IEEE P802.11
Wireless LANs

|  |
| --- |
| Draft Spec Text for 11p Repetition Transmission Mode |
| Date: 2020-06-15 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Rui Cao | NXP | 350 Holger Way, San Jose, CA 95134 |  | rui.cao\_2@nxp.com |
| Alessio Filippi |  |  | alessio.filippi@nxp.com |
| Michael Fisher |  |  | michael.fischer@nxp.com |
| Vincent Martinez |  |  | vincent.martinez@nxp.com |

Abstract

This submission contains spec text proposal for 11p repetition transmission mode. The spec text reflects motion #19 in 11-19/0514r14 and passed strawpolls in 802.11-19/1946r1.

Revisions:

* Rev 0: Initial version of the document.

*TGbd Editor: Please add the following entry to Table 32-1.*

* + 1. TXVECTOR and RXVECTOR

**Table 32-1 TXVECTOR and RXVECTOR paramters**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Condition | Value | TXVECTOR | RXVECTOR |
| N\_REP | FORMAT is NGV | Not present | N | N |
| FORMAT is NON\_NGV\_10  | Indicates the number of repetitive transmissions of NON\_NGV\_10 PPDU. The allowed values are in the range 0 to 3. | Y | N |

*TGbd Editor: Please add the following sub-section to 32.2.5 (Support for NON\_NGV format).*

**32.2.5.x Repetition transmission of NON\_NGV\_10 PPDU**

NGV STA shall support NON\_NGV\_10 PPDU repetition transmission mode. When a PHY-TXSTART.request(TXVECTOR) primitive with the FORMAT parameter equal to NON\_NGV\_10 and N\_REP being non-zero, the NON\_NGV\_10 repetition transmission mode shall be used by the PHY layer.

In this mode, the NON\_NGV\_10 PPDU is transmitted 1+N\_REP times in sequence, where N\_REP is the number of repetition following the first transmission, and N\_REP is indicated through the TXVECTOR. The time separation between every two repeated transmissions is 32 s (SIFS time), as illustrated in Figure 32-X (Example of an NON\_NGV\_10 repetition transmission with N\_REP=2)

32 s

32 s

NON\_NGV\_10 PPDU

NON\_NGV\_10 PPDU

NON\_NGV\_10 PPDU

**Figure 32-X**. Example of NON\_NGV\_10 repetition transmission with N\_REP=2.

The NON\_NGV\_10 repetition transmission mode supports OCB broadcast service to both NGV STAs and NON-NGV STAs with improved packet reception success rate. An NGV STA can decide the number of repetition of NON\_NGV\_10 PPDU based on the channel busy ratio (CBR) and the presence of NON-NGV STAs. The exact procedure and parameterization are to be implemented in upper layers.

*TGbd Editor: Please made the following changes to Section 32.3.11(NGV transmit procedure).*

32.3.11 NGV transmit procedure

There are two paths for the transmit PHY procedure:

* The first path, for which typical transmit procedures are shown in Figure 33-x1 (PHY transmit procedure for NGV transmission), is selected if the FORMAT parameter of the PHY-TXSTART.request(TXVECTOR) primitive is NGV. These transmit procedures do not describe the operation of optional features, such as TBD.
* The second path is to follow the transmit procedure in Clause 17 (Orthogonal frequency division multiplexing (OFDM) PHY specification) if the FORMAT parameter of the PHY-TXSTART.request(TXVECTOR) primitive is NON\_NGV\_10 except that the signal referred to in Clause 17 (Orthogonal frequency division multiplexing (OFDM) PHY specification) is instead generated with the Duration/ID field to report transmitter is an NGV capable STA as defined in 33.xx.

In both paths, in order to transmit data, the MAC generates a PHY-TXSTART.request primitive, which causes the PHY entity to enter the transmit state. Further, the PHY is set to operate at the appropriate frequency through station management via TBD, as specified in 33.xx. Other transmit parameters, such as NGV-MCS Coding types and transmit power, are set via the PHY SAP using the PHY-TXSTART.request(TXVECTOR) primitive, as described in 33.x (TXVECTOR and RXVECTOR parameters).

In the second path, transmit parameter N\_REP is set via the PHY service interface using the PHY-TXSTART.request(TXVECTOR) primitive, as described in Table 33-1 (TXVECTOR and RXVECTOR parameters). If N\_REP is not zero, after the NON\_NGV\_10 PPDU transmission, the same PPDU is repeated N\_REP times, with each repetition being 32us (SIFS) after the previous NON\_NGV\_10 PPDU transmission.

The remainder of the clause applies to the first path.

*TGbd Editor: Please make the following changes to Section to 32.3.12 (NGV receive procedure).*

**32.3.12 NGV receive procedure**

A typical PHY receive procedure is shown in Figure 32-14 (PHY receive procedure for NGV transmission) for NGV format. A typical state machine implementation of the receive PHY is given in Figure 32-15 (PHY receive state machine (TBD)). This receive procedure and state machine do not describe the operation of optional features, such as TBD. If the detected format indicates a NON\_NGV\_10 PPDU, two paths can be taken:

* If combined detection of NON\_NGV\_10 PPDU with repetition is not considered, refer to the receive procedure and state machine in Clause 17 (Orthogonal frequency division multiplexing (OFDM) PHY specification).
* Else the receiver checks whether the currently received PPDU is qualified as a repetition of previously received NON\_NGV\_10 PPDU. The repetition may be determined by checking whether the gap between the time of arrival of currently detected PPDU and the ending time of the previously received NON\_NGV\_10 PPDU is 32 s (SIFS) or not. Other repetition detection techniques may be exploited to improve the detection reliability.
	+ If the current reception is not a repetition, refer to the receive procedure and state machine in Clause 17 (Orthogonal frequency division multiplexing (OFDM) PHY specification) to decode the PPDU, and overwrite the memeory with current PPDU for potential combining with next repetition.
	+ Else, the receiver combines the currently received PPDU with the previously stored NON\_NGV\_10 PPDU symbol-by-symbol and decode the combined PPDU according to the receive procedure and state machine in Clause 17 (Orthogonal frequency division multiplexing (OFDM) PHY specification). Update the memeory with combined PPDU for potential reception of more repetitions.

Further, through station management (via the PLME) the PHY is set to the appropriate frequency, as specified in 32.4 (NGV PLME). Receive parameters, such as RSSI and indicated DATARATE, may be accessed via the PHY SAP.