IEEE P802.11
Wireless LANs

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| Tx Power Control for Non-TB Ranging |
| Date: 2020-08-13 |
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Abstract

This submission proposes the comment resolution of CIDs 3883, 3245, 3893 and 3269 in LB249 related to Tx power control and pathloss measurements

Revisions:

1. Added a support bit in Ranging Parameters
2. Adjusted to Draft 2.3, removed RSSI feedback type subfield
3. Minor fix
4. Added Target RSSI feedback, changed LRM from RSSI feedback to Tx Power, changed NDP-A by moving subfields to a new STA Info, updated to Draft 2.5
5. Incorporated feedback, small changes
	1. Changed bits in Non-TB Ranging Specific subelement to configure I2R and R2I separately
	2. Changed resolution of Target RSSI to 1 dB steps to match other similar fields
	3. Added language specifying that the fields in the LMR only apply to Non-TB R2I LMR
	4. Added CIDs 3245, 3893 and 3269
	5. Added Niranjan Grandhe as an author
6. Incorporated input from discussion

Interpretation of a Motion to Adopt

A motion to approve this submission means that the editing instructions and any changed or added material are actioned in the TGax Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGaz Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

***TGaz Editor: Editing instructions preceded by “TGaz Editor” are instructions to the TGaz editor to modify existing material in the TGaz draft. As a result of adopting the changes, the TGaz editor will execute the instructions rather than copy them to the TGaz Draft.***

**The text preceded by “Discussion” is not part of the adopted changes.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| **3883** | 43.3 | 9.3.1.19 | Similar to AP\_TX\_POWER in Trigger frame NDP TX power will be useful for pathloss computation and power control | Add NDP TX power in STA Info field in NDPA | **Revised**See changes in DCN 11-20/1245r6 |
| **3245** | 142.3 | 11.22.6.4.3.3 | The RSTA has no way of knowing if the ISTA can accommodate its requested UL Target RSSI for unassociated STAs, since it does not transmit frames to them regularly nor can request a headroom udpate | Add a mechanism for the RSTA to request information on the choice of UL Target RSSI, for example by having the ISTAs feed back measured RSSI, so the RSTA can estimate and track pathloss to each ISTA | **Rejected**For TB Ranging, there is no solution for this without using the I2R LMR which is not desired.Commenter withdraws the comment. |
| **3893** | 202.1 | 27.3.17a | Similar to AP\_TX\_POWER in trigger frame. NDP TX POWER can be added in hesiga. It'll be useful for pathloss computation and DL power control | as in comment | **Rejected**Changes to the HE-SIG-A were considered, but not adopted. Instead we are adding the Tx Power in the NDP-A to serve a similar purpose.Commenter withdraws the comment. |
| **3269** | 199.1 | 27.2.2 | LTF\_OFFSET - not needed in RxVector nor TxVector | Remove from Table 27-1--TXVECTOR and RXVECTOR parameters | **Revised**Agree in principle.TGaz editor: No further action needed based on changes is document 11-20/1683r3 |

**9.3.1.19 VHT/HE/Ranging NDP Announcement frame format**

TGaz Editor: Add the following text and Figure 9-61dd on page 46 line 1 (end of subclause 9.3.1.19):

The format of the STA Info field with AID11 subfield equal to 2045 is shown in Figure 9-61dd (STA Info field format in a Ranging NDP Announcement frame if the AID subfield is 2045). (#**3883**)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | B0 B10 | B11 B18 | B19 B26 | B27 | B28 B31 |
|  | AID11 | I2R NDP Tx Power | R2I NDPTarget RSSI | Disambiguation | Reserved |
| Bits: |  11 | 8 | 8 | 1 | 4 |

1. Figure 9-61dd— STA Info field format in a Ranging NDP Announcement frame if the AID11 subfield is 2045 (#3883)

The STA Info field with AID11 subfield equal to 2045 is used in the Non-TB ranging measurement exchange, [11.21.6.4.4](#H11o22o6o4o4) (Non-TB Ranging measurement exchange) to carry the I2R NDP Tx Power and R2I NDP Target RSSI subfields. (#3883)

The I2R NDP Tx Power subfield indicates the combined average power per 20 MHz bandwidth referenced to the antenna connector, of all antennas used to transmit the following I2R NDP. The transmit power is reported with a resolution of 1 dB, with values in the range 0 to 60 representing –20 dBm to 40 dBm, respectively. Values above 60 are reserved. (#3883)

The R2I NDP Target RSSI subfield indicates the preferred receive signal power, averaged over the ISTA's antenna connectors, for future R2I NDPs to be transmitted by the RSTA. The preferred receive signal power in units of dBm is TargetRSSI = –110 + FVal, where FVal is the value of the R2I NDP Target RSSI subfield, except that values above 90 indicate that the ISTA has no receive signal power preference for the R2I NDPs. (#3883)

9.4.2.298 Ranging Parameters element

TGaz Editor: Change Figure 9- 9-788edi —Non-TB specific subelement format on page 77 as follows:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | B0 B7 | B8 B15 | B16 | B17 B39 | B40 B59 | B60 | B61 | B62 B63 |
|  | Subelement ID (0) | Length | Reserved(#**3231**) | Min Time Between Measurements | Max Time Between Measurements | R2I Tx Power | I2R Tx Power | Reserved |
| Bits: | 8 | 8 | 1 | 23 | 20 | 1 | 1 | 2 |

1. Figure 9-788edi —Non-TB specific subelement format

(#**2275,** #**2276,** #**2278,** #**1654,** #**1220**)

The Subelement ID and Length fields are defined in 9.4.3 (Subelements). (#**2081**)

TGaz Editor: Add the following paragraphs to 9.4.2.296 on page 78 line 5:

The R2I Tx Power field in the IFTMR frame is set to 1 to indicate that the ISTA requests the RSTA to report the tx power of the R2I NDPs in the R2I NPD Tx Power field in the following LMR, and 0 otherwise. In the initial Fine Timing Measurement frame, the R2I Tx Power field is set to 1 by the RSTA to indicate that it will report the tx power of the R2I NDPs in the R2I NPD Tx Power field of the following LMR, and 0 otherwise.

The I2R Tx Power field in the IFTMR frame is set to 1 to indicate that the ISTA supports announcing the tx power of the I2R NDPs in the STA Info field with the AID11 subfield set to 2045 of the preceding NDP Announcement frame, and 0 otherwise. In the initial Fine Timing Measurement frame, the I2R Tx Power field is set to 1 by the RSTA to request the ISTA to announce the tx power of the I2R NDPs in the STA Info field with the AID11 subfield set to 2045 of the preceding NDP Announcement frame, and 0 otherwise. (#**3883**)

9.6.7.49 Location Measurement Report frame format

TGaz Editor: Change Figure 9-909aa as follows:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Category | Public Action | Dialog Token | ToD | ToA | ToD Error | ToA Error |
| Octets: | 1 | 1 | 1 | 6 | 6 |  1 | 1 |
|  | CFO Parameter  | R2I NDP Tx Power | I2R NDP Target RSSI | Secure LTF Parameter (optional) | AoA Feedback (optional) |
| Octets: | 2 | 1 | 1 | 13 | 9 |

Figure 9-909aa—Location Measurement Report frame Action field format

TGaz Editor: Add the following paragraphs to 9.6.7.49 starting on page 98 line 26 after the cited paragraph:

The CFO parameter field in I2R LMR indicates the clock rate difference between ISTA and RSTA in units of 0.01 ppm. The CFO parameter field is a signed value of length 2 octets. In R2I LMR, the value of the CFO parameter field is reserved.

The R2I NPD Tx Power and I2R NDP Targer RSSI fields are used in the in R2I LMR as part of the Non-TB ranging measurement exchange, [11.21.6.4.4](#H11o22o6o4o4) (Non-TB Ranging measurement exchange); otherwise their values are reserved.

The R2I NDP Tx Power field indicates the combined average power per 20 MHz bandwidth referenced to the antenna connector, of all antennas used to transmit the preceding R2I NDP. The transmit power is reported with a resolution of 1 dB, with values in the range 0 to 60 representing –20 dBm to 40 dBm, respectively. Values above 60 are reserved. (#3883)

The I2R NDP Target RSSI field indicates the preferred receive signal power, averaged over the RSTA's antenna connectors, for future I2R NDPs transmitted by the ISTA. The preferred receive signal power in units of dBm is TargetRSSI = –110 + FVal, where FVal is the value of the Target RSSI field, except that values above 90 indicate that the RSTA has no prefererred receive signal power for the I2R NPDs. (#3883)

11.21.6.3.3 Negotiation for TB and Non-TB Ranging measurement exchange

TGaz Editor: Add the following paragraph to 11.21.6.3.3 (on page 126, line 39):

If the ISTA indicated support for AOA feedback in the IFTMR frame, the RSTA may set the I2R AOA Requested subfield in the corresponding Initial Fine Timing Measurement frame to 1, or it is set to 0 otherwise.

If the ISTA indicated support to announce the tx power of its I2R NDPs by setting the I2R Tx Power field in the Non-TB specific subelement of the Ranging Parameters element in the IFTMR frame to 1, the RSTA may set the corresponding field in the Initial Fine Timing Measurement frame to 1 to request the ISTA to announce the tx power of its I2R NDs, and 0 otherwise.

11.21.6.4.4.2 Measurement Sounding phase of Non-TB Ranging

TGaz Editor: Modify the following paragraph to 11.21.6.4.4.2 (on page 152, line 30):

In the Non-TB Ranging measurement exchange sequence, the ISTA shall transmit the Ranging NDP Announcement frame with the same bandwidth as the I2R NDP to reserve the medium. (#1829) The Ranging NDP Announcement frame shall be unicast with the RA field set to the address of the RSTA, and contain one STA Info field with the AID11 subfield set to 0. (#3222, #TC707r3) If negotiated, the NPD Announcement frame shall contain another STA Info field with AID11 subfield set to 2045, and the I2R Tx Power subfield shall be set to indicate the tx power of the following I2R NDP. If the STA Info field with AID11 subfield set to 2045 is included, the ISTA shall set the R2I NDP Target RSSI subfield to either its preferred receive signal power or a reserved value.

11.21.6.4.4.3 Non-TB Ranging Measurement Reporting phase

TGaz Editor: Add the following paragraph to 11.21.6.4.4.3 (on page 156, line 4):

The Dialog Token field of the LMR frame shall be copied from the Sounding Dialog Token Number (#3745) subfield in the Ranging NDP Announcement frame that preceded the NDP which is used for the reported measurement.

If negotiated, the RSTA shall set the R2I Tx Power field in the R2I LMR to report the tx power of the preceding R2I NDP; otherwise the R2I Tx Power field shall be set to a reserved value. The RSTA shall set the I2R NDP Target RSSI field to its preferred receive signal power or a reserved value.

11.21.6.4.6 Transmission of a ranging NDP

TGaz Editor: Add the following bullet point to 11.21.6.4.6 (on page 168, line 8):

An RSTA transmitting an HE Ranging NDP to one or more peer ISTAs shall set the TXVECTOR parameter as follows:

* The FORMAT parameter is set to HE\_SU
* The UPLINK\_FLAG parameter is set to 0
* The APEP\_LENGTH parameter is set to 0
* The NUM\_USER parameter is set to the number of ISTAs that the HE Ranging NDP is transmitted to.
* In the Non-TB Ranging measurement exchange ([11.21.6.4.4](#H11o22o6o4o4)), the TXPWR\_LEVEL\_INDEX parameter is set to a value that matches the Tx Power value indicated in the R2I NDP Tx Power field in the following LMR frame, except if the value in the R2I NDP Tx Power field was set to a reserved value. (#3883)

TGaz Editor: Add the following bullet point to 11.21.6.4.6 (on page 170, line 1):

An ISTA transmitting an HE Ranging NDP PPDU shall set the TXVECTOR parameter as follows:

* The FORMAT parameter is set to HE\_SU
* The UPLINK\_FLAG parameter is set to 1
* The APEP\_LENGTH parameter is set to 0
* The NUM\_STS parameter is set to the same value as the I2R N\_STS subfield in the STA Info field in the preceding Ranging NDP Announcement frame
* The LTF\_REP parameter is set to the same value as the I2R Rep subfield in the STA Info field in the preceding Ranging NDP Announcement frame
* The TXPWR\_LEVEL\_INDEX parameter is set to a value that matches the Tx Power value indicated in the I2R NDP Tx Power subfield in the STA Info field with the AID11 subfield set to 2045 in the preceeding Ranging NPD Announcement frame, except if the value in the I2R NDP Tx Power subfield was set to a reserved value. (#3883)