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| Project | **IEEE 802.16 Broadband Wireless Access Working Group <**<http://ieee802.org/16>**>** | |
| Title | **Modification to TWDC address and its use in IEEE 802.16.1a** | |
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| Re: | In response to Letter Ballot #38b on P802.16.1a/D3 | |
| Abstract | This contribution proposes modification to TWDC address and its use in IEEE 802.16.1a. | |
| Purpose | To discuss and adopt the proposed texts in the IEEE 802.16.1a Draft Standard. | |
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Modification to TWDC address and its use in IEEE 802.16.1a

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# Introduction

In the current draft of IEEE 802.16.1a, a pair of two-way direct communication (TWDC) addresses is used to indicate a direct communication (DC) link composed of two HR-MSs. One TWDC is for the transmitting HR-MS and another is for the receiving HR-MS, which seems to be inefficient. The TWDC address can distinguish 2048 (=211) links, and each of 64 HR-MSs in a sector/cell can make full connections with the other 63 HR-MSs in the same sector/cell in the worst case. If a single identifier is allocated to a DC link, then the address space is two times more than that of the case two TWDC addresses are allocated to a DC link. Furthermore, it can support 91 HR-MSs when each of them in a sector/cell is supposed to establish full connections with the other 90 HR-MSs in the worst case. Accordingly, we suggest use of a single Direct Communication Link ID (DCLID) for the identification of a DC link. However, it solely distinguishes a DC link without indicating its direction by which a transmitting HR-MS and a receiving HR-MS are implied, so HR-MS Indicator(HR-MS\_Ind) is used to indicate for which HR-MS is intended for its related signaling such as DC assignment. For example, let’s say that HR-MS A and HR-MS B are assigned to 0b0 and 0b1 as an HR-MS\_Ind, respectively. If HR-MS A would like to transmit an HARQ burst to HR-MS B via their DC link, then 0b0 of HR-MS\_Ind of HR-MS A is included in DC Assignment A-MAP IE to indicate the link direction.

Also, in the DC link creation, each HR-MS involving with it cannot identify which DC link needs to be created due to lack of signaling which DC link is handled. If multiple DSAs are requested from an HR-MS to different HR-MSs, then multiple requests for each DC link creation over the different links is required, but the transmitting HR-MS may not know for which DC link the creation is being requested. Thus, it is proposed to use FID to indicate which DC link is requested to be created in AAI-DC-LC-REQ.

# References

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

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

# Proposed Texts on the IEEE 802.16.1a Amendment Draft Standard

The proposed texts are written in three different types of fonts according to each change purpose as follows.

The same texts in the current draft: black

The texts to be deleted by this contribution: ~~red strikeout~~

The texts to be added by this contribution: blue underline

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

*[Remedy #1: Modify Section 6.12.2.2.2.2.1 on Page 128 in the IEEE P802.16.1a/D3 Draft Standard as follows.]*

~~A-MAP IE for HR-MS direct communication~~Direct communication assignment A-MAP IE

~~Direct Communication Assignment A-MAP IE~~

Table 194 describes the fields in a Direct Communication (DC) Assignment A-MAP IE used for resource assignment to the direct link between two HR-MSs involving in BS-controlled HR-MS direct communications.

DC Assignment A-MAP IE is CRC masked according to Table 192, with the Type Indicator set to 0b011. This value of Type Indicator distinguishes DC Assignment A-MAP IE from ~~DL/UL assignments.~~normal A-MAP IEs. The Direct Link A-MAP IE Type defines the type of resource allocation made to the direct communication between the two HR-MSs.

1. — Direct Communication Assignment A-MAP IE format a

| Syntax | Size (bits) | Notes |
| --- | --- | --- |
| Direct Communication Assignment A-MAP\_IE{ |  |  |
| Direct Link A-MAP IE Type | ~~4~~2 | Set to 0b00~~00~~ |
| *ISizeOffset* | 5 | Offset use to compute burst size index |
| MEF | 1 | MIMO encoder format  0b0: SFBC  0b1: Vertical Encoding with only 1 stream |
| Resource Index | 11 | 512 FFT size: 0 in first 2 MSB bits + 9 bits for resource index  1024 FFT size: 11 bits for resource index  2048 FFT size: 11 bits for resource index  Resource index includes location and allocation size |
| HFA DL | 3 | HARQ Feedback Allocation in the DL |
| HFA UL | 3 | HARQ Feedback Allocation in the UL |
| ACID | 4 | HARQ channel identifier |
| AI\_SN | 1 | HARQ identifier sequence number |
| Number of valid frames | 5 | Number of frames that this allocation applies to; when equal 0b00000, indicate the de-allocation of the defined resource. |
| *Reserved* | 3 | To make the size equal 40 bits |
| } |  |  |

a A 16-bit CRC is generated based on the randomized contents of the Direct Communication Assignment A-MAP IE. The CRC is masked by the 16-bit CRC mask generated according to Table 192, i.e., with Type Indicator set to “0b011”.

HR-BS/RS transmits a DC Assignment A-MAP IE to a particular HR-MS in the same way it would transmit a UL Basic Assignment A-MAP IE to such an HR-MS. This means the same set of rules for UL Basic Assignment A-MAP IE symbol to subcarrier pair mapping in 6.3.4.3, power control in 6.3.5.4.1, and location within A-MAP group/region in 6.3.5.2.2, apply to DC Assignment A-MAP IE. Furthermore, if in the A-MAP group that a DC Assignment A-MAP IE is located in, there are any unicast assignment A-MAP IEs, then this DC Assignment A-MAP shall come after those unicast assignment A-MAP IEs.

*[Remedy #2: Modify Section 6.12.2.21.4 on Line 11~12, Page 126 in the IEEE P802.16.1a/D3 Draft Standard as follows.]*

HR-BS/RS initiates the process by transmitting a DC Assignment A-MAP IE, with the field “Direct Link A-MAP IE Type” set to “0b00~~00~~”.

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