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Re:	"IEEE 802.16-12-400-00-Gdoc," in response to Letter Ballot Recirc #38b on P802.16.1a/D3	
Abstract	Comments on multicast operation in GRIDMAN Draft Standard	
Purpose	To discuss and adopt the proposed text in the draft amendment document on GRIDMAN	
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Clarification on multicast operation over IEEE 802.16.1a

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1. Introduction

This document provides clarification on multicast operation over IEEE 802.16.1a to recognize and distinguish the multicast service between HR multicast operation and other multicast operation.

2. References

[1] IEEE 802.16-12-0132-00, GRIDMAN System Requirement Document including SARM annex, January 2012.
[2] IEEE P802.16n™/D3, Air Interface for Broadband Wireless Access Systems - Draft Amendment: Higher Reliability Networks, June 2012.
[3] IEEE P802.16.1a™/D3, WirelessMAN-Advanced Air Interface for Broadband Access Systems - Draft Amendment: Higher Reliability Networks, June 2012.
[4] EEE P802.16Rev3/D6, IEEE Draft Standard for Local and metropolitan area networks; Part 16: Air Interface for Fixed and Mobile Broadband Wireless Access Systems," April 2012.
[5] IEEE P802.16.1™/D6, IEEE Draft for WirelessMAN-Advanced Air Interface for Broadband Wireless Access Systems, April 2012.

3. Proposed Text on the IEEE 802.16.1a Amendment Draft Standard

[----------Start of Text Proposal----------]

[Remedy1: change 11th row of Table 30, page 13 in P802.16.1a as follows:]

action code	3	bit0: multicast service flow update bit1: location update due to HR multicast zone change bit2: multicast security key update	

[Remedy2: change 6.2.3.2 in P802.16.1a as follows:]

6.2.3.2 AAI-RNG-RSP

Change Table 31 in section 6.2.3.2 as indicated:

Table 31 - AAI-RNG-RSP message field description

Field	Size (bits)	Value/Description	Condition
Ranging Abort	1	Set to 1 when an ABS rejects the AMS.	Present when an ABS rejects an AMS.
If (Ranging Abort == 1) {			
Ranging Abort Timer	16	Timer defined by an ABS to prohibit the AMS from attempting network entry at this ABS, for a specific time duration. Value: 0 (Do not try ranging again at the ABS.) Value: 1–65534, in units of seconds Value: 65535 (When the received CSGID(s) from the AMS does not match any of the CSGID(s) of the Femto ABS. This value indicates the Ranging Abort Timer is not to be used, and the AMS can range any time.)	
}else{			
…	…	…	…
Location Update Response	4	0x0= Success of Location Update 0x1= Failure of Location Update 0x2 = *Reserved* 0x3 = Success of location update and DL traffic pending 0x4 = Allow AMS's DCR mode initiation request or DCR mode extension request 0x5 = Reject AMS's DCR mode initiation request or DCR mode extension request 0x6~0xF: *Reserved*	Shall be included when this message is sent in response to an AAI-RNG-REQ message used to perform location update or DCR mode initiation from Idle Mode or DCR mode extension.
If (Location Update Response == 0x0) {			
…	…	…	…
}//end of for (N-E-MBS-Zone-IDs)			

Table 31 - AAI-RNG-RSP message field description

Field	Size (bits)	Value/Description	Condition
~~New Multicast Group Zone ID~~	~~12~~	~~Indicates a Multicast Group Zone ID to update in target HR-BS.~~	~~Shall be included in HR-Network in response to the AAI-RNG-REQ message where ranging purpose indication is set to 0b1110 and Extended Ranging Purpose Indication is set to 0b0000 and action code bit0 is set to 1.~~
~~New Multicast Indication cycle~~	~~8~~	~~Start of multicast indication cycle. The first superframe is the multicast available interval and rest superframes are the multicast unavailable interval.~~ ~~8 LSB of superframe number~~	~~Shall be present if needed to update in HR-Network~~
For(j=1;j<=M;j++){		Number of Multicast Group ID and FID (M) to update in the T-ABS[1..16]. Mapping of current Multicast Group ID and FID and new Multicast Group ID and FID to be updated. Based on the value of Num of Multicast Group ID and FID to be updated.	Present if it needs to be updated.
Current Multicast Group ID	12		
Current FID	4		
New Multicast Group ID	12		
New FID	4		
~~}~~}			
New HR Multicast Group Zone ID	12	Indicates an HR Multicast Group Zone ID to update in target HR-BS.	Shall be included in HR-Network in response to the AAI-RNG-REQ message where ranging purpose indication is set to 0b1110 and Extended Ranging Purpose Indication is set to 0b0000 and action code bit0 is set to 1.

Table 31 - AAI-RNG-RSP message field description

Field	Size (bits)	Value/Description	Condition
New HR Multicast Indication cycle	8	Start of HR multicast indication cycle. The first superframe is the multicast available interval and rest superframes are the multicast unavailable interval. 8 LSB of superframe number	Shall be present if needed to update in HR-Network
For(n=1;n<=HR_M;n++){		Number of HR Multicast Group ID and FID (HR_M) to update in the T-ABS[1..16]. Mapping of current HR Multicast Group ID and FID and new HR Multicast Group ID and FID to be updated. Based on the value of Number of HR Multicast Group ID and FID to be updated.	Present if it needs to be updated in HR-Network.
Current HR Multicast Group ID	12		
Current FID	4		
New HR Multicast Group ID	12		
New FID	4		
}			
for (k=1;k<=N;k++){		Number of security key of HR multicast (N) to update [1..16]	Present if it needs to update MTEK in HR-Network.
HR Multicast Group ID	12	HR Multicast Group ID to update METK	
FID	4	FID to update MTEK	
COUNTER_MTEK	16	COUNTER_MTEK used for deriving current MTEK	
MEKS	2	Encryption key sequence number for current MTEK	
}			
SMS	*variable*	Short Message content up to the size of 140 bytes.	May be included when SMS contents is sent in idle mode.
}//end of If (Location Update Response == 0x0)			

Table 31 - AAI-RNG-RSP message field description

Field	Size (bits)	Value/Description	Condition
Reentry Process Optimization	5	Reentry process optimization bitmap indicates which MAC control message transactions may be omitted during an attempted reentry (i.e., reentry during HO (including zone switching), and reentry from idle mode) A value of 1 in the bitmap indicates that the corresponding MAC control message transaction may be omitted, while a 0 indicates that the corresponding MAC control message transaction shall be completed. The AMS shall only commence Connected State with the T-ABS after completing all the required MAC control message transactions. Bit 0: Omit AAI-SBC-REQ and AAI-SBC-RSP MAC control messages during reentry processing Bit 1: Omit PKM Authentication phase Bit 2: Omit AAI-REG-REQ and AAI-REG-RSP message during reentry processing. Bit 3: Omit higher layer protocol triggering for IP address refresh during reentry processing Bit 4: For the case of reentry during HO including zone switching, a 1 indicates to the AMS that the T-ABS has received the full service and operational states for static and dynamic context (including ARQ window parameters and state machines). For the case of reentry from Idle mode, a 1 indicates to the AMS that the T-ABS has received the static context of the AMS. The static context includes SFIDs and related description (QoS descriptors and CS classifier information) for all service flows that the AMS has currently established as well as any SAs with their related keying information.	
…	…	…	…

Table 31 - AAI-RNG-RSP message field description

Field	Size (bits)	Value/Description	Condition
If (it is under network reentry for HO){			
~~New Multicast Group Zone ID~~	~~12~~	~~Indicates a Multicast Group Zone ID to update in target HR-BS.~~	~~Shall be included in HR-Network in response to the AAI-RNG-REQ message where ranging purpose indication is set to 0b1110 and Extended Ranging Purpose Indication is set to 0b0000 and action code bit0 is set to 1.~~
~~New Multicast Indication cycle~~	~~8~~	~~Start of multicast indication cycle. The first superframe is the multicast available interval and rest superframes are the multicast unavailable interval.~~ ~~8 LSB of superframe number~~	~~Shall be present if needed to update in HR-Network~~
For (i = 0; i< M; i++) {		Number of Multicast Group ID and FID (M) to update in the T-ABS[1..16]. Mapping of current Multicast Group ID and FID and new Multicast Group ID and FID to be updated. Based on the value of Num of Multicast Group ID and FID to be updated.	Present if it needs to be updated.
Current Multicast Group ID	12		
Current FID	4		
New Multicast Group ID	12		
New FID	4		
}			

Table 31 - AAI-RNG-RSP message field description

Field	Size (bits)	Value/Description	Condition
New HR Multicast Group Zone ID	12	Indicates an HR Multicast Group Zone ID to update in target HR-BS.	Shall be included in HR-Network in response to the AAI-RNG-REQ message where ranging purpose indication is set to 0b1110 and Extended Ranging Purpose Indication is set to 0b0000 and action code bit0 is set to 1.
New HR Multicast Indication cycle	8	Start of HR multicast indication cycle. The first superframe is the multicast available interval and rest superframes are the multicast unavailable interval. 8 LSB of superframe number	Shall be present if needed to update in HR-Network
For (*n* = 0; *n*< HR_M; *n*++) {		Number of HR Multicast Group ID and FID (HR_M) to update in the T-ABS[1..16]. Mapping of current HR Multicast Group ID and FID and new HR Multicast Group ID and FID to be updated. Based on the value of Number of HR Multicast Group ID and FID to be updated.	Present if it needs to be updated in HR-Network
Current HR Multicast Group ID	12		
Current FID	4		
New HR Multicast Group ID	12		
New FID	4		
}			
for (k=1;k<=N;k++){		Number of Security key of HR multicast (N) to update [1..16]	Present if it needs to update MTEK in HR-Network.
HR Multicast Group ID	12	HR Multicast Group ID to update METK	
FID	4	FID to update MTEK	
COUNTER_MTEK	16	COUNTER_MTEK used for deriving current MTEK	

Table 31 - AAI-RNG-RSP message field description

Field	Size (bits)	Value/Description	Condition
MEKS	2	Encryption key sequence number for current MTEK	
}			
}//end of If (it is under network reentry for HO)			
For (*i* = 0; *i*<N_SFIDs; *i*++) {		N_SFIDs is Number of SFIDs supported in MZone when an AMS performs Zone Switching from LZone to MZone. Its maximal number is 24.	Present if CID to FID mapping is done through the AAI-RNG-RSP message during Zone Switching operation. If this field is not present, all FIDs for the transport connection should be reestablished through the AAI-DSA exchanges after completion of network reentry in MZone.
SFID	32	FID in MZone should be assigned as defined in 6.2.6.4.1.3.1 per each DL/UL connections	
}			
} //End of else (Ranging Abort==1)			

[Remedy3: change line#17-20, page29 in P802.16.1a as follows:]

- HR Multicast service flow mapping list (for HR-Network)
  - Neighbor HR Multicast Group Zone ID
  - Neighbor HR Multicast Indication Cycle
  - Mapping of HR Multicast Group ID + FID and neighbor HR Multicast Group ID + FID

[Remedy4: change Table 42 - AAI-NBR-ADV message field description in P802.16.1a as follows:]

Table 42 - AAI-NBR-ADV message field description

Field	Size (bits)	Value/Description	Condition
……	……	……	……
For (*i*=0; *i*<N-NBR-ABSs; *i*++) {		N-NBR-ABSs is the number of neighbor ABSs included in this message, and has the range of [1..64].	
BSID	48	Neighbor ABS ID	
MAC protocol version	8	MAC protocol version of the BS Consistent with IEEE Std 802.16-2009 definition, with new MAC protocol version 10 defined for AAI.	
CP time	2	CP time of the BS 0b00: 1/8 0b01: 1/16 0b10: 1/4	
HR Multimode indication	2	Indicates whether neighbor BR/RS is HR-MS acting as BS/RS or HR-BS acting as RS 0b00: neighbor BS is neither HR-MS acting as BS/RS nor HR-BS acting as RS 0b01: neighbor BS is HR-MS acting as BS/RS 0b10: neighbor BS is HR-BS acting as RS 0b11: *reserved*	Shall be present in HR-Network
Neighbor HR Multicast Group Zone ID	12	Indicates an HR Multicast Group Zone ID provided by neighbor BS.	Present in HR-Network
Neighbor HR Multicast Indication cycle	8	Indicates the start of multicast indication cycle provided by neighbor BS. The first superframe is the multicast available interval and rest superframes are the multicast unavailable interval. 8 LSB of superframe number	Present in HR-Networks
For(j=1;j<=M;j++){		Number of HR Multicast Group ID and FID (M) mapping between serving BS and neighbor BS[1..16]	Present if needed in HR-Networks

Table 42 - AAI-NBR-ADV message field description

Field	Size (bits)	Value/Description	Condition
HR Multicast Group ID	12		
FID	4		
Neighbor HR Multicast Group ID	12		
Neighbor FID	4		
}			
For(*j*=0; *j*<N-Carrier-Info; *j*++) {		N-Carrier-Info is the number of carrier information listed here for the *ABSi*	
……	……	……	……

[Remedy5: change 5th-6th rows in Table 60 - AAI-SCD message field description (page 31) in P802.16.1a as follows:]

HR Multicast Group Zone ID	12	Indicates an HR Multicast Group Zone ID provided by neighbor BS. Shall not be set to "0."	In HR-Network
HR Multicast Indication cycle	8	Start of HR multicast indication cycle. The first superframe is the multicast available interval and rest superframes are the multicast unavailable interval. 8 LSB of superframe number	Shall be present unless HR Multicast Group Zone is set to **"0"** in HR-Network

[Remedy6: change the 2nd row in Table 72 - AAI-PKM-REQ message field description (page 33) in P802.16.1a as follows:]

Field	Size (bits)	Value/Descriptio	Condition

PKM v3 message type code	4	- PKMv3 Reauth-Request; PKM v3 message code = 1 - PKMv3 EAP-Transfer; PKM v3 message code = 2 -PKMv3 Key_Agreement-MSG#2; PKM v3 message code = 4 - PKMv3 TEK-Request; PKM v3 message code = 6 - PKMv3 TEK-Invalid; PKM v3 message code =8 ~~9–16: Reserved~~ - Peer_KeyAgreement_MSG #2; PKM v3 message code = 10 - PKMv3 HR_MulticastKey-Request; PKM v3 message code = 12 149–16: Reserved	

[Remedy7: change the last three rows in Table 72 - AAI-PKM-REQ message field description (page 31) in P802.16.1a as follows:]

If(PKMv3 message code == 12) {			
HR Multicast Group ID	12	HR Multicast Group ID	
FID	4	FID	
}			

[Remedy8: change the 2nd row in Table 73 - AAI-PKM-RSP message field description (page 35) in P802.16.1a as follows:]

Field	Size (bits)	Value/Descriptio	Condition

PKM v3 message type code	4	- PKMv3 EAP-Transfer; PKM v3 message code =2 - PKMv3 Key_Agreement-MSG#1; PKM v3 message code =3 - PKMv3 Key_Agreement-MSG#3; PKM v3 message code =5 - PKMv3 TEK-Reply; PKM v3 message code =7 - PKMv3 TEK-Invalid; PKM v3 message code =8 ~~9–16: *Reserved*~~ - Peer_KeyAgreement_MSG #1; PKM v3 message code = 9 - Peer_KeyAgreement_MSG #3; PKM v3 message code = 11 - PKMv3 HR_MulticastKey-Reply; PKM v3 message code = 13 14~~9~~–16: *Reserved*	

[Remedy9: change the last 6th rows in Table 73 - AAI-PKM-RSP message field description (page 38) in P802.16.1a as follows:]

If(PKMv3 message code == 12) {			
HR Multicast Group ID	12	HR Multicast Group ID	
FID	4	FID	
MC Nonce	128	The number used to derive the MCMAC-MTEK_Prekey	
COUNTER_MTEK	16	The current COUNTER_MTEK in use	
MEKS	2	Multicast Encryption Key Sequence	
}			

[Remedy10: change the last three rows in Table 74 - PKMv3 message field description (page 38-39) in P802.16.1a as follows:]

12	PKMv3 HR MulticastKey-Request	AAI-PKM-REQ
13	PKMv3 HR MulticastKey-Reply	AAI-PKM-RSP
~~9~~14-16	*Reserved*	

[Remedy11: change the section 6.2.3.43.9 (page 39) in P802.16.1a as follows:]

6.2.3.43.9 PKMv3 HR MulticastKey-Request message

The HR-MS transmits the PKMv3 HR MulticastKey-Request message to its serving HR-BS as a first step for an HR-MS initiated multicast key request.

The message shall include the HR multicast group ID and CMAC Digest attribute for verification, which is computed from CMAC_KEY _U.

Code: 12

The message attributes are shown in Table 82a.

Table 82a-PKMv3 HR MulticastKey-Request message attribute

Attribute	Contents
HR MulticastGrpID	HR MGID ~~and FID~~ of the HR multicast group
FID	FID of the HR multicast group
CMAC_digest	Message digest calculated by HR-MS

[Remedy12: change the section 6.2.3.43.10 (page 39) in P802.16.1a as follows:]

6.2.3.43.10 PKMv3 HR MulticastKey-Reply message

The HR-BS transmits the PKMv3 HR MulticastKey-Reply message to derive the multicast keys of an HR multicast group. The message is either transmitted in response to an HR MulticastKey-Request message initiated by an HR-MS, or transmitted unsolicitedly.

The message shall include the HR multicast group ID, MC_Nonce, COUNTER_MTEK and MEKS for an HR-MS to derive the multicast keys.

If the message is unicast to a target HR-MS, it shall be encrypted with the current TEK for confidentiality, and contain the CMAC Digest attribute for verification, which is computed from CMAC_KEY _D.

Otherwise the message is multicast to all HR-MSs and it shall be encrypted with the current MTEK for confidentiality, and contain the MCMAC Digest attribute for MCMAC verification, which is computed from MCMAC_KEY.

Code: 13

The message attributes are shown in Table 82b.

Table 82b-PKMv3 HR MulticastKey-Response message attribute

Attribute	Contents
HR MulticastGrpID	HR MGID ~~and FID~~ of the HR multicast group
FID	FID of the HR multicast group
COUNTER_MTEK	The current COUNTER_MTEK in use
MEKS	Multicast Encryption Key Sequence
(M)CMAC_digest	Message digest calculated using CMAC or MCMAC key by HR-BS

[Remedy13: change line#6-#14, page 40 in P802.16.1a as follows:]

When an ABS commences multicast service, the following parameters shall be included in the AAI-DSA-REQ message.

~~- Multicast Service: Indicates whether multicast service is being requested or provided for the connection that is being successfully setup.~~
~~- Multicast Group Zone ID: Indicates multicast group zone IDs for the connection that is associated with the service flow in AAI-DSA-REQ in HR-Network.~~
~~- Multicast Indication cycle: Indicates multicast indication cycle for the multicast in HR-Network.~~
- Multicast Group ID: Indicates multicast group for the connection that is associated with the service flow in AAI-DSA-REQ.

When an HR-BS commences HR multicast service, the following parameters shall be included in the AAI-DSA-REQ message.

- HR Multicast Service: Indicates whether HR multicast service is being requested or provided for the connection that is being successfully setup.
- HR Multicast Group Zone ID: Indicates HR multicast group zone ID for the connection that is associated with the service flow in AAI-DSA-REQ in HR-Network.
- HR Multicast Indication cycle: Indicates HR multicast indication cycle for the multicast in HR-Network.
- HR Multicast Group ID: Indicates HR multicast group ID for the connection that is associated with the service flow in AAI-DSA-REQ.

[Remedy14: change Table 86 - AAI-DSA-REQ message field description (page 42) in P802.16.1a as follows:]

Table 86 - AAI-DSA-REQ message field description

Field	Size (bits)	Value/Description	Condition
.....	...	.....	...

Table 86 - AAI-DSA-REQ message field description

Field	Size (bits)	Value/Description	Condition
Non-common for Coupled Group	*variable*	Non-common service flow encodings that are specific to individual service flows specified in Coupled FID Parameter List Service flow/convergence sublayer parameters in Table 131, except FID, SFID, E-MBS service related information, Group Parameter Create/Change related information and Coupled Group Create/ Change related information, may be encapsulated in this field.	Shall be present if NFIDs-Coupled-Noncommon is not zero
}			
}			
For (**i**=0; **i**<Num of Multicast Group ID (M); **i**++) {		Num of Multicast Group ID is the number of Multicast Group IDs to add [1..16]	Present when ABS initiates AAI-DSAREQ
Multicast Group ID	12	ID of a group to which the flow is added	Present only if Num of Multicast Group ID> 0
FID	4	Multicast specific FID that is associated with Multicast Group ID	Present only if Num of Multicast Group ID and FID (M)> 0
}			
HR Multicast Service	2	Indicates whether HR multicast service is being requested or provided for the connection that is being successfully setup. 1 indicates support, 0 indicates not support. Bit0: HR Multicast in S-BS only Bit1: HR Multicast in a multi-BS zone supporting If all Bit0-Bit1 are set to 0, it indicates no HR multicast is supported.	
if (HR Multicast is supported) {			
HR Multicast Group Zone ID	12	Indicates an HR multicast group zone to add where the connection for associated service flow is valid.	

Table 86 - AAI-DSA-REQ message field description

Field	Size (bits)	Value/Description	Condition
HR Multicast Indication cycle	8	Start of HR multicast indication cycle. The first superframe is the multicast available interval and rest superframes are the multicast unavailable interval. 8 LSB of superframe number	Shall be present if HR Multicast Group Zone is included in this message and the HR Multicast indication cycle is different from that in AAI-SCD in HR-Network. If the value is the same as that in AAI-SCD, this may not be included in this message
~~For (**i**=0; **i**<Num of Multicast Group ID and FID (M); **i**++) {~~		~~Num of Multicast Group ID and FID (M) is the number of Multicast Group IDs to add [1..16]~~	~~Present when ABS initiates AAI-DSAREQ~~
~~Multicast Group ID~~	~~12~~	~~ID of a group to which the flow is added~~	~~Present only if Num of Multicast Group ID and FID (M)> 0~~
~~FID~~	~~4~~	~~Multicast specific FID that is associated with Multicast Group ID~~	~~Present only if Num of Multicast Group ID and FID (M)> 0~~
For (**i**=0; **i**<Num of HR Multicast Group ID and FID (HR_M); **i**++) {		Num of HR Multicast Group ID and FID (HR_M) to add [1..16]	Present when HR-BS initiates AAI-DSA-REQ
HR Multicast Group ID	12	ID of a group to which the flow is added	Present only if Num of HR Multicast Group ID and FID (HR_M)> 0
FID	4	HR Multicast specific FID that is associated with HR Multicast Group ID	Present only if Num of HR Multicast Group ID and FID (HR_M)> 0
Feedback request indicator FRI	1	0: ACK only 1: NACK only	May be present if feedback is supported in HR-Networks
Logical channel indicator FBACK_LCI	12	Indicates the index of the logical channel assigned to this multicast	Present if FRI is included
if FRI == 0b1 {			
Probability indicator of sending ranging preamble, *pi*	10	Indicates the probability of sending the NAK if NAK is indicated, probability = 2^{-pi}	pi > **0**

Table 86 - AAI-DSA-REQ message field description

Field	Size (bits)	Value/Description	Condition
}			
}			
}//End if (HR Multicast is supported)			
.....	...	.....	...

[Remedy15: change line#4-line#12, page43 in P802.16.1a as follows:]

When an AMS commences multicast service, the ABS shall include the following parameters in the AAI-DSA-RSP message:

~~- Multicast Service: Indicates whether multicast service is being requested or provided for the connection that is being successfully setup.~~

~~- Multicast Group Zone ID: Indicates multicast group zone IDs for the connection that is associated with the service flow in AAI-DSA-RSP in HR-Network.~~

~~- Multicast Indication cycle: Indicates multicast indication cycle for the multicast in HR-Network~~

- Multicast Group ID: Indicates multicast group for the connection that is associated with the service flow in AAI-DSA-RSP.

When an HR-MS commences HR multicast service, the HR-BS shall include the following parameters in the AAI-DSA-RSP message:

- HR Multicast Service: Indicates whether HR multicast service is being requested or provided for the connection that is being successfully setup.

- HR Multicast Group Zone ID: Indicates HR multicast group zone IDs for the connection that is associated with the service flow in AAI-DSA-RSP in HR-Network.

- HR Multicast Indication cycle: Indicates HR multicast indication cycle for the multicast in HR-Network

- HR Multicast Group ID: Indicates HR multicast group for the connection that is associated with the service flow in AAI-DSA-RSP.

[Remedy16: change Table 87 - AAI-DSA-RSP message field description (page 44-45) in P802.16.1a as follows:]

Table 87 - AAI-DSA-RSP message field description

Field	Size (bits)	Value/Description	Condition
.....	...	.....	...

Table 87 - AAI-DSA-RSP message field description

Field	Size (bits)	Value/Description	Condition
Carrier Switching Mode	1	0b0: carrier switching method based on Unicast Available Interval in the AAI-DSA message 0b1: carrier switching method using AAI-E-MBS-REP/RSP message	Present if ABS indicates carrier switching when receiving AMS-initiated DSA
If(Carrier Switching Mode == 0b0) {			
Unicast Available Interval Bitmap	*variable*	Indicates when the AMS should be available in the primary carrier using N bits *b0b1b2...bN-1* If bi==0, then AMS is available for EMBS data scheduling in secondary carrier If *bi*==1, then AMS is available for unicast scheduling in primary carrier *NMSI* = 4 superframes: *N* = 4 bits *NMSI* = 8 superframes: *N* = 8 bits *NMSI* = 16 superframes: *N* = 16 bits *NMSI* = 32 superframes: *N* = 32 bits Depending on the *NMSI*, the number of bits per subframe changes, 4 frames per bit	
}			
For (**i**=0; **i**<Num of Multicast Group ID (M); **i**++) {		Num of Multicast Group ID is the number of Multicast Group IDs to add [1..16]	Present when ABS initiates AAI-DSAREQ
Multicast Group ID	12	ID of a group to which the flow is added	Present only if Num of Multicast Group ID> 0
FID	4	Multicast specific FID that is associated with Multicast Group ID	Present only if Num of Multicast Group ID and FID (M)> 0
}			

Table 87 - AAI-DSA-RSP message field description

Field	Size (bits)	Value/Description	Condition
HR Multicast Service	2	Indicates whether HR multicast service is being requested or provided for the connection that is being successfully setup. 1 indicates support, 0 indicates not support. Bit0: HR Multicast in S-BS only Bit1: HR Multicast in a multi-BS zone supporting If all Bit0-Bit1 are set to 0, it indicates no HR multicast is supported.	Present if needed in HR-Network
if (HR Multicast is supported) {			
HR Multicast Group Zone ID	12	Indicates an HR multicast group zone to add where the connection for associated service flow is valid.	
HR Multicast Indication cycle	8	Start of HR multicast indication cycle. The first superframe is the multicast available interval and rest superframes are the multicast unavailable interval. 8 LSB of superframe number	Shall be present if HR Multicast Group Zone is included in this message and the HR Multicast indication cycle is different from that in AAI-SCD in HR-Network. If the value is the same as that in AAI-SCD, this may not be included in this message
~~For (i=0; i<Num of Multicast Group ID and FID (M); i++) {~~		~~Num of Multicast Group ID and FID (M) is the number of Multicast Group IDs to add [1..16]~~	
~~Multicast Group ID~~	~~12~~	~~ID of a group to which the flow is added~~	~~Present only if Num of Multicast Group ID and FID (M)> 0~~
~~FID~~	~~4~~	~~Multicast specific FID that is associated with Multicast Group ID~~	~~Present only if Num of Multicast Group ID and FID (M)> 0~~
For (i=0; i<Num of HR Multicast Group ID and FID (HR_M); i++) {		Num of HR Multicast Group ID and FID (HR_M) to add [1..16]	Present when HR-BS initiates AAI-DSA-REQ
HR Multicast Group ID	12	ID of a group to which the flow is added	Present only if Num of HR Multicast Group ID and FID (HR_M)> 0

Table 87 - AAI-DSA-RSP message field description

Field	Size (bits)	Value/Description	Condition
FID	4	HR Multicast specific FID that is associated with HR Multicast Group ID	Present only if Num of HR Multicast Group ID and FID (HR_M)> 0
Feedback request indicator FRI	2	0b00: ACK only 0b01: NACK only 0b10: no feedback 0b11: reserved	Present if feedback information needs to ~~update~~add in HR-Networks
Logical channel indicator FBACK_LCI	12	Indicates the index of the logical channel assigned to this multicast	Present if logical channel indication needs to ~~update~~add in HR-Networks.
if FRI == 0b1 {			
Probability indicator of sending ranging preamble, *pi*	10	Indicates the probability of sending the NAK if NAK is indicated, probability = 2^{-pi}	pi ≥ **0** Present if pi needs to ~~update~~add in HR-Networks.
}			
~~}~~			
}//End if (HR Multicast is supported)			
.....	...	.....	...

[Remedy17: change Table 89 - AAI-DSC-REQ message field description (page 46-48) in P802.16.1a as follows:]

Table 89 - AAI-DSC-REQ message field description

Field	Size (bits)	Value/Description	Condition
.....	...	.....	...
For(**i**=0; **i**<N-FIDs-Coupled-Noncommon;**i**++) {		N-FIDs-Coupled-Noncommon is the number of non-common coupled service flow IDs. The maximum value of N-FIDs-Coupled-Noncommon is 32.	
FID	4	Flow identifier	Present when NFIDs-Coupled-Noncommon>0

Table 89 - AAI-DSC-REQ message field description

Field	Size (bits)	Value/Description	Condition
Non-common for Coupled Group	*variable*	Non-common service flow encodings that are specific to individual service flows specified in Coupled FID Parameter List. Service flow/convergence sublayer parameters in Table 131, except FID, SFID, E-MBS service-related information, Group Parameter Create/ Change related information and Coupled Group Create/Change related information, may be encapsulated in this field.	Present when NFIDs-Coupled-Noncommon>0
}			
}			
For (**i**=0; **i**<Num of Multicast Group ID; **i**++) {		Num of Multicast Group ID is the number of Multicast Group IDs to add [1..16]	Present when ABS initiates AAI-DSC-REQ Present only if Multicast Group ID to be added exists
Multicast Group ID to be added	12	Multicast Group ID to be added	Present only if Num of Multicast Group ID> 0
FID	4	Multicast specific FID which is associated with newly added Multicast Group ID	Present only if Num of Multicast Group ID> 0
}			
For (**i**=0; **i**<Num of Multicast Group ID (MC); **i**++) {		Num of Multicast Group ID is the number of Multicast Group IDs to delete [1..16]	Present when ABS initiates AAI-DSC-REQ Present only if Multicast Group ID to be deleted exists
Multicast Group ID to be deleted	12	Multicast Group ID to be deleted	Present only if Num of Multicast Group ID> 0
}			
HR Multicast Group Zone ID	12	Indicates an HR multicast group zone to overwrite where the connection for associated service flow is valid.	Present when ABS initiates AAI-DSCREQ in HR-Network

Table 89 - AAI-DSC-REQ message field description

Field	Size (bits)	Value/Description	Condition
HR Multicast Indication cycle	8	Start of multicast indication cycle to overwrite. The first superframe is the multicast available interval and rest superframes are the multicast unavailable interval. 8 LSB of superframe number	Shall be present if needed to update
~~For (**i**=0; **i**<Num of Multicast Group ID and FID (MC); **i**++) {~~		~~Num of Multicast Group ID and FID (MC) is the number of Multicast Group IDs to add [1..16]~~	
~~Multicast Group ID~~	~~12~~	~~ID of a group to which the flow is added~~	~~Present when ABS initiates AAI-DSAREQ~~
~~FID~~	~~4~~	~~Multicast specific FID that is associated with Multicast Group ID~~	~~Present only if Num of Multicast Group ID and FID (M)> 0~~
For (**i**=0; **i**<Num of Multicast Group ID+FID (HR_MA); **i**++) {		Num of Multicast Group ID+FID (HR_MS) is the number of Multicast Group ID and FIDs to add [1..16]	Present when ABS initiates AAI-DSC-REQ Present only if Multicast Group ID and FID to be added exists
HR Multicast Group ID to be added	12	HR Multicast Group ID to be added	Present only if Num of Multicast Group ID+FID> 0
FID	4	Multicast specific FID which is associated with newly added HR Multicast Group ID	Present only if Num of Multicast Group ID+FID> 0
Feedback request indicator FRI	2	0b00: ACK only 0b01: NACK only 0b10: no feedback 0b11: reserved	Present if feedback information needs to update in HR-Networks
Logical channel indicator FBACK_LCI	12	Indicates the index of the logical channel assigned to this multicast	Present if logical channel indication needs to update in HR-Networks.
if FRI == 0b1 {			
Probability indicator of sending ranging preamble, *pi*	10	Indicates the probability of sending the NAK if NAK is indicated, probability = 2^{-pi}	pi > **0** Present if pi needs to update in HR-Networks.
}			

Table 89 - AAI-DSC-REQ message field description

Field	Size (bits)	Value/Description	Condition
}			
}			
For (i = 0; i< MU; i++) {		Number of Multicast Group ID and FID (MU) to update [1..16]. Mapping of current Multicast Group ID and FID and new Multicast Group ID and FID to update. Based on the value of Num of Multicast Group ID and FID to update.	Present if it needs to update in HRnetwork.
Current Multicast Group ID	12		
Current FID	4		
New Multicast Group ID	12		
New FID	4		
}			
For (i=0; i<Num of Multicast Group ID and FID (MA); i++) {		Num of Multicast Group ID and FID (MA) is the number of Multicast Group IDs to add [1..16]	Present when ABS initiates AAI-DSCREQ Present only if Multicast Group ID to be added exists
Multicast Group ID to be added	12	Multicast Group ID to be added	Present only if Num of Multicast Group ID and FID (MA)> 0
FID	4	Multicast specific FID which is associated with newly added Multicast Group ID	Present only if Num of Multicast Group ID and FID (MA)> 0
}			
For (i=0; i<Num of Multicast Group ID and FID (MD); i++) {		Num of Multicast Group ID and FID (MD) is the number of Multicast Group IDs to delete [1..16]	Present when ABS initiates AAI-DSC-REQ Present only if Multicast Group ID to be delete exists

Table 89 - AAI-DSC-REQ message field description

Field	Size (bits)	Value/Description	Condition
~~Multicast Group ID to be delete~~	~~12~~	~~Multicast Group ID to be delete~~	~~Present only if Num of Multicast Group ID and FID (MD)> 0~~
~~FID~~	~~4~~	~~Multicast specific FID which is associated with newly deleted Multicast Group ID~~	~~Present only if Num of Multicast Group ID and FID (MD)> 0~~
~~}~~			
For (**i**=0; **i**<Num of HR Multicast Group ID+ FID (HR_MD); **i**++) {		Num of Multicast Group ID+FID (HR_MD) to delete [1..16]	Present when ABS initiates AAI-DSC-REQ Present only if Multicast Group ID to be delete exists
HR Multicast Group ID to be delete	12	HR Multicast Group ID to be delete	Present only if Num of HRMulticast Group ID+ FID (HR_MD)> 0
FID	4	Multicast specific FID which is associated with newly deleted HR Multicast Group ID	Present only if Num of HRMulticast Group ID+ FID (HR_MD)> 0
}			
If (Sleep cycle setting is included) {			May be present when sleep cycle setting needs to be changed or switched
Operation	2	This indicates operation request type 0b00~0b01: Reserved 0b10: Change sleep cycle setting 0b11: Switch sleep cycle setting	
.....	...	.....	...

[Remedy18: change line#2-line#8, page94 in P802.16.1a as follows:]

6.2.3.65.55 AAI-HR-MG-IND

An HR-BS providing HR multicast service transmits AAI-HR-MG-IND message in the beginning of available interval in HR multicast indication cycle. This message indicates whether there is DL multicast traffic for a specific HR multicast group. There are two formats for the AAI-HR-MG-IND message, indicated by the indication type field.

If the indication type is set to "0," this message indicates the multicast traffic transmission offset directly. Otherwise, MGIND bitmap indicates a subgroup of HR multicast group and further information will be transmitted by AAI-HR-MT-IND described in 6.2.3.65.56.

[Remedy19: change 4th-5th row of Table 106zz - AAI-HR-MG-IND message field description, page94 in P802.16.1a as follows:]

For(i=0;i<Num_MGID;i++)		Num_MGID is the number of HR multicast group to indicate multicast traffic is transmitting. Range : 0 ~ 32	
HR Multicast Group ID	12		Shall be present

[Remedy20: change line#4-5, page106 in P802.16.1a as follows:]

Table 193-Description of Masking Code for type indicator 010

Decimal Value	Description
4095	Used to mask Broadcast A-MAP IE for multicast assignment
Others	~~Reserved~~ 12 bit HR MGID is used to make HR-Multicast DL Assignment A-MAP IE for high reliable multicast assignment

[Remedy21: change line#1-line#33, page198 in P802.16.1a as follows:]

6.12.9 Support for multicast

Each HR-BS capable of providing multicast communication belongs to a certain HR multicast group zone. An HR multicast zone defined as a set of HR-BSs where the same HR Multicast Group ID and FID is used for transmitting the content of certain service flow(s).

An HR-BS may provide the HR-MS with multicast content locally within its coverage and independently of other HR-BSs. The single HR-BS provision of multicast is therefore a configuration where an HR Multicast Zone is configured to consist of a single HR-BS only. In this case, the HR-BS uses any HR Multicast Group ID and FID for providing multicast service, independently of other HR-BSs, so the HR-MS received the multicast data from its serving HR-BS, and the HR-MS should not expect the service flow for this multicast connection to continue when the HR-MS leaves the serving HR-BS' coverage. However, if the HR-MS moves to an HR-BS that is transmitting the same multicast flow in another HR Multicast Group Zone, HR-MS may update its service flow management encodings to continue to receive the same multicast flows.

To ensure proper multicast operation on networks of HR-BS employing multicast, the HR Multicast Group IDs and

FIDs used for common multicast content and service shall be the same for all HR-BSs within the same HR Multicast Group Zone. This allows the HR-MS which has already registered with a service to be seamlessly synchronized with multicast transmissions within an HR Multicast Group Zone without communicating in the UL or re-registering with other HR-BS within that HR Multicast Group Zone.

The HR Multicast Group Zone identifier shall not be "0."

When the HR Multicast Group Zone identifier appears in AAI-NBR-ADV message with only one value of "0," then the neighbor BS is not affiliated with any HR Multicast group zone. An HR Multicast group zone that is adjacent to another HR Multicast group zone is a neighbor HR multicast group zone to that multicast group zone.

6.12.9.1 Multicast communication operation

An HR-BS establishes a DL multicast service by creating a multicast connection with each HR-MS to be associated with the service. Multicast service flows are not dedicated to the specific HR-MS and are maintained even though the HR-MS is either connected state or idle state. When an HR-MS is registered at an HR-BS for receiving multicast service, multicast service flows shall be instantiated as multicast connections. An HR-MS regardless of what mode the HR-MS is currently in may receive data of multicast service flows transmitted from HR-BS. Any available FID is used for the multicast service (i.e., there are no dedicated FIDs for multicast transport connections). To ensure proper multicast operation, the HR Multicast Group ID and FID used for the service shall be the same for all HR-MSs on the same channel that participate in the connection in a multicast zone. Mapping of multicast service flows to corresponding HR Multicast Group IDs and FIDs shall be known and be the same for all HR-BSs belonging to the same HR Multicast Group Zone.

[Remedy22: change line#8-line#12, page199 in P802.16.1a as follows:]

The AAI-DSA, AAI-DSC and AAI-DSD messages are used to establish, change, and delete multicast service flows respectively. The HR-BS shall send the AAI-DSA-REQ/RSP to the HR-MS with the relevant multicast parameters including HR Multicast Group ID.
To receive multicast data, an HR-MS receives the multicast allocation information in the multicast control channel (i.e., HR multicast assignment MAP).

[Remedy23: change line#17, page 199 - line#33, page201 in P802.16.1a as follows:]

6.12.9.1.2 Multicast communication operation in connected state

When an HR-MS moves across HR Multicast group zone boundaries in Active Mode or Sleep Mode, the HR-MS performs the handover procedure as described in 6.2.6.3.

When the HR-MS transits to a new HR Multicast Group Zone while in Active Mode or Sleep Mode, the HR-MS shall send AAI-RNG-REQ message described in 6.2.3.1 with Ranging Purpose Indication set to 0b1111 and Ranging Purpose Indicator Extension set to 0b001 with action code at the target HR-BS. In response to the request for multicast service flow update (Ranging Purpose 1 Indication is set to 0b1111 and Ranging Purpose Indicator Extension is set to 0b001 and action code bit0 is set to 1), the HR-BS shall transmit AAI-RNG-RSP message described in 6.2.3.2, which may include HR Multicast Group Zone Identifier, HR Multicast Indication Cycle, HR Multicast Group ID, FID Update, and feedback parameters if used, to provide updated service flow management encodings for any affected multicast flow(s) as part of the handover procedure.

6.12.9.1.3 Multicast communication operation in idle state

When an HR-MS in Idle state moves to an HR-BS which does not belong to HR-MS' previous HR Multicast Group Zone, the HR-MS is expected to update the multicast service flow management encodings at that HR-BS to provide continuous reception of multicast content. The HR-MS may obtain the multicast information in the target HR Multicast group zone through broadcast messages in the HR Multicast Zone of the service HR-BS. If the idle HR-MS has not received such information from the serving HR Multicast Group Zone, the HR-MS shall use location update procedure to acquire updated multicast service flow management encodings.

In order to perform the multicast location update process, the HR-MS shall transmit AAI-RNG-REQ message with Ranging Purpose Indication set to 0b1111 and Ranging Purpose Indicator Extension set to 0b001 with action code. When the HR-MS detects the current HR multicast group zone changes and expects to update service flow, the bit0 of action code is set to 1. In addition to changing the HR multicast group zone, when the HR-MS detects current paging zone changes, bit1 of the action code is set to 1. In the case of performing multicast security key update, the bit2 of the action code is set to 1.

In response to the request for multicast location update with action code bit0 set to 1, the HR-BS shall transmit AAI-RNG-RSP message which may include the HR Multicast Group Zone identifier, HR Multicast Indication Cycle, HR Multicast Group ID, and FID and feedback parameters if used to provide update service flow management encodings for any affected multicast flow(s).

If the action code bit1 set to 1, the HR-MS shall perform location update as described in 6.2.18.4. In response to the multicast location update with action code bit1 set to 1, the HR-BS shall transmit AAI-RNG-RSP message to the HR-MS and may notify multicast server and paging controller of the HR-MS' context information, but how to notify is outside of this specification.

In response to the request for multicast security key update with action code bit2 set to 1, multicast security key update procedure is performed as described in 6.2.10.2.

HR-BS providing multicast service transmits multicast indication cycle using AAI-SCD and AAI-DSA/AAI-DSC messages. The HR multicast indication cycle is unique to HR multicast group zone and it consists of multicast available interval and multicast unavailable interval. Multicast available interval is the first superframe of each HR multicast indication cycle. In the multicast available interval, the HR-BS providing multicast service transmits AAI-HR-MG-IND message described in 6.2.3.65.65 and AAI-HR-MT-IND message described in 6.2.3.65.66 during multicast available interval of the HR multicast indication cycle in an HR multicast group zone. AAI-HR-MG-IND and AAI-HR-MT-IND message are used to indicate

- multicast service establishment/change/release
- whether the multicast traffic is transmitted after those messages are transmitted
- to perform network entry or exit sleep mode to transmit multicast related message to change/release
- multicast service and update multicast security key.
- to perform multicast service flow update using ranging procedure

HR Multicast indication cycle included in AAI-SCD message is used for multicast service establishment.

During multicast service establishment/change using AAI-DSA/DSC message, new HR multicast indication cycle may be transmitted.

During multicast available interval, HR-BS transmits AAI-HR-MG-IND message in the beginning of available

interval to indicate multicast traffic of one or more specific multicast groups will transmit. AAI-HR-MG-IND includes an indication whether AAI-HR-MT-IND message will be transmitted. If the AAI-HR-MT-IND message is transmitted after transmitting AAI-HR-MG-IND using frame offset, MGIND bitmap indicates a multicast subgroup which is included in the AAI-HR-MT-IND message. Multicast group is divided into some subgroups (i.e., length of MGIND bitmap) and each subgroup has following number of multicast groups:

~~Number of multicast group in a subgroup = $2^{ML}/M$,~~

$$\text{Number of multicast groups in a subgroup} = \frac{2^{ML}}{M}$$

where *ML* is the length of HR Multicast Group ID, *M* is the length of MGIND bitmap and *N*-th bit in MGIND bitmap indicates a subgroup of multicast groups from ~~$2^{ML} \times N/M$ to $2^{ML} \times (N+1)/M - 1$.~~

$$\text{from } \left(2^{ML} \times \frac{N}{M}\right) \text{ to } \left(2^{ML} \times \frac{N+1}{M}\right) - 1.$$

AAI-HR-MT-IND message is transmitted in the offset included in AAI-HR-MG-IND message after transmitting AAI-HR-MG-IND message and it indicates whether multicast traffic of specific multicast group will transmit. The multicast group is indicated based on the MGIND bitmap in AAI-HR-MG-IND message and MTIND bitmap in AAI-HR-MT-IND message.

N-th bit in MGIND bitmap indicates the value of log*M* MSB of HR Multicast Group ID and *Q*-th bit in MTIND bitmap indicates the value of log*K* LSB of HR Multicast Group ID. For the indicated Multicast Group ID, according to the action code, HR-MSs, member of the HR Multicast Group, perform network entry or receive multicast traffic.

6.12.9.2 Multicast protocol features and functions

6.12.9.2.1 Downlink control channel for multicast communication

HR-multicast control channel (i.e., HR-Multicast DL Assignment A-MAP IE) carries configuration information (including allocation/change/release) for multicast communication for one HR multicast group zone in an HR-BS. In HR-Multicast DL Assignment A-MAP, allocation period indicates a period of persistent allocation of multicast resource and Lifetime is a timer indicating the next instance of HR-Multicast DL Assignment A-MAP IE. During the allocation period, transmission indication indicates whether multicast resource is fragmented. If the transmission indication (*TI*) is set to 00, it indicates no fragmented traffic is transmitted until the next allocation instance. If *TI* is set to 01, it indicates the first fragmented traffic and more fragmented traffic is expected to transmit until the *TI* is set to 11. More fragmented traffic is transmitted with the value of *TI* setting to 10 or 11. If *TI* is set to 10, it indicates more fragmented traffic is transmitting until it is set to 11. If *TI* is set to 11, no more fragmented traffic (i.e., last fragmented traffic) is transmitted. Unless the Lifetime expires, this HR-Multicast DL Assignment A-MAP excluding the value of *TI*, does not change during the allocation duration. At the time the Lifetime expires, the HR-Multicast DL Assignment A-MAP shall change or release the allocation.

[Remedy24: change line#55-56, page 227 in P802.16.1a as follows:]

```
HRMulticastGroupZoneID::=          BIT STRING (SIZE (12))
HRMulticastIndicationCycle::=      BIT STRING (SIZE (8))
```

[Remedy25: change line#19, page 229 in P802.16.1a as follows:]

```
        newHRMulticastGroupZoneId     HRMulticastGroupZoneID        OPTIONAL,
        newHRMulticastIndicationCycle HRMulticastIndicationCycle    OPTIONAL,
        multicastInfo                         SEQUENCE (SIZE (1..16)) OF SEQUENCE {
                currentMulticastGroupID       MulticastGroupID,
                currentFID                    FID,
                newMulticastGroupID           MulticastGroupID,
                newFID                                                FID
        } OPTIONAL,
        hrmulticastInfo                       SEQUENCE (SIZE (1..16)) OF SEQUENCE {
                currentHRMulticastGroupID     MulticastGroupID,
                currentFID                    FID,
                newHRMulticastGroupID         MulticastGroupID,
                newFID                        FID
        } OPTIONAL,
        multicastKeyUpdate            SEQUENCE (SIZE (1..16)) OF SEQUENCE {
                currentMulticastGroupId       MulticastGroupID,
                currentFId                    FID,
                mcNonce                       MulticastNonce,
                counterMtek                   CounterTEK,
                meks                          EKS
        } OPTIONAL,
        smsMessage                    SMS                     OPTIONAL
}

RngRspForHoReentryInfo ::= SEQUENCE {
        newHRMulticastGroupZoneId     MulticastGroupZoneID          OPTIONAL,
        newHRMulticastIndicationCycle HRMulticastIndicationCycle    OPTIONAL,
        multicastInfo                 SEQUENCE (SIZE (1..15)) OF SEQUENCE {
                currentMulticastGroupID MulticastGroupID,
                currentFID                    FID,
                newMulticastGroupID MulticastGroupID,
                newFID                                FID
        } OPTIONAL,
        hrmulticastInfo                       SEQUENCE (SIZE (1..16)) OF SEQUENCE {
                currentHRMulticastGroupID     MulticastGroupID,
                currentFID                    FID,
                newHRMulticastGroupID         MulticastGroupID,
                newFID                        FID
        } OPTIONAL,
        multicastKeyUpdate    SEQUENCE (SIZE (1..16)) OF SEQUENCE {
                currentHRMulticastGroupId     MulticastGroupID,
                currentFId                    FID,
                mcNonce                       MulticastNonce,
                counterMtek                   CounterTEK,
                meks                          EKS
        } OPTIONAL
}
```

[Remedy26: change line#63, page 229 - line#5, page 230 in P802.16.1a as follows:]

```
        neighborHRMulticastGroupZoneId        MulticastGroupZoneID                  OPTIONAL,
        neighborHRMulticastIndicationCycle    MulticastIndicationCycle              OPTIONAL,
        neighborHRMulticastInfo               SEQUENCE (SIZE (1..16)) OF SEQUENCE {
                currentHRMulticastGroupID             MulticastGroupID,
                currentFID                            FID,
                neighborHRMulticastGroupID            MulticastGroupID,
                neighborFID                           FID
        } OPTIONAL,
```

[Remedy27: change line#65, page 252 in P802.16.1a as follows:]

```
        hrmulticastGroupID              MulticastGroupID,
```

[----------End of Text Proposal----------]