### **IEEE P802.11Wireless LANs**

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| PDT - NDP format for sensing |
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This submission includes the proposed draft text on the NDP format for sensing for P802.11bf D0.4.

##### Revision history:

##### R0 – initial version

R1- Updated with the motion results

R2 – Add text to reflect the proposals in 1912r0

***Introduction***

The following two motions, Motions#179 and #180, shown in 22/1708r2 receive unanimous support in TGbf, based on which the draft text on the NDP format for sensing is proposed in following.

**Motion#179:**

**Move to reflect the following text in the Sensing NDP PDT:**

* + To apply the HE TB Ranging NDP to the TF sounding phase in a TB sensing measurement instance when PPDU BW ≤ 160 MHz;
	+ To apply the HE Ranging NDP to the NDPA sounding phase in a TB sensing measurement instance when PPDU BW ≤ 160 MHz;
	+ To apply the HE Ranging NDP to the non-TB sensing measurement instance when PPDU BW ≤ 160 MHz.

**Motion#180**

**Move to reflect the following text in the Sensing NDP PDT:**

* To apply the EHT sounding NDP (including specified preamble puncturing patterns), when PPDU BW = 320 MHz, only to a TB sensing measurement instance in the NDPA sounding phase as the SI2SR NDP.

***TGbf editor: Please modify Subclause 11.55.1.5.2.3 as follows:***

 NDPA sounding phase

In the NDPA sounding phase, the AP, which is a sensing transmitter, sends an SI2SR NDP to one or more STAs, on which the one or more STAs perform sensing measurement(#123, #309, #862). The NDPA sounding phase shall be present in a TB sensing measurement instance if at least one STA that is a sensing receiver in this NDPA sounding phase and that is not assigned to be polled or has responded in the polling phase(#761).

The AP shall transmit a Sensing NDP Announcement frame to one or more STAs that are sensing receivers in this NDPA sounding phase and that are not assigned to be polled or have responded in the polling phase, followed by a SIFS and SI2SR NDP transmission. The STA Info fields within the Sensing NDP Announcement frame specify STAs that shall perform sensing measurements on the SI2SR NDP sent by the AP(#763, #476, #621, #125, #863).

***Add the following paragraphs as follows:***

When a PPDU bandwidth is less than or equal to 160 MHz, the format of the SI2SR NDP in the NDPA sounding phase of a TB sensing measurement instance shall be a HE Ranging NDP, as described in 27.3.18a.1 (HE Ranging NDP).

When the PPDU bandwidth equals 320 MHz, the format of SI2SR NDP in the NDPA sounding phase of a TB sensing measurement instance shall be an EHT sounding NDP, as described in 36.3.18 (EHT sounding NDP). In TB sensing measurement instance, an EHT LTF symbol shall use the 2x LTF with 1.6 µs GI EHT-LTF and all the EHT puncturing patterns shall be supported.

***TGbf editor: Please modify Subclause 11.55.1.5.2.4 as follows:***

11.55.1.5.2.4 TF sounding phase

In the TF sounding phase, the AP, which is a sensing receiver, solicits NDP transmissions from one or more STAs, on which to perform sensing measurement(#864). The TF sounding phase shall be present in a TB sensing measurement instance if at least one STA that is a sensing transmitter in this TF sounding phase and that is not assigned to be polled or has responded in the polling phase(#622, #623, #764).

The AP shall transmit a Sensing Sounding Trigger frame to one or(#865) more STAs that are sensing transmitters in this TF sounding phase and that are not assigned to be polled or have responded in the polling phase to solicit SR2SI NDP transmission(s)(#622, #623, #764). The Sensing Sounding Trigger frame shall allocate spatial resources for one or more SR2SI NDP transmissions covering the full bandwidth(#136, #194, #477). The SR2SI NDP may be transmitted with more than one spatial stream(#136, #194, #477). Any STA addressed by a User Info field in a Sensing Sounding Trigger frame shall transmit an SR2SI NDP a SIFS after receiving the Sensing Sounding Trigger frame(#866).

If the number of available sensing transmitters exceeds the available uplink resources, the AP may perform the frame exchange of transmitting a Sensing Sounding Trigger frame and soliciting the SR2SI NDP transmission(s) multiple times during the TF sounding phase in a TB sensing measurement instance (see Figure 11-75g (Example of multiple frame exchanges of Sensing Sounding Trigger frame and SR2SI NDP transmission(s) during the TF sounding phase(#274, #348)))(#274, #348).

Figure 11-75g—Example of multiple frame exchanges of Sensing Sounding Trigger frame and SR2SI NDP transmission(s) during the TF sounding phase(#274, #348)

***Add the following paragraph as follows:***

When a PPDU bandwidth is less than or equal to 160 MHz, the format of the SR2SI NDP in the TF sounding phase of a TB sensing measurement instance shall be an HE TB Ranging NDP, as described in 27.3.18a.2 (HE TB Ranging NDP).

NOTE: In a TF sounding phase, 320 MHz operation is not supported.

***TGbf editor: Please modify Subclause 11.55.1.5.3 as follows:***

11.55.1.5.3 Non-TB sensing measurement instance

In the TF sounding phase, the AP, which is a sensing receiver, solicits NDP transmissions from one or more STAs, on which to perform sensing measurement(#864). The TF sounding phase shall be present in a TB sensing measurement instance if at least one STA that is a sensing transmitter in this TF sounding phase and that is not assigned to be polled or has responded in the polling phase(#622, #623, #764).

A non-AP STA, acting as a sensing initiator, shall initiate a non-TB sensing measurement instance by transmitting a Sensing NDP Announcement frame addressed to the AP, followed by an SI2SR NDP after SIFS. The non-AP STA shall transmit the SI2SR NDP with the same bandwidth as the PPDU carrying the Sensing NDP Announcement frame(#564). In response to the correctly received Sensing NDP Announcement frame addressed to itself, SIFS after the SI2SR NDP, the AP shall transmit an SR2SI NDP to the non-AP STA. The AP shall transmit the SR2SI NDP with the same bandwidth as the PPDU carrying the Sensing NDP Announcement frame(#564).

If the non-AP STA is only the sensing transmitter, the Sensing NDP Announcement frame should configure the SR2SI NDP to be transmitted with the minimum possible length of one LTF symbol(#436). If the non- AP STA is only the sensing receiver, the Sensing NDP Announcement frame should configure the SI2SR NDP to be transmitted with the minimum possible length of one LTF symbol(#436).

Figure 11-75i (Non-TB sensing measurement instance(#174, #566)) shows a non-TB sensing measurement instance.

Figure 11-75i—Non-TB sensing measurement instance(#174, #566)

***Add the following paragraph as follows:***

When a PPDU bandwidth is less than or equal to 160 MHz, the format of both the SI2SR NDP and SR2SI NDP in a non-TB sensing measurement instance shall be a HE Ranging NDP, as described in 27.3.18a.1 (HE Ranging NDP).

NOTE: In a non-TB sensing measurement instance, 320 MHz operation is not supported.