IEEE P802.11
Wireless LANs

|  |
| --- |
| **11bk Spec Text for IFTM Expanion** |
| **Date:** 2023-03-11 |
| **Author(s):** |
| **Name** | **Affiliation** | **Address** | **Phone** | **Email** |
| Yanjun Sun | Qualcomm |  |  |  |
| Ali Raissinia |  |  |  |  |
| Steve Shellhammer |  |  |  |  |
| George Cherian |  |  |  |  |
|  |  |  |  |  |

Abstract

We propose the draft specification skeleton for NDP Announcement to help the creation of TGbk draft D0.1.

Revisions:

* Rev 0: Initial version of the document.

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 TGbk 0.1 Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGbk D0.1 Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

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

**Discussion:**

The text is prepared for the following motion:

Extends the IFTMR and IFTM frames with a new subelement to indicate information on the transmit power envelope of the BSS.

(11-23-48: 202301-15)

The use-case the group discussed during the motion is to help an unassociated ISTA learn an updated transmit power envelop using a new subelement in the Ranging Parameters field.

Although the Ranging Parameters field is present in both IFTMR and IFTM frames, the use-case only requires the transmit power envelop in an IFTM frame. So, this PDT leaves out IFTMR frame and focus only on IFTM frame.

In addition, if an RSTA wants to update the transmit power envelop in the IFTM frame for the unassociated STA, the existing

**Proposed spec text:**

***TGbk editor: Please note Baseline is REVme\_D2.1 and 11bk D7.0***

**9. Frame formats**

**9.4.2.298 Ranging Parameters element**

… …

***Discussion:***

*Similar to discussions in 11bf, 320 MHz may have a STS value different from that for 160 MHz, so we propose to rename* *Max R2I STS > 80 MHz subfield to Max R2I STS = 160 MHz subfield, and Max I2R STS > 80 MHz subfield to Max I2R STS = 160 MHz subfield.*

*We’ll also need new values for 320 MHz. As a reference, 11be D3.0 has the following to allow a different NSS for 320 MHz*



*As the Ranging Parameters field is not extensible and these new values are not expected to be transmitted frequently, we propose to add them as an optional subelement, similar to transmit power envelop.*

The format of the Ranging Parameters field is shown in Figure [9-788edh](#F09o788edh) (Ranging Parameters field format)

***TGbk editor: Please rename the Max R2I STS > 80 MHz and Max I2R STS > 80 MHz subfields as follows (track change enabled):***

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | B0 B1 | B2 B6 | B7 | B8 B9 | B10 B11 | B12 |  B13 | B14 |  B15 |
|  | StatusIndication | Value | I2R LMR Feedback | Reserved | RangingPriority | R2I TOA Type | I2R TOA Type | R2I AOA Request | I2R AOA Request |
| Bits: | 2 | 5 | 1 | 2 | 2 | 1 | 1 | 1 | 1 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | B16 B21 | B22  | B23 | B24 B26 | B27 B29 | B30 B31 | B32 B34 | B35 B37 |
|  | Formatand Bandwidth | Immediate R2IFeedback | Immediate I2RFeedback | Max I2R Repetition | Max R2I Repetition | Reserved | Max R2ISTS ≤ 80 MHz | Max R2ISTS =160 MHz |
| Bits: | 6 | 1 | 1 | 3 | 3 | 2 | 3 | 3 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | B38 B39  | B40 B41 | B42 B44 | B45 B47 | B48 B55 |
|  | Max R2I LTF Total | Max I2R LTF Total | Max I2RSTS ≤ 80 MHz | Max I2RSTS =160 MHz | BSS ColorInformation |
| Bits: | 2 | 2 | 3 | 3 | 8 |

**Figure 9-788edh—Ranging Parameters field format**

***TGbk editor: Please insert one new subelment id for transmit power envelop and another new subelement id for the Max R2I STS =320 MHz and Max I2R STS = 320 MHz values as follows (track change enabled):***

**Table 9-322h23fd—Ranging Subelement IDs for Ranging Parameters**

|  |  |  |
| --- | --- | --- |
| Subelement ID | Name | Extensible |
| 0 | Non-TB Specific subelement | Yes |
| 1 | TB-specific subelement | Yes |
| 2 | Secure HE-LTF subelement | Yes |
| 3 | Transmit Power Envelop subelement | Yes |
| 4 | Max STS subelement | Yes |
| 5-220 | Reserved |  |
| 221 | Vendor Specific |  |
| 222-255 | Reserved |  |

… …

***TGbk editor: Please insert the following definitions for the two new sublements to the end of this subclause (track change enabled):***

The Transmit Power Envelop subelement has has the same definition as the Transmit Power Envelop element (see 9.4.2.161 (Transmit Power Envelope element))

The format of the Secure HE-LTF subelement is as shown in Figure 9-7xx (Max STS subelement format).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | B0 B7 | B8 B15 | B16 B19 | B20 B23 |
|  | Subelement ID | Length | Max R2ISTS =320 MHz | Max I2RSTS =320 MHz |
| Bits: | 8 | 8 | 4 | 4 |

**Figure 9-7xx—Max STS subelement format**

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

The Max R2I STS = 320 MHz field indicates the maximum number of space-time streams to be used in R2I NDP in the session for 320 MHz bandwidth.

The Max I2R STS = 320 MHz field indicates the maximum number of space-time streams to be used in I2IR NDP in the session for 320 MHz bandwidth.

***TGbk editor: Please update subclause 11.21.6.3.3 as follows (track change enabled):***

**11.21.6.3.3 Negotiation for TB and non-TB ranging measurement exchange**

… …

When a Ranging Parameters element is included in the IFTMR frame, the ISTA shall indicate the following parameters in the Ranging Parameters field:

* … …
* Maximum number of space-time streams it is capable of receiving in the R2I NDP for 160 MHz bandwidth, in the Max R2I STS =160 MHz subfield.
* Maximum number of space-time streams it is capable of transmitting in the I2R NDP for bandwidths less than or equal to 80 MHz, in the Max I2R STS ≤ 80 MHz subfield.
* Maximum number of space-time streams it is capable of transmitting in the I2R NDP for 160 MHz bandwidth, in the Max I2R STS =160 MHz subfield.
* … …

The ISTA shall include a Max STS subelement together with the Ranging Parameters element in the IFTMR frame if the ISTA intends to transmit 320 MHz I2R NDP or receive 320 MHz R2I NDP. In the subelement:

* The Max R2I STS =320 MHz field indicates the maximum number of space-time streams the ISTA is capable of receiving in the R2I NDP for 320 MHz bandwidth.
* The Max I2R STS =320 MHz field indicates the maximum number of space-time streams the ISTA is capable of transmitting in the I2R NDP for 320 MHz bandwidth.

The ISTA shall not include a Transmit Power Envelop subelement in the IFTMR frame.

… …

When the negotiation is successful for TB ranging and non-TB ranging, the corresponding IFTM frame from the RSTA shall include a Ranging Parameters element with the parameters that defines the negotiated range measurement session. The RSTA shall indicate the following parameters in the Ranging Parameters field:

* … …
* In the Max R2I STS =160 MHz subfield, either the maximum number of space-time streams it is capable of transmitting in the R2I NDP for 160 MHz bandwidth, or the value in the corresponding IFTMR frame (referred to as RSTA Assigned R2I STS =160 MHz).
* In the Max I2R STS =160 MHz subfield, either the maximum number of space-time streams it is capable of receiving in the I2R NDP for 160 MHz bandwidth, or the value in the corresponding IFTMR frame, whichever is smaller (referred to as RSTA Assigned I2R STS =160 MHz).
* … …

In the same IFTM frame, the RSTA shall include a Max STS subelement together with the Ranging Parameters element if the corresponding IFTMR frame contains a Max STS subelement and the RTS intends to transmit 320 MHz R2I NDP or receive 320 MHz I2R NDP. In the subelement:

* The Max R2I STS =320 MHz field indicates either the maximum number of space-time streams it is capable of transmitting in the R2I NDP for 320 MHz bandwidth, or the value in the corresponding IFTMR frame (referred to as RSTA Assigned R2I STS =320 MHz).
* The Max I2R STS =320 MHz field indicates either the maximum number of space-time streams it is capable of receiving in the I2R NDP for 320 MHz bandwidth, or the value in the corresponding IFTMR frame, whichever is smaller (referred to as RSTA Assigned I2R STS =320 MHz).

The RSTA shall include a Transmit Power Envelop subelement in the IFTM frame if the IFTM frame contains a Max STS subelement and is addressed to an unassociated ISTA.

***TGbk editor: Please update subclause 11.21.6.4.3.3 as follows (track change enabled):***

**11.21.6.4.3.3 Measurement sounding phase of TB ranging**

… …

 In the TF Ranging Sounding, the RSTA shall set the SS Allocation subfield and the I2R Rep subfield of the User Info fields corresponding to each of the ISTAs triggered by the Trigger frame in the following way:

— The Number of Spatial Streams in each SS Allocation subfield shall not exceed the RSTA Assigned I2R STS ≤ 80 MHz for the corresponding ISTA, if the UL BW subfield in the Common Info field indicated a bandwidth less than or equal to 80 MHz, not exceed the RSTA Assigned I2R STS =160 MHz for the corresponding ISTA if the bandwidth is 160 MHz, and not exceed the RSTA Assigned I2R STS =320 MHz for the corresponding ISTA if the bandwidth is 320 MHz.

… …

After transmission of the TF Ranging Sounding, the RSTA’s MAC sublayer shall issue a PHY-RXLTFSEQUENCE.request primitive with an LTFVECTOR containing the following parameters:

— … …

— The R2I NSTS subfield value shall not exceed the RSTA assigned R2I STS ≤ 80 MHz for the corresponding ISTA, if the TXVECTOR parameter CH\_BANDWIDTH for this Ranging NDP Announcement frame is less than or equal to 80 MH, not exceed RSTA Assigned R2I STS =160 MHz for the corresponding ISTA if the CH\_BANDWIDTH is equal to 160 MHz, and not exceed RSTA Assigned R2I STS =320 MHz for the corresponding ISTA if the CH\_BANDWIDTH is equal to 320 MHz .

***TGbk editor: Please update subclause 11.21.6.4.3.3 as follows (track change enabled):***

**11.21.6.4.4.2 Measurement sounding phase of non-TB ranging**

… …

If the bandwidth is less than or equal to 80 MHz, the ISTA shall set the I2R NSTS subfield and the R2I NSTS subfield in the STA Info field of the Ranging NDP Announcement frame each to a value not to exceed the RSTA assigned I2R STS ≤ 80 MHz and RSTA assigned R2I STS ≤ 80 MHz respectively. If the bandwidth is 160 MHz, the ISTA shall set these same subfields to values not to exceed the RSTA assigned I2R STS =160 MHz and RSTA assigned R2I STS =160 MHz respectively. If the bandwidth is 320 MHz, the ISTA shall set these same subfields to values not to exceed the RSTA assigned I2R STS =320 MHz and RSTA assigned R2I STS =320 MHz respectively.

***Discussion: if an RSTA sends updated transmit power envelop to an unassociated ISTA using the IFTM frame, the ongoing session needs to be re-established. A more efficient way is to send the update using the LMR frame.***

**9.6.7.49 Location Measurement Report (LMR) frame format**

***TGbk editor: Please add a new element to Figure 9-909aa and insert a new paragraph as follows:***

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Category | Public Action | Dialog Token | TOD | TOA | TOD Error | TOA Error |
| Octets: | 1 | 1 | 1 | 6 | 6 | 1 | 1 |
|  | CFOParameter | R2I NDPTx Power | I2R NDPTarget RSSI | Secure HE-LTF Parameters (optional) | AOA Feedback (optional) | Transmit Power Envelop element  |
| Octets: | 2 | 1 | 1 | 14 | 9 | Variable |

**Figure 9-909aa—Location Measurement Report (LMR) frame Action field format**

The Transmit Power Envelop element is described in 9.4.2.161 (Transmit Power Envelop element). This element is optionally present to indicate the transmit power envelop for an unassociated ISTA.

**Straw Poll: Do you support to incorporate the proposed draft text in this document 11-23/0393r1 to the TGbk Draft 0.1?**

**Result: Yes/No/Abstain**