IEEE P802.11  
Wireless LANs

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| CR for 6GHz | | | | |
| Date: 2018-03-01 | | | | |
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Abstract

This document provides CR for CIDs related to 6GHz:

12153, 11960, 12302, 12959, 12961, 13797, 13798

1. **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 TGax Draft. The introduction and the explanation of the proposed changes are 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.***

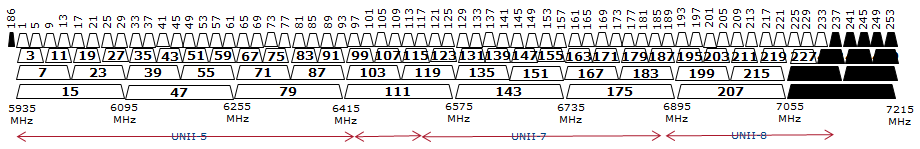
|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **Clause Number(C)** | **Page** | **Comment** | **Proposed Change** | **Resolution** |
| 12153 | 4.3.14a | 37.12 | Change 6GHz to 7.125GHz | as comment | Revised – resolved by CID12205 |
| 11960 | 1 | 4.12 | Update the introduction to match the updated PAR by raising the 6 GHz top end. |  | Revised – agree with the commenter. Make the changes as in doc 397r0. |
| 12302 |  |  | The PAR was recently modified to allow 11ax to operate in the 6-7GHz band. 11ax operation needs to be defined. | Include at least the channelization for 11ax operation in the 6GHz band. | Revised – agree with the commenter. Make the changes as in doc 397r0. |
| 12959 | Abstract | 2.01 | 11ax PAR covers up to 7.125GHz now. The Abstract should reflect this. | Replace "between 1 GHz and 6 GHz." with "between 1 GHz and 7.125 GHz." | Revised – agree with the commenter. Make the changes as in doc 397r0. |
| 12961 | Introduction | 4.12 | While not a part of 11ax D2.0, the Introduction should reflect the fact that 11ax PAR covers up to 7.125GHz now. | Replace "between 1 GHz and 6 GHz." with "between 1 GHz and 7.125 GHz." | Revised – agree with the commenter. Make the changes as in doc 397r0. |
| 13797 |  | 2.03 | "Abstract: This amendment defines modifications to both the IEEE 802.11 physical layer (PHY) and the medium access control (MAC) sublayer for high efficiency operation in frequency bands between 1 GHz and 6 GHz."  6 GHz should be 7.125 GHz. | As in the comment. | Revised – agree with the commenter. Make the changes as in doc 397r0. |
| 13798 |  | 4.12 | "This amendment defines modifications to both the IEEE 802.11 physical layer (PHY) and the medium access control (MAC) sublayer for high efficiency operation in frequency bands between 1 GHz and 6 GHz."  6 GHz should be 7.125 GHz. | As in the comment. | Revised – agree with the commenter. Make the changes as in doc 397r0. |
| 13840 |  | 2.03 | As the 802.11ax PAR was amended to extend operating frequency beyond 6GHz, the sentence of "This amendment defines modifications to both the IEEE 802.11 physical layer (PHY) and the medium access control (MAC) sublayer for high efficiency operation in frequency bands between 1 GHz and 6 GHz" needs to be modified to reflect such change. | TBD | Revised – agree with the commenter. Make the changes as in doc 397r0. |

1. **Discussion**

The figure below shows the channelization proposed at 6GHz.

The starting frequency is therefore at 5940 instead of being on the 6GHz boundary, and the channel numbers can go up to 255.

This allows to define a single operating class for the entire new spectrum, from 5935 to 7125, with channel numbers that are not reused throughout the operating class.



1. **Proposed changes**

***11ax Editor: Modify Abstract as follows:***

**Abstract**: This amendment defines modifications to both the IEEE 802.11 physical layer (PHY) and the medium access control (MAC) sublayer for high efficiency operation in frequency bands between 1 GHz and 7.125 GHz. (#12959, #13797, #13840)

***11ax Editor: Modify Introduction as follows:***

**Introduction**

This amendment defines modifications to both the IEEE 802.11 physical layer (PHY) and the medium access control (MAC) sublayer for high efficiency operation in frequency bands between 1 GHz and 7.125 GHz. (#11960, #12961, #13798)

***11ax Editor: Modify 4.3.14a High efficiency (HE) STA as follows:***

* High efficiency (HE) STA

The IEEE 802.11 HE STA operates in frequency bands between 1 GHz and 7.125 GHz(#12205).

***11ax Editor: Modify Table 11-24 – VHT BSS bandwidth as follows:***

|  |  |  |  |
| --- | --- | --- | --- |
| * VHT (#6508)BSS bandwidth(11ac) | | | |
| HT Operation element STA Channel Width field | VHT Operation element Channel Width field | VHT Operation element Channel Center Frequency Segment 1 subfield (Ed)(M188) | (#6508)BSS bandwidth |
| 0 | 0 | 0 | 20 MHz |
| 1 | 0 | 0 | 40 MHz |
| 1 | 1 | 0 | 80 MHz |
| 1(M188) | 1 | CCFS1 > 0 and | CCFS1 - CCFS0 | = 8 and CCFS1 and CCFS0 have the same Channel starting frequency in Table E-4 | 160 MHz |
| 1(M188) | 1 | Either CCFS1 > 0 and | CCFS1 - CCFS0 | > 16 and CCFS1 and CCFS0 have the same Channel starting frequency in Table E-4  or CCFS1 > 0 and CCFS1 and CCFS0 have different Channel starting frequencies in Table E-4 | 80+80 MHz |
| 1 | 2 | 0 | 160 MHz  (deprecated)(M188) |
| 1 | 3 | CCFS1 > 0 and | CCFS1 - CCFS0 | > 16 | 80+80 MHz  (deprecated)(M188) |
| NOTE 1—CCFS0 represents the value of the Channel Center Frequency Segment 0 subfield.  NOTE 2—CCFS1 represents the value of the Channel Center Frequency Segment 1 subfield. | | | |

***11ax Editor: Modify Table 11-26 – Extended NSS channel width as follows:***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| * Extended NSS channel width(#7684) | | | | |
| HT Operation element STA Channel Width field | VHT Operation element Channel Width field | VHT Operation element CCFS1 field | HT Operation element CCFS2 field | Extended NSS channel width |
| 1 | 1 | 0 | CCFS2 > 0 and  |CCFS2 – CCFS0| = 8 and CCFS2 and CCFS0 have the same Channel starting frequency in Table E-4  (40 MHz apart) | 160 MHz |
| 1 | 1 | 0 | Either CCFS2 > 0 and  |CCFS2 - CCFS0| > 16 and CCFS2 and CCFS0 have the same Channel starting frequency in Table E-4  or CCFS2 > 0 and CCFS2 and CCFS0 have different Channel starting frequencies in Table E-4  (> 80 MHz apart) | 80+80 MHz |
| 1 | 1 | 0 | CCFS2 > 0 and  |CCFS2 – CCFS0| < 8 and CCFS2 and CCFS0 have the same Channel starting frequency in Table E-4  (< 40 MHz apart) | Reserved |
| 1 | 1 | 0 | CCFS2 > 0 and  8 < |CCFS2 – CCFS0| ≤ 16 and CCFS2 and CCFS0 have the same Channel starting frequency in Table E-4  (> 40 MHz and ≤ 80 MHz apart) | Reserved |
| NOTE 1—CCFS0 represents the value of the Channel Center Frequency Segment 0 subfield of the VHT Operation element.  NOTE 2—CCFS2 represents the value of the Channel Center Frequency Segment 2 subfield of the HT Operation element. | | | | |

***11ax Editor: Modify the paragraph starting by “An HE STA shall determin the channelization” in 27.16.1 Basic HE BSS functionality***

* Basic HE BSS functionality

An HE STA shall determine the channelization using the information in the Primary Channel field of the HT Operation element when operating in 2.4 GHz and the combination of the information in the Primary Channel field in the HT Operation element and the Channel Center Frequency Segment 0 and Channel Center Frequency Segment 1 subfields in the VHT Operation Information field in the VHT Operation element when operating in 5 GHz and in 6 GHz (see 21.3.14 (Channelization)).

***11ax Editor: Add a new subclause 28.3.22 Channel numbering***

* + 1. Channel numbering

28.3.22.1 General

The STA may operate in the 6 GHz band and/or 5 GHz band and/or 2.4 GHz band. The set of valid operating channel numbers by regulatory domain is defined in Annex E. Channel allocation in the 2.4 GHz band is defined in 19.3.15.2 (Channel allocation in the 2.4 GHz band). Channel allocation in the 5 GHz band is defined in 19.3.15.3 (Channel allocation in the 5 GHz band). Channel allocation in the 6 GHz band is defined in 28.3.22.2 (Channel allocation in the 6 GHz band).

28.3.22.2 Channel allocation in the 6 GHz band

Channel center frequencies are defined at every integer(#7374) multiple of 5 MHz above 5940 MHz. The relationship between center frequency and channel number is given in Equation (28-xxx).

 (28-xxx)

where

nch = 1, …, 253

Channel starting frequency is defined as 4.940 GHz.

***11ax Editor: Add the following lines in Tables E-4 in Annex E: (#12302)***

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| * Global operating classes | | | | | | |
| Operating class | Nonglobal operating class(es) | Channel starting frequency (GHz) | Channel spacing (MHz) | Channel set(#3054) | Channel center frequency index (11ac)(#3077) | Behavior limits set |
| 131 | — | 5.940 | 20 | — | 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 ,41, 45, 49, 53, 57, 61, 65, 69 ,73, 77, 81, 85, 89, 93, 97, 101, 105, 109, 113, 117, 121, 125, 129, 133, 137, 141, 145, 149, 153, 157, 161, 165, 169, 173, 177, 181, 185, 189, 193, 197, 201, 205, 209, 213, 217, 221, 225, 229, 233, 237, 241, 245, 249, 253 |  |
| 132 | — | 5.940 | 40 | — | 3, 11, 19, 27, 35, 43, 51, 59, 67, 75, 83, 91, 99, 107, 115, 123, 131, 139, 147, 155, 163, 171, 179, 187, 195, 203, 211, 219, 227, 235, 243, 251 |  |
| 133 | — | 5.940 | 80 | — | 7, 23, 39, 55, 71, 87, 103, 119, 135, 151, 167, 183, 199, 215, 231, 247 |  |
| 134 | — | 5.940 | 160 | — | 15, 47, 79, 111, 143, 175, 207, 239 |  |
| 135 | — | 5.940 | 80 | — | 7, 23, 39, 55, 71, 87, 103, 119, 135, 151, 167, 183, 199, 215, 231, 247 | 80+ |