

Project	<b>IEEE 802.16 Broadband Wireless Access Working Group</b> < <a href="http://ieee802.org/16">http://ieee802.org/16</a> >	
Title	<b>Clarification on MAC management messages over IEEE 802.16n</b>	
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Source(s)	Eunkyung Kim, Jaesun Cha, Anseok Lee, Wooram Shin, Kwangjae Lim ETRI	Voice: +82-42-860-5415 E-mail: <a href="mailto:ekkim@etri.re.kr">ekkim@etri.re.kr</a>
Re:	“IEEE 802.16-12-400-00-Gdoc,” in response to Letter Ballot Recirc #37b on P802.16n/D3	
Abstract	Comments on MAC management message 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 MAC management messages over IEEE 802.16n

*Eunkyung Kim, Jaesun Cha, Anseok Lee, Wooram Shin, Kwangjae Lim*  
*ETRI*

## 1. Introduction

This document provides clarification on the MAC management messages over IEEE 802.16n.

## 2. References

- [1] IEEE 802.16-12-0132-00, GRIDMAN System Requirement Document including SARM annex, January 2012.
- [2] IEEE P802.16n<sup>TM</sup>/D3, Air Interface for Broadband Wireless Access Systems - Draft Amendment: Higher Reliability Networks, June 2012.
- [3] IEEE P802.16.1a<sup>TM</sup>/D3, WirelessMAN-Advanced Air Interface for Broadband Access Systems - Draft Amendment: Higher Reliability Networks, June 2012.
- [4] IEEE 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<sup>TM</sup>/D6, IEEE Draft for WirelessMAN-Advanced Air Interface for Broadband Wireless Access Systems, April 2012.

## 3. Proposed Text on the IEEE 802.16n Amendment Draft Standard

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

***[Remedy1: change Table 680 - MAC management messages, page 5-6 on P802.16n as follows:]***

**Table 68053 - MAC management messages**

Type	Message Name	Message Description	Connection
110-255		Reserved	
<del>FBD110</del>	<u>MM-ADV</u>	<u>Multimode Advertisement message</u>	<u>Broadcast</u>
<del>FBD111</del>	<u>MM-BS-REQ</u>	<u>Multimode Base station Request message</u>	<u>Primary</u>
<del>FBD112</del>	<u>MM-BS-RSP</u>	<u>Multimode Base station Response message</u>	<u>Primary</u>
<del>FBD113</del>	<u>MM-BS-CMD</u>	<u>Multimode Base station Command message</u>	<u>Primary</u>

Table 68053 - MAC management messages

Type	Message Name	Message Description	Connection
<a href="#">FBD114</a>	<a href="#">MM-RS-REQ</a>	<a href="#">Multimode Relay Request message</a>	<a href="#">Primary</a>
<a href="#">FBD115</a>	<a href="#">MM-RS-RSP</a>	<a href="#">Multimode Relay Response message</a>	<a href="#">Primary</a>
<a href="#">FBD116</a>	<a href="#">MM-RL-REQ</a>	<a href="#">Multimode Release Request message</a>	<a href="#">Primary</a>
<a href="#">FBD117</a>	<a href="#">MM-RL-RSP</a>	<a href="#">Multimode Release Response message</a>	<a href="#">Primary</a>
<a href="#">FBD118</a>	<a href="#">MM-STAT-REP</a>	<a href="#">Multimode Status Report message</a>	<a href="#">Primary</a>
<a href="#">FBD</a>	<a href="#">MM-MS-ADV</a>	<a href="#">Multi-mode HR-MS advertisement for switching mode to HR-BS.</a>	
<a href="#">FBD119</a>	<a href="#">DC-LC-REQ</a>	<a href="#">Direct Communication Link Creation Request</a>	<a href="#">Primary</a>
<a href="#">FBD120</a>	<a href="#">DC-LC-RSP</a>	<a href="#">Direct Communication Link Creation Response</a>	<a href="#">Primary</a>
<a href="#">FBD121</a>	<a href="#">DC-LD-REQ</a>	<a href="#">Direct Communication Link Deletion Request</a>	<a href="#">Primary</a>
<a href="#">FBD122</a>	<a href="#">DC-LD-RSP</a>	<a href="#">Direct Communication Link Deletion Response</a>	<a href="#">Primary</a>
<a href="#">FBD123</a>	<a href="#">DC-LR-REQ</a>	<a href="#">Direct Communication Link Report Request</a>	<a href="#">Primary</a>
<a href="#">FBD124</a>	<a href="#">DC-LR-RSP</a>	<a href="#">Direct Communication Link Report Response</a>	<a href="#">Primary</a>
<a href="#">FBD125</a>	<a href="#">NCI</a>	<a href="#">Network Configuration Information (for BS-controlled FTN)</a>	<a href="#">Broadcast by forwarding HR-MS</a>
<a href="#">FBD126</a>	<a href="#">PM-NBR-REQ</a>	<a href="#">Neighboring Alternate Path Request Message</a>	<a href="#">Primary</a>
<a href="#">FBD127</a>	<a href="#">PM-NBR-RSP</a>	<a href="#">Neighboring Alternate Path Response Message</a>	<a href="#">Primary</a>
<a href="#">FBD128</a>	<a href="#">PM-SAC-REQ</a>	<a href="#">Switched Access Control Request Message</a>	<a href="#">Primary</a>
<a href="#">FBD129</a>	<a href="#">PM-SAC-RSP</a>	<a href="#">Switched Access Control Response Message</a>	<a href="#">Primary</a>
<a href="#">FBD130</a>	<a href="#">HR-RNG-CMD</a>	<a href="#">Neighbor discovery command</a>	<a href="#">Broadcast or Primary management</a>
<a href="#">FBD131</a>	<a href="#">HR-RNG-REP</a>	<a href="#">Neighbor discovery report</a>	<a href="#">Primary management</a>
<a href="#">FBD132</a>	<a href="#">FN-CONFIG-CMD</a>	<a href="#">BS-controlled FTN configuration</a>	<a href="#">Primary management</a>
<a href="#">FBD133</a>	<a href="#">FN-RNG-FLU</a>	<a href="#">Forwarding Ranging Follow-up</a>	<a href="#">Primary</a>
<a href="#">FBD134</a>	<a href="#">F-MAP</a>	<a href="#">Forwarding MAP (for BS-controlled FTN)</a>	<a href="#">Broadcast by forwarding HR-MS</a>
<a href="#">FBD135</a>	<a href="#">HR-MG-IND</a>	<a href="#">High Reliable Multicast Group Indication</a>	<a href="#">Broadcast</a>
<a href="#">FBD136</a>	<a href="#">HR-MT-IND</a>	<a href="#">High Reliable Multicast Traffic Indication</a>	<a href="#">Broadcast</a>
<a href="#">FBD137</a>	<a href="#">PI</a>	<a href="#">Paging Indicator</a>	<a href="#">Broadcast</a>
<a href="#">FBD138</a>	<a href="#">MSPG-GRP</a>	<a href="#">MS Paging Group List (to add/delete)</a>	<a href="#">Primary</a>

Table 68053 - MAC management messages

Type	Message Name	Message Description	Connection
<del>TBD</del> 139	MSPG-PG	<a href="#">MS Paging Group Configuration</a>	<a href="#">Multicast</a>
140	<a href="#">HR-PCC</a>	<a href="#">High Reliable Power Control Configuration</a>	<a href="#">Primary</a>
141-255		Reserved	

**[Remedy2: change the 3rd row of Table 229a-MM-ADV message format (line #13, page 13) on P802.16n as follows:]**

Management Message Type= <del>TBD</del> 110	8	=
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**[Remedy3: change the 3rd row of Table 229b-MM-BS-REQ message format (line #25, page 14) on P802.16n as follows:]**

Management Message Type= <del>TBD</del> 111	8	=
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**[Remedy4: change the 3rd row of Table 229c-MM-BS-RSP message format (line #29, page 16) on P802.16n as follows:]**

Management Message Type= <del>TBD</del> 112	8	=
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**[Remedy5: change the 3rd row of Table 229d-MM-BS-CMD message format (line #15, page 17) on P802.16n as follows:]**

Management Message Type= <del>TBD</del> 113	8	=
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**[Remedy6: change the 3rd row of Table 229e-MM-RS-REQ message format (line #8, page 18) on P802.16n as follows:]**

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Management Message Type= <del>TBD</del> 114	8	=
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**[Remedy7: change the 3rd row of Table 229f-MM-RS-RSP message format (line #9, page 19) on P802.16n as follows:]**

Management Message Type= <del>TBD</del> 115	8	=
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**[Remedy8: change the 3rd row of Table 229g-MM-RL-REQ message format (line #21, page 20) on P802.16n as follows:]**

Management Message Type= <del>TBD</del> 116	8	=
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**[Remedy9: change the 3rd row of Table 229h-MM-RL-RSP message format (line #11, page 21) on P802.16n as follows:]**

Management Message Type= <del>TBD</del> 117	8	=
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**[Remedy10: delete whole section 6.3.2.3.99.9 MM-MS-ADV message (line#8, page 22 to line5, page 23, on P802.16n.)**

**[Remedy11: change the 3rd row of Table 229j-MM-STAT-REP message format (line #12, page 23) on P802.16n as follows:]**

Management Message Type= <del>TBD</del> 118	8	=
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**[Remedy12: change line#15 - #19, page 23 on P802.16n as follows:]**

**6.3.2.3.99.11 DC-LC-REO message**

When HR-BS creates direct communication link between two HR-MSs. It shall allocate a CID for the direct communication link and send link creation message to both source and destination HR-MSs. Direct communication link creation can only be initiated by the HR-BS.

A DC-LC-REQ message is transmitted by an HR-BS to allocate a CID for the direct communication link between two HR-MSs during creating direct communication link between those two HR-MSs.

**Table 229k - ~~Direct Communication Link Creation Request~~DC-LC-REQ message format**

Syntax	Size (bit)	Notes
DC-LC-REQ_Message_Format () {	=	=
Management Message Type= <del>[TBD]</del> 119	8	=

**[Remedy13: change line#9 - #11, page 24 on P802.16n as follows:]**

**6.3.2.3.99.12 DC-LC-RSP message**

The HR-MSs shall send back a response once they receive the direct communication link creation request.

A DC-LC-RSP message is transmitted by an HR-MS in response to DC-LC-REQ message.

**Table 229l - ~~Direct Communication Link Creation Response~~DC-LC-RSP message format**

Syntax	Size (bit)	Notes
DC-LC-RSP_Message_Format () {	=	=
Management Message Type= <del>[TBD]</del> 120	8	=

**[Remedy14: change line#14 - #18, page 24 on P802.16n as follows:]**

**6.3.2.3.99.13 DC-LD-REQ message**

The HR-BS may transmit this message to both HR-MS of a direct communication link to initiate the removal of that link. See 16.2.2.1.2.1.2 for further details on the procedure for the removal of a direct communications link.

A DC-LD-REQ message is transmitted by an HR-BS to both HR-MSs of a direct communication link to request those HR-MSs to remove the direct communication link.

Table 229m - ~~Direct Communication Deletion Request~~DC-LD-REQ message format

Syntax	Size (bit)	Notes
DC-LD-REQ_Message_Format () {}	=	=
Management Message Type= <del>[TBD]</del> 121	8	=

[Remedy15: change line#20, page24 - line#1, page25 on P802.16n as follows:]

6.3.2.3.99.14 DC-LD-RSP message

The HR-MS shall reply with reasons to HR-BS when it receives the link deletion request from HR-BS. A DC-LD-RSP message is transmitted by an HR-MS in response to DC-LD-REQ message.

Table 229m - ~~Direct Communication Deletion Response~~DC-LD-RSP message format

Syntax	Size (bit)	Notes
DC-LD- <del>ACK</del> RSP_Message_Format () {}	=	=
Management Message Type= <del>[TBD]</del> 122	8	=

[Remedy16: change line#4-line#7, page25 on P802.16n as follows:]

6.3.2.3.99.15 DC-LR-REQ message

HR-BS may require the HR-MS report the status of the direct communication link by sending a ~~request~~ DC-LR-REQ message to the relative HR-MS.

Table 229o - ~~Direct Communication Link Report Request~~DC-LR-REQ message format

Syntax	Size (bit)	Notes
DC-LR-REQ_Message_Format () {}	=	=

Table 229o - ~~Direct Communication Link Report Request~~ DC-LR-REQ message format

Syntax	Size (bit)	Notes
Management Message Type= <del>[TBD]</del> 123	8	=

**[Remedy17: change line#10-line#13, page25 on P802.16n as follows:]**

### 6.3.2.3.99.16 DC-LR-RSP message

HR-MS shall send back a DC-LR-REQ message to report regarding the direct communication link ~~when it receives a link report request from HR-BS~~ in response to DC-LR-REQ message.

Table 229o - ~~Direct Communication Link Report~~ DC-LR-REP message format

Syntax	Size (bit)	Notes
DC-LR-REP_Message_Format () {	=	=
Management Message Type= <del>[TBD]</del> 124	8	=

**[Remedy18: change the 3rd row of Table 229q-NCI message format (line #1, page 26) on P802.16n as follows:]**

Management Message Type= <del>[TBD]</del> 125	8	=
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**[Remedy19: change line#3-line54, page27 on P802.16n as follows:]**

### 6.3.2.3.99.18 PM-NBR-REQ message

HR-MS shall send back a DC-LR-REQ message to report regarding the direct communication link ~~when it receives a link report request from HR-BS~~ in response to DC-LR-REQ message.



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**Table 229r - PM-NBR-REQ message field and description**

<u>Syntax</u>	<u>Size (bit)</u>	<u>Notes</u>
PM-NBR-REQ_Message_Format () {	=	=
<u>Management Message Type=126</u>	<u>8</u>	=
<u>Mode requested</u>	<u>2</u>	<u>0b00: Normal neighbor discovery</u> <u>0b01: Discovery to prepare for BS</u> <u>determine</u> <u>alternative path</u> <u>0b10: Discovery to prepare for MS</u> <u>determine</u> <u>alternative path, HR-BS shall reply HR-</u> <u>MS in the</u> <u>message PM-NBR-REP.</u> <u>0b11: Inform HR-BS of the forwarding</u> <u>HR-MS</u> <u>chosen for alternative path</u>
<u>If (Mode requested == 0b11) {</u>		
<u>Index of the forwarding HR-MS</u> <u>±</u>	<u>4</u>	<u>The index of HR-MS chosen as the</u> <u>forwarding HR-MS as in the PM-NBR-</u> <u>REP message when Mode is 0b11</u>
<u>Reserved</u>	<u>2</u>	
<u>}</u>		
<u>else {</u>		
<u>Reserved</u>	<u>6</u>	
<u>}</u>		
<u>}</u>		

**[Remedy20: change the 2nd-3rd row of Table 229s-PM-NBR-REP message format (line #8, page 27) on P802.16n as follows:]**

PM-NBR-REP_Message_Format() {		
Management Message Type= <del>126</del> 127	<u>8</u>	=

[Remedy21: change line#3-line5, page28 on P802.16n as follows:]

### 6.3.2.3.99.20 PM-SAC-REQ message

Table 229t - PM-SAC-REQ message field and description

<u>Syntax</u>	<u>Size (bit)</u>	<u>Notes</u>
PM-SAC-REQ Message Format () {	=	=
Management Message Type=128	8	=
SAC sub-type	2	0b00: Access Request 0b01: Termination Request 0b10-0b11: reserved
If (SAC sub-type == 0b00) {		
Requested Switched Access Window Size	7	Requested access time in frames
Reserved	7	
} else if (SAC sub-type == 0b01) {		
Termination reason	2	0b00: Backbone recovery 0b01: No connection for FBIS 0b10: Link failures 0b11: reserved
Reserved	4	
}		
}		

[Remedy22: change line#6-line8, page28 on P802.16n as follows:]

### 6.3.2.3.99.21 PM-SAC-RSP message

Table 229u - PM-SAC-RSP message field and description

<u>Syntax</u>	<u>Size (bit)</u>	<u>Notes</u>
PM-SAC-RSP_Message_Format () {	=	=
<u>Management Message Type=129</u>	<u>8</u>	=
<u>SAC sub-type</u>	<u>2</u>	<u>0b00: Access Request</u> <u>0b01: Termination Request</u> <u>0b10-0b11: reserved</u>
<u>If (SAC sub-type == 0b00) {</u>		
<u>  Status</u>	<u>1</u>	<u>0b0 : Switched access granted, allocates</u> <u>Switched Access Window</u> <u>0b1 : Switched access not granted,</u> <u>Switched Access Window not allocated</u>
<u>  If (Statue == 0b0) {</u>		
<u>    Switched Access Window</u>	<u>7</u>	<u>LSB of frame sequence.</u> <u>Indicates the frame that Switched Access</u> <u>Window ended</u>
<u>    Reserved</u>	<u>6</u>	
<u>  } else {</u>		
<u>    Reserved</u>	<u>5</u>	
<u>  }</u>		
<u>} else if (SAC sub-type == 0b01) {</u>		
<u>  Status</u>	<u>1</u>	<u>0b00: Backbone recovery</u> <u>0b01: No connection for FBIS</u> <u>0b10: Link failures</u> <u>0b11: reserved</u>
<u>  Reserved</u>	<u>5</u>	
<u>  }</u>		
<u>}</u>		

**[Remedy23: change the 3rd row of Table 229v-HR-RNG-CMD message format (line #4, page 29) on P802.16n as follows:]**

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Management Message Type= <del>[TBD]</del> 130	8	=
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**[Remedy24: change the 3rd row of Table 229w-HR-RNG-REP message format (line #1, page 31) on P802.16n as follows:]**

Management Message Type= <del>[TBD]</del> 131	8	=
---	---	---

**[Remedy25: change the 3rd row of Table 229x-FN-CONFIG-CMD message format (line #8, page 31) on P802.16n as follows:]**

Management Message Type= <del>[TBD]</del> 132	8	=
---	---	---

**Remedy26: change line#2-line#5, page33 on P802.16n as follows:]**

**6.3.2.3.99.25 FN-RNG-FLU (Forwarding Ranging Follow-up) message**

**ServingAn** HR-BS/RS transmits FN-RNG-FLU [message](#) to instruct an HR-MS to follow-up with the ranging process of a new HR-MS, as part of the coverage extension process.

**Table 229y - FN-RNG-FLU message format**

<b>Syntax</b>	<b>Size (bit)</b>	<b>Notes</b>
<del>HR-RNG-REP_Message_Format () {</del>	=	=
<del>FN-RNG_RLU_Message_Format () {</del>		
Management Message Type= <del>[TBD]</del> 133	8	=

**[Remedy27: change the 3rd row of Table 229z-F-MAP message format (line #11, page 33) on P802.16n as follows:]**

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Management Message Type= <del>FBD</del> 134	8	=
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**[Remedy28: change the 3rd row of Table 229ee-HR-MG-IND message format (line #1, page 36) on P802.16n as follows:]**

Management Message Type= <del>xx</del> 135	8	=
--	---	---

**[Remedy29: change the 3rd row of Table 229ff-HR-MT-IND message format (line #6, page 37) on P802.16n as follows:]**

Management Message Type= <del>xx</del> +136	8	=
---	---	---

**[Remedy30: add new row in Table 229gg-PI message format (line #6, page 39) on P802.16n as follows:]**

PI_message_format () {		
Management Message Type=137	8	=
N_PI	6	Indicates the number of distinct paging indications

**Remedy31: change section 6.3.2.3.99.30 (line#9-line#13, page39) on P802.16n as follows:]**

**6.3.2.3.99.30 MSPG-GRP message**

~~To add or remove an HR-MS to or from a pagers group the HR-BS shall unicast an MSPG-GRP described in Table 229hh:~~

To add or remove an HR-MS to or from a pagers group the HR-BS transmits an MSPG-GRP message.

**Table 229hh - MSPG-GRP message format**

<u>Syntax</u>	<u>Size (bit)</u>	<u>Notes</u>
MSPG-GRP_Message_Format () {	=	=
<a href="#">Management Message Type=138</a>	<u>8</u>	=
<u>Purpose</u>	<u>1</u>	<del>0b - remove from group. 1b - add to group</del> <a href="#">0b0 - remove from group</a> <a href="#">0b1 - add to group</a>
<u>Pager group ID</u>	<u>8</u>	
<u>Padding bits</u>	<u>variable</u>	<u>As required for octet boundary</u>
}		

**Remedy32: change section 6.3.2.3.99.31 (line#1-line#5, page40) on P802.16n as follows:]**

### **6.3.2.3.99.31 MSPG-PG message**

~~MSPG-PG multicast to a group of paging HR-MS lists of paged HR-MS ID and the access resources to be used by them. The format is defined in Table 229ii.~~

[To control the paging operation of the group of paging HR-MSs accessing resources used by them, MSPG-PG message is transmitted by an HR-BS.](#)

**Table 229ii - MSPG-PG message format**

<u>Syntax</u>	<u>Size (bit)</u>	<u>Notes</u>
MSPG-PG_message_format () {	=	=
<a href="#">Management Message Type=139</a>	<u>8</u>	=
<u>N_PI</u>	<u>6</u>	<u>Indicates the number of distinct paging indicators</u>
<u>Sub-channel offset for ranging</u>	<u>5</u>	<u>Counted from the beginning of FCZ assigned for transmissions by forwarded HR-MS</u>

Table 229ii - MSPG-PG message format

<u>Syntax</u>	<u>Size (bit)</u>	<u>Notes</u>
<u>Ranging method</u>	<u>1</u>	<u>0b0: Initial ranging over two symbols</u> <u>0b1: BR/periodic ranging over one symbol</u>
<u>For (i=0; i&lt;N_PI; i++) {</u>		
<u>PI PID</u>	<u>12</u>	
<u>Initial ranging code</u>	<u>5</u>	<u>CDMA codes used for initial ranging as-</u> <u>in table {PIM}</u>
<u>}</u>		
<u>Padding bits</u>	<u>variable</u>	<u>As required for octet boundary</u>
<u>TLV encodings for MSPG-PG</u>	<u>variable</u>	<u>TLV-specific</u>
<u>}</u>		

**Remedy33: change section 6.3.2.3.99.32 (line#7-line#9, page40) on P802.16n as follows:]**

### 6.3.2.3.99.32 HR-PCC Message

Table 229jj - HR-PCC message format

<u>Syntax</u>	<u>Size (bit)</u>	<u>Notes</u>
<u>HR-PCC_message_format () {</u>	<u>=</u>	<u>=</u>
<u>Management Message Type=140</u>	<u>8</u>	<u>=</u>
<u>IOT_C</u>	<u>7</u>	<u>IoT value for control channels, quantized in 0.5 dB steps as IoT level from 0 dB to 63.5 dB</u>
<u>Offset_C</u>	<u>6</u>	<u>Offset value for control channels, represents the value among -15.5 to 16 dB with 0.5 dB step</u>
<u>IOT_D</u>	<u>7</u>	<u>IoT value for data channels, quantized in 0.5 dB steps as IoT level from 0dB to 63.5 dB</u>

Table 229jj - HR-PCC message format

<u>Syntax</u>	<u>Size (bit)</u>	<u>Notes</u>
<u>Offset_D</u>	<u>6</u>	Offset value for data channels, represents the value among -15.5 to 16 dB with 0.5 dB step
<u>Reserved</u>	<u>6</u>	
}		

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

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