IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Proposed spec text for NGV ranging NDP | | | | |
| Date: 2021-02-24 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Qinghua Li | Intel |  |  | Qinghua.li@intel.com |
| Bahar Sadeghi | Intel |  |  | Bahareh.sadeghi@intel.com |
| Jonathan Segev | Intel |  |  |  |
|  |  |  |  |  |
| Stephan Sand | German Aerospace Center (DLR) |  |  | Stephan.Sand@dlr.de |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

Abstract

This submission contains proposed spec text for ranging in NGV.

Specifically:

* IEEE 802.11bd NGV Ranging NDP frame format.
* IEEE 802.11bd NGV Ranging NDPA fields.

Revision History:

* Rev 0: Initial version of the document

***Insert a new subclause at the end of clause 32.3:***

# 32.3.16 NGV Ranging NDP

The NGV Ranging NDP is a variant of NGV data PPDU but without the Data field. The format of an NGV Ranging NDP is shown in Figure 32-xx (NGV Ranging NDP format).



**Figure 32-xx—NGV Ranging NDP Format**

The NGV Ranging NDP has the following properties:

— The TXVECTOR parameter NUM\_SS is used to encode the *NSS* field of the NGV-SIG and RNGV-SIG.

— The TXVECTOR parameter LTF\_REP indicates the number of repetitions of the NGV-LTF.

The only supported NGV-LTF symbol format is NGV-LTF-2x. The other NGV-LTF symbol formats are disallowed.

The number of NGV-LTF symbols in an NVG Ranging NDP is the product of the number of spatial streams NUM\_SS and the number of LTF repetitions. The number of LTF repetitions equals to LTF\_REP plus 1. When LTF repetition is used, LTF\_REP is 1. Otherwise, LTF\_REP is 0.



**Figure 32-xx—Example of NGV LTF with N\_SS=2 and LTF\_REP =2**

The construction of the NGV-LTFs in an NGV Ranging NDP is done by performing the steps in Subclause 32.3.4.7 (Construction of NGV-LTF) LTF\_REP plus 1 times.

# 32.3.8.3.3 NGV-SIG definition

***Make the following changes:***

**Table 32-10—Fields in the NGV-SIG field**

|  |  |  |  |
| --- | --- | --- | --- |
| **Bit** | **Field** | **Number of Bits** | **Description** |
| … |  |  |  |
| ~~B12-B13~~ | ~~Reserved~~ | ~~2~~ | ~~Reserved and each bit is set to 1.~~ |
| B12 | LTF Repetition | 1 | Set to 0 for NGV PPDU with Data field and NGV ranging NDP without NGV-LTF repetition  Set to 1 for NGV ranging NDP with NGV-LTF repetition |
| B13 | Reserved | 1 | Reserved and set to 1. |
| … |  |  |  |

# 9.3.1.19 VHT/HE/Ranging NDP Announcement frame format

***Insert the following new paragraphs at the end of 9.3.1.19***

When used as part of Non-TB Ranging measurement exchange in 11.21.6.4.4, the I2R N\_STS and I2R Rep subfields are used to indicate the configuration of HE-LTF and NGV-LTF of the following I2R NDP’s. The R2I N\_STS and R2I Rep subfields indicate the configuration of HE-LTF and NGV-LTF of the R2I NDP sent in response by the RSTA. When a Ranging NDP Announcement frame is configured for NGV ranging, the subfields of the STA Info field shall be set as follows:

* LTF Offset shall be set to zero.
* R2I N\_STS shall be set to the number of spatial streams of the R2I NDP.
* R2I Rep shall be set to 0 if the NGV-LTF in the R2I NDP is not repeated and shall be set to 1 if the NGV-LTF in the R2I NDP is repeated.
* I2R N\_STS shall be set to the number of spatial streams of the I2R NDP.
* I2R Rep shall be set to 0 if the NGV-LTF in the R2I NDP is not repeated and shall be set to 1 if the NGV-LTF in the R2I NDP is repeated
* TXVECTOR and RXVECTOR

***Insert the following new entries in Table 32-1***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| * TXVECTOR and RXVECTOR parameters | | | | |
| Parameter | Condition | Value | TXVECTOR | RXVECTOR |
| … | … existing fields … | | | |
| PSDU\_LENGTH | FORMAT is NGV | Indicates the number of octets in the PSDU in the range of 0 to a PDUMax-Length octets (see Table 32-23 (NGV PHY characteristics)) in the NGV PSDU. The value of 0 indicates an NGV Ranging NDP. | N | Y |
|  | Otherwise | Not present | N | N |
| … | … existing fields … | | | |
| TIME\_OF\_DEPARTURE | FORMAT is NGV | Enumerated type:  True indicates that the MAC entity requests that the PHY entity measures and reports time of departure parameters corresponding to the time when the first frame energy is sent by the transmitting port. | O | N |
| Otherwise | Not present | N | N |
| LTF\_REP | FORMAT is NGV and PSDU\_LENGTH is 0 | Indicate the number of repetitions of the NGV-LTF symbols.  Set to the number of repetitions minus 1. | O | N |