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| Project | **IEEE 802.16 Broadband Wireless Access Working Group <**<http://ieee802.org/16>**>** |
| Title | **Clarification on relay function of HR-MS over IEEE 802.16.1a**  |
| Date Submitted | **2012-07-09** |
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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 | This provides AWD text proposals for clarification on relay function of HR-MS over IEEE 802.16.1a |
| Purpose | To discuss and adopt the proposed text in the draft amendment document on GRIDMAN |
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**Clarification on relay function of HR-MS over IEEE 802.16.1a**

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# Introduction

In this contribution, we suggest the corrections of typos and modification of the sentences in Section 6.12.1.2 Relay function for HR-MS over IEEE P802.16.1a/D3. The major suggestions are listed in below.

* Grammar errors : verb tense, article, etc.
* Move a paragraph from subsection to subsection
* Remove a paragraph
* Reordering of subsections
* Modifications of sentences

# 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 802.16.1a AWD

Note:

The text in **BLACK** color: the existing text in the 802.16.1a AWD

The text in **~~RED~~** color: the removal of existing 802.16.1a AWD

The text in **BLUE** color: the new text added to the 802.16.1a AWD

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

**6.12 Support for HR-Networks**

**6.12.1 Multi-mode operation**

…

**6.12.1.2 Relay function for HR-MS**

***[Remedy1: Modify the sentences in Section 6.12.1.2 in IEEE P802.16.1a/D3.]***

***[Page# 113, Line# 8]***

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 ~~super-ordinate~~ 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 maintains MS functionalities by performing dual-role ~~MS/RS~~ operation described in 6.12.1.2.5.

***[Remedy2: Move a paragraph in Section 6.12.1.2.1 to Section 6.12.1.2.2 in IEEE P802.16.1a/D3.***

***[Page# 113, Line# 30]***

**6.12.1.2.1 Relay link establishment**

…

~~During establishing relay link, HR-BS transmits AAI-ARS-CONFIG-CMD message described in 6.2.3.57 to configure PHY layer parameter set including superframe number indicating the time to start acting as HR-RS.~~

To support handover as a part of robustness against SPOF as described in 6.12.7.2, an indication of whether MAC context information of the subordinate HR-MS is being shared by infrastructure stations shall be transmitted to HR-MS.

**6.12.1.2.2 Relay link configuration**

During establishing relay link, the HR-BS transmits AAI-ARS-CONFIG-CMD message described in 6.2.3.57 to configure PHY operational parameter set including superframe number indicating the time to start acting as HR-RS.

While HR-MS is acting as relay mode, the superordinate HR-BS shall send AAI-ARS-ESI message described in 6.2.3.58 in the DL relay zone when the essential system information in SFH is changed. The HR-BS also shall send AAI-1 ARS-CONFIG-CMD message in the DL relay zone when PHY layer parameter needs to be reconfigured.

***[Remedy3: Remove the sentence in Section 6.12.1.2.2 in IEEE P802.16.1a/D3.]***

***[Page# 114, Line# 3]***

~~While an HR-MS operating as HR-RS, any communication is performing with superordinate HR-BS in DL/UL relay zone to maintain HR-MS functionalities.~~

HR-MS acting as relay mode may transmit AAI-MM-ADV message described in 6.2.3.65.1 to update PHY/MAC layer parameter after receiving AAI-ARS-ESI or AAI-ARS-CONFIG-CMD message.

***[Remedy4: Modify the sentences in Section 6.12.1.2.3.1 in IEEE P802.16.1a/D3.]***

***[Page# 114, Line# 9]***

**6.12.1.2.3 Relay link maintenance**

**6.12.1.2.3.1 Synchronization control for HR-MS acting as relay**

Since HR-MS acting as relay has mobility, preambles from the superordinate HR-BS shall be received by HR-MS acting as relay periodically in TTR mode. A superordinate HR-BS may allocate time intervals to a relay mode HR-MS ~~in order for an HR-MS acting as relay~~ to receive preambles from the superordinate HR-BS in the purpose of synchronization between a superordinate HR-BS and an HR-MS acting as relay. Such a time interval ~~during which~~ for the HR-MS acting as relay ~~scans~~ scanning preambles from the superordinate HR-BS while not available to serve its MSs is referred to as ~~a~~ an A-preamble scanning interval. Initial parameter values for ~~synchronization time~~ the A-preamble scanning interval shall be given by the superordinate HR-BS through AAI-MM-RS-SYN-RSP message ~~when an HR-MS acting as relay performs network entry to the superordinate HR-BS~~. During the relay mode operation, a superordinate HR-BS may transmit unsolicited AAI-MM-RS-SYN-RSP message to an HR-MS acting as relay or shall respond upon receiving AAI-MM-RS-SYN-REQ message transmitted by HR-MS acting as relay to chase the timing offset. Allocated time interval information shall be transmitted to the subordinate MSs within the coverage of the HR-MS acting as relay through AAI-MM-ADV message. During the scanning interval HR-MS acting as relay may communicate with its serving HR-BS but not with its subordinate MSs.

***[Remedy5: Modify the sentences in Section 6.12.1.2.3.2.1 in IEEE P802.16.1a/D3.]***

***[Page# 115, Line# 6]***

**6.12.1.2.3.2 HO procedure for HR-MS acting as RS**

**6.12.1.2.3.2.1 HR-MS acting as RS scanning of neighbor HR-BSs**

…

In STR mode, two cases are defined for neighbor cell scanning.

* Case 1: the neighbor cells using same FA with the superordinate HR-BS. In this case the HR-MS acting as HR-RS ~~may use any interval to perform~~ performs autonomous scanning.
* Case 2: the neighbor cells using different FAs with the superordinate HR-BS. In this case the scanning procedure of the HR-MS acting as HR-RS is identical to that of in TTR mode.

…

***[Remedy6: Modify the sentences in Section 6.12.1.2.4 in IEEE P802.16.1a/D3.]***

***[Page# 116, Line# 9]***

*[Exchange the position between Relay link release and Dual-role operation of HR-MS]*

**~~6.12.1.2.4~~ 6.12.1.2.5 Relay link release**

An HR-MS acting as RS may end its relay service and remove the relay link from the HR-BS. During the HR-MS’ relay mode release process, all subordinate HR-MSs of the HR-MS acting as RS shall be transferred to another infrastructure station prior to HR-MS’ relay mode release. The HR-MS acting as RS sets Cell Bar bit to 1 in order to prevent HR-MS (re)entry and transmits AAI-MM-ADV message to transfer all subordinate HR-MSs to another infrastructure station. An HR-MS acting as RS may transmit an AAI-MM-RL-REQ message described in 6.2.3.65.4 in UL relay zone to an HR-BS so that it initiates the release procedure and requests handover of all its subordinate HR-MSs. Upon receiving the AAI-MM-RL-REQ message, the HR-BS decides whether it allows the HR-MS’ relay mode release. If the request is accepted, the HR-BS may transmit the AAI-MM-RL-RSP message described in 6.2.3.65.5 in DL relay zone to inform the acceptance ~~and start BS-initiated handover process for the requested HR-MSs. After handover procedures between the HR-BS and HR-MS acting as RS’ subordinate HR-MSs are completed, the HR-BS informs the HR-MS acting as RS that handover is completed by transmitting an AAI-MM-RL-RSP message in DL relay zone~~.

…

***[Remedy7: Modify the sentences in Section 6.12.1.2.5 in IEEE P802.16.1a/D3.]***

***[Page# 116, Line# 28]***

**~~6.12.1.2.5~~ 6.12.1.2.4 Dual-role operation of HR-MS**

An HR-MS acting as RS may maintain MS functionalities in company with RS functionalities. When an HR-MS ~~in TTR relay mode~~ receives AAI-ARS-CONFIG-CMD message with MS functionality maintenance indication that is the value 0b1, it performs dual-role MS/RS operation. At the time instance specified by “Superframe Number Action” in the AAI-ARS-CONFIG-CMD message, the following procedures shall be performed for dual-role operation of the HR-MS acting as RS.

* ~~The dual-role HR-MS starts TTR relay mode and establishes relay link with the superordinate HR-BS.~~ The HR-MS establishes relay link with the superordinate HR-BS and starts the RS mode operation.
* The MS ~~mode~~ entity in the dual-role HR-MS is behaving as a subordinate station of the RS ~~mode~~ entity. For connecting the MS’s service flow(s), the MS ~~mode~~ entity shall communicate with the RS ~~mode~~ entity through internal interfaces in the dual-role HR-MS. The details of MS’s reentry process with the RS through the internal interface ~~is~~ are out of scope of this standard.
* The RS ~~mode~~ entity in the dual-role HR-MS requests to the superordinate HR-BS for switching the data path of the MS ~~mode~~ entity by sending the AAI-L2-XFER message, as if the MS’ handover process had been performed.