IEEE P802.11
Wireless LANs

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| Operation at 6GHz Band |
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Abstract

This submission proposes the operation at 6GHz band:

* TXOP protection and available channel polling.
* TXOP bandwidth.

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 TGax Draft. This introduction is not part of the adopted material. The text under the discussion is not part of the adopted material.

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

***TGax Editor: Editing instructions preceded by “TGax Editor” are instructions to the TGax editor to modify existing material in the TGax draft. As a result of adopting the changes, the TGax editor will execute the instructions rather than copy them to the TGax Draft.***

Discussion 1:

In 2.4/5 GHz band, an HT AP can disallow low MCS for improving throughput of multiple BSSs in enterprise WLAN. The STAs/AP in the HT BSS is required to follow the indication. In 2.4/5 GHz band, a VHT AP can disallow low MCS for improving throughput of multiple BSSs in enterprise WLAN. The STAs/AP in the VHT BSS is recommended to follow the indication. In 2.4/5 GHz band, an HE AP can disallow low MCS for improving throughput of multiple BSSs in enterprise WLAN. The STAs/AP in the HT BSS is required to follow the indication. In 6GHz band, the same requirement should be defined for AP/STAs. Given that HT Capability and HT Operation element are removed from Beacons in 6GHz band. Other method to carry disallowed low MCS should be defined. Option 1 is to carry the disallowed low data rate in HE Operation element. The MCS, NSS combination that is lower than the disallowed low data rate is not allowed in the BSS. Option 2 is do define the low MCS, NSS at 20/40 MHz transmission and low MCS, NSS at 80/160/80+80MHz transmission.

Discussion 2:

In 2.4/5GHz band, when a TXOP is not protected by non-HT duplicate PPDU, the BW of a frame exchange can not be wider than the BW of the PPDU from initiating STA of the immediate previous frame exchange. In 6GHz band, once the TXOP\_Duration is not UNSPECIFIED, the BW of the first frame exchange of a TXOP can be used for the frame exchanges in the TXOP.

**27.5.3 UL MU operation**

**27.5.3.5 UL MU CS mechanism**

***TGax editor: change the last four paragraphs in 27.5.3.5 as follows:***

An AP that transmits a Basic, BSRP, MU-BAR, BQRP or GCR MU-BAR Trigger frame shall set the CS Required subfield to 1 unless one of the following conditions is met:

* The RA of the Trigger frame is an individually addressed STA's MAC address and a QoS Data frame with Ack Policy set to HE TB PPDU (HTP) Ack and/or a Management frame that solicits an acknowledgement are aggregated with the Trigger frame in an A-MPDU, and the UL Length subfield(#11372) in the Common Info field of the Trigger frame is less than or equal to 418.
* The Trigger frame is either an MU-BAR or GCR MU-BAR Trigger frame and the UL Length subfield(#11372) in the Common Info field of the Trigger frame is less than or equal to 418.
* The UL Length subfield in the Common Info field of the Trigger frame is less than or equal to 76.(#11327)
* The frame exchange solicited by a Basic, BSRP, MU-BAR, BQRP or GCR MU-BAR Triffer frame is protected by the preceding non-HT duplicated PPDU in the TXOP
* In 6GHz band, the frame exchange solicited by a Basic, BSRP, MU-BAR, BQRP or GCR MU-BAR Triffer frame is protected by HE SIG-A’s Duration field with value not equal to UNSPECIFIED of the preceding HE PPDU in the TXOP.

NOTE 1—The threshold value 418 of the UL Length subfield(#11372) in the Common Info field of the Trigger frame is obtained from the maximum HE TB PPDU duration, 584 s, that can be solicited by the TRS Control subfield(#13136)(#14137) based on Equation (28-16). This duration is the sum of 20 s for the L-STF, L-LTF and L-SIG fields, 20 s for the RL-SIG, HE-SIG-A and HE-STF fields, 16 s for the 4x HE-LTF field with 3.2 s GI, 512 s for 32 OFDM symbols in the Data field with 3.2 s GI, and 16 s PE field (see 9.2.4.6a.1 (TRS Control), 27.5.3.3 (STA behavior for UL MU operation), and 28.3.4 (HE PPDU formats)).

NOTE 2—The Length 76 is acquired from the duration of 128 s which is acquired from the HE TB PPDU with 4 HE-LTFs and PE.

An AP may transmit an NFRP Trigger frame with the CS Required subfield set to 0 or 1.(#11327)

* Setting TXVECTOR parameters for an HE PPDU

**27.11.5 TXOP\_DURATION**

***TGax editor: Add the following paragraph at the end of 27.1.5:***

In 6 GHz, in order to avoid the spurious EIFS, a TXOP holder that transmits an HE PPDU as the final transmission in a TXOP should not set the TXVECTOR parameter TXOP\_DURATION of the HE PPDU to UNSPECIFIED.

**9.4.2.238 HE Operation element**

***TGax editor: Add one bit Disabled Low MCS NSS Present subfield in HE Operation Parameters field***

***TGax editor: Add one byte optional Disabled Low MCS NSS field at the end of HE Operation element***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | B0            B1 | B2              B3 | B4          B5 | B6                   B7 |
|  | 20/40MHz Disabled Low MCS | 20/40MHz Disabled Low NSS | 80/160/80+80MHz Disabled Low MCS | 80/160/80+80MHz Disabled Low NSS |
| Bits: | 2 | 2 | 2 | 2 |

***TGax editor: Add the following text at the end of 9.4.2.238***

The Disabled Low MCS NSS Present subfield is set to 1 to indicate that the Disabled Low MCS NSS field is present in the HE Operation element and set to 0 otherwise. The field is set to 0 if the HE Operation element is transmitted in a band other than 6GHz.

The Disable Low MCS NSS field if presented in HE Operation element inticates the disabled low MCS, NSS as defined in subclause 27.15.4.3 **Additional rate selection constraints for HE PPDUs**.

**27.15.4.3 Additional rate selection constraints for HE PPDUs**

***TGax editor: Add the following text at the end of 27.15.4.3***

If a STA at 6GHz band transmits the Disabled Low MCS NSS fields or receives the the Disabled Low MCS NSS fields from its associated AP, the STA shall transmit a 20 MHz or 40 MHz HE PPDU with an <HE-MCS, NSS> tuple that satisfies the following requirement:

----the HE-MCS is not less than the value in 20/40MHz Disabled Low MCS subfield in the most recent transmitted or received Disabled Low MCS NSS field respectively

----the NSS is not less than or equal to 20/40MHz Disabled Low NSS subfield in the most recent transmitted or received Disabled Low MCS NSS field respectively.

If a STA at 6GHz band transmits the Disabled Low MCS NSS fields or receives the the Disabled Low MCS NSS fields from its associated AP, the STA shall transmit a 80 MHz, 160MHz or 80+80 MHz HE PPDU with an <HE-MCS, NSS> tuple that satisfies the following requirement:

----the HE-MCS is not less than the value in 80/160/80+80 MHz Disabled Low MCS subfield in the most recent transmitted or received Disabled Low MCS NSS field respectively

----the NSS is not less than or equal to 80/160/80+80 MHz Disabled Low NSS subfield in the most recent transmitted or received Disabled Low MCS NSS field respectively.

***TGax editor: Change the name of subclause 10.22.2.7 to “Multiple frame transmission in an EDCA TXOP in Band other than 6GHz”***

***TGax editor: Add a new subclause in clause 27:***

27.xx Multiple frame transmission in an EDCA TXOP in 6GHz band

A STA in 6GHz band shall follow the procedure defined in subclause 10.22.2.7 to do multiple frame transmission with the following exceptions.

If there is no non-HT duplicate frame in a TXOP, and a TXOP includes at least one HE PPDU whose TXOP field in HE-SIG-A is not set to UNSPECIFIED, the TXOP holder shall set the TXVECTOR parameter CH\_BANDWIDTH of a non-initial PPDU sent after the first HE PPDU whose TXOP field in HE-SIG-A is not set to UNSPECIFIED as follows:

— To be the same or narrower than the CH\_BANDWIDTH parameter in TXVECTOR of the first HE PPDU whose TXOP field in HE-SIG-A is not set to UNSPECIFIED in the same TXOP.

Additionally if the first HE PPDU whose TXOP field in HE-SIG-A is not set to UNSPECIFIED is a DL HE MU PPDU with preamble puncture, the TXOP holder shall use the 20MHz channels for the non-initial PPDU that are within the set of 20MHz channels where pre-HE modulated fields of the first HE PPDU whose TXOP field in HE-SIG-A is not set to UNSPECIFIED are located.

If there is neither frame exchange carried in a HE PPDU whose TXOP field in HE-SIG-A is not UNSPECIFIED nor non-HT duplicate frame exchange in a TXOP, the TXOP holder shall set the TXVECTOR parameter CH\_BANDWIDTH of a non-initial PPDU to be the same or narrower than the TXVECTOR parameter CH\_BANDWIDTH of the preceding PPDU that it has transmitted in the same TXOP, subject to the following constraints:

— If the preceding PPDU is a DL HE MU PPDU with preamble puncture, the TXOP holder shall set the TXVECTOR parameter CH\_BANDWIDTH of the non-initial PPDU to a value whose corresponding 20 MHz channels are within a set of 20 MHz channels where pre-HE modulated fields of the preceding PPDU are located.

— If the non-initial PPDU is a DL HE MU PPDU with preamble puncture, the TXOP holder shall set the TXVECTOR parameter RU\_ALLOCATION of the non-initial PPDU to a value whose corresponding RU is within a set of 20 MHz channels where pre-HE modulated fields of the preceding PPDU are located