IEEE P802.11
Wireless LANs

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| CIDs 24211, 24212 |
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Abstract

This submission proposes resolutions for CIDs 24211 and 24212.

R2: modified based on feedback

R3: further modifications based on feedback, changes relative to R2 indicated with change tracking

CID 166

# Introduction

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **Page/Line** | **Section** | **Comment** | **Proposed Change** | **Proposed Resolution** |
| 24211 | 730.03 | B.4.33.2 | Is this section supposed to be an exhaustive list of PHY features? If so, it would appear that a lot of (mainly optional) features are missing: DCM, Midamble, Spatial reuse, HE-LTF formats, GI, BF feedback formats, pilot formats, UL precorrection, ... | Add features if required | Revised – modify PICS Table as proposed in IEEE 802.11-20/1129r3 |
| 24212 | 730.38 | B.4.33.2 | Shouldn't HEP2.1, HEP2.2, HEP2.3 and HEP2.4 be mandatory? If not, why does the column "Support" offer the options Y, N, N/A? | Correct. Either Put "M" in column "Status" or leave column "Support" blank | Revised – modify PICS Table as in IEEE 802.11-20/1129r3 |

# Discussion and proposed resolutions

## CID 24212

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 24212 | 730.38 | B.4.33.2 | Shouldn't HEP2.1, HEP2.2, HEP2.3 and HEP2.4 be mandatory? If not, why does the column "Support" offer the options Y, N, N/A? | Correct. Either Put "M" in column "Status" or leave column "Support" blank | Revised – modify PICS Table as in 802.11/20-1129r3 |

**Discussion**

The PICS table should indicate whether the listed features are mandatory, optional, or conditional mandatory. This is currently not the case for the PPDU formats. See Figure 1.



Figure 1: PPDU features in PICS Table

Upon closer inspection, it’s not as simple as just assigning one of the categories (“O” or “M”) to the currently listed PPDU features. Support of some PPDU formats depends on whether the STA is an AP or non-AP STA. Also, within the MU PPDU format, certain types (e.g. pure OFDMA) are mandatory, while others are either optional (e.g. UL MU-MIMO) or conditional mandatory (e.g. DL MU-MIMO). Moreover, we need to distinguish between support for transmission and reception of these PPDU formats.

We propose to split up the PPDU feature into a number of sub-features to be able to capture these requirements.

**Resolution**

Proposed resolution: Revised.

Change the PICS entries related to HEP2 in Table in section B.4.33.2 (HE PHY features) as follows:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Item** | **Protocol Capability** | **References** | **Status** | **Support** |
| (…) |
| HEP2 | HE PPDU format |  |  |  |
| \*HEP2.1 | HE SU PPDU  | 27.1.4 (PPDU formats) | CFHE: M | Yes ☐ No ☐ N/A ☐ |
| \*HEP2.2 | HE ER SU PPDU  | 27.1.4 (PPDU formats) | CFHE: M | Yes ☐ No ☐ N/A ☐ |
| \*HEP2.3 | HE MU PPDU  | 27.1.4 (PPDU formats) |  |  |
| \*HEP2.3.1 | DL OFDMA Tx | 27.3.1.1 (MU transmission) | CFAP AND CFHE: M | Yes ☐ No ☐ N/A ☐ |
| \*HEP2.3.2 | DL OFDMA Rx | 27.3.1.1 (MU transmission) | CFSTAofAP AND CFHE: M | Yes ☐ No ☐ N/A ☐ |
| \*HEP2.3.3 | DL MU-MIMO Tx | 27.3.1.1 (MU transmission) | CFAP AND HEP9.1.10: M | Yes ☐ No ☐ N/A ☐ |
| \*HEP2.3.4 | DL MU-MIMO Rx | 27.3.1.1 (MU transmission) | CFSTAofAPAND CFHE: M | Yes ☐ No ☐ N/A ☐ |
| \*HEP2.3.5 | DL MU-MIMO within OFDMA Tx | 27.3.1.1 (MU transmission) | CFAP AND CFHE: O | Yes ☐ No ☐ N/A ☐ |
| \*HEP2.3.6 | DL MU-MIMO within OFDMA Rx | 27.3.1.1 (MU transmission) | CFSTAofAPAND CFHE: O | Yes ☐ No ☐ N/A ☐ |
| HEP2.3.7 | Rx full BW with a single userusing HE MUPPDU with compressedHE-SIG-B | 26.15.2 (PPDU format selection) | CFHE: O | Yes ☐ No ☐ N/A ☐ |
| HEP2.3.8 | Rx full BW with a single userusing HE MUPPDU with noncompressed HE-SIG-B | 26.15.2 (PPDU format selection) | CFHE: O | Yes ☐ No ☐ N/A ☐ |
|  |  |  |  |  |
| HEP2.4 | HE TB PPDU  | 27.1.4 (PPDU formats) |  |  |
| HEP2.4.1 | UL OFDMA Tx | 27.3.1.1 (MU transmission) | CFSTAofAPAND CFHE: M | Yes ☐ No ☐ N/A ☐ |
| HEP2.4.2 | UL OFDMA Rx | 27.3.1.1 (MU transmission) | CFAP AND CFHE: M | Yes ☐ No ☐ N/A ☐ |
| \*HEP2.4.3 | UL MU-MIMO Tx | 27.3.1.1 (MU transmission) | CFSTAofAPAND CFHE: O | Yes ☐ No ☐ N/A ☐ |
| \*HEP2.4.4 | UL MU-MIMO Rx | 27.3.1.1 (MU transmission) | CFAP AND CFHE: O | Yes ☐ No ☐ N/A ☐ |
| HEP2.4.5 | UL MU-MIMO within OFDMA Tx | 27.3.1.1 (MU transmission) | CFSTAofAPAND CFHE: O | Yes ☐ No ☐ N/A ☐ |
| HEP2.4.6 | UL MU-MIMO within OFDMA Rx | 27.3.1.1 (MU transmission) | CFAP AND CFHE: O | Yes ☐ No ☐ N/A ☐ |
| (…) |

## CID 24211

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 24211 | 730.03 | B.4.33.2 | Is this section supposed to be an exhaustive list of PHY features? If so, it would appear that a lot of (mainly optional) features are missing: DCM, Midamble, Spatial reuse, HE-LTF formats, GI, BF feedback formats, pilot formats, UL precorrection, ... | Add features if required | Revised – modify PICS Table as in 802.11/20-1129r3 |

**Discussion**

There is no reason optional features should be omitted from the PICS Table. To identify a list of missing options, I’ve taken the listed optional and mandatory features in 27.1.1 (Introduction to the HE PHY) and the options listed in the PHY HE Capabilities information field (9.4.2.248.3) as a guide and defined new PICS entries for those that were missing from the table. Note that some of these new entries refer to the new PICS entries defined above for the resolution of CID 24212.

**Resolution**

Proposed resolution: Revised.

Add the following entries to the Table in section B.4.33.2 (HE PHY features):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| HEP10 | HE-LTF formats | 27.3.11.10 (HE-LTF) |  |  |
| HEP10.1 | 2x HE-LTF and 0.8 μs GI | 27.3.11.10 (HE-LTF) | CFHE: M | Yes ☐ No ☐ N/A ☐ |
| HEP10.2 | 2x HE-LTF and 1.6 μs GI | 27.3.11.10 (HE-LTF) | CFHE: M | Yes ☐ No ☐ N/A ☐ |
| HEP10.3 | 4x HE-LTF and 3.2 μs GI | 27.3.11.10 (HE-LTF) | CFHE: M | Yes ☐ No ☐ N/A ☐ |
| HEP10.4 | 1x HE-LTF and 0.8 μs GI duration | 27.3.11.10 (HE-LTF) | HEP2.1 OR HEP2.2: O | Yes ☐ No ☐ N/A ☐ |
| HEP10.5 | 4x HE-LTF and 0.8 μs GI duration | 27.3.11.10 (HE-LTF) | HEP2.1 OR HEP2.2: OCFAP AND (HEP2.3.1 OR HEP2.3.3 OR HEP2.3.5): OCFSTAofAP AND (HEP2.3.2 OR HEP2.3.4 OR HEP2.3.6): O | Yes ☐ No ☐ N/A ☐ |
| HEP10.6 | 1x HE-LTF and 1.6 μs GI duration | 27.3.11.10 (HE-LTF) | HEP2.4.3 OR HEP2.4.4: M | Yes ☐ No ☐ N/A ☐ |
|  |  |  |  |  |
| HEP11 | DCM | 27.3.12.9 (Constellation mapping) | CFHE: O | Yes ☐ No ☐ N/A ☐ |
|  |  |  |  |  |
| HEP12 | Preamble puncturing | 27.2.2 (TXVECTOR and RXVECTOR parameters) | CFHE: O | Yes ☐ No ☐ N/A ☐ |
|  |  |  |  |  |
| HEP13 | Sounding |  |  |  |
| HEP13.1 | Punctured sounding operation | 26.7.2 (Sounding sequences and support) | CFHE: O | Yes ☐ No ☐ N/A ☐ |
| HEP13.2 | NDP With 4x HELTFand 3.2 μs GI | 27.3.17 (HE sounding NDP) | CFHE: O | Yes ☐ No ☐ N/A ☐ |
| HEP13.3 | Ng = 16 SU Feedback | 26.7.3 (Rules for HE sounding protocol sequences) | HEM6.3: O | Yes ☐ No ☐ N/A ☐ |
| HEP13.4 | Ng = 16 MU Feedback | 26.7.3 (Rules for HE sounding protocol sequences) | HEM6.6: O | Yes ☐ No ☐ N/A ☐ |
| HEP13.5 | Codebook Size (ϕ,ψ) = {4, 2} SUFeedback | 26.7.3 (Rules for HE sounding protocol sequences) | HEM6.3: O | Yes ☐ No ☐ N/A ☐ |
| HEP13.6 | Codebook Size (ϕ,ψ) = {7, 5} MUFeedback | 26.7.3 (Rules for HE sounding protocol sequences) | HEM6.6: O | Yes ☐ No ☐ N/A ☐ |
| HEP13.7 | Triggered SU BeamformingFeedback | 26.7.3 (Rules for HE sounding protocol sequences) | CFSTAofAP AND HEM6.3: OCFAP AND (HEM6.1 OR HEM6.2): O | Yes ☐ No ☐ N/A ☐ |
| HEP13.8 | Triggered MUBeamforming PartialBW Feedback | 26.7.3 (Rules for HE sounding protocol sequences) | CFSTAofAP AND HEM6.6: OCFAP AND (HEM6.4 OR HEM6.5): O | Yes ☐ No ☐ N/A ☐ |
| HEP13.9 | Triggered CQI Feedback | 26.7.3 (Rules for HE sounding protocol sequences) | CFSTAofAP AND HEM6.3: OCFAP AND (HEM6.1 OR HEM6.2): O | Yes ☐ No ☐ N/A ☐ |
| HEP13.10 | Non-Triggered CQIFeedback | 26.7.3 (Rules for HE sounding protocol sequences) | CFSTAofAP AND HEM6.3: OCFAP AND (HEM6.1 OR HEM6.2): O | Yes ☐ No ☐ N/A ☐ |
|  |  |  |  |  |
|  |  |  |  |  |
| HEP14 | Midambles | 27.3.12.16 (Midambles) | CFHE: O | Yes ☐ No ☐ N/A ☐ |
|  |  |  |  |  |
| HEP15 | HE-SIG-B | 27.3.11.8 (HE-SIG-B) |  |  |
| HEP15.1 | HE-MCSs 0 to 5 for HE-SIG-B | 27.3.11.8 (HE-SIG-B) | HEP2.3: M | Yes ☐ No ☐ N/A ☐ |
| HEP15.2 | Longer than 16 HE-SIG-B OFDM Symbols | 27.3.11.8 (HE-SIG-B) | HEP2.3: O | Yes ☐ No ☐ N/A ☐ |
|  |  |  |  |  |
| HEP16 | Spatial Reuse |  |  |  |
| HEP16.1 | PSR-based SR Support | 26.10.3 (PSR-based spatial reuse operation) | CFHE: O | Yes ☐ No ☐ N/A ☐ |
| HEP16.2 | OBSS PD-based spatial reuse operation | 26.10.2 (OBSS PD-based spatial reuse operation) | CFHE: O | Yes ☐ No ☐ N/A ☐ |