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WiMAX Forum™ Mobile System Profile Specification

Release 1 – IMT-2000 Edition

WMF-T23-007-R010v02
WiMAX Forum Approved
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1 Introduction

This document is the WiMAX Forum® Mobile System Profile: Release 1 – IMT-2000 Edition. It is derived from *WiMAX Forum® Mobile System Profile Rel 1.0 Approved Specifications (Rev 1.2.2, 2006/11/17)*.

The content is reproduced directly from subclause 5.6.2.1 of ITU-R Rec. M.1457-7. No alterations are made except for three typographical corrections on the final page and several insertions of the “TM” symbol. The headers as well as the clause and page numbering are reproduced directly from ITU-R Rec. M.1457-7.

2 References

- [1] **IEEE Standard 802.16-2004**, IEEE Standard for Local and Metropolitan Area Networks – Part 16: Air Interface for Fixed Wireless Access Systems.
- [2] **IEEE Standard 802.16e-2005**, Amendment to IEEE Standard for Local and Metropolitan Area Networks – Part 16: Air Interface for Fixed Wireless Access Systems – Physical and Medium Access Control Layers for Combined Fixed and Mobile Operation in Licensed Bands.

3 Definitions

For the purposes of the present document, the following terms and definitions apply:

3.1 Abbreviations

3.2 Definitions of system profiles

Profile definitions of different devices/usage models and releases are provided in this subsection.

3.3 Conventions

3.3.1 Item column

The Item column contains a number that identifies each description in the Table.

3.3.2 Description column

The Description column describes in free text each respective item (e.g. parameters, timers, etc.).

3.3.3 Reference column

The Reference column indicates the section of [1] and [2] from which the requirement for the item is derived.

3.3.4 Status column

The following notations are used in the Status column to indicate whether each item is mandatory or optional in IEEE standard based on 802.16-2004 [1] as amended by 802.16e-2005 [2].

TABLE 1
Status column entries

m	Explicitly shown as mandatory in the standard. It is required to implement
pm	Potentially mandatory, required for the system to perform basic operations (Not explicitly shown as mandatory in the standard). It is required to implement
o	Explicitly mentioned as optional in the standard or is not explicitly mentioned but has capability negotiations. It may or may not be implemented
oi	Qualified option – for mutually exclusive or selectable options from a set. One or more of the options from the set shall be supported
po	Potentially optional. Not explicitly mentioned as mandatory, but from the standard we may conclude it is, though not really required for the system to perform basic operations. We have to decide whether it should be defined as optional
n/a	Not applicable – in the given context, it is impossible to use the capability

BS/MS Required column

The Required column indicates whether the item is required for every BS/MS to implement for WiMAX certification purposes.

TABLE 2
Required column entries

Y or y	Required to implement
N or n	Not required to implement
IO-NNNN	Inter-operable options: Item belongs to NNNN group of features for which it is requested to provide testing procedure and distinct labelling of BS equipment. More specifically: – the item is not required to get general “WiMAX certified” label, and is required to get distinct “WiMAX certified with NNNN capability” label.
n/a	Not applicable

The following Inter-operable Options are defined and used in this document.

- 1) IO-MIMO: Group of Inter-operable Option features related to Multiple Input Multiple Output (MIMO) operation.
- 2) IO-BF: Group of Inter-operable Option features related to Beam Forming (BF) operation.
- 3) IO-MBS: Group of Inter-operable Option features related to Multicast and Broadcast Services (MBS) operation.
- 4) IO-ETHx (x = 1, 2, 3): Groups of Inter-operable Option features related to Ethernet CS.

3.3.6 BS/MS Values column

This column indicates the specific value or range of values for each BS/MS to implement for WiMAX™ certification purposes.

TABLE 3
Value column entries

xx	Set to value xx
aa – bb	Set to range aa – bb
n/a	Not applicable

3.3.7 Comment column

This column provides additional clarification and reasoning for each item.

4 PHY Profile

4.1 Profiles of BS and MS

4.1.1 System Parameters

4.1.1.1 PHY Mode

TABLE 4
PHY Mode

Item	Description	Reference	Status	BS required	MS required	Comment
1	OFDMA	8.4	m	Y	Y	OFDMA is the sole PHY mode within the scope of this document

4.1.1.2 Band Class Index

(This section is not included in this extract as it is not relevant.)

4.1.1.3 Sampling Factor

TABLE 6
Sampling Factor

Item	Description	Reference	Status	BS required	MS required	Comments
1	If channel bandwidth is a multiple of 1.75 MHz then $n = 8/7$ else if channel bandwidth is a multiple of any of 1.25, 1.5, 2 or 2.75 MHz then $n = 28/25$ else if not otherwise specified then $n = 8/7$	8.4.2.3	m	Y	Y	

4.1.1.4 Cyclic Prefix

TABLE 7
Cyclic Prefix

Item	Description	Reference	Status	BS required	MS required	Comments
1	1/4	8.4.2.3	Oi	N	N	
2	1/8	8.4.2.3	Oi	Y	Y	
3	1/16	8.4.2.3	Oi	N	N	
4	1/32	8.4.2.3	Oi	N	N	

4.1.1.5 Frame Length

TABLE 8
Frame Length

Item	Description	Reference	Status	BS required	MS required	Comments
1	20 ms	8.4.5.2	Oi	N	N	
2	12.5	8.4.5.2	Oi	N	N	
3	10	8.4.5.2	Oi	N	N	
4	8	8.4.5.2	Oi	N	N	
5	5	8.4.5.2	Oi	Y	Y	
6	4	8.4.5.2	Oi	N	N	
7	2.5	8.4.5.2	Oi	N	N	
8	2	8.4.5.2	Oi	N	N	

4.1.1.6 TTG/RTG

This parameter shall be applicable only to TDD mode.

TABLE 9
TTG/RTG

Item	Description	Reference	Status	BS required	BS values	MS required	Comments
1	TTG	8.4.5.2	m	Y	296 PS for 10 MHz, 218 PS for 8.75 MHz, 376 PS for 7 MHz, 148 PS for 5 MHz and 188 PS for 3.5 MHz	n/a	5 μ s minimum specified in the referred section. The requirement is equivalent to “5 ms – (RTG + Number of OFDM symbols \times symbol duration)” where “Number of OFDM symbols” = 47 for 10 and 5 MHz, 42 for 8.75 MHz and 33 for 7 MHz
2	RTG	8.4.5.2	m	Y	168 PS for 10 MHz, 186 PS for 8.75 MHz, 120 PS for 7 MHz, 84 PS for 5 MHz and 60 PS for 3.5 MHz	n/a	5 μ s minimum specified in the referred section. The requirement is equivalent to 60 μ s for 5, 10 and 7 MHz BW and 74.4 μ s for 8.75 MHz BW

4.1.1.7 Number of OFDM Symbols in DL and UL

This feature shall be applicable to TDD operation only and specifies number of OFDM symbols in DL and UL subframes.

TABLE 10
Number of OFDM Symbols in DL and UL

Item	Description	Reference	Status	BS required	BS values	MS required	MS values	Comments
1	Number of OFDM Symbols in DL and UL for 5 and 10 MHz BW	8.4.4.2	oi	Y	(35, 12), (34, 13), (33, 14), (32, 15), (31, 16), (30, 17), (29, 18), (28, 19), (27, 20), (26, 21)	Y	The same as BS values	
2	Number of OFDM Symbols in DL and UL for 8.75 MHz BW	8.4.4.2	oi	Y	(30, 12), (29, 13), (28, 14), (27, 15), (26, 16), (25, 17), (24, 18)	Y	The same as BS values	
3	Number of OFDM Symbols in DL and UL for 7 and 3.5 MHz BW	8.4.4.2	oi	Y	(24, 09), (23, 10), (22, 11), (21, 12), (20, 13), (19, 14), (18, 15)	Y	The same as BS values	

4.1.2 Subcarrier Allocation

4.1.2.1 DL Subcarrier Allocation

TABLE 11
DL Subcarrier Allocation

Item	Description	Reference	Status	BS required	MS required	Comments
1	PUSC	8.4.6.1.2.1	m	Y	Y	
2	PUSC w/ all subchannels	8.4.6.1.2.1	po	Y	Y	
3	PUSC w/ dedicated pilots	8.4.6.1.2.1 and 8.4.5.3.4	po	IO-BF	Y	
4	FUSC	8.4.6.1.2.2	po	Y	Y	
5	FUSC w/ dedicated pilots	8.4.6.1.2.2 and 8.4.5.3.4	po	N	N	
6	Optional FUSC	8.4.6.1.2.3	o	N	N	
7	O-FUSC w/ dedicated pilots	8.4.6.1.2.3 and 8.4.5.3.4	o	N	N	
8	AMC 1x6	8.4.6.3	o	N	N	
	AMC 2x3	8.4.6.3	o	Y	Y	
	AMC 3x2	8.4.6.3	o	N	N	
	Default Type	8.4.6.3 and 6.3.2.3.43.2	o	N	N	Only applicable with HARQ_MAP

TABLE 11 (end)

Item	Description	Reference	Status	BS required	MS required	Comments
9	AMC 1x6 w/ dedicated pilots	8.4.6.3 and 8.4.5.3.4	o	N	N	
	AMC 2x3 w/ dedicated pilots	8.4.6.3 and 8.4.5.3.4	o	IO-BF	Y	
	AMC 3x2 w/ dedicated pilots	8.4.6.3 and 8.4.5.3.4	o	N	N	
10	PUSC-ASCA	8.4.6.4.1	o	N	N	

4.1.2.2 UL Subcarrier Allocation

TABLE 12

UL Subcarrier Allocation

Item	Description	Reference	Status	BS required	MS required	Comments
	PUSC	8.4.6.2.1	po	Y	Y	
	PUSC w/o subchannel rotation	8.4.5.4.7	o	IO-BF	Y	
	Optional PUSC	8.4.6.2.5	o	N	N	
	AMC 1x6	8.4.6.3	o	N	N	
	AMC 2x3	8.4.6.3	o	Y	Y	
	AMC 3x2	8.4.6.3	o	N	N	
	Mini-subchannel	8.4.6.2.4	o	N	N	Only for PUSC and O-PUSC

4.1.2.3 Common SYNC Symbol

TABLE 13

Common SYNC Symbol

Item	Description	Reference	Status	BS required	MS required	Comments
1	Support of the Common SYNC Symbol	8.4.6.1.1.1	o	N	N	

4.1.2.4 UL Sounding

TABLE 14
UL Sounding 1

Item	Description	Reference	Status	BS required	MS required	Comments
1	Type A w/ Cyclic shift – support for P values other than 9 and 18	8.4.6.2.7.1	o	IO-BF	Y	
2	Type A w/ Cyclic shift – Support P values of 9 and 18	8.4.6.2.7.1	o	IO-BF	Y	
3	Type A w/ Decimation	8.4.6.2.7.1	o	IO-BF	Y	
4	Type B	8.4.6.2.7.1	o	N	N	
5	Send Sounding Report Flag	8.4.6.2.7.1	o	N	N	
6	Direct transmission of DL channel coefficients (Include additional feedback, option 0b01)	8.4.6.2.7.1 and 8.4.6.2.7.3	o	N	N	
7	Decimation with randomization	8.4.6.2.7.1	o	N	N	
8	Power Assignment Method: Equal Power (0b00)	8.4.6.2.7.1 and 8.4.6.2.7.	oi	IO-BF	Y	
9	Power Assignment Method: Interference dependent. Per subcarrier power limit; (0b10)	8.4.6.2.7.1 and 8.4.6.2.7.2	oi	N	N	
10	Power Assignment Method: Interference dependent. Total power limit.; (0b11)	8.4.6.2.7.1 and 8.4.6.2.7.2	oi	N	N	
11	Power Boost	8.4.6.2.7.1 and 8.4.6.2.7.2	o	N	N	
12	Feedback of Received Pilot Coefficients (include additional feedback option = 0b10)	8.4.6.2.7.1 and 8.4.6.2.7.4	o	N	N	
13	Feedback of message (include additional feedback option = 0b11)	8.4.6.2.7.1	o	N	N	

TABLE 15
UL Sounding 2

Item	Description	Reference	Status	MS required	MS value	Comments
1	Sounding response time capability	8.4.6.2.7.1 and 11.8.3.7.14	O	Y	Next Frame	
2	max number of simultaneous sounding instructions	8.4.6.2.7.1 and 11.8.3.7.14	O	Y	2	This parameter specifies the max number of sounding transmutions by MS in a frame

4.1.3 UL Control Channels

4.1.3.1 Initial Ranging

TABLE 16
Initial Ranging

Item	Description	Reference	Status	BS required	MS required	Comments
1	Initial Ranging in PUSC zone w/ 2 symbols	8.4.7.1	Oi	Y	Y	
2	Initial Ranging in PUSC zone w/ 4 symbols	8.4.7.1	Oi	N	N	
3	Initial Ranging in Optional PUSC zone w/ 2 symbols	8.4.7.1	Oi	N	N	
4	Initial Ranging in Optional PUSC zone w/ 4 symbols	8.4.7.1	Oi	N	N	
5	Initial Ranging in AMC zone w/ 2 symbols	8.4.7.1	Oi	N	N	
6	Initial Ranging in AMC zone w/ 4 symbols	8.4.7.1	Oi	N	N	

4.1.3.2 HO Ranging

TABLE 17
HO Ranging

Item	Description	Reference	Status	BS required	MS required	Comments
1	HO Ranging in PUSC zone w/ 2 symbols	8.4.7.1	o	Y	Y	
2	HO Ranging in PUSC zone w/ 4 symbols	8.4.7.1	o	N	N	
3	HO Ranging in Optional PUSC zone w/ 2 symbols	8.4.7.1	o	N	N	
4	HO Ranging in Optional PUSC zone w/ 4 symbols	8.4.7.1	o	N	N	
5	HO Ranging in AMC zone w/ 2 symbols	8.4.7.1	o	N	N	
6	HO Ranging in AMC zone w/ 4 symbols	8.4.7.1	o	N	N	

4.1.3.3 Periodic Ranging

TABLE 18
Periodic Ranging

Item	Description	Reference	Status	BS required	MS required	Comments
1	Periodic Ranging in PUSC zone w/ 1 symbols	8.4.7.2	oi	Y	Y	
2	Periodic Ranging in PUSC zone w/ 3 symbols	8.4.7.2	oi	N	N	
3	Periodic Ranging in Optional PUSC zone w/ 1 symbols	8.4.7.2	oi	N	N	
4	Periodic Ranging in Optional PUSC zone w/ 3 symbols	8.4.7.2	oi	N	N	
5	Periodic Ranging in AMC zone w/ 1 symbols	8.4.7.2	oi	N	N	
6	Periodic Ranging in AMC zone w/ 3 symbols	8.4.7.2	oi	N	N	

4.1.3.4 BW Request

TABLE 19
BW Request

Item	Description	Reference	Status	BS required	MS required	Comments
1	BW Request in PUSC zone w/ 1 symbols	8.4.7.2	oi	Y	Y	
2	BW Request in PUSC zone w/ 3 symbols	8.4.7.2	oi	N	N	
3	BW Request in Optional PUSC zone w/ 1 symbols	8.4.7.2	oi	N	N	
4	BW Request in Optional PUSC zone w/ 3 symbols	8.4.7.2	oi	N	N	
5	BW Request in AMC zone w/ 1 symbols	8.4.7.2	oi	N	N	
6	BW Request in AMC zone w/ 3 symbols	8.4.7.2	oi	N	N	

4.1.3.5 Fast-Feedback/CQI Channel Encoding

TABLE 20
Fast-Feedback/CQI Channel Encoding

Item	Description	Reference	Status	MS required	MS value	Comments
1	4 bits	8.4.5.4.10	po	N	N	
2	6 bits	8.4.5.4.10.5	O	Y	Y	This feature is needed for FBSS.
3	3 bits	8.4.5.4.10.5	O	N	N	
4	Primary/Secondary	8.4.5.4.10.12	O	N	N	

Note on Item 2: If the “Feedback Type” in CQICH_Alloc_IE() is set to “0b01 = Effective CINR Feedback” and the MS negotiation capability “Type 173, bit#1 = Enhanced FAST_FEEDBACK” is enabled which indicates support for “6-bit CQI”, the reported effective CINR shall be in the 0b00xxxx format where the 4 LSBs is described in Table 298b of Section 8.4.5.4.10.4 in [2].

4.1.3.6 Fast-Feedback/CQI Channel Allocation Method

TABLE 21
Fast-Feedback/CQI Channel Allocation Method

Item	Description	Reference	Status	BS required	MS required	Comments
1	Fast-Feedback Allocation Subheader support	6.3.2.2.6	o	N	N	
2	Fast feedback channel allocation using CQICH Allocation IE	8.4.5.4.12	o	Y	Y	
3	Fast feedback channel allocation using CQICH Enhanced Allocation IE	8.4.5.4.16	o	N	N	

4.1.4 Channel Coding

4.1.4.1 Repetition

TABLE 22
Repetition

Item	Description	Reference	Status	BS required	MS required	Comments
1	Repetition	8.4.9	M	Y	Y	FCH uses repetition coding (8.4.4.4)

4.1.4.2 Randomization

TABLE 23
Randomization

Item	Description	Reference	Status	BS required	MS required	Comments
1	Randomization	8.4.9.1	m	Y	Y	

4.1.4.3 Convolutional Code

TABLE 24
Convolutional Code

Item	Description	Reference	Status	BS required	MS required	Comments
1	Tail Biting	8.4.9.2.1	m	Y	Y	
2	Zero Tail	8.4.9.2.4	o	N	N	

4.1.4.4 Convolutional Turbo Code

TABLE 25
Convolutional Turbo Code

Item	Description	Reference	Status	BS required	MS required	Comments
1	CTC	8.4.9.2.3 excluding 8.4.9.2.3.5	o	Y	Y	

4.1.4.5 BTC

TABLE 26
Block Turbo Code

Item	Description	Reference	Status	BS required	MS required	Comments
1	BTC	8.4.9.2.2	o	N	N	

4.1.4.6 LDPC

TABLE 27
Low Density Parity Check Code

Item	Description	Reference	Status	BS required	MS required	Comments
1	LDPC	8.4.9.2.5	o	N	N	

4.1.4.7 Interleaving

TABLE 28
Interleaving

Item	Description	Reference	Status	BS required	MS required	Comments
1	Interleaving	8.4.9.3	m	Y	Y	The interleaving subject of this section should not be applied to CTC mode
2	Optional interleaver for CC	8.4.9.3.1 and 11.8.3.7.3	O	N	N	This interleaver mode is only applicable to Convolutional Encoding

4.1.5 H-ARQ Support

4.1.5.1 Chase Combining

TABLE 29

Chase Combining H-ARQ

Item	Description	Reference	Status	BS required	MS required	Comments
1	Chase w/ CC	8.4.15.1	o	N	N	
2	Chase w/ CTC	8.4.15.1	o	Y	Y	
3	Chase with LDPC	8.4.15.1	o	N	N	

TABLE 30

HARQ Parameters for Chase with CTC

Item	Parameter description	Reference	Values	Comments
1	H-ARQ DL Buffer size per channel	11.8.3.7.19	Category 1 = 16.384 (K = 20), Category 2 = 8 192 (K = 16), Category 3 = 16.384 (K = 20), Category 4 = 23.170 (K = 22)	Status for the four categories is oi, that is support for values of items 1-4 and 7-8 corresponding to one or more of the categories from the set shall be supported
2	H-ARQ UL Buffer size per channel	11.8.3.7.19	Category 1 = 16.384 (K = 20), Category 2 = 16.384 (K = 20), Category 3 = 16.384 (K = 20), Category 4 = 16.384 (K = 20)	Status for the four categories is oi, that is support for values of items 1-4 and 7-8 corresponding to one or more of the categories from the set shall be supported
3	DL Aggregate flag for HARQ buffer	11.8.3.7.19	Category 1 = ON or OFF, Category 2 = ON, Category 3 = ON, Category 4 = ON	Status for the four categories is oi, that is support for values of items 1-4 and 7-8 corresponding to one or more of the categories from the set shall be supported
4	UL Aggregate flag for HARQ buffer	11.8.3.7.19	Category 1 = OFF, Category 2 = ON, Category 3 = ON, Category 4 = ON	Status for the four categories is i.o, that is support for values of items 1-4 and 7-8 corresponding to one or more of the categories from the set shall be supported
5	HARQ ACK Delay for DL Burst	6.3.17.1, 11.3.1	1	
6	HARQ ACK Delay for UL Burst	6.3.17.1, 11.4.1	N/A	

TABLE 30 (*end*)

Item	Parameter description	Reference	Values	Comments
7	Number of DL H-ARQ Channels supported by MS	11.8.3.7.2 and 7.3 D5	Category 1 = 4, Category 2 = 16, Category 3 = 16, Category 4 = 16	Status for the four categories is oi, that is support for values of items 1-4 and 7-8 corresponding to one or more of the categories from the set shall be supported
8	Number of UL H-ARQ Channels supported by MS	11.8.3.7.2 and 7.3 D5	Category 1 = 4, Category 2 = 8, Category 3 = 8, Category 4 = 8	Status for the four categories is oi, that is support for values of items 1-4 and 7-8 corresponding to one or more of the categories from the set shall be supported

Note that the HARQ buffer size shall be interpreted as softbits buffer size, i.e. relating to coded data bits and not uncoded. This means the buffer size refers to both the systematic and parity bits transmitted over the air. It is left to vendor's implementation to determine the amount of memory space for each bit of transmitted information. The buffer size is related to buffer size parameter K according to the following equation.

4.1.5.2 Incremental Redundancy

TABLE 31

Incremental Redundancy H-ARQ

Item	Description	Reference	Status	BS required	MS required	Comments
1	IR w/ CC	8.4.9.2.1.1	o	N	N	
2	IR w/ CTC	8.4.9.2.3.5	o	N	N	

4.1.5.3 ACK Channel

TABLE 32

ACK Channel

Item	Description	Reference	Status	BS required	MS required	Comments
1	ACKCH	8.4.5.4.13	m	Y	Y	Conditioned by H-ARQ support

4.1.6 Control Mechanism

4.1.6.1 Synchronization

TABLE 33
Synchronization

Item	Description	Reference	Status	BS required	MS required	Comments
1	BS Synchronization in time/slot	8.4.10.1.1, 6.3.2.3.47	o	Y	N/A	Refer to “Time/Frequency Synchronization Indicator” in Table 108h of the referred section.
2	BS Synchronization in frequency	8.4.10.1.1	o	Y	N/A	
3	BS to Neighbour BS Synchronization in frequency	6.3.2.3.47	o	Y	N/A	Refer to “Time/Frequency Synchronization Indicator” in Table 108h of the referred section.
4	SS Synchronization	8.4.10.1.2	m	N/A	Y	

4.1.6.2 Closed-loop Power Control

TABLE 34
Closed-loop Power Control

Item	Description	Reference	Status	BS required	MS required	Comments
1	CL Power Control	8.4.10.3.1	m	Y	Y	

4.1.6.3 Open-loop Power Control

TABLE 35

Open-loop Power Control

Item	Description	Reference	Status	BS required	MS required	Comments
1	OL Power Control	8.4.10.3.2	o	Y	Y	
2	Passive Uplink open loop power control	8.4.10.3.2	o	Y	Y	
3	Active Uplink open loop power control	8.4.10.3.2	o	N	N	
4	UL Tx power and Headroom transmission condition using bandwidth request and UL Tx Power Report header	8.4.10.3.2.1 and 6.3.2.1.2.1.2	o	Y	Y	
5	UL Tx power and Headroom transmission condition using PHY channel report header	8.4.10.3.2.1 and 6.3.2.1.2.1.5	o	N	N	
6	UL Tx power and Headroom transmission condition using Tx power report extended subheader	8.4.10.3.2.1 and 6.3.2.2.7.5	o	N	N	

4.1.7 Channel Measurement

4.1.7.1 CINR Measurement

TABLE 36

CINR Measurement

Item	Description	Reference	Status	BS required	MS required	Comments
1	Physical CINR measurement from the preamble for frequency reuse = 1 (feedback type = 0b00 and report type = 0 and CINR preamble report type = 0)	6.3.18, 8.4.5.4.12, 8.4.11.3 and 11.8.3.7.9	oi	Y	Y	
2	Physical CINR measurement from the preamble for frequency reuse = 3 (feedback type = 0b00 and report type = 0 and CINR preamble report type = 1)	6.3.18, 8.4.5.4.12, 8.4.11.3 and 11.8.3.7.9	oi	Y	Y	

TABLE 36 (continued)

Item	Description	Reference	Status	BS required	MS required	Comments
3	Physical CINR measurement for a permutation zone from pilot subcarriers (feedback type = 0b00 and report type = 1 and CINR zone measurement type = 0)	6.3.18, 8.4.5.4.12, 8.4.11.3 and 11.8.3.7.9	oi	Y	Y	
4	Physical CINR measurement for a permutation zone from data subcarriers (feedback type = 0b00 and report type = 1 and CINR zone measurement type = 1)	6.3.18, 8.4.5.4.12, 8.4.11.3 and 11.8.3.7.9	oi	N	N	
5	Effective CINR measurement from the preamble for frequency reuse = 1 (feedback type = 0b01 and report type = 0 and CINR preamble report type = 0)	6.3.18, 8.4.5.4.12, 8.4.11.3 and 11.8.3.7.9	oi	N	N	This option provides capability to the MS to report MCS preference to BS
6	Effective CINR measurement from the preamble for frequency reuse = 3 (feedback type = 0b01 and report type = 0 and CINR preamble report type = 1)	6.3.18, 8.4.5.4.12, 8.4.11.3 and 11.8.3.7.9	oi	N	N	This option provides capability to the MS to report MCS preference to BS
7	Effective CINR measurement for a permutation zone from pilot subcarriers (feedback type = 0b01 and report type = 1 and CINR zone measurement type = 0)	6.3.18, 8.4.5.4.12, 8.4.11.3 and 11.8.3.7.9	oi	Y	Y	This option provides capability to the MS to report MCS preference to BS
8	Effective CINR measurement for a permutation zone from data subcarriers (feedback type = 0b01 and report type = 1 and CINR zone measurement type = 1)	6.3.18, 8.4.5.4.12, 8.4.11.3 and 11.8.3.7.9	oi	N	N	This option provides capability to the MS to report MCS preference to BS.
9	Support for 2 concurrent CQI channels with effective CINR reports	6.3.18, 8.4.5.4.12 and 11.8.3.7.9	o	N	N	This feature only addresses two concurrent CQI channels reporting Effective CINR measurements.

TABLE 36 (end)

Item	Description	Reference	Status	BS required	MS required	Comments
10	Frequency selectivity characterization report	8.4.5.4.12, 8.4.11.4 and 11.8.3.7.9	o	N	N	
11	Major group indication (applicable to PUSC zone only)	8.4.5.4.12	o	IO-BF	Y	
12	MIMO permutation feedback cycle (applicable to MIMO only)	8.4.5.4.12	o	IO-MIMO	Y	

4.1.7.2 RSSI Measurement

TABLE 37

RSSI Measurement

Item	Description	Reference	Status	BS required	MS required	Comments
1	RSSI Measurement	8.4.11.2 and 6.3.2.3.50	m	N/A	Y	Processing of RSSI measurements in the BS is specified in § 6.3.2.3.33.

4.1.8 Modulation

4.1.8.1 PRBS (Subcarrier Randomization)

TABLE 38

PRBS

Item	Description	Reference	Status	BS required	MS required	Comments
1	PRBS	8.4.9.4.1	m	Y	Y	

4.1.8.2 Downlink

TABLE 39

Downlink Modulation

Item	Description	Reference	Status	BS required	MS required	Comments
1	QPSK	8.4.9.4.2	m	Y	Y	
2	16-QAM	8.4.9.4.2	m	Y	Y	
3	64-QAM	8.4.9.4.2	o	Y	Y	

4.1.8.3 Uplink

TABLE 40
Uplink Modulation

Item	Description	Reference	Status	BS required	MS required	Comments
1	QPSK	8.4.9.4.2	m	Y	Y	
2	16-QAM	8.4.9.4.2	m	Y	Y	
3	64-QAM	8.4.9.4.2	o	N	N	

4.1.8.4 Pilot Modulation

TABLE 41
Pilot Modulation

Item	Description	Reference	Status	BS required	MS required	Comments
1	Pilot Modulation	8.4.9.4.3	m	Y	Y	

4.1.8.5 Preamble Modulation

TABLE 42
Preamble Modulation

Item	Description	Reference	Status	BS required	MS required	Comments
1	Preamble Modulation	8.4.9.4.3.1	m	Y	N/A	MS shall demodulate the preamble

4.1.8.6 Ranging Modulation

TABLE 43
Ranging Modulation

Item	Description	Reference	Status	BS required	MS required	Comments
1	Ranging Modulation	8.4.7.3	m	N/A	Y	BS shall demodulate the ranging signal.

4.1.9 MAP Support

4.1.9.1 Normal MAP

TABLE 44
Normal MAP

Item	Description	Reference	Status	BS required	MS required	Comments
1	Normal MAP	6.3.2.3.2 and 6.3.2.3.4	m	Y	Y	

4.1.9.2 Compressed MAP

TABLE 45
Compressed MAP

Item	Description	Reference	Status	BS required	MS required	Comments
1	Compressed MAP	8.4.5.6	po	Y	Y	

4.1.9.3 Sub-DL-UL MAP

TABLE 46
Sub-DL-UL MAP

Item	Description	Reference	Status	BS required	MS required	Comments
1	Sub-DL-UL MAP	6.3.2.3.60	o	Y	Y	See 11.8.3.7.12 OFDMA MAP Capability of [2]. Support for Extended HARQ IE in Normal MAP mandates a support for Sub MAP for first zone

4.1.9.4 H-ARQ MAP Message

TABLE 47
H_ARQ MAP Message

Item	Description	Reference	Status	BS required	MS required	Comments
1	Compact DL-MAP IE	6.3.2.3.43	o	N	N	
2	Compact UL-MAP IE	6.3.2.3.43	o	N	N	

4.1.9.5 Extended HARQ IE in the Normal MAP

TABLE 48

Extended H-ARQ IE in Normal MAP

Item	Description	Reference	Status	BS required	MS required	Comments
1	Extended HARQ IE in the Normal MAP	8.4.5.3.21 and 8.4.5.3.22 and 8.4.5.4.25 and 8.4.5.4.24	o	Y	Y	

4.1.9.6 DL Region Definition

TABLE 49

DL Region Definition Support

Item	Description	Reference	Status	BS required	MS required	Comments
1	DL Region Definition Support	8.4.5.3.21, 8.4.5.3.23, 11.8.3.7.12	o	N	N	

4.1.10 AAS

4.1.10.1 AAS Zone Support

TABLE 50

AAS Zone Support

Item	Description	Reference	Status	BS required	MS required	Comments
1	DL AAS Zone	8.4.4.6	o	N	N	
2	UL AAS Zone	8.4.4.6	o	N	N	

4.1.10.2 Supported Permutation in DL

TABLE 51

Supported Permutation in DL

Item	Description	Reference	Status	BS required	MS required	Comments
1	PUSC	8.4.4.6.1 and 8.4.6.1.2.1	oi	N	N	Support for all the items in this table is conditional to the support of DL AAS Zone
2	FUSC	8.4.4.6.1 and 8.4.6.1.2.2	oi	N	N	
3	Optional PUSC	8.4.4.6.1 and 8.4.6.1.2.3	oi	N	N	

TABLE 51 (end)

Item	Description	Reference	Status	BS required	MS required	Comments
4	AMC 2x3	8.4.4.6.1 and 8.4.6.3	oi	N	N	
5	TUSC 1	8.4.4.6.1 and 8.4.6.1.2.4	oi	N	N	
6	TUSC 2	8.4.4.6.1 and 8.4.6.1.2.5	oi	N	N	

4.1.10.3 Supported Permutation in UL

TABLE 52

Supported Permutation in UL

Item	Description	Reference	Status	BS required	MS required	Comments
1	PUSC	8.4.4.6.1 and 8.4.6.2.1	oi	N	N	Support for all the items in this table is conditional to the support of AAS Zone
2	Optional PUSC	8.4.4.6.1 and 8.4.6.2.5	oi	N	N	
3	AMC 2x3	8.4.4.6.1 and 8.4.6.3	oi	N	N	

4.1.10.4 AAS DL Preamble

TABLE 53

AAS DL Preamble

Item	Description	Reference	Status	BS required	MS required	Comments
1	Frequency shifted	8.4.4.6.4.1	o	N	N	
2	Time shifted	8.4.4.6.4.1	o	N	N	
3	PHY Modifier	8.4.5.3.11	o	N	N	
4	DL AAS Preamble Support	8.4.4.6.4.1	o	N	N	Support for 0-3 symbols

4.1.10.5 AAS UL Preamble

TABLE 54
AAS UL Preamble

Item	Description	Reference	Status	BS required	MS required	Comments
1	Frequency shifted	8.4.4.6.4.2	o	N	N	
2	Time shifted	8.4.4.6.4.2	o	N	N	
3	Physical Modifier	8.4.5.4.14	o	N	N	
4	UL AAS Preamble Power Control	8.4.4.6.4	o	N	N	
5	UL AAS Preamble Support	8.4.4.6.4.1	o	N	N	Support for 0-3 symbols

4.1.10.6 Diversity MAP Scan

TABLE 55
Diversity MAP Scan

Item	Description	Reference	Status	BS required	MS required	Comments
1	Diversity-Map Scan	8.4.4.6.2	o	N	N	

4.1.10.7 DL AAS-SDMA Pilots

TABLE 56
DL AAS-SDMA Pilots

Item	Description	Reference	Status	BS required	MS required	Comments
1	AMC AAS-SDMA with All SDMA Pilots	8.4.6.3.3	o	N	N	
2	PUSC AAS-SDMA	8.4.8.1.2.1.1	o	N	N	
3	TUSC1 AAS-SDMA	8.4.6.1.2.6	o	N	N	
4	TUSC2 AAS-SDMA	8.4.6.1.2.6	o	N	N	
5	AMC AAS-SDMA with SDMA pilots A and B only	8.4.6.3.3	o	N	N	

4.1.10.8 UL AAS-SDMA Pilots

TABLE 57
UL AAS_SDMA Pilots

Item	Description	Reference	Status	BS required	MS required	Comments
1	AMC AAS-SDMA with All SDMA Pilots	8.4.6.3.3	o	N	N	
2	PUSC AAS-SDMA	8.4.8.1.5	o	N	N	
3	Optional PUSC AAS-SDMA	8.4.8.4.1	o	N	N	
4	AMC AAS-SDMA with SDMA pilots A and B only	8.4.6.3.3	o	N	N	

4.1.10.9 AAS Private MAP

TABLE 58
AAS Private MAP

Item	Description	Reference	Status	BS required	MS required	Comments
1	AAS Private MAP	8.4.5.6	o	N	N	
2	Reduced Private MAP	8.4.5.8	o	N	N	
3	Reduced Private MAP Chain Support	8.4.5.8	o	N	N	

4.1.10.10 AAS-FBCK-REQ/RSP support

TABLE 59
AAS_FBCK/RSP Support

Item	Description	Reference	Status	BS required	MS required	Comments
1	AAS-FBCK-REQ/RSP support	8.4.5.7	o	N	N	

4.1.11 STC/MIMO

4.1.11.1 Supported Features for DL PUSC

TABLE 60
Supported Features for DL PUSC

Item	Description	Reference	Status	BS required	MS required	Comments
1	FHDC	8.4.8.1.3	o	N	N	
2	2-antenna, matrix A	8.4.8.1.2.1.1 8.4.8.1.4	o	IO-MIMO	Y	The information symbols are mapped serially in an increasing order, first on the sub-carriers of the first antenna, followed by the sub-carriers of the second antenna.
3	2-antenna, matrix B, vertical encoding	8.4.8.1.4	o	IO-MIMO	Y	The first information symbol is mapped on the first sub-carrier of the first antenna, the second information symbol is mapped on the first sub-carrier of the second antenna etc.
4	2-antenna, matrix B, horizontal encoding	8.4.8.1.4	o	N	N	two modulation and coding modules
5	4-antenna enhancement using directivity	8.4.8.1.6	o	N	N	
6	4-antenna, matrix A	8.4.8.2.1 8.4.8.2.3	o	N	N	
7	4-antenna, matrix B, vertical encoding	8.4.8.2.3	o	N	N	
8	4-antenna, matrix B, horizontal encoding	8.4.8.2.3	o	N	N	
9	4-antenna, matrix C, vertical encoding	8.4.8.2.3	o	N	N	
10	4-antenna, matrix C, horizontal encoding	8.4.8.2.3	o	N	N	

4.1.11.2 Supported Features for DL FUSC

TABLE 61
Supported Features for DL FUSC

Item	Description	Reference	Status	BS required	MS required	Comments
1	FHDC		o	N	N	
2	2-antenna, matrix A	8.4.8.1.2.1.2 8.4.8.1.4	o	N	N	
3	2-antenna, matrix B, vertical encoding	8.4.8.1.4	o	N	N	
4	2-antenna, matrix B, horizontal encoding	8.4.8.1.4	o	N	N	
5	4-antenna enhancement using directivity	8.4.8.1.6	o	N	N	
6	4-antenna, matrix A	8.4.8.2.2	o	N	N	
7	4-antenna, matrix B, vertical encoding	8.4.8.2.3	o	N	N	
8	4-antenna, matrix B, horizontal encoding	8.4.8.2.3	o	N	N	
9	4-antenna, matrix C, vertical encoding	8.4.8.2.3	o	N	N	
10	4-antenna, matrix C, horizontal encoding	8.4.8.2.3	o	N	N	

4.1.11.3 Supported Features for DL Optional FUSC

TABLE 62
Supported Features for DL Optional FUSC

Item	Description	Reference	Status	BS required	MS required	Comments
1	2-antenna, matrix A	8.4.8.3.1.1 8.4.8.3.1.2.2 8.4.8.3.3	o	N	N	2 consecutive OFDMA symbols
2	2-antenna, matrix B, vertical encoding	8.4.8.3.1.2.2 8.4.8.3.3	o	N	N	
3	2-antenna, matrix B, horizontal encoding	8.4.8.3.1.2.2 8.4.8.3.3	o	N	N	
4	2-antenna, matrix C	8.4.8.3.1.2.2 8.4.8.3.3	o	N	N	
5	3-antenna, matrix A	8.4.8.3.1.1 8.4.8.3.1.2.2 8.4.8.3.4	o	N	N	2 logical sub-carriers over 2 consecutive symbols
6	3-antenna, matrix B	8.4.8.3.1.1 8.4.8.3.1.2.2 8.4.8.3.4	o	N	N	
7	3-antenna, matrix C	8.4.8.3.1.1 8.4.8.3.1.2.2 8.4.8.3.4	o	N	N	

TABLE 62 (end)

Item	Description	Reference	Status	BS required	MS required	Comments
8	4-antenna, matrix A	8.4.8.3.1.1 8.4.8.3.1.2.2 8.4.8.3.5	o	N	N	2 logical sub-carriers over 2 consecutive symbols
9	4-antenna, matrix B, vertical encoding	8.4.8.3.1.1 8.4.8.3.1.2.2 8.4.8.3.5	o	N	N	
10	4-antenna, matrix B, horizontal encoding	8.4.8.3.1.1 8.4.8.3.1.2.2 8.4.8.3.5	o	N	N	
11	4-antenna, matrix C, vertical encoding	8.4.8.3.1.1 8.4.8.3.1.2.2 8.4.8.3.5	o	N	N	
12	4-antenna, matrix C, horizontal encoding	8.4.8.3.1.1 8.4.8.3.1.2.2 8.4.8.3.5	o	N	N	

4.1.11.4 Supported Features for DL Optional AMC

TABLE 63

Supported Features for DL Optional AMC

Item	Description	Reference	Status	BS required	MS required	Comments
1	2-antenna, matrix A	8.4.8.3.1.1 8.4.8.3.1.2.1 8.4.8.3.3	o	N	N	2 bins over 6 OFDMA symbols
2	2-antenna, matrix B, vertical encoding	8.4.8.3.1.2.1 8.4.8.3.3	o	N	N	Figure 251i
3	2-antenna, matrix B, horizontal encoding	8.4.8.3.1.2.1 8.4.8.3.3	o	N	N	Figure 251i
4	2-antenna, matrix C	8.4.8.3.1.2.1 8.4.8.3.3	o	N	N	
5	3-antenna, matrix A	8.4.8.3.1.1 8.4.8.3.1.2.1 8.4.8.3.4	o	N	N	2 adjacent sub-carriers over 2 consecutive symbols
6	3-antenna, matrix B	8.4.8.3.1.1 8.4.8.3.1.2.1 8.4.8.3.4	o	N	N	
7	3-antenna, matrix C	8.4.8.3.1.1 8.4.8.3.1.2.2 8.4.8.3.4	o	N	N	
8	4-antenna, matrix A	8.4.8.3.1.1 8.4.8.3.1.2.2 8.4.8.3.5	o	N	N	2 adjacent sub-carriers over 2 consecutive symbols
9	4-antenna, matrix B, vertical encoding	8.4.8.3.1.1 8.4.8.3.1.2.2 8.4.8.3.5	o	N	N	

TABLE 63 (end)

Item	Description	Reference	Status	BS required	MS required	Comments
10	4-antenna, matrix B, horizontal encoding	8.4.8.3.1.1 8.4.8.3.1.2.2 8.4.8.3.5	o	N	N	
11	4-antenna, matrix C, vertical encoding	8.4.8.3.1.1 8.4.8.3.1.2.2 8.4.8.3.5	o	N	N	
12	4-antenna, matrix C, horizontal encoding	8.4.8.3.1.1 8.4.8.3.1.2.2 8.4.8.3.5	o	N	N	

4.1.11.5 Supported Features for DL PUSC-ASCA

TABLE 64

Supported Features for DL PUSC-ASCA

Item	Description	Reference	Status	BS required	MS required	Comments
1	STC/MIMO for PUSC-ASCA	8.4.8.3.2	o	N	N	

4.1.11.6 Supported Features in UL PUSC

TABLE 65

Supported Features in UL PUSC

Item	Description	Reference	Status	BS required	MS required	Comments
1	2-antenna, matrix A	8.4.8.1.5	o	N	N	
2	2-antenna, matrix B, vertical encoding	8.4.8.1.5	o	N	N	
3	2-antenna, matrix B, horizontal encoding	8.4.8.1.5	o	N	N	pp. 574 in [2]
4	Collaborative SM for two MS with single transmit antenna	8.4.8.1.5	o	IO-MIMO	Y	
5	Collaborative SM for two MS with two transmit antennas	8.4.8.1.5	o	N	N	Pilot pattern C and D defined in [2]

4.1.11.7 Supported Features in UL Optional PUSC

TABLE 66
Supported Features in UL Optional PUSC

Item	Description	Reference	Status	BS required	MS required	Comments
1	2-antenna, matrix A	8.4.8.4.1 8.4.8.4.2 8.4.8.4.3	o	N	N	2 consecutive slots
2	2-antenna, matrix B, vertical encoding	8.4.8.4.1 8.4.8.4.2 8.4.8.4.3	o	N	N	
3	2-antenna, matrix B, horizontal encoding	8.4.8.4.1 8.4.8.4.2 8.4.8.4.3	o	N	N	
4	Collaborative SM for two MS with single transmit antenna	8.4.8.4.1 8.4.8.4.2 8.4.8.4.3	o	N	N	

4.1.11.8 Supported Features in UL Optional AMC

TABLE 67
Supported Features in UL Optional AMC

Item	Description	Reference	Status	BS required	MS required	Comments
1	2-antenna, matrix A	8.4.8.4.1 8.4.8.4.2 8.4.8.4.3	o	N	N	Same AMC pilots as in DL 1x6 format
2	2-antenna, matrix B, vertical encoding	8.4.8.4.1 8.4.8.4.2 8.4.8.4.3	o	N	N	
3	2-antenna, matrix B, horizontal encoding	8.4.8.4.1 8.4.8.4.2 8.4.8.4.3	o	N	N	
4	Collaborative SM for two MS with single transmit antenna	8.4.8.4.1 8.4.8.4.2 8.4.8.4.3	o	N	N	

4.1.11.9 Closed-Loop MIMO

TABLE 68
Closed-loop MIMO

Item	Description	Reference	Status	BS required	MS required	Comments
1	Antenna Grouping w/ 3 Tx matrix A	8.4.5.4.10.3 8.4.8.3.4.1	o	N	N	Table 298
2	Antenna Grouping w/ 3 Tx matrix B	8.4.5.4.10.3 8.4.8.3.4.2	o	N	N	
3	Antenna Selection w/ 3 Tx matrix C	8.4.5.4.10.3, 8.4.8.3.4.3	o	N	N	Table 298a Table 317f
4	Antenna Grouping w/ 4 Tx matrix A	8.4.5.4.10.3 8.4.8.3.5.1	o	N	N	Table 298
5	Antenna Grouping w/ 4 Tx matrix B	8.4.5.4.10.3 8.4.8.3.5.2	o	N	N	
6	Antenna Selection w/ 4 Tx matrix C	8.4.5.4.10.3, 8.4.8.3.5.3	o	N	N	Table 298a Table 317g
7	Codebook Based Precoding	8.4.8.3.6, 8.4.5.4.11	o	N	N	
8	Quantized Weight Feedback	8.4.5.4.10.2	o	N	N	4-bit CQICH
9	Quantized Weight Feedback	8.4.5.4.10.6	o	N	N	6-bit CQICH

4.1.11.10 MIMO Feedback

TABLE 69
MIMO Feedback

Item	Description	Reference	Status	BS required	MS required	Comments
1	Fast MIMO Feedback (complex weights) w/ 4 bits	8.4.5.4.10.2	o	N	N	
2	Mode Selection Feedback w/ 4 bits	8.4.5.4.10.3	o	N	N	
3	3-bit MIMO Fast Feedback	8.4.5.4.10.4	o	N	N	
4	Fast DL measurement feedback w/ more than one Rx antennas	8.4.5.4.10.5 8.4.5.4.10.6 8.4.5.4.10.1	o	IO-MIMO	Y	
5	Fast MIMO Feedback (complex weights) w/ 6 bits	8.4.5.4.10.7	o	N	N	
6	Mode Selection Feedback w/ 6 bits	8.4.5.4.10.8	o	IO-MIMO	Y	

4.1.11.11 MIMO Midamble

TABLE 70
MIMO Midamble

Item	Description	Reference	Status	BS required	MS required	Comments
1	2 Tx	8.4.8.5.2.1	o	N	N	
2	3 Tx	8.4.8.5.2.2	o	N	N	
3	4 Tx	8.4.8.5.2.2	o	N	N	

4.1.11.12 MIMO Soft-Handover Based Macro-diversity

TABLE 71
MIMO Soft-Handover Macro-diversity

Item	Description	Reference	Status	BS required	MS required	Comments
1	Macro MIMO w/ MIMO_in_another_BS_IE()	8.4.8.2.4	o	N	N	
2	Macro MIMO w/ Macro_MIMO_DL_Basic_I E()	8.4.8.2.4	o	N	N	

4.1.11.13 H-ARQ Downlink Support for MIMO

TABLE 72
H-ARQ Downlink Support for MIMO

Item	Description	Reference	Status	BS required	MS required	Comments
1	MIMO DL Chase	8.4.5.3.21	o	IO-MIMO	Y	MIMO DL Chase is applicable to CC, CTC or LDPC from the perspective of IEEE 802.16. In this document, the feature is only used in CTC mode.
2	MIMO DL IR	8.4.5.3.21 8.4.8.3.1.2.3	o	N	N	w/ CTC
3	MIMO DL IR for Convolutional Code	8.4.5.3.21	o	N	N	
4	MIMO DL STC	8.4.5.3.21.1	o	N	N	

4.1.11.14 H-ARQ Uplink Support for MIMO

TABLE 73

H-ARQ Uplink Support for MIMO

Item	Description	Reference	Status	BS required	MS required	Comments
1	MIMO UL Chase	8.4.5.4.24	o	IO-MIMO	Y	MIMO DL Chase is applicable to CC, CTC or LDPC from the perspective of IEEE 802.16. In this document, the feature is only used in CTC mode.
2	MIMO UL IR	8.4.5.4.24	o	N	N	
3	MIMO UL IR for Convolutional Code	8.4.5.4.24	o	N	N	
4	MIMO UL STC	8.4.8.4.24.2	o	N	N	

4.1.12 HO Support in PHY

4.1.12.1 FBSS

TABLE 74

Fast Base Station Switching

Item	Description	Reference	Status	BS required	MS required	Comments
1	Anchor BS Report for FBSS	8.4.5.4.10.8 and 8.4.5.4.23	o	N	N	Anchor BS CQI and switch indication via CQICH

4.1.12.2 MIMO Soft-handover based macro-diversity transmission

TABLE 75

MIMO Soft-handover based macro-diversity transmission

Item	Description	Reference	Status	BS required	MS required	Comments
1	MIMO Soft-handover based macro-diversity transmission	8.4.8.2.4	o	N	N	
2	Support Macro Diversity Handover using DL soft combining	8.4.5.3.6	o	N	N	
3	Support Macro Diversity Handover using DL burst in another segment in PUSC mode	8.4.5.3.13	o	N	N	

TABLE 75 (end)

Item	Description	Reference	Status	BS required	MS required	Comments
4	Support anchor BS indication of DL data burst in active BS	8.4.5.3.14	o	N	N	
5	Support of active BS indication of DL data burst in anchor BS	8.4.5.3.15	o	N	N	
6	Support of CID translation between Anchor BS and Active BS	8.4.5.3.16	o	N	N	

4.1.12.3 UL Macro diversity

TABLE 76

UL Macro Diversity

Item	Description	Reference	Status	BS required	MS required	Comments
1	UL Macro diversity	8.4.5.4.17	o	N	N	To be used with UL PUSC Burst Allocation in Other Segment IE
2	Support of Macro Diversity Handover using UL transmission in another segment in PUSC mode	8.4.5.4.17	o	N	N	
3	Support of anchor BS indication of UL data burst in active BS	8.4.5.4.18	o	N	N	
4	Support of active BS indication of UL data burst in anchor BS	8.4.5.4.19	o	N	N	

4.2 Performance/Fidelity Requirements

4.2.1 MS Minimum Performance

– SSTTG/SSRTG

TABLE 77

SSTTG/SSRTG

Item	Description	Reference	Status	MS required	MS values	Comments
1	SSTTG	8.4.4.2	m	Y	50 μ sec	
2	SSRTG	8.4.4.2	m	Y	50 μ sec	

– Max DL Concurrent Bursts

TABLE 78

Maximum DL Concurrent Bursts

Item	Description	Reference	Status	MS required	MS values	Comments
1	Max Concurrent Burst	8.4.4.2 and 11.7.8.13	m	Y	10	

– Max Bursts in DL Subframe

TABLE 79

Max Bursts in DL Subframe

Item	Description	Reference	Status	MS required	MS values	Comments
1	Max Burst in Frame	8.4.4.2	m	Y	16	

– Max Number of Zones in DL/UL Subframe

TABLE 80

Max Number of Zones in DL and UL Subframes

Item	Description	Reference	Status	MS required	MS values	Comments
1	Maximum numbers of zones UL	8.4.4.2		Y	3	The number is the same as the number of Zone Switch IEs plus 1
2	Maximum numbers of zones DL	8.4.4.2	Max 8	Y	5	The number is the same as the number of Zone Switch IEs plus 1

– Measurement Processes and CQI Channels

TABLE 81
Measurement Processes and CQI Channels

Item	Description	Reference	Status	MS required	MS values	Comments
1	Maximum numbers of CQI Channels transmitted by an MS per frame	8.4.5.4.10		Y	2	
2	Maximum number of concurrent CINR measurement processes	8.4.5.4.10		Y	2	Maximum number of CINR measurement processes (for physical or effective CINR) that are active concurrently. A CINR measurement process is active from the frame in which it was allocated by a CQICH_Alloc_IE() until the frame in which the last CQI periodic transmission is sent or in which the CQI was de-allocated by the BS.

– Max H-ARQ Bursts in DL/UL Subframe

TABLE 82
Max H-ARQ Bursts

Item	Description	Reference	Status	MS required	MS values	Comments
1	Max Burst in DL Subframe with H-ARQ	8.4.4.2, 8.4.15.1.3, 11.8.3.7.15	o	Y	Category 1 = 2, Category 2 = 5, Category 3 = 5, Category 4 = 5	Status for the four categories is oi, i.e. support for values corresponding to one or more of the categories from the set shall be supported in correlation to the categories of Section 4.1.5.1.
2	Max Burst in UL Subframe with H-ARQ	8.4.4.2, 8.4.15.1.3, 11.8.3.7.15	o	Y	Category 1 = 2, Category 2 = 2, Category 3 = 2, Category 4 = 2	

4.2.1 Transmit Requirements

Note: unless specified otherwise, requirement applies to both BS and MS.

TABLE 83
Transmitter Requirements

Item	Requirement	Reference	Values specified	Values required
1	BS Tx dynamic Range	8.4.12.1		10 dB
2	MS Tx dynamic Range	8.4.12.1		45 dB
3	MS Tx power level min adjustment step	8.4.12.1	1 dB	1 dB
4	MS Tx power level min relative step accuracy	8.4.12.1	± 0.5 dB	± 0.5 dB
5	Spectral flatness	8.4.12.2	$\leq \pm 2$ dB for spectral lines from $-N_{used}/4$ to -1 and $+1$ to $N_{used}/4$ Within $+2/-4$ dB for spectral lines from $-N_{used}/2$ to $-N_{used}/4$ and $+N_{used}/4$ to $N_{used}/2$	$\leq \pm 2$ dB for spectral lines from $-N_{used}/4$ to -1 and $+1$ to $N_{used}/4$ Within $+2/-4$ dB for spectral lines from $-N_{used}/2$ to $-N_{used}/4$ and $+N_{used}/4$ to $N_{used}/2$
6	Power difference between adjacent subcarriers	8.4.12.2	≤ 0.1 dB	≤ 0.1 dB
7	BS Tx reference timing accuracy	8.4.12.4, 8.4.10.1.1	Tx downlink radio frame shall be time-aligned with the 1 pps timing pulse	1 μ sec
8	Tx relative constellation error	8.4.12.3.1 for BS and 8.4.12.3.2 for MS	QPSK-1/2 ≤ -15.0 dB QPSK-3/4 ≤ -18.0 dB 16-QAM-1/2 ≤ -20.5 dB 16-QAM-3/4 ≤ -24.0 dB 64-QAM-1/2 ≤ -26.0 dB (if 64-QAM supported) 64-QAM-2/3 ≤ -28.0 dB (if 64-QAM supported) 64-QAM-3/4 ≤ -30.0 dB (if 64-QAM supported)	≤ -15.0 dB ≤ -18.0 dB ≤ -20.5 dB ≤ -24.0 dB ≤ -26.0 dB ≤ -28.0 dB ≤ -30.0 dB

4.2.2 Receiver Requirements

TABLE 84
Receiver Requirements

Item	Requirement	Reference	Values specified		Values required
1	Min SNR requirements for BER = 10^{-6} with CTC in AWGN channel (the min SNR requirements are used along with Eq. 149b to define sensitivity specifications for CTC)	8.4.13.1	QPSK-1/2 with 60 bytes block size	2.9 dB	
			QPSK-3/4 with 54 bytes block size	6.3 dB	
			16-QAM-1/2 with 60 bytes block size	8.6 dB	
			16-QAM-3/4 with 54 bytes block size	12.7 dB	
			64-QAM-1/2 with 54 bytes block size (if 64-QAM supported)	13.8 dB	
			64-QAM-2/3 with 48 bytes block size (if 64-QAM supported)	16.9 dB	
			64-QAM-3/4 with 54 bytes block size (if 64-QAM supported)	18 dB	
			64-QAM-5/6 with 60 bytes block size (if 64-QAM supported)	19.9 dB	
2	MS Rx max input level on-channel reception tolerance	8.4.13.3.1	-30 dB		-30 dB
3	BS Rx Max input level on-channel reception tolerance	8.4.13.3.2	-45 dBm		-45 dBm
4	MS Rx max input level on-channel damage tolerance	8.4.13.4.1	0 dB		0 dB
5	BS Rx Max input level on-channel damage tolerance	8.4.13.4.2	-10 dBm		-10 dBm
6	Min adjacent channel rejection at BER = 10^{-6} for 3 dB degradation C/I	8.4.13.2	16-QAM-3/4	11 dB	11 dB
			64-QAM-2/3 (if 64-QAM supported)	4 dB	4 dB
7	Min alternate channel rejection at BER = 10^{-6} for 3 dB degradation C/I	8.4.13.2	16-QAM-3/4	30 dB	30 dB
			64-QAM-2/3 (if 64-QAM supported)	23 dB	23 dB
8	“Implementation loss plus Noise Figure” (dB) value assumed for MS for deriving receiver minimum sensitivity (equation 149b)	8.4.13.1	The min requirement for Implementation Loss and Noise Figure in [2] are 5 and 8 dB respectively.		13 dB NOTE – Eq. 149b of [2] shall be used for calculation of Rx sensitivity requirements where min SNR values for CC are given in Table 338 of [2] and the min SNR values for CTC mode are specified in the item 1 of this table

TABLE 84 (end)

Item	Requirement	Reference	Values specified	Values required
9	“Implementation loss plus Noise Figure” (dB) value assumed for BS for deriving receiver minimum sensitivity (equation 149b)	8.4.13.1	The min requirement for Implementation Loss and Noise Figure in [2] are 5 and 8 dB respectively.	13 dB NOTE – Eq. 149b of [2] shall be used for calculation of Rx sensitivity requirements where min SNR values for CC are given in Table 338 of [2] and the min SNR values for CTC mode are specified in the item 1 of this table

4.2.3 Frequency and Time Synchronization Requirements

TABLE 85

Frequency and Time Synchronization Requirements

Item	Requirement	Reference	Values specified	Values required	Comments
1	MS UL symbol timing accuracy	8.4.10.1.2	$\leq \pm (T_b/8)/4$	$\leq \pm (T_b/32)/4$	This requirement includes only the timing error due to MS component and not the effect of inaccuracy of the BS ranging feedback
2	BS reference frequency accuracy	8.4.14.1	$\leq \pm 2 \cdot 10^{-6}$	$\leq \pm 2 \cdot 10^{-6}$	
3	BS to BS frequency synchronization accuracy for hand-over	6.3.2.3.47	1% of OFDMA carrier spacing	1% of OFDMA subcarrier spacing	
4	MS to BS frequency synchronization tolerance	8.4.14.1	$\leq 2\%$ of the subcarrier spacing	$\leq 2\%$ of the subcarrier spacing	

MAC Profile

5.1 Profiles of BS and MS

5.1.1 PHS

TABLE 86

PHS

Item	Description	Reference	Status	BS required	MS required	Comments
1	PHS	5.2.3 5.2.3.1 5.2.3.2	o	Y	Y	

5.1.2 CS Options

TABLE 87
Convergence Sublayer Options

Item	Description	Reference	Status	BS required	MS required	Comments
1	Packet, IPv4	5.2.6, 11.13.19	oi	Y	Y	
2	Packet, IPv6	5.2.6, 11.13.19	oi	Y	Y	
3	Packet, 802.3/Ethernet	5.2.4, 11.13.19	oi	IO-ETH1	N*	* For MS, not required for WiMAX™ certified label, only optionally certified
4	Packet, 802.1Q VLAN	5.2.5, 11.13.19	oi	N	N	
5	Packet, IPv4 over 802.3/Ethernet	5.2.6, 11.13.19	oi	IO-ETH2	N*	* For MS, not required for WiMAX™ certified label, only optionally certified
6	Packet, IPv6 over 802.3/Ethernet	5.2.6, 11.13.19	oi	IO-ETH3	N*	* For MS, not required for WiMAX™ certified label, only optionally certified
7	Packet, IPv4 over 802.1Q VLAN	5.2.6, 11.13.19	oi	N	N	
8	Packet, IPv6 over 802.1Q VLAN	5.2.6, 11.13.19	oi	N	N	
9	ATM	5.2.6, 11.13.19	oi	N	N	
10	Packet, IPv4 with Header Compression (ROHC)	5.2.6, 11.13.19	oi	Y	Y	
11	Packet, IPv4 with Header Compression (ECRTP)	5.2.6, 11.13.19	oi	N	N	
12	Packet, IPv6 with Header Compression (ROHC)	5.2.6, 11.13.19	oi	Y	Y	
13	Packet, IPv6 with Header Compression (ECRTP)	5.2.6, 11.13.19	oi	N	N	
14	Packet, IPv4 over 802.3/Ethernet with Header Compression (ROHC)	5.2.6, 11.13.19	oi	N	N	
15	Packet, IPv4 over 802.3/Ethernet with Header Compression (ECRTP)	5.2.6, 11.13.19	oi	N	N	
16	Packet, IPv6 over 802.3/Ethernet with Header Compression (ROHC)	5.2.6, 11.13.19	oi	N	N	

TABLE 87 (end)

Item	Description	Reference	Status	BS required	MS required	Comments
17	Packet, IPv6 over 802.3/Ethernet with Header Compression (ECRTP)	5.2.6, 11.13.19	oi	N	N	
18	Packet, IPv4 over 802.1Q VLAN with Header Compression (ROHC)	5.2.6, 11.13.19	oi	N	N	
19	Packet, IPv4 over 802.1Q VLAN with Header Compression (ECRTP)	5.2.6, 11.13.19	oi	N	N	
20	Packet, IPv6 over 802.1Q VLAN with Header Compression (ROHC)	5.2.6, 11.13.19	oi	N	N	
21	Packet, IPv6 over 802.1Q VLAN with Header Compression (ECRTP)	5.2.6, 11.13.19	oi	N	N	
NOTE – At least one of options shall be implemented.						

5.1.3 MAC PDU formats

TABLE 88

MAC PDU Formats

Item	Description	Reference	Status	BS required	MS required	Comments
1	Reassembly at Rx	6.3.2.2.1, 6.3.3.3.2	m	Y	Y	
2	Fragmentation at Tx	6.3.2.2.1, 6.3.3.3.2	m	Y	Y	Capability is mandatory
3	Packing of fixed-length MAC SDUs	6.3.2.2.3, 6.3.3.4	o	N	N	
4	Packing of variable-length MAC SDUs at MS	6.3.2.2.3, 6.3.3.4	o	N/A	Y	Unpacking is mandatory. Refer 6.3.3.4.
5	Packing ARQ Feedback Payload	6.3.3.4.3	o	Y	Y	“ARQ Feedback Payload is treated like any other payload” (Refer to 6.3.3.4.3 of [1]) Unpacking of ARQ Feedback Payload is mandatory if ARQ implemented/enabled at the connection

TABLE 88 (end)

Item	Description	Reference	Status	BS required	MS required	Comments
6	Extended subheader support	6.3.2.2.7, 11.7.5	o	Y	Y	Extended subheader support is negotiated
7	Capability of receiving bandwidth requests using Grant management Subheader	6.3.2.2.2	o	Y	N/A	
8	3-bit FSN support		o	N	N	See [2]. Negotiated during SBC, 11 bits is default

5.1.4 MAC Support of PHY layer

5.1.4.1 Feedback Mechanism

TABLE 89

Feedback Mechanism

Item	Description	Reference	Status	BS required	MS required	Comments
1	Feedback Header	6.3.2.1.2.2.1	o	Y	Y	
2	FAST-FEEDBACK allocation subheader	6.3.2.2.6	o	N	N	
3	MIMO mode feedback extended subheader	8.4.5.4.10.3, 6.3.2.2.7.4	o	N	N	
4	Feedback request extended subheader	6.3.2.2.7.3	o	N	N	
5	Mini-Feedback extended subheader	6.3.2.2.7.6	o	N	N	
6	Feedback Polling IE	8.4.5.4.28	o	Y	Y	
7	PHY channel report header	6.3.2.1.2.1.5	o	N	N	
8	UL Tx Power Report extended subheader	6.3.2.2.7.5	o	N	N	

5.1.5 Multicast connection

TABLE 90

Multicast Connection

Item	Description	Reference	Status	BS required	MS required	Comments
1	Multicast traffic connection	6.3.13	o	Y	Y	

5.1.6 Network Entry

TABLE 91
Network Entry

Item	Description	Reference	Status	BS required	MS required	Comments
1	SS management support	6.3.9.9.1, 6.3.9.10-12, 6.3.2.3.28-29, 11.7.2	o	N	N	
2	IP management mode	11.7.3	o	N	N	Conditional based on item 1

5.1.7 ARQ

TABLE 92
ARQ

Item	Description	Reference	Status	BS required	MS required	Comments
1	ARQ implementation	6.3.4	o	Y	Y	All items below are conditional dependently on ARQ implementation
2	ARQ ACK type 0 – Selective ACK entry	6.3.4.2, 11.7.23	o	N	N	Negotiable over REG-REQ/RSP (11.7.23 ARQ-ACK Type)
3	ARQ ACK type 1 – Cumulative ACK entry	6.3.4.2, 11.7.23	o	Y	Y	Negotiable over REG-REQ/RSP (11.7.23 ARQ-ACK Type)
4	ARQ ACK type 2 – Cumulative with Selective ACK entry	6.3.4.2, 11.7.23	o	Y	Y	Negotiable over REG-REQ/RSP (11.7.23 ARQ-ACK Type)
5	ARQ ACK type 3 – Cumulative ACK with Block Sequence ACK	6.3.4.2, 11.7.23	o	Y	Y	Negotiable over REG-REQ/RSP (11.7.23 ARQ-ACK Type)

5.1.8 MAC support for H-ARQ

TABLE 93
MAC Support for HARQ

Item	Description	Reference	Status	BS required	MS required	Comments
1	HARQ Support	6.3.17	o	Y	Y	All items below are conditional dependently on HARQ support
2	HARQ Buffer Negotiation Capability	11.8.3.7.19	o	Y	Y	
3	HARQ Channel mapping	6.3.17, 11.13.32	o	Y	Y	Determined by BS
4	Capability of DL HARQ channels Number negotiation	11.8.3.7.2	o	Y	Y	
5	Capability of UL HARQ channels Number negotiation	11.8.3.7.3	o	Y	Y	
6	Capability of HARQ ACK delay negotiation in DL transmission	11.4.1	o	Y	Y	
7	Capability of HARQ ACK delay negotiation in UL transmission	11.3.1	o	Y	Y	
8	PDU SN extended subheader for HARQ reordering	11.13.33	o	Y	Y	

5.1.9 QoS

TABLE 94
QoS

Item	Description	Reference	Status	BS required	MS required	Comments
1	Dynamic service flow creation – BS – initiated	6.3.14.7.1.2	m	Y	Y	
2	Dynamic service flow creation – SS – initiated	6.3.14.7.1.1	o	Y	Y	
3	Dynamic service flow change – BS – initiated	6.3.14.9.4.2	m	Y	Y	
4	Dynamic service flow change – SS – initiated	6.3.14.9.4.1	o	Y	Y	
5	Dynamic service flow deletion – BS – initiated	6.3.14.9.5.2	m	Y	Y	
6	Dynamic service flow deletion – SS – initiated	6.3.14.9.5.1	o	Y	Y	

5.1.10 Data delivery services for mobile network

TABLE 95

Data Delivery Services for Mobile Network

Item	Description	Reference	Status	BS required	MS required	Comments
1	Unsolicited Grant service (UGS)	6.3.20.1.1, 6.3.5.2.1	o	Y	Y	
2	Real-Time Variable Rate (RT-VR) Service	6.3.20.1.2, 6.3.5.2.2	o	Y	Y	
3	Non-Real-Time Variable Rate (NRT-VR) Service	6.3.20.1.3, 6.3.5.2.3	o	Y	Y	
4	Best Effort (BE) Service	6.3.20.1.4, 6.3.5.2.4	o	Y	Y	
5	Extended Real-Time Variable Rate (ERT-VR) service	6.3.20.1.5, 6.3.5.2.2.1	o	Y	Y	

5.1.11 Request-Grant mechanism

TABLE 96

Request-Grant Mechanism

Item	Description	Reference	Status	BS required	MS required	Comments
1	Incremental bandwidth request using BW request header	6.3.6.1	o	Y	Y	
2	Aggregate bandwidth request using BW request header	6.3.6.1	pm	Y	Y	[2] mistakenly does not request periodically to transmit aggregate bandwidth requests
3	Bandwidth request using Grant Management Subheader	6.3.2.2.2	o	Y	Y	
4	Multicast Polling Assignment Request/response	6.3.2.3.18-19	o	N	N	
5	Request-Grant mechanism combined with CINR report	6.3.2.1.2.1.3	o	N	N	
6	Request-Grant mechanism combined with UL Tx power report	6.3.2.1.2.1.2	o	Y	Y	
7	CQICH allocation request using CQICH allocation request header	6.3.2.1.2.1.4	o	Y	Y	

5.1.12 Neighbour Advertisement

TABLE 97

Neighbour Advertisement

Item	Description	Reference	Status	BS required	MS required	Comments
1	Neighbour Advertisement	6.3.2.3.47	o	Y	Y	All items below are conditional dependently on Neighbour Advertisement implementation
2	Support BS index at the BS (Use BS index instead of BSID) in Scan/HO related messages, as numbered in MOB_NBR-ADV	6.3.2.3.48-51, 6.3.2.3.53	o	Y	N/A	Applicable to MOB_SCN-REQ/RSP, MOB_SCAN-REPORT, MOB_xxHO-REQ/RSP BS may decide not to use the index
3	Support BS index at the MS (Use BS index instead of BSID) in Scan/HO related messages, as numbered in MOB_NBR-ADV	6.3.2.3.48-51, 6.3.2.3.53	pm	N/A	Y	Applicable to MOB_SCN-REQ/RSP, MOB_SCAN-REPORT, MOB_xxHO-REQ/RSP as BS may decide to use the index while MS has to support it

5.1.13 Scanning and Association

5.1.13.1 Scanning

TABLE 98

Scanning

Item	Description	Reference	Status	BS required	MS required	Comments
1	Scanning for cell selection (HO)	6.3.2.3.48-49	o	Y	Y	
2	MS Requests Scanning Interval Allocations from BS	6.3.2.3.48-49 6.3.21.1.2	o	Y	Y	BS shall respond to MOB_SCN-REQ message from mobile
3	Unsolicited Scanning Interval Allocation by BS	6.3.2.3.48-49, 6.3.21.1.2	o	Y	Y	
4	Event Triggered Scanning based on serving BS metrics	6.3.21.1.2	o	Y	Y	
5	MS autonomous neighbour cell scanning	8.4.13.1.3	o	N/A	Y	

5.1.13.2 Scan Reporting Type Support

TABLE 99
Scan Reporting Type Support

Item	Description	Reference	Status	BS required	MS required	Comments
1	Periodic reporting as indicated in MOB_SCN-RSP message	6.3.2.3.49, 11.4.1	o	Y	Y	
2	Event triggered reporting based on metric conditions	6.3.2.3.49, 11.4.1	o	Y	Y	

5.1.13.3 Association

TABLE 100
Association

Item	Description	Reference	Status	BS required	MS required	Comments
1	Support for association during scanning	6.3.21.1.3, 6.3.2.3.51	o	N	N	It is recommended to implement the following capabilities for MS: When switching to a different Frequency Assignment, the MS should be capable of independently (without ranging) perform timing, power, and frequency adjustments based on both downlink reception quality ("open loop ranging") and information in the DCD/UCD of the target BS.
2	Support "Ranging Parameters Validity Time" Indication (by MS)	11.20	o	N	N	

5.1.13.4 Association Type Support

TABLE 101
Association Type Support

Item	Description	Reference	Status	BS required	MS required	Comments
1	Uncoordinated Association (Level 0)	6.3.21.1.3.1 and 11.8.8	o	N	N	Conditioned on the support of association
2	Coordinated Association (level 1)	6.3.21.1.3.2 and 11.8.8	o	N	N	Conditioned on the support of association
3	NW Assisted Association Reporting (level 2)	6.3.21.1.3.3 and 11.8.8	o	N	N	Conditioned on the support of association This feature includes Reporting of Association Result.
4	Directed Association	6.3.21.1.3, 11.8.8	o	N	N	Conditioned on the support of association

5.1.13.5 HO/Scan/Report Trigger Metrics

TABLE 102
HO/Scan/Report Trigger Metrics

Item	Description	Reference	Status	BS required	MS required	Comments
1	Mean BS CINR	6.3.2.3.53, 11.8.7	o	Y	Y	Conditioned by HO and Scanning support
2	Mean BS RSSI	6.3.2.3.53, 11.8.7	o	Y	Y	Conditioned by HO and Scanning support
3	Relative Rx Delay	6.3.2.3.53, 11.8.7	o	N	N	Conditioned by HO and Scanning support
4	BS Round Trip Delay	6.3.2.3.53, 11.8.7	o	Y	Y	Conditioned by HO and Scanning support

5.1.14 MAC layer HO procedures

TABLE 103
MAC Layer HO Procedures

Item	Description	Reference	Status	BS required	MS required	Comments
1	General HO Support	6.3.22.2, 6.3.2.3.55	o	Y	Y	Following items are conditioned by this item
2	HO initiated by MS support at MS side	6.3.2.3.53	oi	N/A	Y	
3	HO initiated by MS support at BS side	6.3.2.3.53	pm	Y	N/A	
4	HO initiated by BS support at MS side	6.3.2.3.52	oi	N/A	Y	

TABLE 103 (end)

Item	Description	Reference	Status	BS required	MS required	Comments
5	HO initiated by BS support at BS side	6.3.2.3.52	o	Y	N/A	
6	HO Indication	6.3.2.3.55	o	Y	Y	
7	Cancellation of HO	6.3.22.2.3	o	Y	Y	Conditioned by support of HO Indication
8	Metric Triggered HO Requests	11.1.7 (Table 348g)	o	Y	Y	
9	Resource Retention Support	6.3.2.3.52, 6.3.2.3.54	o	Y	Y	
10	CDMA HO Ranging	6.3.10.3.3	o	Y	Y	
11	HO_ID support	6.3.2.3.52, 6.3.2.3.54	o	Y	Y	
12	Support negotiating of "HO authorization policy" during HO (i.e. between BSs)	6.3.2.3.52, 6.3.2.3.54	o	Y	Y	Using MOB_BSHO-REQ/RSP Does not request support of specific policy, just capability of negotiating.

5.1.15 HO Optimization

TABLE 104

HO Optimization

Item	Description	Reference	Status	BS required	MS required	Comments
1	HO Optimization Support	6.3.2.3.6, 6.3.21.2.7, 11.6	o	Y	Y	1) HO Optimization requires network support 2) All further features are conditioned by this item
2	Support Omission of SBC-REQ management messages	6.3.2.3.6, 6.3.21.2.7, 11.6	o	Y	Y	
3	Support Omission of PKM Authentication phase except TEK Phase	6.3.2.3.6, 6.3.21.2.7, 11.6	o	Y	Y	
4	Support Omission of PKM TEK creation phase during re-entry processing	6.3.2.3.6, 6.3.21.2.7, 11.6	o	Y	Y	
5	Support of Network Address Acquisition at secondary management connection	6.3.2.3.6, 6.3.21.2.7, 11.6	o	N	N	Meaningful only for managed MS

TABLE 104 (continued)

Item	Description	Reference	Status	BS required	MS required	Comments
6	Support of Time of Day Acquisition at secondary management connection	6.3.2.3.6, 6.3.21.2.7, 11.6	o	N	N	Meaningful only for managed MS
7	Support of TFTP Phase at secondary management connection	6.3.2.3.6, 6.3.21.2.7, 11.6	o	N	N	Meaningful only for managed MS
8	Support "Full State Sharing" – No exchange of network re-entry messages after ranging before resuming normal operations	6.3.2.3.6, 6.3.21.2.7, 11.6	o	Y	Y	
9	Notifying MS of DL data Pending	6.3.2.3.6, 6.3.21.2.7, 11.6	o	N	N	
10	Unsolicited SBC-RSP management message with updated capabilities information	6.3.2.3.6, 6.3.21.2.7, 11.6	o	Y	Y	
11	Unsolicited SBC- RSP message in same frame as RNG-RSP	6.3.2.3.6, 6.3.21.2.7	o	N	N	
12	Support SBC- RSP TLVs as part of RNG-RSP message	11.6	o	Y	Y	
13	Support Omission of REG-REQ during NW re-entry	6.3.2.3.6, 6.3.21.2.7, 11.6	o	Y	Y	
14	Unsolicited REG-RSP with updated capabilities information	6.3.2.3.6, 6.3.21.2.7, 11.6	o	Y	Y	
15	Unsolicited REG-RSP in same frame as RNG-RSP message	6.3.2.3.6, 6.3.21.2.7	o	N	N	
16	Support REG-RSP TLV as part of RNG-RSP message	11.6	o	Y	Y	
17	Support of ARQ continuation using SN report header after NW re-entry	6.3.2.3.6, 6.3.21.2.7, 11.6	o	Y	Y	Requires support of SDU SN extended subheader and SN_REPORT header
18	Support continuation of non-ARQ connection using SDU SN extended sub-header before handover and using SN report header after NW re-entry	6.3.2.2.7.1, 6.3.2.1.2.1.7, 6.3.22.2.8		Y	Y	

TABLE 104 (end)

Item	Description	Reference	Status	BS required	MS required	Comments
19	OFDMA Fast Ranging IE	8.4.5.4.21 6.3.21.2.4	o	Y	Y	
20	Support sending Bandwidth Request header with zero BR as a notification of MS's successful re-entry registration	6.3.21.2.7, 11.6	o	Y	Y	
21	Support sending at BS and receiving at MS traffic IP address refresh bit	11.6	o	Y	Y	

5.1.16 CID and SAID Update

CID update encodings (11.7.9) and SAID update encodings (11.7.18) may be used in RNG-RSP for reestablishment of connections.

TABLE 105

CID and SAID Update

Item	Description	Reference	Status	BS required	MS required	Comments
1	CID update from BS by RNG-RSP	11.7.9, 11.6	o	Y	N/A	
2	CID update in MS by RNG-RSP	11.7.9	pm	N/A	Y	
3	CID update from BS by REG-RSP	11.7.9	o	Y	N/A	
4	CID update in MS by REG-RSP	11.7.9	pm	N/A	Y	
5	Compressed CID update from BS by RNG-RSP	11.7.9.1	o	Y	N/A	
6	Compressed CID update in MS by RNG-RSP	11.7.9.1	pm	N/A	Y	
7	Compressed CID update from BS by REG-RSP	11.7.9.1	o	Y	N/A	
8	Compressed CID update in MS by REG-RSP	11.7.9.1	pm	N/A	Y	
9	SAID update from BS by RNG-RSP	11.7.17, 11.6	o	Y	N/A	
10	SAID update in MS by RNG-RSP	11.7.17, 11.6	pm	N/A	Y	
11	SAID update from BS by REG-RSP	11.7.17, 11.6	o	N	N/A	

TABLE 105 (end)

Item	Description	Reference	Status	BS required	MS required	Comments
12	SAID update in MS by REG-RSP	11.7.17, 11.6	pm	N/A	N	
13	SAID update from BS by SA-TEK-RSP	11.7.20	o	Y	N/A	
14	SAID update in MS by SA-TEK_RSP	11.7.20	o	N/A	Y	

5.1.17 Fast BS Switching

TABLE 106

Fast Base Station Switching

Item	Description	Reference	Status	BS required	MS required	Comments
1	General FBSS capability	6.3.21.3.2-4	o	N	N	All further features in the table are conditioned by this item
2	Diversity set Update initiated by MS	6.3.21.3.3	oi	N	N	If FBSS supported, Diversity set update is mandatory
3	Diversity set Update initiated by BS	6.3.21.3.3	oi	N	N	
4	Anchor BS Update using HO messages	6.3.21.3.4	oi	N	N	MS and BS supporting MDHO or FBSS shall implement at least one of the two mechanisms to perform Anchor BS update
5	Anchor BS Update using fast feedback channel	6.3.21.3.4	oi	N	N	
6	MS implementation of Fast feedback channel pre-allocated by MOB_BSHO-RSP or MOB_BSHO-REQ	6.3.21.3.4.2	pm	N	N	Fast-feedback channel shall be allocated by one of the following three methods, if fast-feedback channel is supported
7	BS implementation of Fast feedback channel pre-allocated by MOB_BSHO-RSP or MOB_BSHO-REQ	6.3.21.3.4.2	oi	N	N	

TABLE 106 (end)

Item	Description	Reference	Status	BS required	MS required	Comments
8	MS implementation of Fast feedback channel allocation by Anchor_Switch_IE	6.3.21.3.4.2	pm	N	N	
9	BS implementation of Fast feedback channel allocation by Anchor_Switch_IE	6.3.21.3.4.2	oi	N	N	
10	MS implementation of Fast feedback channel allocation by UL_MAP of new Anchor BS	6.3.21.3.4.2	pm	N	N	
11	BS implementation of Fast feedback channel allocation by UL_MAP of new Anchor BS	6.3.21.3.4.2	oi	N	N	
12	Monitoring of multiple MAPs from active BSs	11.7.11	o	N	N	
13	MS assisted coordination of DL transmission using SN report	6.3.21.3.5	o	N	N	
14	Cancellation of Diversity set update by MOB_HO-IND	6.3.21.3.3	o	N	N	
15	Rejection of Diversity set update by MOB_HO-IND	6.3.21.3.3	o	N	N	
16	SN report header	6.3.2.1.6	o	N	N	Conditional, dependent on SN feedback support
17	SDU SN extended subheader	6.3.2.2.7.1	o	N	N	Conditional, dependent on SN feedback support
18	SN request extended subheader	6.3.2.2.7.7	o	N	N	
19	SN feedback support	11.13.28	o	N	N	No text on optionality in standard, but it is negotiated on a per-connection basis in DS(A/C)-REQ and disabled by default. So it is effectively optional
20	MS autonomous neighbour cell scanning	8.4.13.1.3	m	N	N	This feature is conditioned by implementation of FBSS or MDHO

5.1.18 Macro Diversity Handover

TABLE 107

Macro Diversity Handover

Item	Description	Reference	Status	BS required	MS required	Comments
1	General MDHO capability	6.3.21.3.1, 6.3.21.3.3-4	o	N	N	Status for all following features is conditional, based on implementation of MDHO capability. Network support may be required to support this feature
2	Diversity set Update initiated by MS	6.3.21.3.3	oi	N	N	If MDHO supported, Diversity set update is mandatory
3	Diversity set Update initiated by BS	6.3.21.3.3	oi	N	N	If MDHO supported, Diversity set update is mandatory
4	Anchor BS Update using HO messages	6.3.21.3.4	oi	N	N	If MDHO supported, at least one of the items 4 and 5 shall be implemented
5	Anchor BS Update using fast feedback channel	6.3.21.3.4.2	oi	N	N	If MDHO supported, at least one of the items 4 and 5 shall be implemented
6	MOB_BSHO-RSP for acknowledgement for Diversity set update request from MS	6.3.21.3.1	m	N	N	
7	MDHO DL soft Combining supported with monitoring single MAP from anchor BS	8.4.5.3.14 8.4.5.3.15 8.4.5.4.18 8.4.5.4.19 11.7.11	o	N	N	
8	MDHO DL RF Combining supported with monitoring MAPs from all active BS	8.4.5.3.14 8.4.5.3.15 8.4.5.4.18 8.4.5.4.19 11.7.11	o	N	N	
9	MDHO DL soft combining supported with monitoring MAPs from all active BS	8.4.5.3.14 8.4.5.3.15 8.4.5.4.18 8.4.5.4.19 11.7.11	o	N	N	
10	Recommended BS list in MOB_MSHO-REQ	6.3.21.3.3	po	N	N	MS may provide a list, but BS is not obligated to follow the list

TABLE 107 (end)

Item	Description	Reference	Status	BS required	MS required	Comments
11	Recommended BS list in MOB_BSHO-RSP	6.3.21.3.3	po	N	N	BS may provide a list ("the BSs may provide a recommended list of BSs to be included in the MS' Diversity set."), but MS is not obligated to follow the list
12	MS implementation of Fast feedback channel pre-allocated at the new Anchor BS by MOB_BSHO-RSP or MOB_BSHO-REQ when a BS is added to the Diversity set	6.3.21.3.4.2	pm	N	N	At least one of the following three methods of fast-feedback channel allocation shall be implemented, if fast-feedback channel is supported
13	BS implementation of Fast feedback channel pre-allocated at the new Anchor BS by MOB_BSHO-RSP or MOB_BSHO-REQ when a BS is added to the Diversity set	6.3.21.3.4.2	oi	N	N	
14	MS implementation of Fast feedback channel allocation by Anchor_Switch_IE	6.3.21.3.4.2	pm	N	N	
15	BS implementation of Fast feedback channel allocation by Anchor_Switch_IE	6.3.21.3.4.2	oi	N	N	
16	MS implementation of Fast feedback channel allocation by UL_MAP of new Anchor BS	6.3.21.3.4.2	pm	N	N	
17	BS implementation of Fast feedback channel allocation by UL_MAP of new Anchor BS	6.3.21.3.4.2	oi	N	N	
18	UL transmission to multiple BS	11.7.11	o	N	N	
19	MS autonomous neighbour cell scanning	8.4.13.1.3	m	N	N	This feature is conditioned by implementation of FBSS or MDHO

5.1.19 Sleep Mode

TABLE 108
Sleep Mode

Item	Description	Reference	Status	BS required	MS required	Comments
1	Sleep Mode Implementation in MS	6.3.20.2	o	N/A	Y	For MS, all items below are conditional based on Sleep Mode implementation
2	Power Saving Class type 1 support	6.3.20.2	o	Y	Y	
3	Support of Traffic Indication Message for Power Saving Class type 1	6.3.20.2	o	Y	Y	Status of following items related to SLPID is conditional, depends on support of TRF-IND. Three alternative ways to wake an MS are 1) to use SLP-RSP message, and 2) to use downlink sleep control extended sub-header
4	Indicating DL traffic by SLPID bit map in TRF-IND	6.3.20.1	oi	Y	Y	One of the items 4 or 5 shall be implemented. BS may just not use SLPID. BS must support either this or Short Basic CID
5	Indicating DL traffic by SLPID in TRF-IND	6.3.20.1	oi	Y	Y	BS must support either this or SLPID
6	Support of SLPID at the MS including SLPID_Update TLV in TRF-IND	6.3.20.1	pm	N/A	Y	MS has no way to signal it does not support SLPID
7	Support of SLPID_Update TLV at BS in TRF-IND	6.3.20.1	o	Y	N/A	
8	Traffic triggered wakening flag	6.3.2.3.44-45, 6.3.20.2	m (MS) and o (BS)	Y	Y	
9	Power Saving Class type 2 support	6.3.20.3	o	N	N	
10	Power Saving Class type 3 support	6.3.20.4	o	N	N	
11	Activation of Power Saving Class by unsolicited SLP-RSP message from BS	6.3.20.1	o	Y	Y	

TABLE 108 (end)

Item	Description	Reference	Status	BS required	MS required	Comments
12	Activation of Power Saving Class by RNG-RSP message (type 3 only)	6.3.20.4	o	N	N	
13	Activation of Power Saving Class by RNG-REQ message with Power_Saving_Class_Parameters TLV	6.3.2.3.5	o	N	N	
14	DL sleep control extended subheader	6.3.2.2.7.2	o	Y	Y	
15	Bandwidth request and uplink sleep control header	6.3.2.1.5	o	Y	Y	
16	Support of periodic ranging in sleep mode	6.3.20.5	pm	Y	Y	
17	DL Traffic indication by RNG-RSP message	6.3.20.5	o	N	N	
18	MDHO/FBSS diversity set maintenance during sleep mode at MS	6.3.20.6	m	N/A	N	Conditioned by support of MDHO/FBSS
19	MDHO/FBSS diversity set maintenance during sleep mode at BS	6.3.20.6	m	N	N/A	Conditioned by support of FBSS/MDHO
20	Sleep mode multicast CID support at MS	10.4	m	N/A	Y	MS has to support it as BS can use it
21	Sleep mode multicast CID support at BS	10.4	o	Y	N/A	
22	MS Support of triggered action indicated by Enabled-Action-Triggered TLV	6.3.20.1, 11.5, 11.6, 11.7.3	o	N/A	Y	
23	BS Support of triggered action indicated by Enabled-Action-Triggered TLV	6.3.20.1, 11.5, 11.6, 11.7.3	o	Y	N/A	If MS transmits the TLV, BS has to respond to it

5.1.20 Idle Mode

TABLE 109
Idle Mode

Item	Description	Reference	Status	BS required	MS required	Comments
1	General Idle Mode functionality	6.3.24	o	Y	Y	All items below are conditional based on Idle Mode implementation
2	Idle mode initiation by DREG-REQ message from MS	6.3.24.1	oi	Y	Y	One of two Idle mode initiation methods is mandatory
3	Idle Mode initiation by unsolicited DREG-CMD from BS	6.3.24.1	oi	Y	Y	
4	Maintain connection information at BS during Idle Mode initiation process	6.3.24.1	m	Y	Y	
5	Request for MS to retain service and operational information by DREG-CMD message	6.3.24.1	m	Y	Y	
6	Request from MS to BS to retain service and operational information by DREG-REQ message	6.3.24.1	m	Y	Y	Mandatory feature see 6.3.2.3.42
7	Implementation in MS of the reception of periodic transmission of MS MAC address hash in Paging message	6.3.24.1	m	N/A	N	See 6.3.2.3.5-6. The MS may request BS inclusion of MS MAC Address Hash in MOB_PAG-ADV message at regular intervals, regardless of need for notification
8	Implementation in BS of Periodic transmission of MS MAC address hash in Paging message for a idle MS	6.3.24.1	o	N	N/A	
9	BS capability of transmitting Broadcast Control Pointer IE	6.3.24.5	o	Y	N/A	
10	MS capability of receiving Broadcast Control Pointer IE	6.3.24.5	m	N/A	Y	

TABLE 109 (end)

Item	Description	Reference	Status	BS required	MS required	Comments
11	BS Capability of providing dedicated ranging region and ranging code allocation for location update or network entry of MS in Idle Mode 6.3.22.8.1	6.3.24.8.1	o	N	N/A	
12	MS Capability of using dedicated ranging region and ranging code allocation for location update or network entry of MS in Idle Mode	6.3.24.8.1	m	N/A	Y	
13	Paging Group Update at MS	6.3.24.9.1.1	m	Y	Y	
14	Timer Location Update at MS	6.3.24.9.1.2	m	Y	Y	
15	Power Down Location Update at MS	6.3.24.9.1.3	m	Y	Y	
16	MAC Hash Skip Threshold Location Update at MS	6.3.24.9.1.4	m	N/A	N	This is mandatory under the condition that MAC Hash Skip Threshold option is implemented in the MS. This item is conditioned by Item 7 of this table
17	Secure Location Update	6.3.24.9.2.1	o	Y	Y	
18	Un-secure Location Update	6.3.24.9.2.2	m	Y	Y	
19	Paging Preference	11.13.27	pm	Y	Y	
20	Idle mode multicast CID support at MS	10.4	m	N/A	Y	MS has to support it as BS can use it
21	Idle mode multicast CID support at BS	10.4	o	Y	N/A	

5.1.21 Expedited Network Re-entry from Idle Mode

TABLE 110

Expedited Network Re-entry from Idle Mode

Item	Description	Reference	Status	BS required	MS required	Comments
1	Expedited network re-entry from Idle Mode support	6.3.23.9	o	Y	Y	
2	Support Omission of SBC-REQ management messages	11.6	o	Y	Y	
3	Support Omission of PKM Authentication phase except TEK phase	11.6	o	Y	Y	
4	Support Omission of PKM TEK creation phase during re-entry processing	11.6	o	Y	Y	
5	Support of Network Address Acquisition at secondary management connection	11.6	o	N	N	
6	Support of Time of Day Acquisition at secondary management connection	11.6	o	N	N	
7	Support TFTP Phase at secondary management connection	11.6	o	N	N	
8	Support "Full State Sharing" – No exchange of network re-entry messages after ranging before resuming normal operations	11.6	o	Y	Y	
9	Notifying MS of DL data pending	11.6	o	N	N	Not relevant to idle mode
10	Unsolicited SBC-RSP management message with updated capabilities information	11.6	o	Y	Y	
11	Unsolicited SBC-RSP message in same frame as RNG-RSP	11.6	o	N	N	
12	Support SBC-RSP TLVs as part of RNG-RSP message	11.6	o	Y	Y	
13	Support Omission of REG-REQ during NW re-entry	11.6	o	Y	Y	

TABLE 110 (end)

Item	Description	Reference	Status	BS required	MS required	Comments
14	Unsolicited REG-RSP with updated capabilities information	11.6	o	Y	Y	
15	Unsolicited REG-RSP in same frame as RNG-RSP message	11.6	o	N	N	
16	Support REG-RSP TLV as part of RNG-RSP message	11.6	o	Y	Y	
17	MS send Bandwidth Request header with zero BR as a notification of MS's successful re-entry registration	11.6	o	Y	Y	
18	MS trigger a higher layer protocol required to refresh its traffic IP address (e.g. DHCP Discover [IETF RFC 2131] or Mobile IPv4 re-registration [IETF RFC 3344])	11.6	o	Y	Y	

5.1.22 Security

5.1.22.1 Authorization Policy Support

TABLE 111

Authorization Policy Support

Item	Description	Reference	Status	BS required	MS required	Comments
1	802.16 Authorization policy support	11.7.8.7	o	Y	Y	

5.1.22.2 PKM Version Support

TABLE 112

PKM Version Support

Item	Description	Reference	Status	BS required	MS required	Comments
1	PKMv1 Support	11.8.4.1	o	N	N	
2	PKMv2 Support	11.8.4.1	o	Y	Y	

5.1.22.3 PKMv2 Authorization policy support – initial network entry

TABLE 113

PKMv2 Authorization Policy Support-Initial Network Entry

Item	Description	Reference	Status	BS required	MS required	Comments
1	No Authorization	11.8.4.2	o	Y	Y	
2	EAP-based authorization	11.8.4.2	o	Y	Y	
3	EAP-based authorization and Authenticated (EIK) EAP-based authorization	11.8.4.2	o	N	N	
4	RSA-based authorization	11.8.4.2	o	N	N	
5	RSA-based authorization and Authenticated (EIK) EAP-based authorization	11.8.4.2	o	N	N	
6	RSA-based authorization and EAP-based authorization	11.8.4.2	o	N	N	

5.1.22.4 PKMv2 Authorization policy support – network re-entry

TABLE 114

PKMv2 Authorization Policy Support-Network Re-entry

Item	Description	Reference	Status	BS required	MS required	Comments
1	No Authorization	11.8.4.2	o	Y	Y	
2	EAP-based authorization	11.8.4.2	o	Y	Y	
3	EAP-based authorization and Authenticated (EIK) EAP-based authorization	11.8.4.2	o	N/A	N/A	
4	RSA-based authorization	11.8.4.2	o	N/A	N/A	
5	RSA-based authorization and Authenticated (EIK) EAP-based authorization	11.8.4.2	o	N/A	N/A	
6	RSA-based authorization and EAP-based authorization	11.8.4.2	o	N/A	N/A	

5.1.22.5 Supported cryptographic suites

“Cryptographic suites” includes Data encryption, Data authentication, TEK encryption algorithm.

TABLE 115

Supported Cryptographic Suites

Item	Description	Reference	Status	BS required	MS required	Comments
1	No data encryption, no data authentication and 3-DES, 128	11.9.14	o	Y	Y	This cryptographic suite means no encryption and no TEK exchange
2	CBC-Mode 56-bit DES, no data authentication and 3-DES, 128	11.9.14	o	N	N	
3	No data encryption, no data authentication and RSA, 1024	11.9.14	o	N	N	
4	CBC-Mode 56-bit DES, no data authentication and RSA, 1024	11.9.14	o	N	N	
5	CCM-Mode 128-bit AES, CCM-Mode, 128-bit, ECB mode AES with 128-bit key	11.9.14	o	N	N	
6	CCM-Mode 128-bit AES, CCM-Mode, AES Key Wrap with 128-bit key	11.9.14	o	Y	Y	
7	CBC-Mode 128-bit AES, no data authentication, ECB mode AES with 128-bit key	11.9.14	o	N	N	
8	MBS CTR Mode 128 bits AES, no data authentication, AES ECB mode with 128-bit key	11.9.14	o	N	N	
9	MBS CTR mode 128 bits AES, no data authentication, AES Key Wrap with 128-bit key	11.9.14	o	N	N	

5.1.22.6 Message Authentication Code Mode

TABLE 116

Message Authentication Code Mode

Item	Description	Reference	Status	BS required	MS required	Comments
1	No message authentication	11.8.4.3	o	Y	Y	
2	HMAC	11.8.4.3	o	N	N	
3	CMAC	11.8.4.3	o	Y	Y	
4	64-bit short-HMAC	11.8.4.3	o	N	N	
5	80-bit short-HMAC	11.8.4.3	o	N	N	
6	96-bit short-HMAC	11.8.4.3	o	N	N	

5.1.22.7 Security Association

TABLE 117

Security Association

Item	Description	Reference	Status	BS required	MS required	Comments
1	Support of Static SA	7.2.1.1	o	Y	Y	
2	Support of Dynamic SA	7.2.1.1	o	Y	Y	
3	Support of Primary SA	7.2.1.1	m	Y	Y	

5.1.22.8 SA Service Type

TABLE 118

SA Service Type

Item	Description	Reference	Status	BS required	MS required	Comments
1	Unicast	11.9.35	o	Y	Y	
2	Group multicast service	11.9.35	o	N	N	
3	MBS Services	11.9.35	po	N	N	Conditioned by MBS support

5.1.22.9 EAP Authentication methods

TABLE 119

EAP Authentication Methods

Item	Description	Reference	BS required	MS required	Comments
1					

5.1.22.10 Certificate profile

TABLE 120
Certificate Profile

Item	Description	Reference	Status	BS required	MS required	Comments
1	X.509 MS certificate for device authorization	7.6	pm	N	N	Conditioned by usage of PKM v1 or PKM v2 with RSA authentication
2	X.509 Manufacturer certificate	7.6	pm	N	N	Conditioned by usage of PKM v1 or PKM v2 with RSA authentication
3	X.509 BS Cert Profile	7.6	pm	N	N	Conditioned by usage of PKM v1 or PKM v2 with RSA authentication

5.1.22.11 Multicast Broadcast Re-keying Algorithm (MBRA)

TABLE 121
Service Type

Item	Description	Reference	Status	BS required	MS required	Comments
1	MBRA for Group multicast service	7.9	o	N	N	
2	MBRA for MBS service	7.9	o	N	N	

5.1.23 MBS

TABLE 122
MBS

Item	Description	Reference	Status	BS required	MS required	Comments
1	Single-BS-MBS	6.3.13	o	N	N	
2	Multi-BS-MBS	6.3.13	o	IO-MBS	Y	Synchronization between BSs of mapping of MBS service flow IDs to CIDs throughout MBS_ZONE
3	Time diversity scheme in Multi-BS-MBS	6.3.2.3.57	o	N	N	Conditioned by item 2
4	Logical channel ID scheme in Multi-BS-MBS	6.3.2.3.57	o	N	N	Conditioned by item 2
5	Support for MBS_MAP-IE	6.3.13.2.3	pm	IO-MBS	Y	This item depends on multi-BS MBS implementation
6	MS initiated MBS request using DSA-REQ	11.13.20	oi	IO-MBS	Y	At least one is required. Dependent on MBS implementation (either item 1 or item 2)
7	BS initiated MBS request using DSA-REQ	11.13.20	oi	IO-MBS	Y	Dependent on MBS implementation (either item 1 or item 2)

5.1.24 AAS

TABLE 123
AAS

Item	Description	Reference	Status	BS required	MS required	Comments
1	General AAS functionality	6.3.7.6	o	N	N	

5.1.25 MS's Network Entry issued by BS restart

TABLE 124

MS's Network Entry issued by BS restart

Item	Description	Reference	Status	BS required	MS required	Comments
1	MS's Network Entry triggered by BS restart counter change	6.3.9.11, 11.4.1	o	Y	Y	

5.2 Parameters

A default, maximum and minimum should be provided for all parameters.

TABLE 125

Parameters

Item	Description	Reference	Status	Min	Def	Max	Comments
1	Number of concurrent outstanding PKM exchanges SS is capable of handling at one time.	11.8.4.5		2			
2	Number of transport security associations that SS is capable of supporting simultaneously.	11.8.4.6		2			
3	PN window size in PNs	11.8.4.4	pm	128			Conditional, depends on support of AES in CCM mode
4	UCD Transition	10.1	BS	50 msec			The time the BS shall wait after transmitting a UCD message with an incremented Configuration Change Count before issuing a UL-MAP message referring to Uplink_Burst_Profiles defined in that UCD message
5	DCD Transition	10.1	BS	50 msec			The time the BS shall wait after transmitting a DCD message with an incremented Configuration Change Count before issuing a DL-MAP message referring to Downlink_Burst_Profiles defined in that DCD message

TABLE 125 (continued)

Item	Description	Reference	Status	Min	Def	Max	Comments
6	T _{proc}	10.1	BS	T _f = Frame length			Time provided between arrival of the last bit of a UL-MAP at an SS and effectiveness of that map
7	RNG-RSP processing time	10.1	MS			2.5 ms from the start of the frame (n+1) where frame n is the frame containing the RNG_RSP. If there is an UL allocation to the SS before the 2.5 ms in frame n+1 then the power change shall be applied before the end of the frame n+1	Time allowed for an SS following receipt of a RNG-RSP before it is expected to apply the corrections instructed by the BS Minimum value
8	Initial Ranging Interval	11.3.1	BS			250 m	Time between Initial Ranging regions allocated by the BS
9	Lost DL-MAP Interval	10.1	MS			600 m	Time since last received DL-MAP message before downlink synchronization is considered lost
10	Lost UL-MAP Interval	10.1	MS			600 m	Time since last received UL-MAP message before uplink synchronization is considered lost
11	T ₁	10.1	MS			min (20 secs, 5 × DCD Interval maximum value)	Wait for DCD timeout
12	T ₃	10.1	MS			60 ms: RNG-RSP after CDMA ranging or RNG-REQ during initial or periodic ranging 50 ms: RNG-RSP after RNG-REQ during HO to negotiated target BS 200 ms: RNG-RSP after RNG-REQ during HO to non-negotiated target BS 200 ms: RNG-RSP after RNG-REQ during location update or re-entry from idle mode	Ranging Response reception timeout following the transmission of a Ranging Request

TABLE 125 (continued)

Item	Description	Reference	Status	Min	Def	Max	Comments
13	T4	10.1	MS	5 sec		35 sec	Wait for unicast ranging opportunity. If the pending-until-complete field was used earlier by this SS, then the value of that field shall be added to this interval (copied from [1])
14	T6	10.1	MS			1 sec	Wait for registration response (copied from [1])
15	T7	10.1	MS/BS			1 s	Wait for DSA/DSC/DSD Response timeout (copied from [1])
16	T8		MS/BS			100 msec	Wait for DSA/DSC Acknowledge timeout (copied from [1])
17	T12	10.1	MS			min (20 s, $5 \times$ UCD Interval maximum value)	Wait for UCD descriptor
18	T14	10.1	MS			100 msec	Wait for DSX-RVD Timeout
19	T17	10.1	BS	5 min	5 min		Time allowed for SS to complete SS Authorization and Key Exchange
20	T18	10.1	MS	50 ms	50 ms	90 ms	Wait for SBC-RSP timeout
21	T22	10.1	MS/BS			0.5 s	Wait for ARQ-Reset
22	Idle Mode Timer	10.1	MS	128 s	4 096 s	65 536 s	
23	T43	10.1	MS			100 ms	Time the MS waits for MOB_SLP-RSP
24	T44	10.1	MS			100 ms	Time the MS waits for MOB_SCN-RSP
25	T46	10.1	BS	50 ms		100 ms	Time the BS waits for DREG REQ in case of unsolicited Idle Mode initiation from BS
26	T47	10.1		8 frames	64 frames	128 frames	PMC_RSP Timer: BS shall send the PMC_RSP before T47 + 1 frames after BS receives PMC_REQ (confirmation = 0) correctly
27	Paging Interval Length	10.1	MS/BS	1 frames	2 frames	5 frames	time duration of Paging Interval of the BS

TABLE 125 (continued)

Item	Description	Reference	Status	Min	Def	Max	Comments
28	Max Dir Scan Time	10.1	MS			2 s	Maximum scanning time of neighbour BSs by MS before reporting any results
29	Maximum SDU size	11.13.16		1 522 Bytes			Recommended value to derive Maximum Transmission Unit (MTU) from
30	Number of transport connections in UL	N/A		4			Minimum number of concurrent transport CIDs MS is capable to support in UL
31	Number of transport connections in DL	N/A		4			Minimum number of concurrent transport CIDs MS is capable to support in DL
32	Total number of power save class instances supported from class types 1 and 2	11.8.5		1			Number of power saving class instances supported by the MS sufficient for the conformance with the profile
33	ARQ_RESET_MAX_RETRIES	6.3.4.6.2, Figures 34, 35			2		The default value must be supported
34	Min required CS Types per MS	N/A	MS		1		Minimum number of simultaneously supported CS options, which is required for MS certification
35	ARQ_RETRY_TIME_OUT on non H-ARQ connections	11.13.18.3	BS/MS	20 ms		1.3 s	Used in DSA-REQ and DSA-RSP to indicate the ARQ_Retry_Timeout value. 5 ms granularity
36	ARQ_RETRY_TIME_OUT on H-ARQ connections	11.13.18.3	BS/MS			1.3 s	Used in DSA-REQ and DSA-RSP to indicate the ARQ_Retry_Timeout value. 5 ms granularity
37	ARQ_SYNC_LOSS_TIMEOUT for non H-ARQ connections	11.13.18.5	BS/MS	100 ms			Used in DSA-REQ and DSA-RSP to indicate timeout for ARQ. 5 ms granularity
38	ARQ_RX_PURGE_TIMEOUT for non H-ARQ connections	11.13.18.7	BS/MS	100 ms			Used in DSA-REQ and DSA-RSP to indicate timeout for ARQ. 5 ms granularity
39	ARQ_RX_PURGE_TIMEOUT for H-ARQ connections	11.13.18.7					Used in DSA-REQ and DSA-RSP to indicate timeout for ARQ. 5 ms granularity

TABLE 125 (end)

Item	Description	Reference	Status	Min	Def	Max	Comments
40	ARQ_BLOCK_LIFETIME granularity	11.13.18.4					5 ms granularity
41	AI_SN value upon init and after HO (HARQ reset)	6.3.2.3.43.4	BS/MS		0		AI_SN is used in HARQ to indicate the sequence number of the ACID. Initial value at the network entry and after HO
42	Power_control_IE: Power measurement frame relevance	8.4.5.4.5	BS/MS			4 MS Transmission	

TABLE 126

Minimum Performance Requirements

Item	Description	Reference	Status	Min	Def	Max	Comments
1	HO Parameters Processing Time	11.7.24				3 frame	Time in ms the MS needs to process information on connections provided in RNRSP or REG-RSP message during HO

5.3 Recommended Configuration

TABLE 127

Recommended Configurations

Parameter	Value	Reference
PN window size		MS PN window size for HARQ CID
SAID supported – DL		Maximum number of SAID supported – Downlink
SAID supported – UL		Maximum number of SAID supported – Uplink
Max SDU size for IP CS		
Maximum number of power save class instances supported from class 1 and 2		
Maximum number of power save class instances supported from class 3		

Radio Profile

RF channels are calculated using the following formula:

$$RFChannel_n = F_{start} + n \cdot \Delta F_c, \forall n \in N_{range}$$

where:

- F_{start} : is the reference frequency for the specific band
- ΔF_c : is the centre frequency step
- N_{range} : is the range values for the n parameter.

As an example, Table 127128 shows the applicability of the formula to the 2 500-2 690 MHz band for IMT-2000 OFDMA TDD WMAN.

TABLE 128

Example of applicability of the formula to the 2 500-2 690 MHz band

Channel BW (MHz)	Centre frequency step (kHz)	F_{start} (MHz)	N_{range}	Comment
5	250	2 498.5	{16, ..., 756}	200 kHz frequency step is considered for Europe 2.5 GHz extension. 200 kHz frequency step is considered for Europe 2.5 GHz extension
10		2 501	{16, ..., 756}	

Power Class Profile

The Power Classes listed in following table is developed to cover the complete target range of power levels while different interpretation of applicable modulation levels is addressed through a dual range requirement for QPSK and 16-QAM per Power Class.

TABLE 129

Power Classes

Class identifier	Transmit power (dBm) for 16-QAM	Transmit power (dBm) for QPSK	MS required
Power Class 1	$18 \leq P_{Tx,max} < 21$	$20 \leq P_{Tx,max} < 23$	oi
Power Class 2	$21 \leq P_{Tx,max} < 25$	$23 \leq P_{Tx,max} < 27$	oi
Power Class 3	$25 \leq P_{Tx,max} < 30$	$27 \leq P_{Tx,max} < 30$	oi
Power Class 4 ³	$30 \leq P_{Tx,max}$	$30 \leq P_{Tx,max}$	oi

IMT-2000 OFDMA TDD WMAN mobile stations comply with local, regional, and international regulations for maximum transmitter power relevant to their operations, wherever applicable. The operational maximum power level ($P_{Tx,max}$) for IMT-2000 OFDMA TDD WMAN mobile equipment is in the range of 20 to 24 dBm in the band identified in Table 127128.

³ Exceptionally, non-handheld equipment with higher operational maximum power levels of up to 33 dBm is also supported by the system, subject to relevant regulation.