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| Project | **IEEE 802.16 Broadband Wireless Access Working Group <**<http://ieee802.org/16>**>** | |
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| Re: | In response to Sponsor Ballot on P802.16n | |
| Abstract | Comments on multimode operation over IEEE 802.16n | |
| Purpose | To discuss and adopt the proposed text in the draft amendment document on GRIDMAN | |
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**Clarification on multimode operation over IEEE 802.16n**

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# Introduction

This contribution provides the modification of the sentences related to multimode operation in P802.16n/D5 to be consistent with P802.16.1a/D5.

* Remedy1: The change of position for some sentences will give clearer understanding.
* Remedy2 & Remedy3: To maintain consistency with 802.16.1a draft, we modified or removed some of sentences.

# References

[1] IEEE P802.16nTM/D5, Air Interface for Broadband Wireless Access Systems - Draft Amendment: Higher Reliability Networks, 2012.

[2] IEEE P802.16.1aTM/D5, WirelessMAN-Advanced Air Interface for Broadband Access Systems - Draft Amendment: Higher Reliability Networks, 2012.

[3] IEEE Std 802.16™-2012, IEEE Standard for Air Interface for Broadband Wireless Access Systems,” 2012.

[4] IEEE P802.16.1™/D6, IEEE Draft for WirelessMAN-Advanced Air Interface for Broadband Wireless Access Systems, 2012.

# Proposed Text for the 802.16n/D5

Note:

The text in **BLACK** color: the existing text in the 802.16n/D5

The text in **~~RED~~** color: the removal of existing 802.16n/D5

The text in **BLUE** color: the new text added to the 802.16n/D5

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

***[Remedy1: Modify the following text in Section 16.1.2 of IEEE P802.16n/D5.]***

***[Line# 2, Page# 72]***

**16.1.2 Relay function for HR-MS**

An HR-MS may operate as an HR-RS to provide connectivity for multiple out-of-coverage HR-MSs. During basic capability negotiation at network entry, an HR-MS that is capable of role change to HR-RS shall report such capability to the superordinate HR-BS/HR-RS. A mode switch to HR-RS shall be commanded by its superordinate HR-BS.

While operating as HR-RS, the station may maintain MS functionalities by performing dual-role operation described in **~~Error! Reference source not found.~~**16.1.2.3. ~~A mode switch to HR-RS shall be commanded by its superordinate HR-BS.~~

***[Remedy2: Modify the following text in Section 16.1.3.1 of IEEE P802.16n/D5.]***

***[Line# 4, Page# 74]***

**16.1.3.1 Proactive Operation**

A superordinate HR-BS may select a target HR-MS among its subordinate HR-MSs which are capable of role changing to HR-BS, according to the measured signal power at HR-BS and/or subordinate HR-MS’ status information such as the battery level. The superordinate HR-BS may transmit MM-ADV message ~~with trigger condition for which the subordinate HR-MSs capable of role changing to HR-BS shall report its status information~~ with action type set to 0b1000 for obtaining the status information of the subordinate HR-MSs. ~~When the trigger condition is met~~ Upon receiving the MM-ADV message with action type set to 0b1000, the subordinate HR-MS capable of role changing to HR-BS may report its status information to the superordinate HR-BS via MM-STAT-REP message as described in 6.3.2.3.99.9.

After selecting the target HR-MS, the superordinate HR-BS requests the target HR-MS to change its mode to HR-BS by transmitting MM-BS-REQ message. The MM-BS-REQ message may include PHY operational parameters recommended by the superordinate HR-BS. If the target HR-MS accepts the request from the superordinate HR-BS to change the mode to HR-BS, it shall transmit MM-BS-RSP message to the superordinate HR-BS when it is ready to start HR-BS role.

After receiving the MM-BS-RSP message, the superordinate HR-BS shall transmit MM-BS-CMD message to the target HR-MS to inform the action time ~~or trigger conditions~~ for starting as HR-BS mode. If the action time for mode change are included in the MM-BS-CMD message, the target HR-MS starts the HR-BS mode operation upon expiring the action time. At the same time, the superordinate HR-BS may stop the HR-BS role in order to avoid potential interference from the target HR-MS. ~~If the trigger type is 0b1, trigger conditions for mode change shall be included in the MM-BS-CMD message and the mode change to HR-BS role starts after trigger event. One possible use is to prepare against an unforeseeable SPOF event, e.g., a HR-BS failure. The trigger shall be canceled if the target HR-MS performs a handover to other infrastructure stations.~~

If handover of subordinate MSs connected to the superordinate HR-BS is necessary, the superordinate HR-BS may transmit MS\_Context-REQ message which contains MS context information before sending MM-BS-CMD message to the target HR-MS.

***[Remedy3: Modify the following text and table in Section 6.3.2.3.99.4 of IEEE P802.16n/D5.]***

***[Line# 13, Page# 17]***

**6.3.2.3.99.4 MM-BS-CMD (multimode base station command) message**

To inform the time for starting HR-BS role, the MM-BS-CMD message shall be sent from superordinate HR-BS to the multimode HR-MS. ~~The trigger condition indicates when a HR-MS shall initiate a mode change to BS. See Table 680.~~

**Table 229d — MM-BS-CMD message format**

|  |  |  |
| --- | --- | --- |
| **Syntax** | **Size**  **(bit)** | **Notes** |
| MM-BS-CMD message format () { | — | — |
| **Management Message Type = 113** | 8 | — |
| BS\_Mode | 1 | 0b0: Start HR-BS mode ~~after expiring~~ at action time  0b1: Start HR-BS mode ~~upon reaching trigger conditions~~ operation immediately |
| *Reserved* | 7 | Shall be set to zero. |
| TLV encodings for MM-BS-CMD | variable | TLV-specific |
| } |  |  |

All parameters according to action code are coded as TLV tuples, as defined in 11.32.7.

The following parameter shall be included if BS\_Mode is set to 0b0 in MM-BS-CMD message.

**Action time**

This is the wait time in units of 100 ms before the HR-MS starts to perform HR-BS mode.

The multimode HR-MS shall start HR-BS mode at the action time expires.

The following parameter shall be included if BS\_Mode is set to 0b1 in MM-BS-CMD message.

**~~Trigger condition~~**

~~Triggers defined in Table 680.~~

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