IEEE P802.11
Wireless LANs

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| Detailed Text Proposal on NDP Announcement frame format |
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Abstract

This document contains Proposed Draft Text (PDT) for the NDP Announcement frame format of the proposed TGbn (UHR, Ultra High Reliability) amendment to the 802.11 standard.

**Revision information**

The following is a summary of the important changes that occurred within each revision of this document:

|  |  |
| --- | --- |
| **Revision** | **Major changes** |
| 0 | Initial revision |
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**Introduction**

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 TGbe Draft. The abstract, revision information, introduction, explanation of the proposed changes and references sections are not part of the adopted material.

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

**Explanation of the proposed changes:**

The proposed changes to the 802.11 TGbn draft within this document are based on the following motions adopted by the TGbn task group:

**Relevant passing motions:**

All the passing motions up to and including those in the 1/15/2025 TGbn Joint call (see [1] and [2]).

[Motion #189 in [1] and [184, 250, 251] in [3]]

* NDP Announcement Variant subfield shall be set to 3 for Co-BF NDPA in UHR.

[Motion #219 in [2] and [249,264] in [3]]

* For the Co-BF case, the information in the NDP Announcement frame for the responding AP has a unified design for joint-NDP based sounding as well as cross-BSS section of sequential sounding.

[Motion #250 in [2] and [264,280] in [3]]

* 11bn defines 5-bit Recommended CSI MCS subfield in the second Special STA Info field of the NDPA targeted for OBSS AP in the UHR Co-BF sounding
	+ It is set from B20 to B24 in the second Special STA Info field
	+ The 5-bit MCS level includes “No Recommendation” MCS entry in addition to the UHR MCS entries
		- Index 31 indicates “No Recommendation”
	+ The Recommended CSI MCS is for the OBSS AP to set the MCS in the BFRP trigger frame sent in the future Cross-BSS sounding / Joint Sounding sequence
	+ When there are multiple OBSS STAs to feedback the CSI report, the Recommended CSI MCS can be set to the lowest MCS among all those OBSS STAs

[Motion #262 in [2] and [249, 250, 264] in [3]]

* When the initiating AP requests the responding AP to join the Co-BF sounding, the red subfields in the first and second User Info fields of the NDPA shall be set as follows.
	+ NDPA Version Identifier is set to 0 for Co-BF sounding in UHR
	+ Number of LTF symbols is set to 0 and 1 for 4 and 8 symbols, respectively
	+ Starting Spatial Stream is set to 0 and 1 for the 1st and 5th streams, respectively
	+ Number of spatial streams is set to 0 and 1 for the 4 and 8 streams, respectively
	+ LTF+GI is set to 0 and 1 for 2x LTF+0.8us GI and 2x LTF+1.6us GI, respectively
	+ B20-26, which are shown as Reserved in the second User Info field, can be used in the future

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Bit | 0 - 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 - 26 | 27 | 28 | 29 | 30 | 31 |
| 1st User Info field | AID11: 2047 | NDPA Version Identifier | BSS Color | TXOP | Disambiguation | Bandwidth | Reserved |
| 2nd User Info field | AID11: AID of responding AP | Punctured Channel Information | Number of LTF Symbols | Starting SpatialStream | Number of Spatial Streams | LTF+GI | Reserved | Disambiguation | Reserved |

**Legends:**

* Yellow marker: Instructions to TGbn editor.

**Text to be adopted begins here.**

***TGbn editor: Please add the following new subclause for* NDP Announcement frame format *to the 802.11bn draft D0.1:***

##### **9.3.1.19 NDP Announcement frame format**

###### **9.3.1.19.1 General description**

***TGbn editor: Change the first paragraph as follows:***

[M#262] The NDP Announcement frame has six variants, the VHT NDP Announcement frame, the HE NDP Announcement frame, the Ranging NDP Announcement frame, the Sensing NDP Announcement frame, the EHT NDP Announcement frame, and the UHR NDP Announcement frame. The six formats are distinguished by 1) the setting of the NDP Announcement Variant subfield in the Sounding Dialog Token field, 2) the presence or absence of the STA Info field with AID11 subfield equal to 2045 and with B31 set to 1 (see Table 9-42b (NDP Announcement frame variant encoding) and Table 9-42ba (Ranging NDP Announcement frame and Sensing NDP Announcement frame encoding)), and 3) the presence or absence of the STA Info field with AID11 subfield equal to 2047. The STA Info field with AID11 subfield equal to 2045 is always present in a Sensing NDP Announcement frame and it is transmitted as the first STA Info field. The STA Info field with AID11 subfield equal to 2045 is not present in the Ranging NDP Announcement frame used for TB ranging measurement exchange but is present in the non-TB ranging measurement exchange. The STA Info field with AID11 subfield equal to 2047 is always present in a UHR NDP Announcement frame and it is transmitted as the first STA Info field.

***TGbn editor:Change Table 9-42a as follows:***

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| [M#262] Table 9-xxa—Encoding of the AID11 subfield in an NDP Announcement frame  |
| AID11 subfield | Description | NDP Announcement frame variant applicability (see NOTE) |
| VHT | HE | EHT | Ranging | Sensing | UHR |
| 0 | STA Info field is addressed to an AP or mesh | Applicable | Not applicable |
| 1–2006 | If the NDP Announcement frame is not a Ranging or a Sensing variant, the STA Info field is addressed to an associated STA whose AID is equal to the value in the AID11 subfield.If the NDP Announcement frame is a Ranging or a Sensing variant, the STA Info field is addressed to an unassociated STA or an associated STA whose RSID/USID/AID is equal to the value in the RSID11/USID11/AID11 subfield. | Applicable |
| 2007 | Applicable | Applicable (subject to 35.15.1 (Basic EHT BSS operation)) | Not applicable | Applicable | Applicable | Not applicable |
| 2008–2042 | N/A | Not applicable |
| 2043 | STA Info field contains a sequence authentication code | Not applicable | Not applicable | Not applicable | Applicable | Not applicable | Not applicable |
| 2044 | STA Info field contains a partial TSF | Not applicable | Not applicable | Not applicable | Applicable | Applicable | Not applicable |
| 2045 | For Ranging NDP Announcement frame, it contains I2R NDP TX Power and R2I RSSI target. For Sensing NDP Announcement frame, it contains the SI2SR NDP TX power and the Measurement Session ID, and it may contain the sensing responder to sensing initiator (SR2SI) NDP Target RSSI. | Not applicable | Not applicable | Not applicable | Applicable | Applicable | Not applicable |
| 2046 | N/A | Not applicable |
| 2047 | If the NDP Announcement frame is a HE variant, the STA Info field contains a Disallowed Subchannel Bitmap subfield.If the NDP Announcement frame is a UHR variant, the STA Info field contains information for the responding AP. | Not applicable | Applicable | Not applicable | Not applicable | Not applicable | Applicable |
| NOTE—Not applicable means that the particular AID11 value is not used for that variant and is reserved. |

***TGbn editor:Change Table 9-42b as follows:***

|  |
| --- |
| [M#189] Table 9-xxb—NDP Announcement frame variant encoding  |
| NDP Announcement Variant subfield | NDP Announcement frame variant |
|  |
| 0 | VHT NDP Announcement frame |  |
| 1 | Ranging NDP Announcement frame or Sensing NDPAnnouncement frame (see Table 9-42ba (Ranging NDPAnnouncement frame and Sensing NDP Announcement frameencoding)) |  |
| 2 | HE NDP Announcement frame |  |
| 3 | EHT/UHR NDP Announcement frame  |  |

***TGbn editor:Change the second paragraph after Table 9-42b as follows:***

The STA Info List field contains one or more, *n*, STA Info fields (see [9.3.1.19.2 (VHT NDP Announcement](file:///C%3A%5CUsers%5Cmtk28741%5CDocuments%5C802.11%20Standards%5CUHR%20draft%5C11beD6.0%5CTGbe_Cl_09.docx#_bookmark39) [frame format)](file:///C%3A%5CUsers%5Cmtk28741%5CDocuments%5C802.11%20Standards%5CUHR%20draft%5C11beD6.0%5CTGbe_Cl_09.docx#_bookmark39), [9.3.1.19.3 (HE NDP Announcement frame format)](file:///C%3A%5CUsers%5Cmtk28741%5CDocuments%5C802.11%20Standards%5CUHR%20draft%5C11beD6.0%5CTGbe_Cl_09.docx#_bookmark44), [9.3.1.19.5 (EHT NDP Announcement frame format)](file:///C%3A%5CUsers%5Cmtk28741%5CDocuments%5C802.11%20Standards%5CUHR%20draft%5C11beD6.0%5CTGbe_Cl_09.docx#_bookmark55)) and [9.3.1.19.x](file:///C%3A%5CUsers%5Cmtk28741%5CDocuments%5C802.11%20Standards%5CUHR%20draft%5C11beD6.0%5CTGbe_Cl_09.docx#_bookmark44) (UHR NDP Announcement frame format).

***[M#250, M#262] TGbn editor:Add the following section after 9.3.19.5:***

**9.3.1.19.x UHR NDP Announcement frame format**

The format of the UHR NDP Announcement frame is the same as the HE NDP Announcement frame shown in Figure 9-74f (HE NDP Announcement frame format).

Note: The UHR NDP Announcement frame is only used in the Cross-BSS UHR TB sequential NDP sounding sequence or the UHR TB joint NDP sounding sequence.

The Duration, RA, and TA fields are set as in a VHT NDP Announcement frame.

The NDP Announcement Variant subfield is set to 3 and the AID11 subfield of the first STA Info field is set to 2047 to identify the frame as a UHR NDP Announcement frame.

The Sounding Dialog Token Number subfield in the Sounding Dialog Token field contains a value selected by the beamformer to identify the UHR NDP Announcement frame.

The format of the first STA Info field in a UHR NDP Announcement frame is defined in Figure 9-xxx (first STA Info field format in a UHR NDP Announcement frame).

 B0 B10 B11 B13 B14 B19 B20 B26 B27 B28 B30 B31

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| AID11 | NDPA Version | BSS Color | TXOP | Disambigu ation | Bandwidth | Reserved |

Bits: 11 3 6 7 1 3 1

**Figure 9-xxx—First STA Info field format in a UHR NDP Announcement frame**

The AID11 subfield is set to 2047 as identifier of the first STA Info field in a UHR NDP Announcement frame to carry the information for the responding AP.

The NDPA Version subfield is set to 0 for UHR. The values from 1 to 7 are reserved.

The BSS Color subfield is set to the TXVECTOR parameter BSS\_COLOR.

The TXOP subfield indicates the TXOP duration, and the definition is the same as the TXOP subfield in the U-SIG field of an EHT MU PPDU shown in Table 36-28 (U-SIG field of an EHT MU PPDU).

The Bandwidth subfield indicates the bandwidth of the following EHT sounding NDP and the definition is the same as the Bandwidth subfield in the U-SIG field of an EHT MU PPDU shown in Table 36-28 (U-SIG field of an EHT MU PPDU).

NOTE—Setting the Disambiguation subfield to 1 prevents a non-UHR VHT STA from incorrectly identifying its AID in the UHR NDP Announcement frame.

The format of the second STA Info field in a UHR NDP Announcement frame is defined in Figure 9-xxx (second STA Info field format in a UHR NDP Announcement frame).

B0 B10 B11 B15 B16 B17 B18 B19 B20 B24 B25 B26 B27 B28 B31

Bits: 11 5 1 1 1 1 5 2 1 4

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| AID11 | Punctured Channel Information | Number of EHT-LTF Symbols | Starting Spatial Stream | Number of Spatial Streams | LTF+GI Size | Recommended MCS for CSI Feedback | Reserved | Disambiguation | Reserved |

**Figure 9-xxx—Second STA Info field format in a UHR NDP Announcement frame**

The AID11 subfield contains an identifier of the responding AP expected to transmit an EHT sounding NDP following the UHR NDP Announcement frame.

The Punctured Channel Information subfield indicates the puncturing information of the following EHT sounding NDP transmission. See Table 36-30 (Definition of the Punctured Channel Information field in the U-SIG for an EHT MU PPDU using non-OFDMA transmissions) for the definition.

The Number Of EHT-LTF Symbols subfield indicates the number of EHT-LTF symbols of the following EHT sounding NDP transmission. A value of 0 indicates the number of EHT-LTF symbols is 4, a value of 1 indicates the number of EHT-LTF symbols is 8.

The Starting Spatial Streams subfield indicates the starting spatial stream of the responding AP in the following EHT sounding NDP transmission. A value of 0 indicates the starting spatial steam index is 1, a value of 1 indicates the starting spatial steam index is 5.

The Number of Spatial Streams subfield indicates the number of spatial streams of the responding AP in the following EHT sounding NDP transmission. A value of 0 indicates the number of spatial steams is 4, a value of 1 indicates the number of spatial steams is 8.

The GI+LTF Size subfield indicates the GI duration and EHT-LTF size and is set to 0 or 1 for 2´ EHT-LTF + 0.8 µs GI or 2´ EHT-LTF + 1.6 µs GI, respectively.

The Recommended MCS for CSI Feedback subfield indicates the MCS that may be used by the sounded STA to send the CSI report to the sender AP of the NDP in another BSS. The recommended MCS may be included in the BFRP trigger frame sent by the responding AP of the NDPA in the Cross-BSS UHR TB sequential NDP sounding sequence or the UHR TB joint NDP sounding sequence. The definition of Recommended MCS for CSI Feedback is the same as the MCS subfield in a UHR MU PPDU. The encoding of the Recommended MCS for CSI Feedback subfield is defined in 38.3.12 (UHR-SIG modulation and coding schemes (UHR-SIG-MCSs)) and additionally, value 31 indicates “No Recommendation”. When multiple non-AP STAs associated with the responding AP are scheduled to feedback CSI reports, the Recommended MCS for CSI Feedback may be set to the lowest MCS among all the non-AP STAs associated with the responding AP.

NOTE—Setting the Disambiguation subfield to 1 prevents a non-UHR VHT STA from incorrectly identifying its AID in the UHR NDP Announcement frame.

Except the first and second STA Info fields, the format of the remaining STA Info field in a UHR NDP Announcement frame is defined in Figure 9-74n (STA Info field format in an EHT NDP Announcement frame).

**References:**

1. [11-24/0171r26](https://mentor.ieee.org/802.11/dcn/24/11-24-0171-26-00bn-tgbn-motions-list-part-1.pptx): 11-24-0171-26-00bn-tgbn-motions-list-part-1, Alfred Asterjadhi (Qualcomm Inc.)
2. [11-25/14r3](https://mentor.ieee.org/802.11/dcn/25/11-25-0014-03-00bn-tgbn-motions-list-part-2.pptx): 11-25-0014-03-00bn-tgbn-motions-list-part-2, Alfred Asterjadhi (Qualcomm Inc.)
3. 11-24/0209r9: 11-24-0209-09-00bn-specification-framework-for-tgbn.docx, Ross Jian Yu (Huawei)