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| Project | **IEEE 802.16 Broadband Wireless Access Working Group <**<http://ieee802.org/16>**>** | |
| Title | **Modification of MM-ADV message in IEEE 802.16n** | |
| Date Submitted | **2012-07-09** | |
| Source(s) | Won-Ik Kim, Eunkyung Kim, Miyoung Yun, Seokki Kim, Sungkyung Kim, Hyun Lee, Chulsik Yoon, Sungcheol Chang  ETRI  Seokjoo Shin  Chosun University | E-mail:  [woniks@etri.re.kr](mailto:woniks@etri.re.kr)  [scchang@etri.re.kr](mailto:scchang@etri.re.kr)  [sjshin@chosun.ac.kr](mailto:sjshin@chosun.ac.kr) |
| Re: | “IEEE 802.16-12-400-00-Gdoc,” in response to Letter Ballot Recirc #37b on P802.16n/D3 | |
| Abstract | This provides AWD text proposals for clarification of message fields for 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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**Modification of MM-ADV message in IEEE 802.16n**

Won-Ik Kim, Eunkyung Kim, Miyoung Yun, Seokki Kim, Sungkyung Kim, Hyun Lee, Chulsik Yoon, Sungcheol Chang

ETRI

Seokjoo Shin

Chosun University

# Introduction

According to Section 16.1.3.1 Proactive Operation of IEEE P802.16n/D3, multimode HR-MSs can transmit their status information to the superordinate HR-BS after receiving MM-ADV message. In the current standard, however, MM-ADV message does not have an Action Type for requesting HR-MS’s status information response.

In this contribution, we suggest to insert an additional value of Action Type in MM-ADV for requesting multimode HR-MS’s status information.

# References

[1] IEEE P802.16nTM/D3, Air Interface for Broadband Wireless Access Systems - Draft Amendment: Higher Reliability Networks, June 2012.

[2] IEEE P802.16.1aTM/D3, WirelessMAN-Advanced Air Interface for Broadband Access Systems - Draft Amendment: Higher Reliability Networks, June 2012.

[3] 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,” June 2012.

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

# Proposed Text for the 802.16n AWD

Note:

The text in **BLACK** color: the existing text in the 802.16n AWD

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

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

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

***[Remedy1: Modify the sentence and type in Section 6.3.2.3.99.1 in IEEE P802.16n/D3.]***

***[Page# 13, Line# 12]***

**6.3.2.3.99.1 MM-ADV (multimode advertisement) message**

Infrastructure stations and HR-MS acting as HR-BS or HR-RS may transmit MM-ADV message to support multimode operation in the case as follows:

* When the backhaul link is down or up
* During maintaining relay link due to unavailable backhaul link, PHY/MAC layer parameters need be reconfigured such as
  + Power down
  + Power reduction
  + FA change
* Multimode service establish/release/change to inform subordinate stations to perform handover
* Report status information of multimode station

**Table 229a — MM-ADV message format**

| **Syntax** | **Size**  **(bits)** | **Notes** |
| --- | --- | --- |
| MM-ADV message format () { | - | - |
| Management Message Type = [TBD] | 8 | - |
| Action Type | ~~3~~ 4 | Used to indicate the purpose of this message  ~~0b000~~ 0b0000: Reconfiguration of HR-BS/RS including multimode BS/RS  ~~0b001~~ 0b0001: Restart of HR-BS/RS including multimode BS/RS  ~~0b010~~ 0b0010: Power down (including FA down) of HR-BS/RS including multimode BS/ RS  ~~0b011~~ 0b0011: Power reduction of HR-BS/RS including multimode BS/RS  ~~0b100~~ 0b0100: Backhaul link down of HR-BS 0b101: Backhaul link up of HR-BS  ~~0b110~~ 0b0110: FA change of HR-BS/RS including multimode BS/RS  ~~0b111~~ 0b0111: Multimode service end of HR-MS  0b1000: Report status information of multimode station  0b1001–0b1111: *reserved* |
| *reserved* | 5 4 |  |
| TLV encodings for MM-ADV | *variable* | TLV-specific |
| … | … | … |

All parameters according to action type are 2 coded as TLV tuples, as defined in 11.32.1.

The following parameter shall be included if action type is set to ~~0b000, 0b001, 0b010, and 0b011~~ 0b0000, 0b0001, 0b0010, and 0b0011, and may be included if action type is set to ~~0b101, 0b110, and 0b111~~ 0b0101, 0b0110, and 0b0111 in MM-ADV message:

Time to start the action

Expected time to start the action in unit of 8-bit LSBs of frame number

The following parameter shall be included if action type is set to ~~0b000, 0b001, and 0b011~~ 0b0000, 0b0001, and 0b0011, and may be included if action type is set to ~~0b010, 0b100, and 0b110~~ 0b0010, 0b0100, and 0b0110 in MM-ADV message:

Time during action

Expected time during the action in unit of 8-bit LSBs of frame number

The following parameters may be included only if action type is set to ~~0b000~~ 0b0000 in MM-ADV message:

New DCD

New DCD setting that the BS will use after the reconfiguration

New UCD

New UCD setting that the BS will use after the reconfiguration

The following parameter shall be included only if action type is set to ~~0b011~~ 0b0011 in MM-ADV message:

Tx Power Reduction

dB value of Tx power reduction, included in DCD setting

The following parameter shall be included only if action type is set to ~~0b110~~ 0b0110 in MM-ADV message:

FA index

FA index that the BS will use after changing FA, included in DCD setting

***[Remedy2: Modify the sentence and type in Section 11.32.1 in IEEE P802.16n/D3.]***

***[Page# 63, Line# 7]***

| **Name** | **Type** | **Length** | **Value** |
| --- | --- | --- | --- |
| Time to start the action | 1 | 1 | Start time of the action in unit of 8-bit LSBs of frame number.  It indicates the unavailable time due to reconfiguration (~~0b000~~ 0b0000), restart (~~0b001~~ 0b0001), power down (~~0b010~~ 0b0010), backhaul link down (~~0b100~~ 0b0100), or FA change (~~0b110~~ 0b0110)  It also indicates the time for ~~powerreduction~~ power reduction (~~0b011~~ 0b0011) or expected backhaul link up (~~0b111~~ 0b0111). |
| Time during action | 2 | 1 | Time for the action in unit of 8-bit LSBs of frame number.  If acting type is set to ~~0b000, 0b001, or 0b100~~ 0b0000, 0b0001, or 0b0100, it is the unavailable time interval.  After this time during action, BS will reconfigure (~~0b000~~ 0b0000), restart service (~~0b001~~ 0b0001), or backhaul link available either by itself or via neighbor HR-BS (~~0b100~~ 0b0100). |
| DCD setting | 3 | *variable* | The DCD\_settings is a compound TLV value that encapsulates TLVs from the BS’ DCD message that may be transmitted in the advertised BS downlink channel after  Reconfiguration |
| UCD setting | 4 | *variable* | The UCD\_settings is a compound TLV value that encapsulates TLVs from the BS’ UCD message that may be transmitted in the advertised BS downlink channel after reconfiguration |

***[Remedy3: Modify the type in Section 16.1.1.1 in IEEE P802.16n/D3.]***

***[Page# 70, Line# 16]***

**…**

The HR-BS having no connection to backhaul transmits MM-ADV message with action type = ~~0b100~~ 0b0100 described in 6.3.2.3.99.1 including expected time of backhaul link available. Based on the expected time, HR-MS handovers to neighbor infrastructure station or staying in the HR-BS until restarting service with available backhaul link.

**…**

***[Remedy4: Modify the type in Section 16.1.1.3 in IEEE P802.16n/D3.]***

***[Page# 71, Line# 33]***

**…**

HR-BS transmits MM-ADV message with action type = ~~0b101~~ 0b0101 described in 6.3.2.3.99.1 including expected time of backhaul link up. When receiving the MM-ADV message, HR-MS performs either handover to neighbor infrastructure station and returns to the HR-BS at the expected time or waiting in the HR-BS until restarting service with available backhaul link.

**…**