IEEE P802.11
Wireless LANs

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| 11az Ranging NDP-A Format Amendment Text |
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Abstract

This submission proposes the text for the ranging NPD-A format.

Revisions:

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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 TGaz 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.**

TGaz Editor: Change the title of 9.3.1.19 as follows:

9.3.1.19 VHT/HE/Ranging NDP Announcement frame format

TGaz Editor: Change the following paragraph of 9.3.1.19:

The VHT/HE/Ranging NDP Announcement frame has three variants, the VHT NDP Announcement frame, ~~and~~ the HE NDP Announcement frame and the Ranging NDP Announcement frame. The ~~two~~ three formats are distinguished by the setting of the HE subfield and the Ranging subfield in the Sounding Dialog Token field.

TGaz Editor: Change Figure 9-58 as follows:

|  |  |  |
| --- | --- | --- |
| B0 | B1 | B2          B7 |
| ~~Reserved~~ Ranging  | HE | Sounding Dialog Token Number |
| 1 | 1 | 6 |
| **Figure 9-58 - Sounding Dialog Token field** |

TGaz Editor: Change the following paragraphs of 9.3.1.19:

The VHT/HE/Ranging NDP Announcement frame contains at least one STA Info field. If the VHT/HE/Ranging NDP Announcement frame contains only one STA Info field, then in the case of VHT or HE NDPAnnouncement frames the RA field is set to the address of the STA that can provide feedback (see 10.37.5.2 (Rules for VHT sounding protocol sequences)), while in the case of Ranging NPD Announcement frames, the RA address is set to the address of the RSTA. If the VHT/HE/Ranging NDP Announcement frame contains more than one STA Info field, then the RA field is set to the broadcast address.

The TA field is set to the address of the STA transmitting the VHT/HE/Ranging NDP Announcement frame or the bandwidth signaling TA of the STA transmitting the VHT/HE/Ranging NDP Announcement frame. In a VHT/HE/Ranging NDP Announcement frame transmitted by a VHT or HE STA in a non-HT or non-HT duplicate format and where the scrambling sequence carries the TXVECTOR parameter CH\_BANDWIDTH\_IN\_NON\_HT, the TA field is set to a bandwidth signaling TA.

TGaz Editor: Insert the following after the 5th paragraph (“The format of the Sounding...”):

The Ranging subfield in the Sounding Dialog Token field is set to 1 to identify the frame as a Ranging NDP Announcement frame. The Ranging NDP Announcement frame is used for an LTF measurement exchange mode of the TB and NTB Ranging protocol (see 11.22.6.4.3 and 11.22.6.4.4 respectively).

***TGaz Editor:*** *Insert the following at the end of 9.3.1.20:*

The Ranging NDP Announcement uses the same Frame Control subtype as the VHT NDP Announcement. The frame format of the Ranging Announcement frame is shown in Figure 1-9-51d.



Figure 9-51d Ranging NDP Anouncement Frame

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

The Ranging subfield in the Sounding Dialog Token field is set to 1 to identify the frame as a Ranging NDP Announcement frame. The HE subfield in the Sounding Dialog Token field is set to 1 to identify a TB Ranging measurement exchange and set to 0 to identify an NTB Ranging measurement exchange.

The format of the STA Info field in a Ranging NDP Announcement Frame is defined in Figure 2-9-51e.



Figure 9-51e STA Info field format in a Ranging NDP Announcement frame

A Ranging NDP Announcement frame contains at most 1 STA Info field per STA, where in the NTB Ranging protocol there is always only one STA (see 11.22.6.4.4) but can have the optional STA Info SAC field present when operating in secure mode (see 11.22.6.4.6.1).

The AID11/RID11 subfield contains the 11 least significant Bits of the AID or RID of a STA expected to process the following NDP frame.

When used as part of the TB Ranging measeurement exchange, the Offset, DL N\_STS and DL Rep subfields are used to indicate the following DL NDP’s LTF configuration, see Section 28.3.17.

When used as part of the NTB Ranging measurement exchange, the UL N\_STS and UL Rep subfields are used to indicate the following UL NDP’s HE-LTF configuration, while the DL N\_STS and DL Rep subfields indicate the HE-LFT configuration of the DL NDP sent in response by the RSTA, see Section 11.22.6.4.4.

The Offset subfield can take values between 0 and 63 and indicates the number of HE-LTF to skip when processing the following NDP and is set 0 in all cases except the secure variant of the TB Ranging measurement exchange.

The DL N\_STS and UL N\_STS subfields indicate the number of space-time streams of the corresponding NDP and is set to the number of space-time streams minus 1.

The DL Rep and UL Rep subfields indicate the number of repetitions N\_REP of the HE-LTF symbols of the corresponding HE Ranging NDP PDPU beyond the number of space-time streams, see Section 28.3.17. There can be N\_REP = 1 to 8 repetitions and the DL Rep and UL Rep subfields are set N\_REP-1.

The Disambiguation subfield is set to 1 to prevent a non-HE VHT STA from wrongly determining its AID in the NDP Announcement frame. The Disambiguation subfield coincides with the MSB of the AID12 subfield of an expected VHT NDP Announcement when the Ranging NDP Announcement frame is parsed by a non-HE VHT STA. The MSB of the AID12 subfield is always 0 for a non-HE VHT STA due to the limitation of the AID to a maximum of 2007.



Figure 9-51f STA Info SAC Field

The STA Info SAC field is used in the secure variant of the NTB Ranging measurement exchange protocol to carry the secure authentication code (SAC), see Figure 9-51f. It is included in the Ranging NDP Announcement frame after the other STA Info field(s), see Figure 9-51d.

The RSVD AID11 subfield is set to 2047, which is a value above the maximum AID value of 2007, and is used to identify the STA Info SAC field. The Disambiguation subfield is also included in the STA Info SAC field such that together with the RSVD AID11 subfield, other STAs can avoid interpreting the STA Info SAC field as another STA Info field addressed to them.

The SAC subfield contains the 16bit SAC used in the secure variant of the NTB Ranging protocol, see Section 11.22.6.4.