IEEE P802.11
Wireless LANs

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| “Near-Far” self-classification capabilities of EDMG STAs  |
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Abstract

This document proposes specification text for subclauses 9.5.1 and 10.36.11.6 of the spec describing method for EDMG STA “Near-Far” self-classification.

**9.5.1 Sector Sweep field**

***Change the figure as follows***

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | B0 | B1 B9 | B10 B15 | B16 B17 | B18 | B19 B21 | B22 B23 |
|  | Direction | CDOWN | Sector ID | DMG Antenna ID | Quasi-omni TX | PCP/AP Coverage Parameter | Reserved |
| Bits | 1 | 9 | 6 | 2 | 1 | 3 | 2 |

**Figure 47—SSW field format when transmitted in a DMG Beacon frame**

*Insert the following at the end of the subclause*

PCP/AP Coverage Parameter field contains the composite value describing the PCP/AP-related link budget parameter specific for the sector and DMG antenna defined in Sector ID and DMG Antenna ID fields. The components and the usage of PCP/AP Coverage Parameter value are described in 10.36.11.6. The field is encoded as 3-bit value of (4×PCP/AP Coverage Parameter + 14), where PCP/AP Coverage Parameter is measured in dBm. This covers a range from 14 dBm to 42 dBm in 4 dBm steps.

**10.36.11.6 EDMG STA “Near-Far” self-classification**

An EDMG STA may estimate whether its signal can be successfully received by an PCP/AP which is listening in quasi-omnidirectional mode , i.e. to classify itself as “Near” or “Far” STA respectively. This allows the EDMG STA to decide whether to access the A-BFT (if it is classified as “Near”) or to use asymmetric beaemforming (if it classified as “Far”). To enable this, the PCP/AP informs EDMG STAs about its link-budget parameters combined in one value, the PCP/AP Coverage Parameter, which is transmitted in SSW field of the DMG Beacon frame.

EDMG STA may classify itself as “Near” STA if the following inequality is true:

 (1)

where:

* *PAPrx* is calculated by STA expected power of STA signal received by PCP/AP
* *EIRPSTA* = *PSTA+GSTAtx*, where *PSTA* and *GSTAtx* are transmit power and antenna gain for expected STA transmission
* *GSTArx* is STA receive antenna gain during DMG Beacon reception
* *RSSI* is the power that was measured by STA during DMG Beacon reception
* PCP/AP Coverage Parameter = *EIRPAP – GAPomni\_rx – GAPadd\_gain* is the composite value which describes PCP/AP link budget parameters. The encoded value of PCP/AP Coverage Parameter is transmitted by PCP/AP in SSW field of DMG Beacon frame (see 9.5.1)
* *EIRPAP* = *PAP + GAPtx*, where *PAP* and *GAPtx* are transmit power and antenna gain for DMG Beacon frame transmission.
* *GAPomni\_rx* is antenna gain of AP receiver in quasi-omnidirectional mode.
* *GAPadd\_gain* = *Pmin\_sensitivity –* *PAPsensitivity*, where *PAPsensitivity* is actual PCP/AP receiver sensitivity
* *Pmin\_sensitivity* is the receiver sensitivity for MCS 0 defined in Table 21-3

NOTE—as far as antenna gain values *GAPomni\_rx* and *GAPtx* may vary depending on the direction, the value of PCP/AP Coverage Parameter in DMG Beacon frames transmitted through different sectors may be different

Otherwise EDMG STA classifies itself as “Far” STA.

Referring to Figure 1, the behavior of an EDMG STA with “Near-Far” self-classification capability is as follows. After reception of a DMG Beacon frame with PCP/AP Coverage Parameter subfield in SSW field, the EDMG STA checks inequality (1). In case the inequality (1) is true, EDMG STA classifies itself as a “Near” EDMG STA for this PCP/AP and may access A-BFT and regular allocations in DTI. In case if inequality (1) is false, EDMG STA classifies itself as a “Far” EDMG STA for this PCP/AP, therefore it should skip the A-BFT and use asymmetric beamforming, if scheduled by the PCP/AP, to establish communication with the PCP/AP.

The behavior of an EDMG STA with “Near-Far” self-classification capability is described in Figure 1.



Figure 1. The behavior of EDMG STA with “Near-Far” self-classification capability

**References:**

1. Draft P802.11ay\_D0.3