IEEE P802.11  
Wireless LANs

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| |  |  |  |  |  | | --- | --- | --- | --- | --- | | 1024QAM Comment Resolution | | | | | | Date: 2018-03-06 | | | | | | Author(s): | | | | | | Name | Affiliation | Address | Phone | email | | Ron Porat | Broadcom |  |  | [Ron.porat@broadcom.com](mailto:Ron.porat@broadcom.com) | |  |  |  |  |  | |  |  |  |  |  | |  |  |  |  |  | |  |  |  |  |  | |  |  |  |  |  | |  |  |  |  |  | |

Abstract

This submission proposes resolutions for comments:

13402, 13404, 13452, 13489, 13397

From the letter ballot of TGax D2.0.

Changes relative to D2.2

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.

***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.***

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| **CID** | **Commenter** | **Clause** | **Page/Line** | **Comment** | **Proposed Change** | **Resolution** |
| 13402 | Ron Porat | 28.3.7 | 388.64 | 1024QAM should be supported for RU less than 242 in order to maximize OFDMA Tput | Delete lines 64 and 65 | Revised  Editor: delete lines 10,11 in page 409 of D2.2 |
| 13404 | Ron Porat | 28.5 | 523.45 | 1024QAM should be supported for RU less than 242 in order to maximize OFDMA Tput | delete "HE-MCS 10 and 11 (1024-QAM) and add 1024QAM to all the relevant tables in this section are applicable only to RU sizes equal to or larger than 242 tones." | Revised.  Editor: Please make the changes shown in document 11-18-0359r2 |
| 13452 | Sigurd Schelstraete | 28.3.7 | 388.64 | Change "HE-MCSs with indices 10 and 11 (1024-QAM) are optionally applied to the Data field of an HE PPDU with RUs equal to or larger than 242-tone." to "Support for HE-MCSs with indices 10 and 11 (1024-QAM) is optional and can only be used for RUs equal to or larger than 242-tone" | See comment | Rejected  We propose to include support of 1024QAM for small RU. |
| 13489 | Sigurd Schelstraete | 28.3.11.9 | 462.39 | Change "1024-QAM is optional for SU and MU for RUs equal to or larger than 242 subcarriers." to "1024-QAM is optional for SU and MU and, when supported, can only be used for RUs equal to or larger than 242 subcarriers." | See comment | Revised  Editor delete the sentence in 486.52 in D2.2: “1024-QAM is optional for SU and MU for RUs equal to or larger than 242 subcarriers” |
| 13397 | Ron Porat | 28.3.11.5 | 455 | Mention here also that RU 26/52/106 dont support 1024 QAM | As in ncomment | Rejected  This document proposes support for 1024QAM over small RU |

Discussion

The current spec does not support transmission of 1024QAM over RU smaller than 242 even though this is possible without any changes to the spec.

However we find that supporting 1024QAM over small RU seems to be important for many scenarios e.g.:

1. 20MHz DL/UL OFDMA – currently the peak throughput of this mode is 25% lower than 20MHz SU and hence reduces the appeal of this mode
2. 40MHz DL/UL 4x106RU OFDMA (4 user OFDMA) - currently the peak throughput of this mode is 25% lower than 40MHz SU or 2 user OFDMA and hence reduces the appeal of this mode
3. 80MHz DL/UL 8x106RU OFDMA (8 user OFDMA) - currently the peak throughput of this mode is 25% lower than 80MHz SU or 4 user OFDMA and hence reduces the appeal of this mode

We therefore propose to simply remove this artificial limitation in the spec and the missing rates to the tables of 26/52/106RU.

Editor: Changes for comments 13404:

Please make the following change on page 548 lines 45,46:

Support for HE-MCS 8, 9, 10, and 11 ~~(when valid)~~ is optional in all cases. ~~HE-MCS 10 and 11 (1024-QAM) are applicable only to RU sizes equal to or larger than 242 tones.~~

Please add lines for MCS10 and MCS11 in tables 28-51 thru 28-74 (24 tables in total, 8 for 26RU, 8 for 52RU, 8 for 106RU) as follows:

DCM column for all tables: N/A (for both MCS10 and MCS11)

Modulation column for all tables: 1024-QAM (for both MCS10 and MCS11)

R column for all tables: 3/4 for MCS10 line. 5/6 for MCS11 line

***NBPSCS*** for all tables: 10 (for both MCS10 and MCS11)

***NSD*** for each table: same as the Nsd for MCS9 in that table (for both MCS10 and MCS11)

TGax Editor: The following table provides the values for the 5 rightmost columns of each table

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| table 28-xx | Ncbps | Ndbps | 0.8 uS | 1.6uS | 3.2uS |
| 51 | 240 | 180 | 13.2 | 12.5 | 11.3 |
| 51 | 240 | 200 | 14.7 | 13.9 | 12.5 |
| 52 | 480 | 360 | 26.5 | 25 | 22.5 |
| 52 | 480 | 400 | 29.4 | 27.8 | 25 |
| 53 | 720 | 540 | 39.7 | 37.5 | 33.8 |
| 53 | 720 | 600 | 44.1 | 41.7 | 37.5 |
| 54 | 960 | 720 | 52.9 | 50 | 45 |
| 54 | 960 | 800 | 58.8 | 55.6 | 50 |
| 55 | 1200 | 900 | 66.2 | 62.5 | 56.3 |
| 55 | 1200 | 1000 | 73.5 | 69.4 | 62.5 |
| 56 | 1440 | 1080 | 79.4 | 75 | 67.5 |
| 56 | 1440 | 1200 | 88.2 | 83.3 | 75 |
| 57 | 1680 | 1260 | 92.6 | 87.5 | 78.8 |
| 57 | 1680 | 1400 | 102.9 | 97.2 | 87.5 |
| 58 | 1920 | 1440 | 105.9 | 100 | 90 |
| 58 | 1920 | 1600 | 117.6 | 111.1 | 100 |
| 59 | 480 | 360 | 26.5 | 25 | 22.5 |
| 59 | 480 | 400 | 29.4 | 27.8 | 25 |
| 60 | 960 | 720 | 52.9 | 50 | 45 |
| 60 | 960 | 800 | 58.8 | 55.6 | 50 |
| 61 | 1440 | 1080 | 79.4 | 75 | 67.5 |
| 61 | 1440 | 1200 | 88.2 | 83.3 | 75 |
| 62 | 1920 | 1440 | 105.9 | 100 | 90 |
| 62 | 1920 | 1600 | 117.6 | 111.1 | 100 |
| 63 | 2400 | 1800 | 132.4 | 125 | 112.5 |
| 63 | 2400 | 2000 | 147.1 | 138.9 | 125 |
| 64 | 2880 | 2160 | 158.8 | 150 | 135 |
| 64 | 2880 | 2400 | 176.5 | 166.7 | 150 |
| 65 | 3360 | 2520 | 185.3 | 175 | 157.5 |
| 65 | 3360 | 2800 | 205.9 | 194.4 | 175 |
| 66 | 3840 | 2880 | 211.8 | 200 | 180 |
| 66 | 3840 | 3200 | 235.3 | 222.2 | 200 |
| 67 | 1020 | 765 | 56.3 | 53.1 | 47.8 |
| 67 | 1020 | 850 | 62.5 | 59 | 53.1 |
| 68 | 2040 | 1530 | 112.5 | 106.3 | 95.6 |
| 68 | 2040 | 1700 | 125 | 118.1 | 106.3 |
| 69 | 3060 | 2295 | 168.8 | 159.4 | 143.4 |
| 69 | 3060 | 2550 | 187.5 | 177.1 | 159.4 |
| 70 | 4080 | 3060 | 225 | 212.5 | 191.3 |
| 70 | 4080 | 3400 | 250 | 236.1 | 212.5 |
| 71 | 5100 | 3825 | 281.3 | 265.6 | 239.1 |
| 71 | 5100 | 4250 | 312.5 | 295.1 | 265.6 |
| 72 | 6120 | 4590 | 337.5 | 318.8 | 286.9 |
| 72 | 6120 | 5100 | 375 | 354.2 | 318.8 |
| 73 | 7140 | 5355 | 393.8 | 371.9 | 334.7 |
| 73 | 7140 | 5950 | 437.5 | 413.2 | 371.9 |
| 74 | 8160 | 6120 | 450 | 425 | 382.5 |
| 74 | 8160 | 6800 | 500 | 472.2 | 425 |