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| Project | **IEEE 802.16 Broadband Wireless Access Working Group <**<http://ieee802.org/16>**>** |
| Title | **Initial ranging for priority access in IEEE 802.16.1a**  |
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| Re: | In response to Sponsor Ballot on P802.16.1a |
| Abstract | Comments on priority access operation in IEEE P802.16.1a |
| Purpose | To discuss and adopt the proposed text in the draft amendment document on GRIDMAN |
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**Clarification on MAC control message and Header for multimode operation over IEEE 802.16.1a**

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# Introduction

This contribution is for subsection 6.12.8 which is ‘Support for priority access operation’.

According to the role of HR-MS user or HR-MS device, various priority levels can be assigned to HR-MSs. The purpose of this contribution is to propose a method for priority HR-MSs access to a HR-BS in initial ranging phase with taking precedence over the non-priority HR-MS and AMS.

In the previous contribution we suggested a priority access handling method by differentiating initial ranging window size for each non-priority users and priority users through two control messages, S-SFH SP3 and AAI-SCD, respectively.

In this contribution, we propose an additional feature for priority access operation. An HR-BS can allocate a set of exclusive RP codes for priority users by means of Mns which is the number of cyclic shifed codes per ZC root index shown in Table 265. Mns is a parameter to generate available ranging preamble codes used in initial ranging.

When an HR-BS needs to control priority access, it sends additional initial ranging window size parameters through AAI-SCD. At the same time the HR-BS broadcasts the value Mns index selected only between 0 and 2. According to the given Mns index by the HR-BS, the number of root index rp of Zadoff-Chu sequence generated by given parameters is (Ncont + Ndedi)/ Mns. The available RP codes for priority access users are now generated by cyclically shifted in each root index rp with changing Mns for Sp and NCS to its maximum. In other words, the RP codes generated by given Mns announced by an HR-BS are the codes for non-priority users, while the additional cyclically shifted RP codes when the given Mns is changed to its highest value are the codes for priority users. For example, in the priority access operation an HR-BS selects 2 for Mns index which is less than its maximum, 3. Then all users receiving this value generate root index rp of Zadoff-Chu sequence in which the number of rp is (Ncont + Ndedi)/ 4. For each rp the number of cyclically shifted Zadoff-Chu sequences is 4 according to Sp and NCS. The priority user generates a set of additional cyclic shift sequences by putting Mns to its maximum value, 8, in Sp and NCS calculations. The number of RP codes for non-priority users are (Ncont + Ndedi) and the number of RP codes for priority users generated additionally by changing Mns reaches to (Ncont + Ndedi) in this example.

Inclusion of initial ranging backoff parameters in AAI-SCD indicates that the priority access mechanism is initiated by an HR-BS. When this indication is true, a priority user calculates the exclusively assigned RP codes by putting the Mns index as 3. Then, a priority user shall select one ranging channel from all available ranging channels in the corresponding backoff window informed by AAI-SCD message. After selecting the ranging channel, the priority user shall choose a ranging preamble code (from the RP code set for priority users) using a uniform random process. The HR-BS should try to detect all RP codes explicitly assigned for non-priority users and implicitly assigned for priority users. If RP codes assigned for priority users are received, the HR-BS shall provide BW allocation for the HR-MSs to send a RNG-REQ message prior to other users.

# 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 802.16.1a 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: Modified subsection in Section 6.12.8 in IEEE P802.16.1a/D5.]***

***[Line# 19, Page# 206]***

6.12.8 Support for priority access operation

6.12.8.1 Priority access operation in initial ranging

An HR-MS may have higher priority than others due to its role of communication in PPDR. In order for priority HR-MSs to take precedence over the non-priority HR-MSs or AMSs, an HR-BS assigns different values to the initial ranging backoff window size to priority and non-priority users by sending AAI-SCD and S-SFH SP3, respectively. In addition, an HR-BS allocates a set of exclusive RP codes for priority users implicitly by means of Mns index. Mns is the number of cyclic shifted codes per ZC root index shown in Table 265.

In general, all users including non-priority and priority users shall try to do initial ranging to an HR-BS with given ~~initial ranging backoff window size~~ parameters received through S-SFH SP3 during the initial ranging process.

If congestion occurs ~~during in initial ranging~~ or it is necessary to control priority access among users in initial ranging process, an HR-BS may transmit S-SFH SP3 with a larger initial ranging backoff window size for non-priority users while transmitting AAI-SCD with a smaller initial ranging backoff window size for priority users. At the same time, an HR-BS selects and broadcasts a value of Mns index between 0 and 2 (not its highest value, 3) in order to give a set of exclusive RP codes for priority users. According to the Mns index given by the HR-BS, the number of root index rp of Zadoff-Chu sequence generated by given parameters is (Ncont + Ndedi)/ Mns. The available RP codes for priority access users are now generated by cyclically shifting the sequences in each root index rp with changing Mns to its highest value for Sp and NCS calculations. In other words, the RP codes generated by given Mns announced by an HR-BS are the codes for non-priority users, while the additional cyclically shifted RP codes when the given Mns is changed to its highest value are the codes for priority users.

Inclusion of initial ranging backoff parameters in AAI-SCD indicates that the priority access mechanism is initiated by an HR-BS. When this indication is true, a priority user calculates the exclusively assigned RP codes by putting the Mns index as 3. Then, a priority user shall select one ranging channel from all available ranging channels in the corresponding backoff window informed by AAI-SCD message. After selecting the ranging channel, the priority user shall choose a ranging preamble code (from the RP code set for priority users) using a uniform random process. The HR-BS should try to detect all RP codes explicitly assigned for non-priority users and implicitly assigned for priority users. If RP codes assigned for priority users are received, the HR-BS shall provide BW allocation for the HR-MSs to send a RNG-REQ message prior to other users.

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