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Title	[MBS Clarification]
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Re:	Response to Sponsor Ballot about TGe. Rev1 is revision of C802.16e-04/444 to fit template. Rev2 includes modification relating with MBS service registration.
Abstract	For clarification of current description and messages about MBS
Purpose	Discuss and Adopt this proposal
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MBS Clarification

Jung Je Son, Yong Chang

Proposed Solution

1. For MBS supporting Macro diversity, we shall synchronize also MBS_MAP message in MBS region with other BS at same MBS zone. Therefore, we propose using MBS_MAP message only for MBS supporting macro diversity. ~~Therefore, for MBS supporting Macro diversity, we need only one MBS_MAP_IE pointing MBS region.~~
2. For MBS not supporting macro diversity, imbedded bandwidth allocation in DL_MAP for MBS suffice since MSS should synchronize with BS.
3. Since MBS service only for H-ARQ enabled MSS, it is named as “MBS with time diversity”, is available, we also applied macro diversity to MBS with time diversity only for H-ARQ enabled MSS. And it is separately applied to each MBS service for general MSS and H-ARQ enabled MSS.
4. MBS for general MSS covers all MSS including H-ARQ enabled MSS but doesn’t use H-ARQ and MBS with time diversity for H-ARQ enabled MSS is informed with H-ARQ MAP message only applied to H-ARQ enabled MSS.
5. To indicate MBS with time diversity only to H-ARQ enabled MSS, we use H-ARQ Compact MBS_MAP_IE in H-ARQ MAP message.
6. In MBS-MAP message, it is used to indicate data allocation of MBS data using macro diversity, we use different IE for allocation of MBS data for general MBS and MBS with time diversity.

Proposed Text Change

[Remedy 1 : Modify 6.3.13.1.3 as following:]

6.3.13.1.3 Power saving operation

Power efficient reception of MBS connections is particularly important to MSS in Sleep and IDLE mode. To facilitate that, an MBS_-MAP_-IE may be placed in the DL-MAP to points to the location of a dedicated MBS zone in the DL sub-frame ~~(see 8.4.5.3.9)~~. The purpose of this IE is to do the initial direction of the MSS to the MBS zone, and to redirect MSS that lost synchronization with MBS zone back to the MBS zone. Furthermore, this IE is used not only to direct MSS to the MBS region for MBS data using macro diversity enhancement but also to allocate MBS data not using macro diversity enhancement. If MBS_MAP_IE in the DL-MAP indicates the MBS region, the MBS region uses two dimensional allocation using OFDMA symbol and subchannel. And if H-ARQ Compact MBS_MAP_IE in H-ARQ MAP message indicates the MBS region, the MBS region uses one dimensional allocation.~~.~~ Inside the MBS zone a MBS_MAP message is transmitted and functions like a DL-MAP in the sense that it provides the physical attributes for the connection allocated to the MBS zone. In addition to this functionality, the MBS_MAP provides per each connection the location of the next frame where data will be sent on it.

[Remedy 2 : Modify Table 283b as following at page 167 line 4, section 8.4.5.3.11]

Table 283b—Multicast and Broadcast Service MAP IE

Syntax	Size	Notes
MBS_MAP_IE{		
Extended DIUC	4 bits	MBS_MAP = 0x05
Length	4 bits	
Multicast CID	12 bits	12 LSB of CID for multicast
MBS Zone identifier	7 bits	MBS Zone identifier corresponds to the identifier provided by the BS at connection initiation
Macro diversity enhanced	1 bits	0 = Non Macro-Diversity enhanced zone 1 = Macro-Diversity enhanced zone
If(Macro diversity enhanced = 1){		
Permutation	2 bits	0b00 = PUSC permutation 0b01 = FUSC permutation 0b10 = Optional FUSC permutation 0b11 = Adjacent subcarrier permutation
Idcell	6 bits	
OFDMA Symbol Offset	8 bits	OFDMA symbol offset with respect to start of the MBS region
} else{		
DIUC	4 bits	
OFDMA Symbol Offset	8 bits	The offset of the OFDMA symbol in which the burst starts, measured in OFDMA symbols from beginning of the downlink frame in which the DL-MAP is transmitted.
Subchannel offset	6 bits	The lowest index OFDMA subchannel used for carrying the burst, starting from subchannel 0.
Boosting	3 bits	000: normal (not boosted); 001: +6dB; 010: -6dB; 011: +9dB; 100: +3dB; 101: -3dB; 110:-9dB;111: -12dB;
NO. OFDMA Symbols	7 bits	
NO. Subchannels	6 bits	
Repetition Coding Indication	2 bits	0b00 - No repetition coding 0b01 - Repetition coding of 2 used 0b10 - Repetition coding of 4 used 0b11 - Repetition coding of 6 used
Next MBS frame offset	8 bits	The Next MBS frame offset value is lower 8 bits of the frame number in which the BS shall transmit the next MBS frame.

Next MBS OFDMA Symbol offset	8 bits	The offset of the OFDMA symbol in which the next MBS zone starts, measured in OFDMA symbols from the beginning of the downlink frame in which the MBS-MAP is transmitted.
}		
if !(byte boundary){		
Padding Nibble	variable	Padding to reach byte boundary
}		
}-		

~~Syntax~~	~~Size~~	~~Notes~~
~~MBS_MAP_IE{~~		
~~Extended DIUC~~	~~4 bits~~	
~~Length~~	~~4 bits~~	
~~Multicast CID~~	~~12 bits~~	~~12 LSB of CID for multicast~~
~~MBS Zone Identifier~~	~~7 bits~~	
~~OFDMA Symbol Offset~~	~~8 bits~~	
~~Macro diversity enhanced~~	~~1 bits~~	
~~If(macro diversity enhanced = 1){~~		
~~Permutation~~	~~2 bits~~	
~~Idcell~~	~~6 bits~~	
~~}~~		
~~Else{~~		
~~Reserved~~	~~8 bits~~	
~~}~~		
~~}-~~		

[Remedy 3 : Replace H-ARQ Compact MBS_MAP_IE at page 55 as following and move it from 6.3.2.3.43.8 to 6.3.2.3.43.6.9 at the end of section 6.3.2.3.43.6.8, page 44]

~~6.3.2.3.43.8~~6.3.2.3.43.6.9 **H-ARQ Compact MBS MAP IE**

Table 14c—H-ARQ Compact MBS-MAP IE format for extension

Syntax	Size	Notes
Compact MBS_MAP_IE{		
DL_MAP Type = ??		
Multicast CID	12 bits	12 LSB of CID for multicast
MBS Zone Identifier	7 bits	
Macro diversity enhanced	1 bits	
If(macro diversity enhanced = 1){		
Permutation	2 bits	
Idcell	6 bits	
OFDMA Symbol Offset	8 bits	OFDMA symbol offset with respect to start of the MBS region
} else {		
N_EP code	4 bits	
N_SCH code	4 bits	
AI_SN	1 bits	
SPID	2 bits	
ACID	4 bits	
Next MBS frame offset	8 bits	The Next MBS frame offset value is lower 8 bits of the frame number in which the BS shall transmit the next MBS frame.
Next MBS OFDMA Symbol offset	8 bits	The offset of the OFDMA symbol in which the next MBS zone starts, measured in OFDMA symbols from the beginning of the downlink frame in which the MBS-MAP is transmitted.
}		
if !(byte boundary){		
Padding Nibble	variable	Padding to reach byte boundary
}		
}-		

NEP code, NSCH code

The combination of NEP code and NSCH code indicates the number of allocated subchannels and scheme of coding and modulation for the DL burst

AI_SN

Defines ARQ Identifier Sequence Number. This is toggled between ‘0’ and ‘1’ on successfully transmitting each encoder packet with the same ARQ channel.

SPID

Defines SubPacket ID, which is used to identify the four subpackets generated from an encoder packet.

ACID

Defines ARQ Channel ID for TimeDiversity MBS packet. Each TimeDiversity MBS connection can have multiple ARQ channels, each of which may have an encoder packet transaction pending.

The MBS burst indicated by the H-ARQ Comapct MBS_MAP_IE is encoded at the same way of HARQ. But it does not need the acknowledgement from MSS.

[Remedy 4 : Replace MBS_MAP message at page89, section6.3.2.3.56 as following:]

6.3.2.3.56 MBS MAP

The BS may send an MBS-MAP message on an MBS region~~zone~~ to describe the MBS connections serviced by the MBS region~~zone~~. When a MBS-MAP is sent, the connections need be described in the DL-MAP, but a MBSMAP_IE() shall be substituted instead.

Table 107—MBS-MAP

Syntax	Size	Notes
MBS-MAP Message Format(){		
Management Message Type = ?	4 bits	
Frame number	4 bits	The frame number is identical to the frame number in the DL-MAP
#MBS_DATA_IE	8 bits	Number of included MBS_DATA_IE
For (i = 0; i<n; i++){	12 bits	N = #MBS_DATA_IE
MBS_DATA_IE	Variable	
}	8 bits	
#MBS_DATA_Time_Diversity_IE		Number of included MBS_DATA_Time_Diversity_IE
For(i = 0; i<m; i++){		M = #MBS_DATA_Time diversity_IE
MBS_DATA_Time_Diversity_IE	Variable	
}		
If(!byte boundary){		
Padding_Nibble		
}	8 bits	
}-		

Table 107a MBS_MAP_Type

MBS_MAP_Type	Description
0	MBS_DATA_IE
1	MBS_DATA_Time_Diversity_IE
2~255	Reserved

Table 107b MBS_DATA_IE

Syntax	Size	Notes
MBS_DATA_IE{		
_MBS_MAP Type = 0	4 bits	
Multicast CID	12 bits	12 LSB of CID for multicast
DIUC	4 bits	
OFDMA Symbol Offset	8 bits	OFDMA symbol offset with respect to start of the MBS region
Subchannel offset	6 bits	
Boosting	3 bits	000: normal (not boosted); 001: +6dB; 010: -6dB; 011: +9dB; 100: +3dB; 101: -3dB; 110:-9dB; 111: -12dB;
NO. OFDMA Symbols	7 bits	
NO. Subchannels	6 bits	
Repetition Coding Indication	2 bits	0b00 - No repetition coding 0b01 - Repetition coding of 2 used 0b10 - Repetition coding of 4 used 0b11 - Repetition coding of 6 used
Next MBS frame offset	8 bits	The Next MBS frame offset value is lower 8bits of the frame number in which the BS shall transmit the next MBS frame.
Next MBS OFDMA Symbol offset	8 bits	The offset of the OFDMA symbol in which the next MBS zone starts, measured in OFDMA symbols from the beginning of the downlink frame in which the MBS-MAP is transmitted.
}-		

Table 107c MBS_DATA_Time_Diversity_IE

Syntax	Size	Notes
MBS_DATA_Time_Diversity _IE{		
MBS_MAP Type = 1	4 bits	
Multicast CID	12 bits	12 LSB of CID for multicast
N_EP code	4 bits	OFDMA symbol offset with respect to start of the MBS zone
N_SCH code	4 bits	
AI_SN	1 bits	

SPID	2 bits	
ACID	4 bits	
Next MBS frame offset	8 bits	
Next MBS OFDMA Symbol offset	8 bits	
}		

NEP code, NSCH code

The combination of NEP code and NSCH code indicates the number of allocated subchannels and scheme of coding
and modulation for the DL burst

AI_SN

Defines ARQ Identifier Sequence Number. This is toggled between '0' and '1' on successfully transmitting each
encoder packet with the same ARQ channel.

SPID

Defines SubPacket ID, which is used to identify the four subpackets generated from an encoder packet.

ACID

Defines ARQ Channel ID for TimeDiversity MBS packet. Each TimeDiversity MBS connection can have multiple
ARQ channels, each of which may have an encoder packet transaction pending.

MBS_DATA_Time_Diversity_IE presents when MBS only for H-ARQ enabled MSS is provided.
The MBS burst indicated by the MBS_DATA_Time_Diversity_IE is encoded at the same way of HARQ.
But it does not need the acknowledgement from MSS.

[Remedy 5 : Modify Table 381 at section 11.13 Service Flow management encoding and add section 11.13.20 as following:]

Table 381-- Service Flow Encodings

Type	*Parameter*
…	*…*
3	*Service Class Name*
4	~~*reserved*~~*MBS service*
5	*QoS Parameter Set Type*
…	*…*

11.13.20 MBS service

This TLV indicates whether or not the MBS service is being requested for the connection that is being setup.

A value of 0 indicates MBS without macro-diversity is requested and a value of 1 indicates MBS with macro-diversity is requested. If MSS or BS want to initiate MBS service, DSA-REQ with MBS service shall be used. The DSA-RSP message shall contain the acceptance or rejection of request and if there is no available MBS, MBS service value may be set to 0. ARQ shall not be enabled for this connection.

Type	Length	Value	Scope
[145/146].4	1	0 : No available MBS 1 : MBS without macro-diversity 2 : MBS with macro-diversity	DSx-REQ DSx-RSP DSx-ACK