IEEE P802.11
Wireless LANs

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| Support for 320 MHz Ranging Subelement |
| Date: 2023-10-23 |
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Abstract

This submission proposes a change of the Max Nss subelement to Support for 320 MHz Ranging Subelement, changes are relative to Draft P802.11be\_D4.0, IEEE802.11az-2022 and Draft P802.11bk D0.7.

Revisions:

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 TGbk 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 TGaz draft. As a result of adopting the changes, the TGbk editor will execute the instructions rather than copy them to the TGbk Draft.***

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

1. ***TGbk Editor: Change clause 9.4.2.298 as follows:***

The Format And Bandwidth subfield indicates the requested or allocated PPDU format and bandwidth used to transmit the I2R/R2I NDP exchange as part of the non-TB ranging, or TB ranging measurement exchange; see 11.21.6.4.3 (TB ranging measurement exchange) and 11.21.6.4.4 (Non-TB ranging measurement exchange). The encoding of this subfield is given in Table 9-322h23fb (Format And Bandwidth subfield).

1. Table 9-322h23fb—Format And Bandwidth subfield

|  |  |  |
| --- | --- | --- |
| Field value | Format | Bandwidth |
| 0 | HE | 20 |
| 1 | HE | 40 |
| 2 | HE | 80 |
| 3 | HE | 80+80 |
| 4 | HE (two separate RF LOs) | 160 |
| 5 | HE (single RF LO) | 160 |
| 6 | EHT (single RF LO) | 320 |
| ~~6~~7-63 | Reserved | Reserved |

The field values of 3, 4 and 5 specifies the STA support for 160 MHz operation as either 80+80, 160 two-LO or 160 single-LO respectively in addition to supporting 80, 40 and 20 MHz bandwidths (e.g., field value of 5 does not mean the device supports all 160 MHz options but rather 160 MHz single LO).

The field value of 6 specifies the STA support for 320 MHz operation as 320 MHz single-LO using EHT format in addition to supporting 160 single-LO, 80, 40 and 20 MHz bandwidths in HE format.

1. ***TGbk Editor: Change clause 9.4.2.298 as follows:***

***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 in the table below.***

**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 Envelope subelement | Yes |
| 4 | 320 MHz Ranging subelement | Yes |
| 5-220 | Reserved |  |
| 221 | Vendor Specific |  |
| 222-255 | Reserved |  |

… …

***Change the following two paragraphs on page 77. (#202308-01)***

The Max R2I STS ~~> 80~~=160 MHz subfield indicates for the bandwidth~~s greater than 80~~ of 160 MHz the maximum number of space-time streams to be used in R2I NDP in the session.

… …

The Max I2R STS ~~> 80~~=160 MHz subfield indicates for the bandwidth~~s greater than 80~~ of 160 MHz the maximum number of space-time streams to be used in I2R NDP in the session.

… …

***Insert the following definitions for the two new sublements to the end of this subclause. (#202308-01)***

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

The format of the 320 MHz Ranging subelement is as shown in Figure 9-7xx (320 MHz Ranging subelement format).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | B0 B7 | B8 B15 | B16 B18 | B19 B21 | B22  | B23 |
|  | Subelement ID | Length | Max R2INss =320 MHz | Max I2RNss =320 MHz | Puncturing Pattern Support | Reserved |
| Bits: | 8 | 8 | 3 | 3 | 1 | 1 |

**Figure 9-7xx—320 MHz Ranging subelement format**

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

The Max R2I Nss = 320 MHz field indicates for the bandwidth of 320 MHz the maximum number of spatial streams to be used in R2I NDP in the session.

The Max I2R Nss = 320 MHz field indicates for the bandwidth of 320 MHz the maximum number of spatial streams to be used in I2R NDP in the session.

The Puncturing Pattern Support field is set to one to indicate support of all optional puncturing pattern; it is set to zero to indicate support of only the mandatory puncturing patterns.

1. ***TGbk Editor: Change clause 11.21.6.3.3 as follows:***

***Change subclause 11.21.6.3.3 in paragraph 8 as follows. (#202308-01)***

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~~s greater than 80 MHz~~, in the Max R2I STS ~~> 80~~=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~~s greater than 80 MHz~~, in the Max I2R STS ~~> 80~~=160 MHz subfield.
* … …

To indicate support for 320 MHz Ranging an ISTA shall set the Format and Bandwidth subfield to 5, and the ISTA shall include a 320 MHz Ranging subelement together with the Ranging Parameters element in the IFTMR frame. In the subelement:

* The Max R2I Nss = 320 MHz field is set to the maximum number of spatial streams the ISTA is capable of receiving in the R2I NDP for 320 MHz bandwidth minus 1.
* The Max I2R Nss = 320 MHz field is set to the maximum number of spatial streams the ISTA is capable of transmitting in the I2R NDP for 320 MHz bandwidth minus 1.

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

… …

 ***Change subclause 11.21.6.3.3 in paragraph 21 as follows. (#202308-01)***

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 Format and Bandwidth subfield, it assigns the maximum allowed bandwidth used during measurement exchanges (referred to as RSTA Assigned Max Bandwidth). This value shall not be greater than the value in the corresponding IFTMR frame, or can be set to 6, to indicate 320 MHz Ranging, if the IFTMR included a 320 MHz Ranging subelement.
* … …
* In the Max R2I STS ~~> 80~~=160 MHz subfield, either the maximum number of space-time streams it is capable of transmitting in the R2I NDP for 160 MHz bandwidth~~s greater than 80 MHz~~, or the value in the corresponding IFTMR frame, whichever is smaller (referred to as RSTA Assigned R2I STS ~~> 80~~=160 MHz).
* In the Max I2R STS ~~> 80~~=160 MHz subfield, either the maximum number of space-time streams it is capable of receiving in the I2R NDP for 160 MHz bandwidth~~s greater than 80 MHz~~, or the value in the corresponding IFTMR frame, whichever is smaller (referred to as RSTA Assigned I2R STS ~~> 80~~=160 MHz).
* … …

If the Format and Bandwidth subfield is set to a value of 6, in the same IFTM frame, the RSTA shall include a 320 MHz Ranging subelement together with the Ranging Parameters element. In the 320 MHz Ranging subelement:

* The Max R2I Nss = 320 MHz field is set to either the maximum number of spatial streams it is capable of transmitting in the R2I NDP for 320 MHz bandwidth minus 1, or the value in the corresponding IFTMR frame, whichever is smaller (referred to as RSTA Assigned R2I Nss =320 MHz).
* The Max I2R Nss = 320 MHz field is set to either the maximum number of spatial streams it is capable of receiving in the I2R NDP for 320 MHz bandwidth minus 1, or the value in the corresponding IFTMR frame, whichever is smaller (referred to as RSTA Assigned I2R Nss =320 MHz).
* The Puncturing Pattern Support field is set to 1 to indicate support of all optional puncturing patterns, or it is set to 0 to indicate support of only mandatory puncturing patterns.

… …

***Change subclause 11.21.6.3.3 in paragraph 28 as follows. (#202308-01)***

Upon reception of an IFTMR frame with the Format and Bandwidth subfield set to a value of 3, 4 or 5 representing the ISTA’s support for one of the 160 MHz BW options, the RSTA shall respond with the same requested value in the Format and Bandwidth subfield in the IFTM frame, if it supports the requested 160 MHz BW option, otherwise respond with a value less than 3. Upon reception of an IFTMR frame with the Ranging Parameters element including a 320 MHz Ranging subelement, representing the ISTA’s support for 320 MHz Ranging, the RSTA shall respond with the value of 6 in the Format and Bandwidth subfield in the IFTM frame, if it supports the requested 320 MHz BW option.