IEEE P802.11
Wireless LANs

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| Comment Resolutions on Section 26.3.10.12 Pilot subcarriers |
| Date: 2016-04-25 |
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Abstract

This document provides PHY resolutions for the following CIDs on Clause 26.3.10.12. The baseline for this comment resolution document is 802.11ax Draft 0.1.

* CIDs: 347, 531, 532, 533, 534, 535, 536, 850, 2093, 2094, 2095

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| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Clause Number** | **Page** | **Line** | **Comment** | **Proposed Change** | **Resolution** |
| 347 | 26.3.10.12 |  |  | IEEE PHY Motion #139,140 regarding 11ax pilot sequence were approved but no corresponding spec text is present in the draft | please add | Revised:A technical solution has been provided.Instruction to editor:Please modify the text according to the changes indicated under CID 347, 531-536, and 850. |
| 531 | 26.3.10.12 | 146 | 54 | The pilot sequence for 26-tone RU was approved but no corresponding text is present in the draft. | Define the pilot sequences for 26-tone RU based on the PHY Motion 139 [11-16/0235r7]. |
| 532 | 26.3.10.12 | 147 | 36 | The pilot sequence for 52-tone RU was approved but no corresponding text is present in the draft. | Define the pilot sequences for 52-tone RU based on the PHY Motion 139 [11-16/0235r7]. |
| 533 | 26.3.10.12 | 148 | 8 | The pilot sequence for 106-tone RU was approved but no corresponding text is present in the draft. | Define the pilot sequences for 106-tone RU based on the PHY Motion 139 [11-16/0235r7]. |
| 534 | 26.3.10.12 | 148 | 43 | The pilot sequence for 242-tone RU was approved but no corresponding text is present in the draft. | Define the pilot sequences for 242-tone RU based on the PHY Motion 139 [11-16/0235r7]. |
| 535 | 26.3.10.12 | 149 | 12 | The pilot sequence for 484-tone RU was approved but no corresponding text is present in the draft. | Define the pilot sequences for 484-tone RU based on the PHY Motion 139 [11-16/0235r7]. |
| 536 | 26.3.10.12 | 149 | 46 | The pilot sequence for 996-tone RU was approved but no corresponding text is present in the draft. | Define the pilot sequences for 996-tone RU based on the PHY Motion 139 [11-16/0235r7]. |
| 850 | 26.3.10.12 | 146 | 54 | The pilot sequences for RUs with 26, 52, 106, 242, 484 and 996 tones need to be defined. | Add description on pilot sequences for RUs with 26, 52, 106, 242, 484 and 996 tones. |
| 2093 | 26.3.10.12 | 146 | 17 | Clarify RU numbering | I don't think the RU numbering has been defined explicitly. We should agree on a numbering before refering to the "ith 26-tone RU". | Rejected: The RU indices have been defined in Tables 26-8, 26-9 and 26-10  |
| 2094 | 26.3.10.12 | 146 | 26 | Improve Table | This Table is hard to read and use (just try finding the pilot tones of the 54th RU for 160 MHz for instance). Some more structure in the Table would help. | Rejected: This Table and the following other tables in this section have clear one to one mapping from RU index to the corresponding pilot subcarrier index set, except for 160MHz, in which explicitly listing all the pilot indices in the Table(s) may not be a good option due to large amount of RUs in 160MHz. To the commenter: it says in section 26.3.7.3 (Pilot tones) that the pilot tone locations for 160 MHz or 80+80 MHz shall use the same 80 MHz locations for both 80 MHz. So for 160MHz, pilot subcarrier index set should be decided with 2 steps: First, check which 80MHz the interested RU belongs to and the corresponding RU index in that 80MHz; Second, look up the table in the 80MHz row for pilot index set. Then the final pilot index set is given in the 160MHz row in the Table: {pilot tone indices in 80 MHz -512} or {pilot tone indices in 80 MHz +512} depends on which 80MHz under consideratioon.  |
| 2095 | 26.3.10.12 | 149 | 29 | Only show values in Table 26-32, no need for background information | Delete "{pilot tone indices in 80 MHz -512, pilot tone indices in 80 MHz +512}:" | Revised: Keep "{pilot tone indices in 80 MHz -512, pilot tone indices in 80 MHz +512} and remove the indices values in Table 26-32 is to be consistent with other tables in this section.Instruction to editor:Please modify the text according to the changes indicated under CID 2095. |

**Red Lined Text Changes for the Proposed Resolutions:**

**Changes to D0.1 Related to CID 347, 531-536, and 850**

***Instructions for the Editor: please insert the following table right after Table 26-27 in section 26.3.10.12 at Line 24 Page 146:***

Table 26-x1 - Pilot values for 2 pilots in 26-tone RU transmission

|  |  |
| --- | --- |
| **Ψ**0 | **Ψ**1 |
| **1** | **-1** |

***Instructions for the Editor: please insert the following table right after Table 26-28 in section 26.3.10.12 at Line 8 Page 147:***

Table 26-x2 - Pilot values for 4 pilots in 52-tone and 106-tone RU transmission

|  |  |  |  |
| --- | --- | --- | --- |
| **Ψ**0 | **Ψ**1 | **Ψ**2 | **Ψ**3 |
| **1** | **1** | **1** | **-1** |

***Instructions for the Editor: please insert the following table right after Table 26-30 in section 26.3.10.12 at Line 18 Page 148:***

Table 26-x3 - Pilot values for 8 pilots in 242-tone RU transmission

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Ψ0** | **Ψ1** | **Ψ2** | **Ψ3** | **Ψ4** | **Ψ5** | **Ψ6** | **Ψ7** |
| **1** | **1** | **1** | **-1** | **-1** | **1** | **1** | **1** |

***Instructions for Editor: please remove the i-index in*** ***in Equation 26-101 in section 26.3.10.12 at Line 46 Page 146, and modify the sentence after the Equation to the following:***

Where  is defined in Table 26-x1 (Pilot values for 2 pilots in 26-tone RU transmission)

***Instructions for Editor: please remove the i-index in*** ***in Equation 26-102 in section 26.3.10.12 at Line 30 Page 147, and modify the sentence after the Equation to the following:***

Where  is defined in Table 26-x2 (Pilot values for 4 pilots in 52-tone and 106-tone RU transmission)

***Instructions for Editor: please remove the i-index in*** ***in Equation 26-103 in section 26.3.10.12 at Line 2 Page 148, and modify the sentence after the Equation to the following:***

Where  is defined in Table 26-x2 (Pilot values for 4 pilots in 52-tone and 106-tone RU transmission)

***Instructions for Editor: please remove the i-index in*** ***in Equation 26-104 in section 26.3.10.12 at Line 37 Page 148, and modify the sentence after the Equation to the following:***

Where  is defined in Table 26-x3 (Pilot values for 8 pilots in 242-tone RU transmission)

***Instructions for Editor: please modify the sentence in section 26.3.10.12 at Line 46 Page 148 as follows:***

For a 484-tone RU transmission, the pilot mapping for 8 pilots in 242-tone RU is replicated in the two 242-RUs of the 484-tone RU transmission. Specifically, ~~F~~for a user transmitting on the *i*-th 484-tone RU in a given PPDU BW, sixteen pilot tones shall be inserted in subcarriers $k\in K\_{R484\_{i}}$, ……

***Instructions for Editor: please remove the i-index in*** ***in Equation 26-105 in section 26.3.10.12 at Line 5 Page 149, and modify the sentence after the Equation to the following:***

Where  is defined in Table 26-x3 (Pilot values for 8 pilots in 242-tone RU transmission)

***Instructions for Editor: please modify the sentence in section 26.3.10.12 at Line 16 Page 149 as follows:***

For a 996-tone RU transmission, the pilot mapping for its 16 pilots is the same as the mapping for 484-tone RU transmission. Specifically, ~~F~~for a user transmitting on the *i*-th 996-tone RU in a given PPDU BW, sixteen pilot tones shall be inserted in subcarriers $k\in K\_{R996\_{i}}$,………

***Instructions for Editor: please remove the i-index in*** ***in Equation 26-106 in section 26.3.10.12 at Line 40 Page 149, and modify the sentence after the Equation to the following:***

Where  is defined in Table 26-x3 (Pilot values for 8 pilots in 242-tone RU transmission)

***Instructions for Editor: please modify the sentence in section 26.3.10.12 at Line 49 Page 149 as follows:***

For a 160 MHz transmission (equivalently two 996-tone RUs transmission), the 80 MHz (equivalently 996-tone RU) pilot mapping is replicated in the two 80 MHz subchannels of the 160 MHz transmission.

***Instructions for Editor: please remove the i-index in*** ***in Equation 26-107 in section 26.3.10.12 at Line 2 Page 150, and modify the sentence after the Equation to the following:***

Where  is defined in Table 26-x3 (Pilot values for 8 pilots in 242-tone RU transmission)

**Changes to D0.1 related to CID 2095**

***Instructions for the Editor: please make the following changes to Table 26-32 in section 26.3.10.12 at Line 30-31 on Page 149:***

Table 26‑32 - Pilot indices for 996-tone RU transmission

|  |  |
| --- | --- |
| **PPDU BW** | $$K\_{R996\_{i}}$$ |
| 20 MHz | N/A |
| 40 MHz | N/A |
| 80 MHz, i=1 | -468/-400/-334/-266/-226/-158/-92/-24/24/92/158/226/266/334/400/468 |
| 160 MHz, i=1:2 | {for i=1 pilot tone indices in 80 MHz -512, for i=2 pilot tone indices in 80 MHz +512}:~~-980/-912/-846/-778/-738/-670/-604/-536/-488/-420/-354/-286/-246/-178/-112/-44, 44/112/178/246/286/354/420/488/536/604/670/738/778/846/912/980~~ |

**References:**

1. **IEEE P802.11ax™/D0.1, March 2016**