



WiMAX Forum[®] Air Interface Specifications

WiMAX Forum[®] Mobile System Profile

WMF-T23-001-R010v09

WiMAX Forum[®] Approved

(2010-09-07)

WiMAX Forum Proprietary

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Abstract

This document specifies the WiMAX Forum® mobile network system profile, primarily for the purpose of certification of conformant Subscriber Stations and Base Stations. The profile is based on IEEE Std 802.16-2004 as amended by IEEE Std 802.16e-2005.

1. Scope

This document specifies the WiMAX Forum® mobile network system profile, primarily for the purpose of certification of conformant Subscriber Stations and Base Stations. The profile is based on IEEE Std 802.16-2004 as amended by IEEE Std 802.16e-2005.

2. References

- [1] IEEE Std 802.16-2004, “IEEE Standard for Local and Metropolitan Area Networks - Part 16: Air Interface for Fixed Wireless Access Systems.”
- [2] IEEE Std 802.16e-2005, “IEEE Standard for Local and Metropolitan Area Networks - Part 16: Air Interface for Fixed Broadband Wireless Access Systems” “Corrigendum to IEEE Standard for Local and Metropolitan Area Networks - Part 16: Air Interface for Fixed Wireless Access Systems”
- [3] WMF- T23-005-R015, WiMAX Forum® Mobile Radio Specification Document, WiMAX Forum® Certification Working Group
- [4] IEEE P802.16/Cor2/D3, Draft Standard for Local and metropolitan area networks - Part 16: Air Interface for Fixed and Mobile Broadband Wireless Access Systems - Corrigendum 2 D3, IEEE Std 802.16 Working Group, July 2007

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 Std 802.16-2004 [1] as amended by IEEE Std 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 options need a mutually exclusive or selectable option 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.

3.3.5 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 labeling 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 red to.
IOMS-NNNN	Inter-operable Options: Item belongs to NNNN group of features for which it is requested to provide testing procedure and distinct labeling of MS equipment. More specifically ▪ The item is not required to get general “WiMAX certified” label and ▪ It 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/IOMS-MBS2: Group 2 of Inter-operable Option features related to Multicast and Broadcast Services (MBS) operation.
5. IO/IOMS-MBS3: Group 3 of Inter-operable Option features related to Multicast and Broadcast Services (MBS) operation.
6. IO/IOMS-MBS4: Group 4 of Inter-operable Option features related to Multicast and Broadcast Services (MBS) operation.
7. IO-ETHx (x = 1, 2, 3): Groups of Inter-operable Option features related to Ethernet CS
8. IO-QoS: Inter-operable Optional related to QoS features SS-initiated service flow transactions
9. IO-ROHC: Groups of inter-operable features related to usage of RoHC option in CS.
10. IOMS-ROHC: Groups of inter-operable features related to usage of RoHC option in CS.

3.3.6 BS/MS Values column

The value 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

The comment 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 Channel bandwidths and corresponding FFT sizes

Table 5 specifies the FFT sizes corresponding to various channel bandwidths.

Table 5. FFT Sizes

Channel Bandwidth (MHz)	FFT Size
3.5	512
5	512
7	1024
8	1024
8.75	1024
10	1024

4.1.1.3 Sampling Factor

Table 6. Sampling Factor

Item	Description	Reference	Status	BS Required	MS Required	Comment
1	If channel bandwidth is a multiple of 1.75MHz 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	Comment
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	Comment
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	Comment
1	TTG	8.4.5.2	m	Y	296 PS for 10 MHz, 409 PS for 8 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 us minimum specified in the referred section. The requirement is equivalent to "5 msec - (RTG+ Number of OFDM symbols x symbol duration)" where "Number of OFDM symols" = 47 for 10 and 5 MHz, 37 for 8 MHz, 42 for 8.75 MHz and 33 for 7 MHz.
2	RTG	8.4.5.2	m	Y	168 PS for 10	n/a	5 us minimum

Item	Description	Reference	Status	BS Required	BS Values	MS Required	Comment
					MHz, 135 PS for 8 MHz, 186 PS for 8.75 MHz, 120 PS for 7 MHz, 84 PS for 5 MHz and 60 PS for 3.5 MHz		specified in the referred section. The requirement is equivalent to 60 us for 5, 10 and 7 MHz BW and 74.4 us for 8.75 MHz BW. 60.27 us for 8 MHz.

1

2 4.1.1.7 Number of OFDM Symbols in DL and UL

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

5 **Table 10. Number of OFDM Symbols in DL and UL**

Item	Description	Reference	Status	BS Required	BS Values	MS Required	MS Values	Comment
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	Number of OFDM Symbols in DL and UL for 8 MHz BW	8.4.4.2	oi	Y	(28, 9), (27, 10), (26, 11), (25, 12), (24, 13), (23, 14), (22, 15), (21, 16), (20, 17)	Y	The same as BS values	

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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	Comment
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	Also refer [4]
4	FUSC	8.4.6.1.2.2	po	N	N	
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
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	Also refer [4]
	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	Comment
1.	PUSC	8.4.6.2.1	po	Y	Y	
2.	PUSC w/o subchannel rotation	11.3.1	o	IO-BF	Y	Also refer [4]
3.	Optional PUSC	8.4.6.2.5	o	N	N	
4.	AMC 1x6	8.4.6.3	o	N	N	

Item	Description	Reference	Status	BS Required	MS Required	Comment
	AMC 2x3	8.4.6.3	o	Y	Y	Also refer [4]
	AMC 3x2	8.4.6.3	o	N	N	
5.	Mini-subchannel	8.4.6.2.4	o	N	N	Only for PUSC & O-PUSC

4.1.2.3 Common SYNC Symbol

Table 13. Common SYNC Symbol

Item	Description	Reference	Status	BS Required	MS Required	Comment
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	Comment
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	

Item	Description	Reference	Status	BS Required	MS Required	Comment
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	Comment
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 transmissions 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	Comment
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	Comment
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	Comment
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	Comment
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	8.4.7.2	oi	N	N	

	PUSC zone w/ 1 symbols					
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	BS Required	MS Required	Comment
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	Comment
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	Comment
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	Comment
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	Comment
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	Comment
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	Comment
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	Comment
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	Comment
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	Comment
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	Comment
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Item	Parameter Description	Reference	Values	Comment
1	H-ARQ DL Buffer size per channel	11.8.3.7.19	Category 1 = 16,384 (K=20), Category 2 = 8192 (K=16), Category 3 = 16,384 (K=20), Category 4 = 23,170 (K=22), Category 5 = 32,768 (K=24), Category 6 = 32,768 (K=24)	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), Category 5 = 16384 (K=20), Category 6 = 23170 (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.
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, Category 5 = ON, Category 6 = 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, Category 5 = ON, Category 6 = 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	
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, Category 5 = 16, Category 6 = 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, Category 5 = 10, Category 6 = 10	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:

$$\text{Buffer size} = \text{floor}[512 * 2^{(K/4)}]$$

4.1.5.2 Incremental Redundancy

Table 31. Incremental Redundancy H-ARQ

Item	Description	Reference	Status	BS Required	MS Required	Comment
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	Comment
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	Comment
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 Neighbor 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	Comment
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	Comment
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	

4.1.6.4 MS Maximum Transmission Power Limitation Control Using UCD TLV

Table 36. MS Maximum Transmission Power Limitation Control

Item	Description	Reference	Status	BS Required	MS Required	Comment
1	MS Power Limit	11.3.1	M	O	Y	

1 4.1.7 Channel Measurement

2 4.1.7.1 CINR Measurement

3 **Table 37. CINR Measurement**

Item	Description	Reference	Status	BS Required	MS Required	Comment
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	
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	Also refer [4]
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.

Item	Description	Reference	Status	BS Required	MS Required	Comment
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. Also refer [4]
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.
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 38. RSSI Measurement

Item	Description	Reference	Status	BS Required	MS Required	Comment
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 Section 6.3.2.3.33.

4.1.8 Modulation

4.1.8.1 PRBS (Subcarrier Randomization)

Table 39. PRBS

Item	Description	Reference	Status	BS Required	MS Required	Comment
1	PRBS	8.4.9.4.1	m	Y	Y	

4.1.8.2 Downlink

Table 40. Downlink Modulation

Item	Description	Reference	Status	BS Required	MS Required	Comment
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 41. Uplink Modulation

Item	Description	Reference	Status	BS Required	MS Required	Comment
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 42. Pilot Modulation

Item	Description	Reference	Status	BS Required	MS Required	Comment
1	Pilot Modulation	8.4.9.4.3	m	Y	Y	

4.1.8.5 Preamble Modulation

Table 43. Preamble Modulation

Item	Description	Reference	Status	BS Required	MS Required	Comment
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1	Preamble Modulation	8.4.9.4.3.1	m	Y	N/A	MS shall demodulate the preamble
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4.1.8.6 Ranging Modulation

Table 44. Ranging Modulation

Item	Description	Reference	Status	BS Required	MS Required	Comment
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 45. Normal MAP

Item	Description	Reference	Status	BS Required	MS Required	Comment
1	Normal MAP	6.3.2.3.2 and 6.3.2.3.4	m	Y	Y	

4.1.9.2 Compressed MAP

Table 46. Compressed MAP

Item	Description	Reference	Status	BS Required	MS Required	Comment
1	Compressed MAP	8.4.5.6	po	Y	Y	

4.1.9.3 Sub-DL-UL MAP

Table 47. Sub-DL-UL MAP

Item	Description	Reference	Status	BS Required	MS Required	Comment
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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. Also refer [4]
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4.1.9.4 H-ARQ MAP Message

Table 48. H_ARQ MAP Message

Item	Description	Reference	Status	BS Required	MS Required	Comment
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 49. Extended H-ARQ IE in Normal MAP

Item	Description	Reference	Status	BS Required	MS Required	Comment
1	Extended HARQ IE in the Normal MAP	8.4.5.3.21 & 8.4.5.4.25 & 8.4.5.4.24	o	Y	Y	

4.1.9.6 DL Region Definition

Table 50. DL Region Definition Support

Item	Description	Reference	Status	BS Required	MS Required	Comment
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 51. AAS Zone Support

Item	Description	Reference	Status	BS Required	MS Required	Comment
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 52. Supported Permutation in DL

Item	Description	Reference	Status	BS Required	MS Required	Comment
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	
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 53. Supported Permutation in UL

Item	Description	Reference	Status	BS Required	MS Required	Comment
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	
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4.1.10.4 AAS DL Preamble

Table 54. AAS DL Preamble

Item	Description	Reference	Status	BS Required	MS Required	Comment
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 55. AAS UL Preamble

Item	Description	Reference	Status	BS Required	MS Required	Comment
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 56. Diversity MAP Scan

Item	Description	Reference	Status	BS Required	MS Required	Comment
1	Diversity-Map Scan	8.4.4.6.2	o	N	N	

4.1.10.7 DL AAS-SDMA Pilots

Table 57. DL AAS-SDMA Pilots

Item	Description	Reference	Status	BS Required	MS Required	Comment
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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&B only	8.4.6.3.3	o	N	N	

4.1.10.8 UL AAS-SDMA Pilots

Table 58. UL AAS_SDMA Pilots

Item	Description	Reference	Status	BS Required	MS Required	Comment
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&B only	8.4.6.3.3	o	N	N	

4.1.10.9 AAS Private MAP

Table 59. AAS Private MAP

Item	Description	Reference	Status	BS Required	MS Required	Comment
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 60. AAS_FBCK/RSP Support

Item	Description	Reference	Status	BS Required	MS Required	Comment
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 61. Supported Features for DL PUSC

Item	Description	Reference	Status	BS Required	MS Required	Comment
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	
3	2-antenna, matrix B, vertical encoding	8.4.8.1.4, 8.4.8.1.2.1.3	o	IO-MIMO	Y	
4	2-antenna, matrix B, horizontal encoding	8.4.8.1.4, 8.4.8.1.2.1.3	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 62. Supported Features for DL FUSC

Item	Description	Reference	Status	BS Required	MS Required	Comment
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, 8.4.8.1.2.1.3	o	N	N	
4	2-antenna, matrix B, horizontal encoding	8.4.8.1.4, 8.4.8.1.2.1.3	o	N	N	
5	4-antenna enhancement using directivity	8.4.8.1.6	o	N	N	

Item	Description	Reference	Status	BS Required	MS Required	Comment
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 63. Supported Features for DL Optional FUSC

Item	Description	Reference	Status	BS Required	MS Required	Comment
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, 8.4.8.1.2.1.3	o	N	N	
3	2-antenna, matrix B, horizontal encoding	8.4.8.3.1.2.2 8.4.8.3.3, 8.4.8.1.2.1.3	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 subcarriers 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	
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 subcarriers 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	

Item	Description	Reference	Status	BS Required	MS Required	Comment
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 64. Supported Features for DL Optional AMC

Item	Description	Reference	Status	BS Required	MS Required	Comment
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, 8.4.8.1.2.1.3	o	N	N	Figure 251i
3	2-antenna, matrix B, horizontal encoding	8.4.8.3.1.2.1 8.4.8.3.3, 8.4.8.1.2.1.3	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 subcarriers 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 subcarriers 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	

Item	Description	Reference	Status	BS Required	MS Required	Comment
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 65. Supported Features for DL PUSC-ASCA

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

4.1.11.6 Supported Features in UL PUSC

Table 66. Supported Features in UL PUSC

Item	Description	Reference	Status	BS Required	MS Required	Comment
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 67. Supported Features in UL Optional PUSC

Item	Description	Reference	Status	BS Required	MS Required	Comment
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	

Item	Description	Reference	Status	BS Required	MS Required	Comment
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 68. Supported Features in UL Optional AMC

Item	Description	Reference	Status	BS Required	MS Required	Comment
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 69. Closed-loop MIMO

Item	Description	Reference	Status	BS Required	MS Required	Comment
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	

Item	Description	Reference	Status	BS Required	MS Required	Comment
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 70. MIMO Feedback

Item	Description	Reference	Status	BS Required	MS Required	Comment
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 71. MIMO Midamble

Item	Description	Reference	Status	BS Required	MS Required	Comment
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 72. MIMO Soft-Handover Macro-diversity

Item	Description	Reference	Status	BS Required	MS Required	Comment
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_IE()	8.4.8.2.4	o	N	N	

4.1.11.13 H-ARQ Downlink Support for MIMO

Table 73. H-ARQ Downlink Support for MIMO

Item	Description	Reference	Status	BS Required	MS Required	Comment
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 74. H-ARQ Uplink Support for MIMO

Item	Description	Reference	Status	BS Required	MS Required	Comment
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 75. Fast Base Station Switching

Item	Description	Reference	Status	BS Required	MS Required	Comment
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 76. MIMO Soft-handover based macro-diversity transmission

Item	Description	Reference	Status	BS Required	MS Required	Comment
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	
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 77. UL Macro Diversity

Item	Description	Reference	Status	BS Required	MS Required	Comment
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Item	Description	Reference	Status	BS Required	MS Required	Comment
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

4.2.1.1 SSTTG/SSRTG

Table 78. SSTTG/SSRTG

Item	Description	Reference	Status	MS Required	MS Values	Comment
1	SSTTG	8.4.4.2	m	Y	50 usec	
2	SSRTG	8.4.4.2	m	Y	50 usec	

4.2.1.2 Max DL Concurrent Bursts

Table 79. Maximum DL Concurrent Bursts

Item	Description	Reference	Status	MS Required	MS Values	Comment
1	Max Concurrent Burst	8.4.4.2 and 11.7.8.13	m	Y	10	

4.2.1.3 Max Bursts in DL Subframe

Table 80. Max Bursts in DL Subframe

Item	Description	Reference	Status	MS Required	MS Values	Comment
1	Max Burst in Frame	8.4.4.2	m	Y	16	

4.2.1.4 Max Number of Zones in DL/UL Subframe

Table 81. Max Number of Zones in DL and UL Subframes

Item	Description	Reference	Status	MS Required	MS Values	Comment
1	Maximum numbers of zones UL			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.

4.2.1.5 Measurement Processes and CQI Channels

Table 82. Measurement Processes and CQI Channels

Item	Description	Reference	Status	MS Required	MS Values	Comment
1	Maximum numbers of CQI Channels transmitted by an MS per frame			Y	2	
2	Maximum number of concurrent CINR measurement processes			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.

4.2.1.6 Max H-ARQ Bursts in DL/UL Subframe

Table 83. Max H-ARQ Bursts

Item	Description	Reference	Status	MS Required	MS Values	Comment
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	
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4.2.2 Transmit Requirements

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

Table 84. 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	Single step size m Required relative accuracy m = 1dB +/- 0.5 dB m = 2dB +/- 1 dB m = 3dB +/- 1.5 dB 4dB < m <= 10dB +/- 2 dB Two exception points of at least 10 dB apart are allowed over the 45 dB range, where in these two points an accuracy of up to +/- 2 dB is allowed for any size step.	Single step size m Required relative accuracy ceil(m) = 1dB +/- 0.5 dB ceil(m) = 2dB +/- 1 dB ceil(m) = 3dB +/- 1.5 dB 4dB < ceil(m) <= 10dB +/- 2 dB Two exception points of at least 10 dB apart are allowed over the 45 dB range, where in these two points an accuracy of up to +/- 2 dB is allowed for any size step.
5.	Spectral flatness	8.4.12.2	≤ ±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 $N_{used}/2$	≤ ±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	8.4.12.2	≤ 0.4 dB	≤ 0.4 dB

Item	Requirement	Reference	Values Specified		Values Required
	between adjacent subcarriers				
7.	Default BS Tx reference timing accuracy	8.4.12.4, 8.4.10.1.1	Tx downlink radio frame shall be time-aligned with the 1pps timing pulse		1 usec
8.	Network synchronized BS Tx reference timing accuracy	8.4.12.4, 8.4.10.1.1	Tx downlink radio frame shall be time-aligned with the 1pps timing pulse from GPS		2.3 usec with reference to 1pps signal from GPS The transmit reference timing shall not change by more than 25nsec integrated in absolute value over any 1 sec period. The transmitted carrier frequency shall not change by more than 10 Hz integrated in absolute value over any 300 msec period.
9.	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	≤ -15.0 dB
			QPSK 3/4	≤ -18.0 dB	≤ -18.0 dB
			16-QAM 1/2	≤ -20.5 dB	≤ -20.5 dB
			16-QAM 3/4	≤ -20.5 dB	≤ -24.0 dB
			64-QAM 1/2 (if 64-QAM supported)	≤ -24.0 dB	≤ -26.0 dB
			64-QAM 2/3 (if 64-QAM supported)	≤ -26.0 dB	≤ -28.0 dB
			64-QAM 3/4 (if 64-QAM supported)	≤ -28.0 dB	≤ -30.0 dB
			64QAM-5/6 (if applicable)	≤ -30.0 dB	≤ -30.0 dB

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4.2.3 Receiver Requirements

Table 85. 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 dBm		-30 dBm
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 dBm		0 dBm
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 64-QAM 3/4 (if 64-QAM supported)	10 dB 4 dB	10 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 64-QAM 3/4 (if 64-QAM supported)	29 dB 23 dB	29 dB 23 dB

Item	Requirement	Reference	Values Specified	Values Required
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.
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.

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2 4.2.4 Frequency and Time Synchronization Requirements

3 **Table 86. Frequency and Time Synchronization Requirements**

Item	Requirement	Reference	Values Specified	Values Required	Comment
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 subcarrier 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	
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5. MAC Profile

5.1 Profiles of BS and MS

5.1.1 PHS

Table 87. PHS

Item	Description	Reference	Status	BS Required	MS Required	Comment
1	PHS	5.2.3 5.2.3.1 5.2.3.2	o	Y	Y	

5.1.2 CS Options

Table 88. Convergence Sublayer Options

Item	Description	Reference	Status	BS Required	MS Required	Comment
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*	
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*	
6.	Packet, IPv6 over 802.3/Ethernet	5.2.6, 11.13.19	oi	IO-ETH3	N*	
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	IO-ROHC	IOMS-ROHC	
11.	Packet, IPv4 with Header Compression (EC RTP)	5.2.6, 11.13.19	oi	N	N	
12.	Packet, IPv6 with Header Compression (ROHC)	5.2.6, 11.13.19	oi	IO-ROHC	IOMS-ROHC	

Item	Description	Reference	Status	BS Required	MS Required	Comment
13.	Packet, IPv6 with Header Compression (EC RTP)	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 (EC RTP)	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	
17.	Packet, IPv6 over 802.3/Ethernet with Header Compression (EC RTP)	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 (EC RTP)	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 (EC RTP)	5.2.6, 11.13.19	oi	N	N	

5.1.3 MAC PDU formats

Table 89. MAC PDU Formats

Item	Description	Reference	Status	BS Required	MS Required	Comment
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
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 90. Feedback Mechanism

Item	Description	Reference	Status	BS Required	MS Required	Comment
1.	Feedback Header	6.3.2.1.2.2.1	o	N	N	
2.	FAST-FEEDBACK allocation subheader	6.3.2.2.6	o	N	N	

Item	Description	Reference	Status	BS Required	MS Required	Comment
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	N	N	
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 91. Multicast Connection

Item	Description	Reference	Status	BS Required	MS Required	Comment
1	Multicast traffic connection	6.3.13	o	Y	Y	

5.1.6 Network Entry

Table 92. Network Entry

Item	Description	Reference	Status	BS Required	MS Required	Comment
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 93. ARQ

Item	Description	Reference	Status	BS Required	MS Required	Comment
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Item	Description	Reference	Status	BS Required	MS Required	Comment
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)

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2 5.1.8 MAC support for H-ARQ

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Table 94. MAC Support for HARQ

Item	Description	Reference	Status	BS Required	MS Required	Comment
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	

Item	Description	Reference	Status	BS Required	MS Required	Comment
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 95. QoS

Item	Description	Reference	Status	BS Required	MS Required	Comment
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	IO-QOS	N*	
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	IO-QOS	N*	
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 96. Data Delivery Services for Mobile Network

Item	Description	Reference	Status	BS Required	MS Required	Comment
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	
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5.1.11 Request-Grant mechanism

Table 97. Request-Grant Mechanism

Item	Description	Reference	Status	BS Required	MS Required	Comment
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 Neighbor Advertisement

Table 98. Neighbor Advertisement

Item	Description	Reference	Status	BS Required	MS Required	Comment
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Item	Description	Reference	Status	BS Required	MS Required	Comment
1.	Neighbor Advertisement	6.3.2.3.47	o	Y	Y	All items below are conditional dependently on Neighbor 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 99. Scanning

Item	Description	Reference	Status	BS Required	MS Required	Comment
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 neighbor cell scanning	8.4.13.1.3	o	N/A	Y	
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5.1.13.2 Scan Reporting Type Support

Table 100. Scan Reporting Type Support

Item	Description	Reference	Status	BS Required	MS Required	Comment
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 101. Association

Item	Description	Reference	Status	BS Required	MS Required	Comment
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	
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5.1.13.4 Association Type Support

Table 102. Association Type Support

Item	Description	Reference	Status	BS Required	MS Required	Comment
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 103. HO/Scan/Report Trigger Metrics

Item	Description	Reference	Status	BS Required	MS Required	Comment
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 104. MAC Layer HO Procedures

Item	Description	Reference	Status	BS Required	MS Required	Comment
1.	General HO Support	6.3.21.2, 6.3.2.3.55	o	Y	Y	Following items are conditioned by this item
2.	HO initiated by MS support at MS side		oi	N/A	Y	
3.	HO initiated by MS support at BS side		pm	Y	N/A	
4.	HO initiated by BS support at MS side ,		oi	N/A	Y	
5.	HO initiated by BS support at BS side	6.3.21.2.2	o	Y	N/A	
6.	HO Indication	6.3.21.2.5	o	Y	Y	
7.	Cancellation of HO	6.3.21.2.3	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	N	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 105. HO Optimization

Item	Description	Reference	Status	BS Required	MS Required	Comment

Item	Description	Reference	Status	BS Required	MS Required	Comment
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.
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	N	N	

Item	Description	Reference	Status	BS Required	MS Required	Comment
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 reentry	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	N	N	
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, 6.3.22.2.7, 11.6	o	N	N	Requires support of 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			N	N	Requires support of SDU SN extended subheader and SN_REPORT header
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	

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3 5.1.16 CID and SAID Update

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

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Table 106. CID and SAID Update

Item	Description	Reference	Status	BS Required	MS Required	Comment
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	N	N/A	
4.	CID update in MS by REG-RSP	11.7.9	pm	N/A	N	
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	N	N/A	
8.	Compressed CID update in MS by REG-RSP	11.7.9.1	pm	N/A	N	
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	
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	

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4 **5.1.17 Fast BS Switching**

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Table 107. Fast Base Station Switching

Item	Description	Reference	Status	BS Required	MS Required	Comment
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

Item	Description	Reference	Status	BS Required	MS Required	Comment
3.	Diversity set Update initiated by BS	6.3.21.3.3	oi	N	N	mandatory
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	
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	

Item	Description	Reference	Status	BS Required	MS Required	Comment
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 neighbor cell scanning	8.4.13.1.3	m	N	N	This feature is conditioned by implementation of FBSS or MDHO.

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2 5.1.18 Macro Diversity Handover

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Table 108. Macro Diversity Handover

Item	Description	Reference	Status	BS Required	MS Required	Comment
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.

Item	Description	Reference	Status	BS Required	MS Required	Comment
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.
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.

Item	Description	Reference	Status	BS Required	MS Required	Comment
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 neighbor 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 109. Sleep Mode

Item	Description	Reference	Status	BS Required	MS Required	Comment
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 waking 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	

Item	Description	Reference	Status	BS Required	MS Required	Comment
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 110. Idle Mode

Item	Description	Reference	Status	BS Required	MS Required	Comment
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Item	Description	Reference	Status	BS Required	MS Required	Comment
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	
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	

Item	Description	Reference	Status	BS Required	MS Required	Comment
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	o	N/A	N	
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 111. Expedited Network Re-entry from Idle Mode

Item	Description	Reference	Status	BS Required	MS Required	Comment
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Item	Description	Reference	Status	BS Required	MS Required	Comment
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	N	N	
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	

Item	Description	Reference	Status	BS Required	MS Required	Comment
14.	Unsolicited REG-RSP with updated capabilities information	11.6	o	N	N	
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	

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2 5.1.22 MBS

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Table 112. MBS

Item	Description	Reference	Status	BS Required	MS Required	Comments
1.	MBS without Macro Diversity within a Zone	6.3.13	o	IO-MBS	Y	If MBS is supported, either MBS without Macro Diversity or MBS with Macro Diversity is required.
2.	MBS with Macro-diversity within a zone	6.3.13	o	IO-MBS	Y	If MBS is supported, either MBS without Macro Diversity or MBS with Macro Diversity is required.
3.	Time diversity scheme in Multi-BS-MBS	6.3.2.3.52	o	N	N	Conditioned by items 1 or 2

Item	Description	Reference	Status	BS Required	MS Required	Comments
4.	Logical channel ID scheme in Multi-BS-MBS	6.3.2.3.52	o	N	N	Conditioned by items 1 or 2
5.	Support for MBS_MAP-IE	8.4.5.3.12	pm	IO-MBS	Y	
6.	MS initiated MBS request using DSA-REQ	11.13.22	oi	N	N	At least one is required. Dependent on MBS implementation (either item 1 or item 2).
7.	BS initiated MBS request using DSA-REQ, DSC-REQ and DSD-REQ	11.13.22	oi	IO-MBS	Y	Dependent on MBS implementation (either item 1 or item 2).
8.	BS initiated MBS request using Group DSA-REQ and DSC-REQ,	11.13.39	o	IO-MBS2	IOMS-MBS2	
9.	Update of MBS configuration using MCID_Preallocation and Transmission Info. TLV (upon traversing MBS zone boundary)	6.3.22, 11.1.12.1	o	IO-MBS3	IOMS-MBS3	
10.	Update of MBS configuration using MCID_Continuity and Transmission Info. TLV (upon traversing MBS zone boundary)	6.3.22, 11.1.12.2	o	IO-MBS3	IOMS-MBS3	
11.	Location Update for MBS Update	6.3.23.8.1.5, 6.3.2.3.5	o	IO-MBS4	IOMS-MBS4	

5.1.23 AAS

Table 113. AAS

Item	Description	Reference	Status	BS Required	MS Required	Comments
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1.	General AAS functionality	6.3.7.6	o	N	N	
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5.1.24 MS's Network Entry issued by BS restart

Table 114. 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	

5.1.25 NSP Selection

Table 115. NSP Selection

Item	Description	Reference	Status	BS Required	MS Required	Comments
1.	NSP Selection	802.16 Rev2/D2: 11.1.11.1-2, 11.4.1, 11.8.9, 11.8.11, 11.8.13, 11.8.14, 6.3.2.3.63	o	Y	Y	Support of NSP list by both SII-Adv. and SBC-RSP message shall be supported. This change is conditioned on the approval of the BOD to this exception to the certification reference.

5.2 Parameters

The parameters in subclause 10.1 of the IEEE Std 802.16-2004, as modified by corrigendum 802.16/Cor2 and 802.16e-2005 amendment, relevant to the features required by this profile apply to this section. However the following parameters listed in table 127 below supersede the whole information of the parameters in 10.1.

Table 116. Parameters

Item	Description	Reference	Status	Min	Def	Max	Comments
1.	Number of concurrent outstanding PKM exchanges SS is capable of handling at one time.			2			

Item	Description	Reference	Status	Min	Def	Max	Comments
2.	Number of transport security associations that SS is capable of supporting simultaneously.			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		BS	50msec			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		BS	50msec			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
6.	Tproc		BS	Tf = Frame length			Time provided between arrival of the last bit of a UL-MAP at an SS and effectiveness of that map

Item	Description	Reference	Status	Min	Def	Max	Comments
7.	RNG-RSP processing time		MS			2.5 msec from the start of the frame (n+1) were frame n is the frame containing the RNG_RSP . If there is an UL allocation to the SS before the 2.5 msec 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		BS			250m	Time between Initial Ranging regions allocated by the BS
9.	Lost DL-MAP Interval		MS		<u>30 s (after initial network entry)</u>	600m (during initial network entry), 120 s (after initial network entry)	Time since last received DL-MAP message before downlink synchronization is considered lost
10.	Lost UL-MAP Interval		MS		<u>30 s (after initial network entry)</u>	600m (during initial network entry), 120 s (after initial network entry)	Time since last received UL-MAP message before uplink synchronization is considered lost
11.	T1		MS			min (20 secs , 5x DCD Interval maximum value)	Wait for DCD timeout

Item	Description	Reference	Status	Min	Def	Max	Comments
12.	T3		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
13.	T4		MS	5sec		35sec	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		MS	10 msec		3sec	Wait for registration response
15.	T7		MS/BS	10 msec		1s	Wait for DSA/DSC/DSD Response timeout
16.	T8		MS/BS	10 msec		300 msec	Wait for DSA/DSC Acknowledge timeout
17.	T10		MS/BS	600 msec		3 sec	Wait for Transaction end timeout
18.	T12		MS			min (20 sec , 5x UCD Interval maximum value)	Wait for UCD descriptor

Item	Description	Reference	Status	Min	Def	Max	Comments
19.	T14		MS			100msec	Wait for DSX-RVD Timeout
20.	T17		BS	5min	5min		Time allowed for SS to complete SS Authorization and Key Exchange
21.	T18 short		MS	50ms		100 ms	Wait for SBC-RSP timeout In case of network discovery when SBC-REQ message contains SIQ TLV. The timer is started when SBC-REQ is transmitted
22.	T18 long		MS	90		200	Wait for SBC-RSP timeout In case of initial network entry and network re-entry when SBC-REQ message does not contain SIQ TLV. The timer is started when SBC-REQ is transmitted
23.	T9		BS	300		660	Registration Timeout, the time allowed between the BS sending a RNG-RSP (success) to an SS, and receiving a SBC-REQ from that same SS
24.	T22		MS/BS			0.5 s	Wait for ARQ-Reset
25.	Idle Mode Timer		MS	128 s	4096 s	65536 s	
26.	T43		MS			100 ms	Time the MS waits for MOB_SLP-RSP
27.	T44		MS			100 ms	Time the MS waits for MOB_SCN-RSP
28.	T46		BS	50 ms		100 ms	Time the BS waits for DREG REQ in case of unsolicited Idle Mode initiation from BS
29.	T47			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.
30.	Paging Interval Length		MS/BS	1 frames	2 frames	5 frames	time duration of Paging Interval of the BS
31.	Max Dir Scan Time		MS			2 sec	Maximum scanning time of neighbor BSs by MS before reporting any results

Item	Description	Reference	Status	Min	Def	Max	Comments
32.	Maximum SDU size			1522 Bytes			Recommended value to derive Maximum Transmission Unit (MTU) from
33.	Number of transport connections in UL			4			Minimum number of concurrent transport CIDs MS is capable to support in UL.
34.	Number of transport connections in DL			4			Minimum number of concurrent transport CIDs MS is capable to support in DL.
35.	Total number of power save class instances supported from class types 1 & 2	11.8.5		1			Number of power saving class instances supported by the MS sufficient for the conformance with the profile.
36.	ARQ_RESET_MAX_RETRIES	6.3.4.6.2, Figures 34, 35			2		The default value must be supported
37.	Min required CS Types per MS		MS		1		Minimum number of simultaneously supported CS options, which is required for MS certification
38.	ARQ_RETRY_TIME_OUT on non H-ARQ connections	11.13.18.3	BS/MS	20ms		1.3s	Used in DSA-REQ and DSA-RSP to indicate the ARQ_Retry_Timeout value. 5msec granularity.
39.	ARQ_RETRY_TIME_OUT on H-ARQ connections	11.13.18.3	BS/MS			1.3s	Used in DSA-REQ and DSA-RSP to indicate the ARQ_Retry_Timeout value. 5msec granularity.
40.	ARQ_SYNC_LOSS_TIMEOUT for non H-ARQ connections	11.13.18.5	BS/MS	100ms			Used in DSA-REQ and DSA-RSP to indicate timeout for ARQ. 5msec granularity.
41.	ARQ_RX_PURGE_TIME_OUT for non H-ARQ connections	11.13.18.7	BS/MS	100ms			Used in DSA-REQ and DSA-RSP to indicate timeout for ARQ. 5msec granularity.
42.	ARQ_RX_PURGE_TIME_OUT for H-ARQ connections	11.13.18.7					Used in DSA-REQ and DSA-RSP to indicate timeout for ARQ. 5msec granularity.
43.	ARQ_BLOCK_LIFETIME granularity	11.13.18.4					5msec granularity.
44.	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.

Item	Description	Reference	Status	Min	Def	Max	Comments
45.	Power_control_IE:: Power measurement frame relevance		BS/MS			10 MS Data Transmiss ion	When the MS transmission frame only includes UL-MAP allocations with UIUC = 0, 11 (type =8), 12, 13 and/or 14, that frame shall not be counted for this purpose.
46.	N _{MS_max_neighbors}	P802.16 (Rev2/D7) 6.3.21.1.1	MS	32			The MS must be able to process at least N _{MS_max_neighbors} in a MOB_NBR-ADV message.

1

Table 117. Minimum Performance Requirements

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

2

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6. Security

6.1 Authorization Policy Support

Table 118. Authorization Policy Support

Item	Feature	Reference	Status	BS Required	MS Required	Comments
1	802.16 Authorization policy support	11.7.8.7	o	Y	Y	

6.2 PKM Version Support

Table 119. 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	

6.3 PKMv2 Authorization policy support – initial network entry

Table 120. 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	

6.4 PKMv2 Authorization policy support – network re-entry

Table 121. 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	

6.5 Supported cryptographic suites

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

Table 122. Supported Cryptographic Suites

Item	Description	Reference	Status	BS Required	MS Required	Comments
1.	No data encryption, no data authentication & 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 & 3-DES, 128	11.9.14	o	N	N	
3.	No data encryption, no data authentication & RSA, 1024	11.9.14	o	N	N	

Item	Description	Reference	Status	BS Required	MS Required	Comments
4.	CBC-Mode 56-bit DES, no data authentication & 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	

6.6 Message Authentication Code Mode

Table 123. 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	

6.7 Security Association

Table 124. 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	N	N	
3.	Support of Primary SA	7.2.1.1	m	Y	Y	

6.8 SA Service Type

Table 125. 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

6.9 EAP Authentication methods

Table 126. EAP Authentication Methods

Item	Description	Reference	BS Required	MS Required	Comments
1.					

6.10 Certificate profile

Table 127. 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

Item	Description	Reference	Status	BS Required	MS Required	Comments
						authentication
3.	X.509 BS Cert Profile	7.6	pm	N	N	Conditioned by usage of PKM v1 or PKM v2 with RSA authentication

1
2

3 6.11 Multicast Broadcast Re-keying Algorithm (MBRA)

4

Table 128. 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	

7. Radio Profile

Table 129 shows an example of the RF channels to be calculated using the following formula:

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

Where:

F_{start} is the start frequency for the specific band

ΔF_c is the center frequency step,

N_{range} is the range values for the n parameter

Table 129. Example of applicability of the formula to the 2500 - 2690 MHz band

Channel BW (MHz)	Center Frequency Step (kHz)	F_{start} (MHz)	N_{range}	Comment
5	250	2498.5	{16, ..., 756}	.
10		2501	{16, ..., 736}	

8. 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 130. 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	$30 \leq P_{Tx,max}$	$30 \leq P_{Tx,max}$	oi

Note: The maximum MS output power may be limited by the value included in a MS Maximum Transmission Power Limitation Control TLV that may be included in the UCD.