IEEE P802.11
Wireless LANs

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| Extension of mmWave Operating Class |
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Abstract

This contribution proposes the addition of 64-71GHz as the extension to the US Operating Class 34 (60GHz mmWave band).

The discussion is in reference to Draft P802.11REVmc\_D6.0.

Proposed Changes:

1. Change p3379.13; Table D-1 - Regulatory requirement list: United States row Documents "...Sections 15.205, 15.209, and 15.247 and Subpart E,..." to "...Sections 15.205, 15.209, 15.247 and 15.255; and Subpart E,... "
2. Change p3389.25; Table E-1— Operating classes in the United States  Operating Class row 34 Channel Set value from "1,2,3,4" to "1,2,3,4,5,6"
3. Change p3398.28; Table E-4— Operating Classes Operating Class row 180 Channel Set value from "1,2,3,4" to "1,2,3,4,5,6"

**Discussion**:

On July 14, 2016, the FCC adopted (DOC-340301A1) new rules for wireless broadband operations in 7 GHz of unlicensed spectrum at 64-71 GHz. The new service rule and requirements are expected to be published in a few days under the same Part 15 provisions that allow operation in the currently authorized 57-64 GHz band. It is also expected that the details of ruling extend the technical requirements in section 15.255 to encompass the 57-71 GHz band.

Following figure illustrates the extension band and the channel sets.



**Context of the proposed changes**:

##### <<Unchanged sections omitted >>

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Regulatory references

* **External regulatory references**

This annex and Annex E provide information and specifications for operation in many regulatory domains.

WLANs implemented in accordance with this standard and the specifications and definitions referenced in it are subject to equipment certification and operating requirements established by regional and national -regulatory administrations. The specification establishes minimum technical requirements for interoperability, based upon established regulations at the time this standard was issued. These regional and national -regulations are subject to revision or may be superseded. Regulatory requirements that do not affect interoperability are not addressed in this standard. Implementers are referred to the regulatory sources in Table D-1 (Regulatory requirement list) for further information. Operation in countries within defined regulatory domains may be subject to additional or alternative national regulations.

The documents listed in Table D-1 (Regulatory requirement list) specify current regulatory requirements for various frequency bands and geographic areas at the time this standard was developed. They are provided for information only and are subject to change or revision at any time.

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| * **Regulatory requirement list(#1708)**
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| **Geographic area** | **Approval standards** | **Documents** | **Approval authority** |
| Canada(11af) | Minister of Industry | RSS-210 — Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment | Industry Canada |
| China | Ministry of Industry and Information Technology (MIIT) | Xin Bu Wu [2002] #353,Xin Bu Wu [2002] #277,Gong Xin Bu Wu Han [2012] #620(11ac) | MIIT |
| Europe | European Conference of Postal and Telecommunications (CEPT) -Administrations and its Electronic Communications Committee (ECC). Also, European Radiocommunications Office, European Telecommunications -Standards Institute (ETSI) | ECC DEC (04) 08, ETSI EN 300 328 [B13],ETSI EN 301 893,ETSI ES 202 663 [B15],ETSI EN 302 571 [B14], Clause 5 | CEPT |
| Japan | Ministry of Internal Affairs and Communications (MIC) | MIC Equipment -Ordinance (EO) for Regulating Radio Equipment Articles 7, 49.20, 49.21[[1]](#footnote-1) | MIC |
| United States | Federal Communications -Commission (FCC) | 47 CFR [B9], Part 15, Sections 15.205, 15.209, 15.247 and 15.255; and Subpart E, Sections 15.401–15.407, and Subpart H, Sections 15.701–15.716,(11af)Section 90.210, Sections 90.371–383, Sections 90.1201–90.1217,Sections 90.1301–90.1337, Section 95.639, Sections 95.1501–1511 | FCC |

##### <<Unchanged sections omitted >>

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Country elements and operating classes

* Country information and operating classes

WLANs implemented in accordance with this standard and the specifications and definitions referenced in it may be subject to equipment certification and operating requirements established by regional and national regulatory administrations. The specification establishes minimum technical requirements for interoperability, taking into consideration established regulations at the time this standard was issued. These regional and national regulations may be revised or may be superseded. Regulatory requirements that do not affect interoperability are not addressed in this standard. Implementers are referred to the regulatory sources in Table D-1 (Regulatory requirement list) and their successors for further information. Operation in countries within defined regulatory domains may be subject to additional or alternative national regulations.

The Country element (see 9.4.2.9 (Country element)) allows a STA to configure its PHY and MAC for operation when Operating Triplet field(11ac) is present. The Operating Triplet field(11ac) indicates both PHY and MAC configuration characteristics and operational characteristics. The First Channel Number field of subsequent Subband Triplet fields(11ac) is based on the dot11ChannelStartingFactor that is indicated by the Operating Class field.

The operating class is an index into a set of values for radio operation in a regulatory domain. The operating class tables also contain pointers to behaviors and signal detection limits in Annex D where further operational requirements may be found.

The channel starting frequency variable is a frequency, used together with an operating class number and a channel number, to calculate a channel center frequency. A (#7644)“—” in the Channel starting frequency column of the operating classes tables (Table E-1 (Operating classes in the United States) through Table E-5 (Operating classes in China))(#5830) indicates the channel starting frequency is not defined by the operating class and is derived from regulation.(#3053)

Channel spacing is the frequency difference between nonoverlapping adjacent channel center frequencies when using the maximum bandwidth of one frequency segment allowed for this operating class.(#3053)

The channel set is the list of integer channel numbers that are legal for a regulatory domain and class. A (#7644)“—” in the Channel set column of the operating classes tables (Table E-1 (Operating classes in the United States) through Table E-5 (Operating classes in China))(#5830) indicates either that the values in the channel center frequency index field apply for calculating channel center frequencies of this operating class, or where both the channel set field and the channel center frequency index field are (#7644)“—” indicates that the channel set is not defined by the operating class and is derived from regulation.(#3054)

The channel center frequency index is the set of integer channel numbers that correspond to frequency segments and that are allowed for the operating class.(11ac) A“—”(#7644)(Ed) in the Channel center frequency index column of the operating classes tables (Table E-1 (Operating classes in the United States) through Table E-5 (Operating classes in China))(#5830) indicates either that the values in the channel set field apply for calculating channel center frequencies of this operating class or, when(#5831) both the Channel set and the Channel center frequency index column of the operating classes tables (Table E-1 (Operating classes in the United States) through Table E-5 (Operating classes in China))(#5830) are “—”,(#7644)(#5831)(Ed) indicates that the channel center frequency index is not defined by the operating class and is derived from regulation.(#3077)

A behavior limits set is an enumerated list, each element of which points to a row in Table D-2 (Behavior limits) containing behavior limits in various regulatory domains.

Operating classes for operation in the United States are enumerated in Table E-1 (Operating classes in the United States).

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| * Operating classes in the United States
 |
| Operating class | Global operating class (see Table E-4 (Global operating classes))  | Channel starting frequency (GHz) | Channel spacing (MHz) | Channel set**(#3054)** | Channel center frequency index (11ac)**(#3077)** | Behavior limits set |
| 1 | 115 | 5 | 20 | 36, 40, 44, 48 | — |  |
| 2 | 118 | 5 | 20 | 52, 56, 60, 64 | — | DFS\_50\_100\_Behavior  |
| 3 | 124 | 5 | 20 | 149, 153, 157, 161 | — | NomadicBehavior |
| 4 | 121 | 5 | 20 | 100, 104, 108, 112, 116, 120, 124, 128, 132, 136, 140, 144(11ac) | — | DFS\_50\_100\_Behavior, UseEirpForVHTTxPowEnv(11ac) |
| 5 | 125 | 5 | 20 | 149, 153, 157, 161, 165 | — | LicenseExemptBehavior |
| 6 | 103 | 4.9375 | 5 | 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 | — |  |
| 7 | 103 | 4.9375 | 5 | 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 | — |  |
| 8 | 102 | 4.89 | 10 | 11, 13, 15, 17, 19 | — |  |
| 9 | 102 | 4.89 | 10 | 11, 13, 15, 17, 19 | — |  |
| 10 | 101 | 4.85 | 20 | 21, 25 | — |  |
| 11 | 101 | 4.85 | 20 | 21, 25 | — |  |
| 12  | 81 | 2.407 | 25 | 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11  | — | LicenseExemptBehavior |
| 13  | 94 | 3.000 | 20 | 133, 137 | — | CCA-EDBehavior |
| 14  | 95 | 3.000 | 10 | 132, 134, 136, 138 | — | CCA-EDBehavior |
| 15  | 96 | 3.0025 | 5 | 131, 132, 133, 134, 135, 136, 137, 138 | — | CCA-EDBehavior |
| 16[[2]](#footnote-2)  | —(#3079) | 5.0025 | 5 | 170–184 | — | ITS\_nonmobile\_operations, ITS\_mobile\_operations |
| 17a, [[3]](#footnote-3) | —(#3079) | 5 | 10 | 171–184 | — | ITS\_nonmobile\_operations, ITS\_mobile\_operations |
| 18a, b | —(#3079) | 5 | 20 | 172–183 | — | ITS\_nonmobile\_operations, ITS\_mobile\_operations |
| 19–21  | Reserved | Reserved | Reserved | Reserved | Reserved | Reserved |
| 22 | 116 | 5  | 40  | 36, 44 | — |  PrimaryChannelLowerBehavior |
| 23 | 119 | 5 | 40 | 52, 60 | — |  PrimaryChannelLowerBehavior |
| 24 | 122 | 5 | 40 | 100, 108, 116, 124, 132, 140(11ac) | — |  PrimaryChannelLowerBehavior, DFS\_50\_100\_Behavior, UseEirpForVHTTxPowEnv(11ac) |
| 25 | 126 | 5 | 40 | 149, 157 | — |  PrimaryChannelLowerBehavior |
| 26 | 126 | 5 | 40 | 149, 157 | — | LicenseExemptBehavior, PrimaryChannelLowerBehavior |
| 27 | 117 | 5  | 40  | 40, 48 | — |  PrimaryChannelUpperBehavior |
| 28 | 120 | 5 | 40 | 56, 64 | — |  PrimaryChannelUpperBehavior |
| 29 | 123 | 5 | 40 | 104, 112, 120, 128, 136, 144(11ac) | — | NomadicBehavior, PrimaryChannelUpperBehavior, DFS\_50\_100\_Behavior,UseEirpForVHTTxPowEnv(11ac)  |
| 30 | 127 | 5 | 40 | 153, 161 | — | NomadicBehavior, PrimaryChannelUpperBehavior |
| 31 | 127 | 5 | 40 | 153, 161 | — | LicenseExemptBehavior, PrimaryChannelUpperBehavior |
| 32 | 83 | 2.407 | 40 | 1–7 | — | LicenseExemptBehavior, PrimaryChannelLowerBehavior |
| 33 | 84 | 2.407 | 40 | 5–11 | — | LicenseExemptBehavior, PrimaryChannelUpperBehavior |
| 34(11ad) | 180 | 56.16 | 2160 | 1, 2, 3, 4, 5, 6 | — | — |
| 35–127 (11ac)  | Reserved | Reserved | Reserved | Reserved | Reserved | Reserved |
| 128(11ac) | 128 | 5 | 80 | — | 42, 58, 106, 122, 138, 155 | UseEirpForVHTTxPowEnv |
| 129(11ac) | 129 | 5 | 160 | — | 50, 114 | UseEirpForVHTTxPowEnv |
| 130(11ac) | 130 | 5 | 80 | — | 42, 58, 106, 122, 138, 155 | 80+,UseEirpForVHTTxPowEnv |
| 131–255 (11ac) | Reserved | Reserved | Reserved | Reserved | Reserved | Reserved |
| NOTE 1—The channel spacing for operating classes 22 to 33 specifies the maximum radio bandwidth of one frequency segment.(#3078) In these operating classes, the AP operating in a 20/40 MHz BSS, and the operating channel width for a non-AP STA is either 20 MHz or 40 MHz.(#3078)NOTE 2—The channel spacing for operating classes 128, 129, and 130 specifies the maximum radio bandwidth of one frequency segment.(#3078) |

##### <<Unchanged sections omitted >>

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| * 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** |
| 1–80 | —(#3079) | Reserved | Reserved | Reserved | — | Reserved |
| 81 | E-1-12, E-2-4, E-3-30,E-5-7(11ac) | 2.407 | 25 | 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13 | — |  |
| 82 | E-3-31 | 2.414 | 25 | 14 | — |  |
| 83 | E-1-32, E-2-11, E-3-56,E-5-8(11ac) | 2.407 | 40 | 1, 2, 3, 4, 5, 6, 7, 8, 9 | — | PrimaryChannelLowerBehavior |
| 84 | E-1-33,E-2-12, E-3-57,E-5-9(11ac) | 2.407 | 40 | 5, 6, 7, 8, 9, 10, 11, 12, 13 | — | PrimaryChannelUpperBehavior |
| 85(11af) | —(#3079) | — | 6, 7, 8 | — | — | GeoDB |
| 86(11af) | —(#3079) | — | 12, 14, 16 | — | — | GeoDB |
| 87(11af) | —(#3079) | — | 24, 28, 32 | — | — | GeoDB |
| 88-93 | —(#3079) | Reserved | Reserved | Reserved | Reserved | Reserved |
| 94 | E-1-13 | 3 | 20 | 133, 137 | — | CCA-EDBehavior |
| 95 | E-1-14 | 3 | 10 | 132, 134, 136, 138 | — | CCA-EDBehavior |
| 96 | E-1-15 | 3.0025 | 5 | 131, 132, 133, 134, 135, 136, 137, 138 | — | CCA-EDBehavior |
| 97–100 | —(#3079) | Reserved | Reserved | Reserved | Reserved | Reserved |
| 101 | E-1-10,11 | 4.85 | 20 | 21, 25 | — |  |
| 102 | E-1-8,9 | 4.89 | 10 | 11, 13, 15, 17, 19 | — |  |
| 103 | E-1-6,7 | 4.9375 | 5 | 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 | — |  |
| 104 | E-3-46,47,48,49,50 | 4 | 40 | 184, 192 | — | PrimaryChannelLowerBehavior |
| 105 | E-3-51,52,53,54,55 | 4 | 40 | 188, 196 | — | PrimaryChannelUpperBehavior |
| 106 | —(#3079) | 4 | 20 | 191, 195 | — |  |
| 107 | —(#3079) | 4 | 10 | 189, 191, 193, 195, 197 | — |  |
| 108 | —(#3079) | 4.0025 | 5 | 188, 189, 190, 191, 192, 193, 194, 195, 196, 197 | — |  |
| 109 | E-3-7,8,9,10,11 | 4 | 20 | 184, 188, 192, 196 | — |  |
| 110 | E-3-16,17,18,19,20 | 4 | 10 | 183, 184, 185, 186, 187, 188, 189 | — |  |
| 111 | E-3-25,26,27,28,29 | 4.0025 | 5 | 182, 183, 184, 185, 186, 187, 188, 189 | — |  |
| 112 | E-3-2,3,4,5,6 | 5 | 20 | 8, 12, 16 | — |  |
| 113 | E-3-12,13,14,15 | 5 | 10 | 7, 8, 9, 10, 11 | — |  |
| 114 | E-3-21,22,23,24 | 5.0025 | 5 | 6, 7, 8, 9, 10, 11 | — |  |
| 115 | E-1-1,E-2-1, E-3-1,E-5-1(11ac) | 5 | 20 | 36, 40, 44, 48 | — | UseEirpForVHTTxPowEnv (11ac)(#3305) |
| 116 | E-1-22, E-2-5, E-3-36,E-5-4(11ac) | 5 | 40 | 36, 44 | — | PrimaryChannelLowerBehavior, UseEirpForVHTTxPowEnv (11ac)(#3305) |
| 117 | E-1-27, E-2-8, E-3-41 | 5 | 40 | 40, 48 | — | PrimaryChannelUpperBehavior, UseEirpForVHTTxPowEnv (11ac)(#3305) |
| 118 | E-1-2, E-2-2, E-3-32,33,E-5-2(11ac) | 5 | 20 | 52, 56, 60, 64 | — |  DFS\_50\_100\_Behavior , UseEirpForVHTTxPowEnv (11ac)(#3305) |
| 119 | E-1-23, E-2-6, E-3-37,38,E-5-5(11ac) | 5 | 40 | 52, 60 | — | PrimaryChannelLowerBehavior, DFS\_50\_100\_Behavior, UseEirpForVHTTxPowEnv (11ac)(#3305) |
| 120 | E-1-28, E-2-9, E-3-42,43 | 5 | 40 | 56, 64 | — | PrimaryChannelUpperBehavior, DFS\_50\_100\_Behavior, UseEirpForVHTTxPowEnv (11ac)(#3305) |
| 121 | E-1-4, E-2-3, E-3-34,35,58 | 5 | 20 | 100, 104, 108, 112, 116, 120, 124, 128, 132, 136, 140 | — |  DFS\_50\_100\_Behavior, UseEirpForVHTTxPowEnv (11ac)(#3305) |
| 122 | E-1-24, E-2-7, E-3-39,40 | 5 | 40 | 100, 108, 116, 124, 132 | — | PrimaryChannelLowerBehavior, DFS\_50\_100\_Behavior, UseEirpForVHTTxPowEnv (11ac)(#3305) |
| 123 | E-1-29, E-2-10, E-3-44,45 | 5 | 40 | 104, 112, 120, 128, 136 | — | PrimaryChannelUpperBehavior, DFS\_50\_100\_Behavior, UseEirpForVHTTxPowEnv (11ac)(#3305) |
| 124 | E-1-3 | 5 | 20 | 149, 153, 157, 161 | — | NomadicBehavior, UseEirpForVHTTxPowEnv (11ac)(#3305) |
| 125 | E-1-5, E-2-17,E-5-3(11ac) | 5 | 20 | 149, 153, 157, 161, 165, 169 | — | LicenseExemptBehavior, UseEirpForVHTTxPowEnv (11ac)(#3305) |
| 126 | E-1-25,26,E-5-6(11ac) | 5 | 40 | 149, 157 | — | PrimaryChannelLowerBehavior, UseEirpForVHTTxPowEnv (11ac)(#3305) |
| 127 | E-1-30,31 | 5 | 40 | 153, 161 | — | PrimaryChannelUpperBehavior, UseEirpForVHTTxPowEnv (11ac)(#3305) |
| 128(11ac) | E-1-128,E-2-128,E-3-128E-5-128 | 5 | 80 | — | 42, 58, 106, 122, 138, 155 | UseEirpForVHTTxPowEnv |
| 129(11ac) | E-1-129,E-2-129,E-3-129E-5-129 | 5 | 160 | — | 50, 114 | UseEirpForVHTTxPowEnv |
| 130(11ac) | E-1-130,E-2-130,E-3-130E-5-130 | 5 | 80 | — | 42, 58, 106, 122, 138, 155 | 80+,UseEirpForVHTTxPowEnv |
| 131–179(11ac) | — | Reserved | Reserved | Reserved | Reserved | Reserved |
| 180(11ad) | E-1-34, E-2-18, E-3-59 | 56.16 | 2160 | 1, 2, 3, 4, 5, 6 | — | — |
| 181–191 | — | Reserved | Reserved | Reserved | — | Reserved |
| 192–254 | — | Vendor specific | Vendor specific | Vendor specific | — | Vendor specific |
| 255 | — | Reserved | Reserved | Reserved | — | Reserved |
| NOTE 1—The channel spacing for operating classes 116, 117, 119, 120, 122, 123, 126, and 127 specifies the maximum radio bandwidth of one frequency segment.(#3078) In these operating classes, the AP operates in a 20/40 MHz BSS, and the operating channel width for a non-AP STA is either 20 MHz or 40 MHz.(11ac)NOTE 2—The channel spacing for operating classes 128, 129, and 130 specifies the maximum radio bandwidth of one frequency segment.(#3078) |

##### <<Unchanged sections omitted >>

**Reference:**

[1] Draft P802.11REVmc\_D6.0.

[2] DOC-340301A1, FCC TAKES STEPS TO FACILITATE MOBILE BROADBAND AND NEXT GENERATION WIRELESS TECHNOLOGIES IN SPECTRUM ABOVE 24 GHZ, New rules will enable rapid development and deployment of next generation 5G technologies and services

1. [↑](#footnote-ref-1)
2. This operating class specifies a list of channels in the 5.9 GHz band. Current regulations may only permit a subset of these channels. [↑](#footnote-ref-2)
3. It is the responsibility of management layers outside the scope of this standard to ensure that channels in use at any location are nonoverlapping. [↑](#footnote-ref-3)