- if an uplink grant for this TTI has been received in a Random Access Response:
 - ~~indicate a valid~~deliver the uplink grant and the associated HARQ information to the HARQ entity for this TTI.
 - else, if an uplink grant for this TTI has been configured:
 - ~~indicate an~~deliver the configured uplink grant, ~~valid for new transmission,~~ and the associated HARQ information to the HARQ entity for this TTI.

NOTE: The period of configured uplink grants is expressed in TTIs.

NOTE: If the UE receives both a grant for its RA-RNTI and a grant for its C-RNTI, the UE may choose to continue with either the grant for its RA-RNTI or the grant for its C-RNTI.

5.4.2 HARQ operation

5.4.2.1 HARQ entity

There is one HARQ entity at the UE, which maintains a ~~A~~ number of parallel HARQ processes ~~are used in the UE to support the HARQ entity,~~ allowing transmissions to take place continuously while waiting for the feedback on the successful or unsuccessful reception of previous transmissions.

At a given TTI, if an uplink grant is indicated for the TTI, the HARQ entity identifies the HARQ process for which a transmission should take place. It also routes the ~~receiver~~received feedback (ACK/NACK information), MCS and resource, relayed by the physical layer, to the appropriate HARQ process.

If TTI bundling is configured, the parameter TTI_BUNDLE_SIZE provides the number of TTIs of a TTI bundle. If a transmission is indicated for the TTI, the HARQ entity identifies the HARQ process for which a transmission should take place. The next TTI_BUNDLE_SIZE uplink TTIs are subsequently used for transmissions for the identified HARQ process. HARQ retransmissions within a bundle shall be performed without waiting for feedback from previous transmissions according to TTI_BUNDLE_SIZE. The UE expects feedback only for the last transmission of a bundle.

For transmission of an uplink message containing the C-RNTI MAC control element or an uplink message including a CCCH SDU during Random Access (see section 5.1.5) TTI bundling does not apply.

The number of HARQ processes is equal to [X] [FFS]. Each process is associated with a number from 0 to [X-1].

~~At the given~~For each TTI, the HARQ entity shall:

- identify the HARQ process associated with this TTI;
- if an uplink grant ~~indicating that the NDI~~ has been indicated for this TTI;

- ~~if the NDI provided in the associated HARQ information has been incremented/toggled~~ compared to the value in the previous transmission of this HARQ process; ~~is indicated for this TTI~~ or
- ~~if this is the very first transmission for this HARQ process (i.e., no previous NDI is available—a new transmission takes place for this HARQ process):~~
 - if there is an ongoing Random Access procedure and there is a MAC PDU in the [Message3] buffer:
 - obtain the MAC PDU to transmit from the [Message3] buffer.
 - ~~else, if the "uplink prioritisation" entity indicates the need for a new transmission:~~
 - obtain the MAC PDU to transmit from the "Multiplexing and assembly" entity;
- ~~deliver the MAC PDU and the uplink grant and the HARQ information to the identified HARQ process;~~
- instruct the identified HARQ process ~~corresponding to this TTI~~ to trigger a new transmission ~~using the identified parameters.~~
- else:
 - deliver the uplink grant and the HARQ information (redundancy version) to the identified HARQ process;
 - ~~flush the HARQ buffer.~~
- ~~else, if an uplink grant, indicating that the NDI is identical to the value in the previous transmission of this HARQ process (i.e. a retransmission takes place for this HARQ process), is indicated for this TTI:~~
 - instruct the identified HARQ process to generate an adaptive retransmission.
- else, if the HARQ buffer of the HARQ process corresponding to this TTI is not empty:
 - instruct the identified HARQ process to generate a non-adaptive retransmission.

NOTE: A retransmission triggered by the HARQ entity should be cancelled by the corresponding HARQ process if it collides with a measurement gap or if a non-adaptive retransmission is not allowed.

5.4.2.2 HARQ process

Each HARQ process is associated with a HARQ buffer.

Each HARQ process shall maintain a state variable CURRENT_TX_NB, which indicates the number of transmissions that have taken place for the MAC PDU currently in the buffer. When the HARQ process is established, CURRENT_TX_NB shall be initialized to 0.

The sequence of redundancy versions is defined to be 0, 2, 3, 1. The variable CURRENT_IRV provides a pointer to a redundancy version in the defined set. This variable is up-dated modulo 4.

New transmissions and adaptive ~~retransmissions~~ retransmissions are performed on the resource and with the MCS indicated on PDCCH, while a non-adaptive retransmission is performed on the same resource and with the same MCS as was used for the last made transmission attempt,

The UE is configured with a Maximum number of HARQ transmissions and a Maximum number of Message3 HARQ transmissions by RRC. For transmissions on all HARQ processes and all logical channels except for transmission of a MAC PDU stored in the [Message3] buffer, maximum number of transmissions shall be set to Maximum number of HARQ transmissions. For transmission of a MAC PDU stored in the [Message3] buffer, maximum number of transmissions shall be set to Maximum number of Message3 HARQ transmissions.

If the HARQ entity requests a new transmission, the HARQ process shall:

- set CURRENT_TX_NB to 0;
- set CURRENT_IRV to 0;

- store the MAC PDU in the associated HARQ buffer;
- store the uplink grant received from the HARQ entity;
- generate a transmission as described below.

If the HARQ entity requests a retransmission, the HARQ process shall:

- increment CURRENT_TX_NB by 1;
- if there is no measurement gap at the time of the retransmission:
 - ~~for~~if the HARQ entity requests an adaptive retransmission:
 - store the uplink grant received from the HARQ entity;
 - set CURRENT_IRV to the value ~~corresponding to the redundancy version indicated on PDCCH provided in the HARQ information;~~
 - generate a transmission as described below.
 - ~~for~~else if the HARQ entity requests a non-adaptive retransmission:
 - if the last feedback for this HARQ process is a HARQ NACK:
 - generate a transmission as described below.

NOTE: When receiving a HARQ ACK alone, the UE keeps the data in the HARQ buffer.

To generate a transmission, the HARQ process shall:

- instruct the physical layer to generate a transmission according to the stored uplink grant with the redundancy version corresponding to the CURRENT_IRV value ~~and the transmission timing;~~
- increment CURRENT_IRV by 1;
- if there is a measurement gap at the time of the feedback for this transmission, consider the feedback coinciding with the measurement gap to be a HARQ ACK.

The HARQ process shall:

- if CURRENT_TX_NB = maximum number of transmissions:
 - flush the HARQ buffer;
 - if the transmission corresponds to a transmission of CCCH; and
 - if the last feedback received (i.e., the feedback received for the last transmission of this process) is a HARQ NACK:
 - notify RRC that the transmission of the corresponding MAC SDU failed.

The HARQ process may:

- if CURRENT_TX_NB = maximum number of transmissions configured; and
- if the last feedback received (i.e., the feedback received for the last transmission of this process) is a HARQ NACK:
 - notify the relevant ARQ entities in the upper layer that the transmission of the corresponding RLC PDUs failed.

Page 1: [1] Commented [H14] **Explanation of field** **12/7/2006 4:08:00 PM**

Enter a single letter corresponding to the most appropriate category listed. For more detailed help on interpreting these categories, see Technical Report [21.900](#) "TSG working methods".

Page 1: [2] Commented [H18] **Explanation of field** **12/7/2006 4:09:00 PM**

Enter here the consequences if this CR were to be rejected. It is mandatory to complete this section only if the CR is of category "F" (i.e. correction), though it may well be useful for other categories.

Page 1: [3] Commented [H19] **Explanation of field** **12/7/2006 4:10:00 PM**

Enter the number of each clause which contains changes. Be as specific as possible (ie list each subclause, not just the umbrella clause).

Page 1: [4] Commented [H20] **Explanation of field**

Tick "yes" box if any other specifications are affected by this change. Else tick "no". You MUST fill in one or the other.

Page 1: [5] Commented [H22] **Explanation of field**

Enter any other information which may be needed by the group being requested to approve the CR. This could include special conditions for it's approval which are not listed anywhere else above.