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| Project | **IEEE 802.16 Broadband Wireless Access Working Group <**<http://ieee802.org/16>**>** |
| Title | **Clarification on HR-MS neighbor discovery**  |
| Date Submitted | **2012-07-15** |
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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 |  |
| Purpose | To discuss and adopt the proposed text in the draft amendment document on GRIDMAN |
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**Clarification on HR-MS neighbor discovery**

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# Introduction

We propose some modifications to the specification of HR-MS neighbor discovery to make the description clearer.

# 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.

# 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---------------------------------------------------]

***[Remedy1: Modify Section 6.2.3.65.12 in IEEE P802.16.1a/D3 as indicated]***

* + - * 1. AAI-HR-RNG-CMD message

HR-BS/RS sends AAI-HR-RNG-CMD message to instruct ~~one or group of~~ its associated HR-MS to carry out neighbor discovery. The field “Action” in AAI-HR-RNG-CMD message tells the receiving HR-MS whether ~~it (them) should~~ to transmit or receive the specified ranging signal~~s~~. The serving HR-BS/HR-RS can allocate ranging resources to both involved HR-MSs in a single assignment. ~~This allows the receiving HR-MS to transmit back a ranging sequence right after successfully processing the ranging sequence transmitted by the other HR-MS.~~

Table 106 – AAI-HR-RNG-CMD message field description

| **~~Field~~** | **~~Size (bits)~~** | **~~Value/Description~~** | **~~Condition~~** |
| --- | --- | --- | --- |
| ~~Frame Identifier~~ | ~~4~~ | ~~Frame which contains the ranging channel. The frame identifier is the 4 least significant bits of the frame number.~~ |  |
| ~~Subframe Index~~ | ~~3~~ | ~~Indicates the subframe index of the allocated ranging opportunity.~~ |  |
| ~~Dedicated ranging code index~~ | ~~5~~ | ~~Indicates the index of dedicated ranging code.~~ |  |
| ~~Action~~ | ~~2~~ | ~~0b00: ranging for neighbor discovery and receiving node to carry out transmission~~~~0b01: ranging for neighbor discovery and receiving node to carry out receiving~~~~0b10: DC/FTN periodic ranging transmission~~~~0b11: Reserved~~ |  |
| ~~Reversed action offset~~ | ~~4~~ | ~~0b0001-0b1111: Indicates number of frames that this HR-MS should switch to receive the same ranging code in the same ranging slot~~~~0b0000: no such reversed action.~~ |  |
| ~~if (Action == 0b00||0b10) || (Reversed action offset > 0x0){~~ |  |  |  |
| ~~Transmit power level~~ | ~~5~~ | ~~Unsigned integer from 0 to 31 in units of 1 dBm, where 0b00000 = 0dBm and 0b11111 = 31dBm~~ |  |
| ~~}~~ |  |  |  |
| ~~If (Action == 0b10){~~ |  |  |  |
| ~~Periodicity~~ | ~~2~~ | ~~Indicates the periodicity of periodic ranging:~~~~0b00: transmit ranging signal every 2 frames~~~~0b01: transmit ranging signal every 4 frames~~~~0b10: transmit ranging signal every 16 frames~~~~0b11: transmit ranging signal every 32 frames~~ |  |
| ~~Tx/Rx Offset~~ | ~~1~~ | ~~Offset between transmitting and receiving ranging from the other HR-MS:~~~~0b0: Offset = 1 frame~~~~0b1: Offset = 3 frames~~ |  |
| ~~}~~ |  |  |  |
| ~~Reporting mode~~ | ~~1~~ | ~~Indicates if the report mode is exclusive or triggered by threshold.~~~~0b0: exclusive reporting~~~~0b1: triggered-based reporting~~ |  |
| ~~if(Reporting mode == 0b1){~~ |  |  |  |
| ~~SINR threshold~~ | ~~4~~ | ~~Indicates the SINR threshold for the ranging signal above which report should be made by receiving station. The 4 bit value from 0b0000 to 0b1111 represent values among {–9, –8.5, –8, –7.5, –7, –6.5,–6, –5.5, –5, –4.5, –4, –3.5, –3, –2.5,–2, –1.5} dB~~ |  |
| ~~}~~ |  |  |  |

| **Field** | **Size (bits)** | **Value/Description** | **Condition** |
| --- | --- | --- | --- |
| Frame Identifier | 4 | Frame which contains the ranging channel. The frame identifier is the 4 least significant bits of the frame number. |  |
| Subframe Index | 3 | Indicates the subframe index of the allocated ranging opportunity. |  |
| Dedicated ranging code index | 5 | Indicates the index of dedicated ranging code. |  |
| Action | 2 | 0b00: ranging for neighbor discovery and receiving node to carry out transmission0b01: ranging for neighbor discovery and receiving node to carry out receiving0b10: DC/FTN periodic ranging transmission0b11: Reserved |  |
| if (Action == 0b00){ |  |  |  |
| Transmit power level | 5 | Unsigned integer from 0 to 31 in units of 1 dBm, where 0b00000 = 0dBm and 0b11111 = 31dBm |  |
| Reversed action offset | 4 | 0b0001-0b1111: Indicates the number of frames between the frame that this HR-MS transmits the ranging code until the frame that this HR-MS should try to receive the same ranging code. | Present if HR-BS assigns ranging resources in both directions. |
| Reporting mode | 1 | Indicates if the report mode is exclusive or triggered by threshold.0b0: exclusive reporting0b1: triggered-based reporting | Present if HR-BS assigns ranging resources in both directions. |
| if(Reporting mode == 0b1){ |  |  |  |
| SINR threshold | 4 | Indicates the SINR threshold for the ranging signal above which report should be made by receiving station. The 4 bit value from 0b0000 to 0b1111 represent values among {–9, –8.5, –8, –7.5, –7, –6.5,–6, –5.5, –5, –4.5, –4, –3.5, –3, –2.5,–2, –1.5} dB |  |
| } |  |  |  |
| }elseif (Action == 0b01){ |  |  |  |
| Reporting mode | 1 | Indicates if the report mode is exclusive or triggered by threshold.0b0: exclusive reporting0b1: triggered-based reporting |  |
| if(Reporting mode == 0b1){ |  |  |  |
| SINR threshold | 4 | Indicates the SINR threshold for the ranging signal above which report should be made by receiving station. The 4 bit value from 0b0000 to 0b1111 represent values among {–9, –8.5, –8, –7.5, –7, –6.5,–6, –5.5, –5, –4.5, –4, –3.5, –3, –2.5,–2, –1.5} dB |  |
| } |  |  |  |
| Reversed action offset | 4 | 0b0001-0b1111: Indicates the number of frames between the frame that this HR-MS receives the ranging code until the frame that this HR-MS should switch to transmit the same ranging code. | Present if HR-BS assigns ranging resources in both directions. |
| Transmit power level | 5 | Unsigned integer from 0 to 31 in units of 1 dBm, where 0b00000 = 0dBm and 0b11111 = 31dBm | Present if HR-BS assigns ranging resources in both directions. |
| }elseif (Action == 0b10){ |  |  |  |
| Transmit power level | 5 | Unsigned integer from 0 to 31 in units of 1 dBm, where 0b00000 = 0dBm and 0b11111 = 31dBm |  |
| Periodicity | 2 | Indicates the periodicity of periodic ranging:0b00: transmit ranging signal every 2 frames0b01: transmit ranging signal every 4 frames0b10: transmit ranging signal every 16 frames0b11: transmit ranging signal every 32 frames |  |
| Tx/Rx Offset | 1 | Offset between transmitting and receiving ranging from the other HR-MS:0b0: Offset = 1 frame0b1: Offset = 3 frames |  |
| } |  |  |  |

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