IEEE P802.11
Wireless LANs

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| PDT PHY Reciver specification |
| Date: 2024-12-02 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Juan Fang | Intel |  |  | Juan.fang@intel.com |
| Eugene Baik | Qualcomm |  |  |  |
| YuHesien Chang | Mediatek |  |  |  |
| Shengquan Hu | Mediatek |  |  |  |
| Jianhan Liu | Mediatek |  |  |  |
| Bo Sun | Sanechips |  |  |  |
| Mahmoud Kamel | Interdigital |  |  |  |
| Youhan Kim | Qualcomm |  |  |  |
| Ross Jian Yu | Huawei |  |  |  |
| Yusuke Asai | NTT |  |  |  |
| You-wei Chen | Mediatek |  |  |  |
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# Revision information

The following is a summary of the important changes that occurred within each revision of this document:

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| **Revision** | **Major changes** |
| 0 | Initial revision |
| 1 | Update the MCS index for the new MCSs |
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# Introduction

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 TGbn Draft. The abstract, revision information, introduction, explanation of the proposed changes, and references sections are not part of the adopted material.

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

## Explanation of the proposed changes:

*The proposed changes to the 802.11 TGbn draft within this document are based on the following motions adopted by the TGbn task group.*

### Relevant passing motions:

[Motion #42, [1]]:

* Add the following modulation and code rate combinations as the new MCSs for 11bn:
	+ Modulations of {QPSK, 16QAM, 256QAM} with code rate R=2/3
	+ Modulation of 16QAM with code rate R=5/6

[Motion #76, [1]]:

* ELR PPDU only supports the following two modulation and coding schemes:
	+ BPSK with coding rate R=1/2
	+ QPSK with coding rate R=1/2

[Motion #181, [1]]:

* The first 16 entries of the 5 bit MCS table (MCS0 to MCS15) are identical to 11be

**[Motion #195, [2]:**

* **In the 5bit MCS table**
	+ MCS17 signals QPSK rate 2/3; MCS19 signals 16QAM rate 2/3;
	+ MCS20 signals 16QAM rate 5/6; MCS23 signals 256QAM rate 2/3

# Text to be adopted begins here:

***TGbn editor: Please add the following subclauses for Receiver Specification to the 802.11bn draft D0.1:***

# 38.3.21 Receiver Specification

# 38.3.21.1 General

For receiver minimum input sensitivity, adjacent channel rejection, nonadjacent channel rejection, receiver maximum input level, and CCA sensitivity requirements described in this subclause, the input levels are measured at the antenna connector and are referenced as the average power per receive antenna. The number of spatial streams under test shall be equal to the number of utilized transmitting STA physical antenna (output) ports and also equal to the number of utilized receiving STA antenna (input) ports. Each output port of the transmitting STA shall be connected through a cable to one input port of the receiving STA.

 NOTE—Additional test requirements and/or test methods may be needed to meet regulatory requirements.

The requirements on receiver minimum input sensitivity in 38.3.21.2 (Receiver minimum input sensitivity), adjacent channel rejection in 38.3.21.3 (Adjacent channel rejection) and nonadjacent channel rejection in 38.3.21.4 (Nonadjacent channel rejection) apply to PPDUs that meet all the following conditions:

* 0.8 µs GI is used.
* If the PPDU bandwidth is 20 MHz and the UHR-MCS is less than 10 or equal to 15, 17, 19, 20 or 23, then BCC is used. Otherwise, LDPC is used.
* The PPDU is a UHR MU PPDU without puncturing and a PPDU Type And Compression Mode field in U-SIG field is equal to 1.

# 38.3.21.2 Revier minimum input sensitivity

The PER shall be less than 10% for a PSDU with the rate-dependent input levels listed in Table 38-xx1 (Receiver minimum input level sensitivity) and Table 38-xx2. The PSDU length shall be 2048 octets for UHR-MCS 14, UHR-MCS 15, ELR-MCS0 or ELR-MCS1 or 4096 octets for all other modulations.

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| Table 38-xx1– Receiver minimum input level sensitivity |
| Modulation | Rate (*R*) | Minimum sensitivity (20 MHz PPDU) (dBm) | Minimum sensitivity (40 MHz PPDU) (dBm) | Minimum sensitivity (80 MHz PPDU) (dBm) | Minimum sensitivity (160 MHz PPDU) (dBm) | Minimum sensitivity (320 MHz PPDU) (dBm) |
|
| BPSK | 1/2 | –82 | –79 | –76 | –73 | –70 |
| QPSK | 1/2 | –79 | –76 | –73 | –70 | –67 |
| QPSK(UHR-MCS 17) | 2/3 | (TBD) | (TBD) | (TBD) | (TBD) | (TBD) |
| QPSK | 3/4 | –77 | –74 | –71 | –68 | –65 |
| 16-QAM | 1/2 | –74 | –71 | –68 | –65 | –62 |
| 16-QAM(UHR-MCS 19) | 2/3 | (TBD) | (TBD) | (TBD) | (TBD) | (TBD) |
| 16-QAM | 3/4 | –70 | –67 | –64 | –61 | –58 |
| 16-QAM(UHR-MCS 20) | 5/6 | (TBD) | (TBD) | (TBD) | (TBD) | (TBD) |
| 64-QAM | 2/3 | –66 | –63 | –60 | –57 | –54 |
| 64-QAM | 3/4 | –65 | –62 | –59 | –56 | –53 |
| 64-QAM | 5/6 | –64 | –61 | –58 | –55 | –52 |
| 256-QAM(UHR-MCS 23) | 2/3 | (TBD) | (TBD) | (TBD) | (TBD) | (TBD) |
| 256-QAM | 3/4 | –59 | –56 | –53 | –50 | –47 |
| 256-QAM | 5/6 | –57 | –54 | –51 | –48 | –45 |
| 1024-QAM | 3/4 | –54 | –51 | –48 | –45 | –42 |
| 1024-QAM | 5/6 | –52 | –49 | –46 | –43 | –40 |
| 4096-QAM | 3/4 | –49 | –46 | –43 | –40 | –37 |
| 4096-QAM | 5/6 | –46 | –43 | –40 | –37 | –34 |
| BPSK-DCM(UHR-MCS 15) | 1/2 | –82 | –79 | –76 | –73 | –70 |
| BPSK-DCM-DUP(UHR-MCS 14) | 1/2 | N/A | N/A | –78 | –75 | –72 |
| NOTE—N/A = not supported by the PPDU format. |

Table 38-xx2– Receiver minimum input level sensitivity for ELR

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| --- | --- | --- | --- |
| Modulation | Rate (*R*) | RU tone and Dup | Minimum sensitivity (20 MHz PPDU) (dBm) |
| BPSK | 1/2 | 52-tone RRU with four times duplication  | TBD |
| QPSK | 1/2 | 52-tone RRU with four times duplication | TBD |

# 36.3.21.3 Adjacent channel rejection

Adjacent channel rejection for *W* MHz (where *W* is 20, 40, 80, 160, or 320) shall be measured by setting the desired signal’s strength 3 dB above the rate-dependent sensitivity specified in Table 38-xx1 (Receiver minimum input level sensitivity) and raising the power of the interfering signal of *W* MHz bandwidth until 10% PER is caused for a PSDU length of 2048 octets for BPSK modulation with DCM or 4096 octets for all other modulations. The difference in power between the signals in the interfering channel and the desired channel is the corresponding adjacent channel rejection. The center frequency of the adjacent channel shall be placed *W* MHz away from the center frequency of the desired signal.

The interfering signal in the adjacent channel shall be a signal compliant with the UHR PHY, unsynchronized with the signal in the channel under test, and shall have a minimum duty cycle of 50%. The corresponding rejection shall be no less than specified in Table 38-xx3(Minimum required adjacent and nonadjacent channel rejection levels).

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| Table 38-xx3– Minimum required adjacent and nonadjacent channel rejection levels |
| Modulation | Rate (*R*) | Adjacent channel rejection (dB) | Nonadjacent channel rejection (dB) |
| 20/40/80/160/320 MHz channel | 20/40/80/160/320 MHz channel |
| BPSK | 1/2 | 16 | 32 |
| QPSK | 1/2 | 13 | 29 |
| QPSK(UHR-MCS 17) | 2/3 | (TBD) | (TBD) |
| QPSK | 3/4 | 11 | 27 |
| 16-QAM | 1/2 | 8 | 24 |
| 16-QAM(UHR-MCS 19) | 2/3 | (TBD) | (TBD) |
| 16-QAM | 3/4 | 4 | 20 |
| 16-QAM(UHR-MCS 20) | 5/6 | (TBD) | (TBD) |
| 64-QAM | 2/3 | 0 | 16 |
| 64-QAM | 3/4 | –1 | 15 |
| 64-QAM | 5/6 | –2 | 14 |
| 256-QAM(UHR-MCS 23) | 2/3 | (TBD) | (TBD) |
| 256-QAM | 3/4 | –7 | 9 |
| 256-QAM | 5/6 | –9 | 7 |
| 1024-QAM | 3/4 | –12 | 4 |
| 1024-QAM | 5/6 | –14 | 2 |
| 4096-QAM | 3/4 | –17 | –1  |
| 4096-QAM | 5/6 | –20  | –4  |
| BPSK-DCM(UHR-MCS 15) | 1/2 | 16 | 32 |
| BPSK-DCM-DUP(UHR-MCS14) | 1/2 | 16 | 32 |

Table 38-xx4– Minimum required adjacent and nonadjacent channel rejection levels for ELR MCS

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| --- | --- | --- | --- | --- |
| Modulation | Rate (*R*) | RU tone and Dup | Adjacent channel rejection (dB) | Nonadjacent channel rejection (dB) |
| 20MHz channel | 20MHz channel |
| BPSK | 1/2 | 52-tone RRU with four times duplication | (TBD) | (TBD) |
| QPSK | 1/2 | 52-tone RRU with four times duplication | (TBD) | (TBD) |

The measurement of adjacent channel rejection for 160 MHz and 320 MHz operation in regulatory domain is required only if such a frequency band plan is permitted in the regulatory domain.

**36.3.21.4 Nonadjacent channel rejection**

Nonadjacent channel rejection for *W* MHz channels (where *W* is 20, 40, 80, 160, or 320) shall be measured by setting the desired signal’s strength 3 dB above the rate-dependent sensitivity specified in Table 38-xx1 (Receiver minimum input level sensitivity), and raising the power of the interfering signal of *W* MHz bandwidth until a 10% PER occurs for a PSDU length of 2 048 octets for BPSK modulation with DCM or 4 096 octets for all other modulations. The difference in power between the signals in the interfering channel and the desired channel is the corresponding nonadjacent channel rejection. The nonadjacent channel rejection shall be met with any nonadjacent channels located at least 2*W* MHz away from the center frequency of the desired signal.

The interfering signal in the nonadjacent channel shall be a signal compliant with the UHR PHY, unsynchronized with the signal in the channel under test, and shall have a minimum duty cycle of 50%. The corresponding rejection shall be no less than specified in Table 38-xx3 (Minimum required adjacent and nonadjacent channel rejection levels).

The measurement of nonadjacent channel rejection for 160 MHz and 320 MHz operation in regulatory domain is required only if such a frequency band plan is permitted in the regulatory domain.

**36.3.21.5 Receiver maximum input level**

The receiver shall provide a maximum PER of 10% at a PSDU length of 2 048 octets for BPSK modulation with DCM or 4 096 octets for all other modulations, for a maximum input level of –30 dBm in the 5 GHz and 6 GHz bands and –20 dBm in the 2.4 GHz band, measured at each antenna for any baseband UHR modulation.

**36.3.21.6 CCA sensitivity**

**36.3.21.6.1 General**

The thresholds in this subclause are compared with the signal level at each receiving antenna.

**36.3.21.6.2 CCA sensitivity for operating classes requiring CCA-ED**

**36.3.21.6.3 CCA sensitivity for the primary 20 MHz channel**

**36.3.21.6.4 Per 20 MHz CCA sensitivity**

**References:**

1. **11-24-0171r26: 11-24-0171-26-00bn-tgbn-motions-list-part-1, Alfred Asterjadhi (Qualcomm Inc.)**
2. 11-25-0014r2: 11-25-0014-02-00bn-tgbn-motions-list-part-2, Alfred Asterjadhi (Qualcomm Inc.)