IEEE P802.11
Wireless LANs

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| --- |
| AP Transmission Power Signaling |
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Abstract

This submission is a comment resolution of the CID 231 and 2526.

This submission clarifies received signal strength measurements in the transition discovery procedure. This submission is related to the presentation 11-24-2118r2.

Revisions:

Rev 0: Initial version of the document.

**Solved CIDs:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 231 | 75.52 | 37.8.2.5.2 | Before roam to a specific target AP MLD, non-AP MLD shall obtain at least the RSSI (or SNR) between itself and the target AP MLD. In addition to passively monitor the Beacon from target AP MLD, non-AP MLD can actively send a request frame (e.g., Probe Request frame) and get the response frame from the target AP MLD to evalute the link quality. | During roaming preparation procedure, before transfer context and set up the link(s) with the target AP MLD, the non-AP MLD can use request/reponse frame to actively monitor the RSSI (link quality) between itself and a target AP MLD. | REVISED. Agree in principle with the comment. TGbn Editor, please make the changes in 11-25-1017r0 identified with #231. |
| 2526 | 75.42 | 37.8.2.5.1 | A scanning STA needs AP transmission power information, so that STAs can estimate UL RSSI by using the measured DL RSSI. The UL and DL RSSI help to estimate AP link performance. AP transmission power also helps to estimate multiple links performance and avoid possible nasty UL RSSI surprises in the 6 GHz band. | Please include the AP transmission power information to the discovery information as specified in the submission 24/2118. | REVISED. Agree in principle with the comment. TGbn Editor, please make the changes in 11-25-1017r0 identified with #2526.  |

### 37.9.2 SMD BSS transition discovery procedure (#188)(#507)(#2000)(#2352)

*TGbn Editor, please add the new paragraph as shown with track changes below.*

A non-AP MLD can use mechanisms such as active scanning (see 11.1.4.3.2 (Active scanning procedure for a non-DMG STA) and 35.3.4.2 (Use of multi-link probe request and response)), the BSS transition management framework (see 11.21.7 (BSS transition management) and 35.3.23 (BSS transition management for MLDs)) or the neighbor report framework (see 11.10.10 (Usage of the neighbor report)) for discovery of the neighboring AP MLDs and SMD BSS transition support by those AP MLDs.

NOTE 1 – A neighboring AP MLD might or might not be part of the same SMD.

[M#344] NOTE 2 – An AP is not required to report non-collocated APs in the Reduced Neighbor Report element that is carried in its Beacon and FILS Discovery frames.

A non-AP MLD can use the mechanisms defined in 37.9.2.1 (Obtaining received signal strength of the reported APs) to bidirectionally estimate the received signal strength between itself and an AP that it has discovered. (#231, #2526)

[M#352](#3912) An SMD Information element provides an 37.9.2 identifier and SMD capabilities for an SMD. (#1066)An AP MLD that is managed by an SMD shall include the SMD Information element in the Probe Response frames. The SMD Information element is provided as part of the Neighbor Report element in the BSS Transition Management Request frame and Neighbor Report Response frames for a reported AP that is part of a different SMD than the reporting AP.

[M#333] A mechanism is defined to retrieve probe response content for neighboring AP MLD(s) of the current AP MLD, through the current AP MLD.

**37.9.2.1 Obtaining received signal strength of the reported APs (#2526, #231)**

*TGbn Editor, please add the new subclause as shown below.*

A STA can estimate the DL signal strength for an AP that the STA has discovered by receiving any PPDU transmitted by the AP. It is recommended to estimate the DL signal strength on a PPDU that is transmitted with basic transmission rates, because PPDUs transmitted at higher rates are likely transmitted with lower transmission power.

Additionally, a STA may also estimate the received signal strength of frames transmitted by the STA and received by the AP (UL received signal strength). The STA may estimate the UL received signal strength by using the following parameters: the DL received signal strength, its transmission power, and the Tx Power Indication element, the TX Power Indication in Neighbor Report, or the AP Conducted Tx Power field of the ML element.

An AP MLD may have multiple affiliated APs. A STA should measure or estimate DL received signal strength and estimate UL received signal strength of all affiliated enabled APs with which the STA intends to setup a link.

**9.4.2.322.2.4 Link Info field of the Basic Multi-Link element**

*TGbn Editor, please add the field as shown below.*

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| B0 B3 | B4 | B5 | B6 | B7 | B8 | B9 | B10 | B11 | B12 | B13 B15 |
| Link ID | Complete Profile | STA MAC Address Present | Beacon Interval Present | TSF Offset Present | DTIM Info Present | NSTR Bitmap Present | NSTR Bitmap Size | BSS Parameters Change Count Present | AP Conducted Tx Power Present | Reserved |
| Bits: 4 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 |

**Figure 9-1074v—STA Control field format of the Basic Multi-Link element**

*TGbn Editor, please add the following paragraph after the BSS Change Count Present subfield as shown below.*

The AP Conducted Tx Power Present subfield indicates the presence of the AP Conducted Tx Power subfield in the STA Info field. It is set to 1 if the AP Tx Power subfield is present in the STA Info field. Otherwise, it is set to 0. A non-AP STA sets this subfield to 0 in the basic Multi Link element that the STA transmits. An AP MLD sets this subfield to 1 when the element carries a complete profile.(#2526, #231)

*TGbn Editor, please add the field as shown below.*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | STA Info Length | STA MAC Address | Beacon Interval | TSF Offset | DTIM Info | NSTR Indication Bitmap | BSS Parameter Change Count | AP Conducted Tx Power  |
| Octets:  | 1 | 0 or 6 | 0 or 2 | 0 or 8 | 0 or 2 | 0 or 1 or 2 | 0 or 1 | 0 or 1 |

**Figure 9-1074w—STA Info field format of the Basic Multi-Link element**

*TGbn Editor, please add the following paragraph after the BSS Change Count field as shown below.*

The AP Conducted Tx Power field has the same definition as the AP Conducted Tx Power field in the Tx Power Indication element, see 9.4.2.aax(Tx Power Indication Element). (#2526, #231)

**9.4.2.aax Tx Power Indication Element (#2526, #231)**

*TGbn Editor, please add the new element as shown below.*

The Tx Power Indication element signals the transmission power of the Beacon frames. The element format is shown in the figure 9-xxx(Tx Power Indication element format).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Element ID | Length | Element ID Extension | AP Conducted Tx Power |
| Octets: | 1 | 1 | 1 | 1 |

**Figure 9-xxx1 — Tx Power Indication element format**

|  |  |  |
| --- | --- | --- |
|  | AP Conducted Beacon Tx Power | Reserved |
| Bits: | 5 | 3 |

**Figure 9-xxx2—AP Tx Power field format**

The AP Conducted Tx Power subfield indicates the AP’s combined transmit power at the transmit antenna connector of all the antennas used to transmit the Beacon PPDU in units of dBm/20 MHz. The transmit power in dBm/20 MHz, PTXx, is calculated as PTX = –20 + 2×FVal, where FVal is the value of the AP Tx Power subfield, except for the value 31, which is reserved.

NOTE - The AP Conducted Beacon Tx Power is the total conducted power and does not include antenna gain. This is different from the Transmit Power field in TPC Report element (9.4.2.15) which indicates the EIRP including antenna gain.

**9.4.2.1 General**

*TGbn Editor, modify Table 9-130 as shown below.*

**Table 9-130—Element IDs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Element** | **Element ID** | **Element ID Extension** | **Extensible** | **Fragmentable** |
| Conducted Tx Power Indication (see 9.4.2.aax (Tx Power Indication Element)) (#2526, #231) | 255 | <ANA> | Yes | No |

**9.3.3.10 Probe Response frame format**

*TGbn Editor, modify Table 9-69 as shown below.*

**Table 9-69— Probe Response frame body**

|  |  |  |
| --- | --- | --- |
| **Order** | **Information** | **Notes** |
| <ANA> (#2526, #231) | Tx Power Indication | The Tx Power Indication element is present if dot11UHROptionImplementedis true; otherwise, it is optionally present. |

**9.4.2.35 Neighbor Report element**

*TGbn Editor, modify Table 9-212 as shown below.*

**Table 9-212—Optional subelement IDs for Neighbor Report**

|  |  |  |
| --- | --- | --- |
| **Subelement Id** | **Name** | **Extensible** |
| <ANA> (#2526, #231) | Tx Power Indication | Yes |

**9.4.2.19.7 Beacon request**

*TGbn Editor, please modify the following table as shown below.*

Table 9-141—Measurement Mode definitions for Beacon request

|  |  |
| --- | --- |
| Mode | Value |
| Passive | 0 |
| Active | 1 |
| Beacon Table | 2 |
| RTS/Active  | 3 |
| Reserved | 4-255 |

**9.4.2.20.7 Beacon report**

*TGbn Editor, please modify the following paragraph as shown below.*

The Reported Frame Type subfield indicates the type of frame reported. A 0 indicates a Beacon or Probe Response frame; a 1 indicates a Measurement Pilot frame or CTS frame.

The RCPI field indicates the received channel power of the Beacon, Measurement Pilot, Probe Response frame, or CTS frame, which is a logarithmic function of the received signal power, as defined 9.4.2.36 (RCPI element).

The RSNI field indicates the received signal-to-noise indication for the Beacon, Measurement Pilot, Probe Response frame, or CTS frame, as described in 9.4.2.39 (RSNI element).

The BSSID field contains the BSSID from the Beacon, Measurement Pilot, Probe Response frame, or RTS frame that solicited a CTS frame being reported.

**11.10.9.1 Beacon report**

**11.10.9.1.1 General**

*TGbn Editor, please add the following paragraph as shown below.*

If dot11RMBeaconTableMeasurementActivated is false and the (#6309)measurement mode in the measurement request is Beacon Table, the measuring STA shall reject the measurement request by returning a Beacon report with the Incapable subfield(#291) set in the Measurement Report Mode field.

If the measurement mode of the measurement request is RTS/Active, the measuring STA may perform on the requested channel the procedure as defined when the measurement mode is active or the following procedure:

* Send an RTS frame at the 20 MHz primary channel to the individual address specified by the BSSID field of the measurement request frame.
* Set a measurement duration timer.
* At the end of the measurement duration, process the CTS frames solicited by the RTS frame sent by the measuring STA.

NOTE – The CTS frames are transmitted as defined in 10.3.2.9(CTS and DMG CTS procedure).