IEEE P802.11
Wireless LANs

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| LB 205 Comment Resolution for Clause 24 and Annex E sections |
| Date: 2015-01-12 |
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Abstract

This submission proposes resolutions for comments in Clause 24 and Annex E of TGah Draft 3.0 with the following CIDs:

 Clause 24 CIDs: 5096, 5396

Annex E CIDs: 5414, 5348, 5352, 5416, 5469, 5470, 5471

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 TGah Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGah Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

***TGah Editor: Editing instructions preceded by “TGah Editor” are instructions to the TGah editor to modify existing material in the TGah draft. As a result of adopting the changes, the TGah editor will execute the instructions rather than copy them to the TGah Draft.***

## Comment Resolutions for Clause 24 CIDs

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| --- | --- | --- | --- | --- | --- |
| **CID** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 5096 | 485.42 | 24.3.19 | Weakened CCA for STAs in an OBSS makes 11ah fragile in the wide variety of real world deployments. Consider two overlapping BSSs each comprising an AP and a client (for simplicity). The STAs in BSS1 are far apart, and hear each other at better-than-minimum-sensitivity. The STAs in BSS2 are very close together, and hear each other 30-40-50 dB above sensitivity. The STAs in BSS2 are closer to one STA in BSS1 but hear it just below the required OBSS CCA threshold (so STAs in BSS2 report CCA as Clear whatever any STA in BSS1 is doing). But the long range communications in BSS1 require OBSS STAs to be silent during their transmissions to achieve adequate SINR. This is one example, and we know from classic 802.11 that all kinds of deployments are possible and are indeed typical. And with mobile APs/BSSs, this deployment variability is redoubled. Fundamentally 11ah needs to "just work", and an arbitrary fixed BSS/OBSS-dependent CCA threshold does not achieve this goal. | Either 1) In the absence of information from an OBSS, give STAs in OBSSs the same level of CCA protection as STAs in this BSS (can keep the COLOR field, but as FYI only), or 2) give STAs in the victim OBSS control over the CCA thresholds used in this BSS, somewhat like the "40MHz Intolerant" bit (but preferably with an incentive to not over-claim a required CCA threshold). See also P477L11 and P479L10 where the "shall's" are overly constrained by a matching COLOR. | Reject.The additions of COLOR/ID and Uplink Indication logic do not desensitize primary channel packet detection CCA levels of STAs to OBSS transmissions, relative to BSS transmission levels.In 802.11a/b/g/n/ac, the philosophy has been for STAs to consider a channel busy if it detects transmissions above a CCA sensitivity level for that channel (which be be a function of primary/ secondary, channel bandwidth, etc).This comment deals with the specific case when neighboring BSSs have the same primary 2MHz channel. In Clause 24 text, detection sensitivity for each STA does not distinguish whether a packet came from within BSS or from OBSS. The new addition in 11ah of using the COLOR/ID in conjunction with Uplink Indication allows the STA to determine the source of the transmission (whether from AP or non-AP, from BSS or OBSS). This fills a loophole in 11n/11ac, where a channel could be declared idle when a detected transmission comes in BELOW the CCA threshold. Transmissions from within a STAs BSS should be deferred to regardless of level, if detected since this is an indication that the serving AP is busy either Rx’ing or Tx’ing.If the COLOR/ID and Uplink Indication indicate it is an OBSS transmission, then it is the same as the 11n/11ac behaviour where the channel is marked busy if the signal is above the CCA level. In this case, that level would be the primary channel start of packet level, which gives the same protection to intra-BSS and OBSS transmissions.  |
| 5396 |  | 24.3.16 | A base document IEEE P802.11mc D3.0 defines 22.3.18.5 Time of Departure accuracy which is important for the Timing measurement specified in 10.24.5 and 10.24.6. The timing measurement is the base function for ranging (location) and time synchronization (IEEE Std 1588 and IEEE Std 802.1AS) and is important for Sensor STAs.It is necessary to specify the Time of Departure accuracy in 24.3.16. | Insert subclause 24.3.16.5 (Time of Departure accuracy) based on the proposed changes shown in 11-13/1316r6 with modification of the value of TIME\_OF\_DEPARTURE\_ACCURACY\_TEST\_THRESH to "100ns for a CH\_BANDWIDTH parameter equal to CBW16, unspecified otherwise". | Revise.Accept in principle the proposal to include the Time of Departure Accuracy test threshold. However, revise the proposed resolution to “80ns for a CH\_BANDWIDTH parameter equal to CBW16, unspecified otherwise".In 11a/b/g/n/ac, the accuracy requirement is 80ns for all CH\_BANDWIDTH values, and does not scale with bandwidth. Likewise, since 16MHz is close to 20MHz, we should keep the requirement at 80ns rather than impose a different unique requirement of 100ns.Instructions to Editor: Please insert a new subclause 24.3.16.5 based on the contents of 11-13/1316r6, with the 100ns value changed to 80ns. See 11-15/0060r0 for detailed editing instructions. |

### Editing Instructions for CID 5396

*(Instruction to Editor) Insert a new subclause 24.3.16.5 as follows:*

### 24.3.16.5 Time of Departure accuracy

The Time of Departure accuracy test evaluates TIME\_OF\_DEPARTURE against aTxPHYTxStartRMS and aTxPHYTxStartRMS against TIME\_OF\_DEPARTURE\_ACCURACY\_TEST\_THRESH as defined in Annex T with the following test parameters:

* MULTICHANNEL\_SAMPLING\_RATE is:

1 × 106 (1+⎾ (fH - fL)/1 MHz⏋) sample/s, for a CH\_BANDWIDTH parameter equal to CBW1

2 × 106 (1+⎾ (fH - fL)/2 MHz⏋) sample/s, for a CH\_BANDWIDTH parameter equal to CBW2

4 × 106 (1+⎾ (fH - fL)/4 MHz⏋) sample/s, for a CH\_BANDWIDTH parameter equal to CBW4

8 × 106 (1+⎾ (fH - fL)/8 MHz⏋) sample/s, for a CH\_BANDWIDTH parameter equal to CBW8

16 × 106 (1+⎾ (fH - fL)/16 MHz⏋) sample/s, for a CH\_BANDWIDTH parameter equal to CBW16

where

fH is the nominal center frequency in Hz of the highest channel in the channel set

fL is the nominal center frequency in Hz of the lowest channel in the channel set, the channel set is the set of channels upon which frames providing measurements are transmitted.

⎾x⏋ is defined in 1.5 (Mathematical Usage).

* FIRST\_TRANSITION\_FIELD is STF.
* SECOND\_TRANSITION\_FIELD is LTF1.
* TRAINING\_FIELD is LTF1 windowed in a manner which should approximate the windowing described in 18.3.2.5 (Mathematical conventions in the signal descriptions) with TTR = 1000 ns.
* TIME\_OF\_DEPARTURE\_ACCURACY\_TEST\_THRESH is 80ns for a CH\_BANDWIDTH parameter equal to CBW16, and unspecified otherwise.

NOTE —The indicated windowing applies to the time of departure accuracy test equipment, and not the transmitter or receiver.

## Comment Resolutions for Annex E CIDs

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 5414 | 573.13 | 24.3.13 | Channel center frequency = Channel starting frequency + 0.5 [MHz] x ChannelCenterFrequencyIndex and the line that follows indicate that the ChannelCenterFrequencyIndex "are given by the operating class (Annex E)." The tables in Annex E do not provide this information. Channel center frequencies cannot be calculated. | Provide ChannelCenterFrequencyIndex for each entry in the appropriate table(s). | Revise.Agree that Channel Center Frequency Index is missing from Table E-4a.Instruction to Editor: Please see 11-15/0060r0 for re-write of Annex E. |
| 5348 | 573.19 | E.1 | Channel starting frequency unit is GHz not MHz | Replace "MHz" with "GHz" in third column. | Revise.Agree that MHz should be GHz.Instruction to Editor: Please see 11-15/0060r0 for re-write of Annex E. |
| 5352 | 572.58 | E.1 | It is never nice to start a subclause with a note. Not to mention that there is a missing instrcution to the editor for its insertion. | Add this note at the end of Table E-4 (as last row of the same table). | Revise.Agree to remove Note from beginning of subclauseInstruction to Editor: Please see 11-15/0060r0 for re-write of Annex E. |
| 5416 | 573.14 | E.1 | Column heading in Table E-4a for Channel starting frequency specifies the units in MHz, as does the formula that uses it, but the entries in the table are obviously shown in GHz. | All of the Channel starting frequncies in Table E-4a should be changed from the GHz value to the MHz value, e.g. 0.902 to 902, or change the units value in the table heading and change the formulas that refere to this value in MHz. | Revise.Agree that MHz should be GHz.Instruction to Editor: Please see 11-15/0060r0 for re-write of Annex E. |
| 5469 | 573.17 | E.1 | Undefined terms are used in column heads of table E-4a. An informative NOTE is not enough, reproduce normative definitions here. | Define CCA Level Classification and Types in E.1 definitions before Table E-1. | Revise.Agree to define CCA Level Classification in Annex E.Instruction to Editor: Please see 11-15/0060r0 for re-write of Annex E. |
| 5470 | 573.17 | E.1 | Table E-4a is missing a description/indication of operating channels within the class | Define an exhastive list of channels for each Operating Class | Revise.Agree to define list of channels via listing them by their Channel center frequency index offsets.Instruction to Editor: Please see 11-15/0060r0 for re-write of Annex E. |
| 5471 | 573.17 | E.1 | It is possible to reorganize Table E-4a so the independent variable is channel spacing, and the country code infers which channel starting frequencies are used in that regulatory domain for that bandwidth, rather that wastefully allocate 131-160 in the Global Table. Commenter will propose using Operating Class values between 60 and 80 for 11ah classes across all countries and Globally. | Use Classes below 80 for 11ah values, and do make corresponding entries in Tables E-1 through E-5. | Revise.Agree to reduce range of Global operating class values, by sharing Global operating class values for similar channelizations in different countries. Will differentiate country-specific channelizations within a Global operating class via the S1G Operating class parameter in Table E-4a. Instruction to Editor: Please see 11-15/0060r0 for re-write of Annex E. |

### Editing Instructions for CID 5414, 5348, 5352, 5416, 5469, 5470, 5471

*(Instruction to Editor) Replace the existing Annex E text with the text below:*

*

Country elements and operating classes

* Country information and operating classes

***Insert the rows (ignoring the header row) below for Operating classes <61> through <76>:***

|  |
| --- |
| * Global operating classes
 |
| Operating class | Nonglobal operating class(es) | Channel starting frequency (GHz) | Channel spacing (MHz) | Channel set | Channel center frequency index | Behavior limits set |
| 61 | E-4a 🡪9 | 0.755 | 1 |  | Reserved | Reserved |
| 62 | E-4a 🡪10 | 0.779 | 1 |  | Reserved | Reserved |
| 63 | E-4a 🡪11 | 0.779 | 2 |  | Reserved | Reserved |
| 64 | E-4a 🡪12 | 0.779 | 4 |  | Reserved | Reserved |
| 65 | E-4a 🡪13 | 0.779 | 8 |  | Reserved | Reserved |
| 66 | E-4a 🡪6, 17 | 0.863 | 1 |  | Reserved | Reserved |
| 67 | E-4a 🡪7, 19 | 0.863 | 2 |  | Reserved | Reserved |
| 68 | E-4a 🡪1, 18, 22, 26 | 0.902 | 1 |  | Reserved | Reserved |
| 69 | E-4a 🡪2, 20, 23, 27 | 0.902 | 2 |  | Reserved | Reserved |
| 70 | E-4a 🡪3, 21, 24, 28 | 0.902 | 4 |  | Reserved | Reserved |
| 71 | E-4a 🡪4, 25, 29 | 0.902 | 8 |  | Reserved | Reserved |
| 72 | E-4a 🡪5 | 0.902 | 16 |  | Reserved | Reserved |
| 73 | E-4a 🡪8 | 0.9165 | 1 |  | Reserved | Reserved |
| 74 | E-4a 🡪14 | 0.9175 | 1 |  | Reserved | Reserved |
| 75 | E-4a 🡪15 | 0.9175 | 2 |  | Reserved | Reserved |
| 76 | E-4a 🡪16 | 0.9175 | 4 |  | Reserved | Reserved |

***Insert the table below immediately after Table E-4 as follows:***

Definition of CCA Level Classification and required behavior for Type 1 and Type 2 channels is described in 24.3.17.5.4 and 24.3.17.5.5(#4172).

|  |  |
| --- | --- |
|  | * S1G Operating classes
 |
| S1G Operating class | Global operating Class (see Table E-4) | Channel starting frequency (GHz) | Channel spacing (MHz) | Channel center frequency index | CCA Level Classification | Behavior limits set |
| 1 (U.S.) | 68 | 0.902 | 1 | 1,3,37,39,41,43,45,47, 49,51 | Type 1 (902-904 MHz, 920-928 MHz) | Reserved |
| 5,7,9,11,13,15,17,19,21,23,25,27,29,31,33,35 | Type 2 (904-920 MHz) |
| 2 (U.S.) | 69 | 0.902 | 2 | 2,38,42, 46,50 | Type 1 (902-904 MHz, 920-928 MHz) | Reserved |
| 6,10,14,18,22,26,30,34 | Type 2 (904-920 MHz) |
| 3 (U.S.) | 79 | 0.902 | 4 | 40,48 | Type 1 (920-928 MHz) | Reserved |
| 8,16,24,32 | Type 2 (904-920 MHz) |
| 4 (U.S.) | 71 | 0.902 | 8 | 44 | Type 1 (920-928 MHz) | Reserved |
| 12, 28 | Type 2 (904-920 MHz) |
| 5 (U.S.) | 72 | 0.902 | 16 | 20 | Type 2 (904-920 MHz) | Reserved |
| 6 (Europe) | 66 | 0.863 | 1 | 1,3,5,7,9 | Type 1 (863-868 MHz) | Reserved |
| 7 (Europe) | 67 | 0.863 | 2 | 2,6 | Type 1 (863-868 MHz) | Reserved |
| 8 (Japan) | 73 | 0.9165 | 1 | 1,3,5,7,9,11,13,15,17,19,21 | Type 1 (916.5-927.5 MHz) | Reserved |
| 9 (China) | 61 | 0.755 | 1 | 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47 | Type 1 (755-779 MHz) | Reserved |
| 10 (China) | 62 | 0.779 | 1 | 1, 3, 5, 7, 9, 11, 13, 15 | Type 2 (779-787 MHz) | Reserved |
| 11 (China) | 63 | 0.779 | 2 | 2, 6, 10, 14 | Type 2 (779-787 MHz) | Reserved |
| 12 (China) | 64 | 0.779 | 4 | 4, 12 | Type 2 (779-787 MHz) | Reserved |
| 13 (China) | 65 | 0.779 | 8 | 8 | Type 2 (779-787 MHz) | Reserved |
| 14 (Korea) | 74 | 0.9175 | 1 | 1,3,5,7,9,11 | Type 1 (917.5-923.5 MHz) | Reserved |
| 15 (Korea) | 75 | 0.9175 | 2 | 2,6,10 | Type 1 (917.5-923.5 MHz) | Reserved |
| 16 (Korea) | 76 | 0.9175 | 4 | 8 | Type 1 (917.5-923.5 MHz) | Reserved |
| 17 (Singapore) | 66 | 0.863 | 1 | 7, 9, 11 | Type 1 (866-869 MHz) | Reserved |
| 18 (Singapore) | 68 | 0.902 | 1 | 37, 39, 41, 43, 45 | Type 1 (920-925 MHz) | Reserved |
| 19 (Singapore) | 67 | 0.863 | 2 | 10 | Type 1 (866-869 MHz) | Reserved |
| 20 (Singapore) | 69 | 0.902 | 2 | 38, 42 | Type 1 (920-925 MHz) | Reserved |
| 21 (Singapore) | 70 | 0.902 | 4 | 40 | Type 1 (920-925 MHz) | Reserved |
| 22 (Australia) | 68 | 0.902 | 1 | 27, 29, 31, 33, 35 | Type 1 (915-920 MHz) | Reserved |
| 37, 39, 41, 43, 45, 47, 49, 51 | Type 2 (920-928 MHz) |
| 23 (Australia) | 69 | 0.902 | 2 | 28, 32 | Type 1 (915-920 MHz) | Reserved |
| 38, 42, 46, 50 | Type 2 (920-928 MHz) |
| 24 (Australia) | 70 | 0.902 | 4 | 30 | Type 1 (915-920 MHz) | Reserved |
| 40, 48 | Type 2 (920-928 MHz) |
| 25 (Australia) | 71 | 0.902 | 8 | 44 | Type 2 (920-928 MHz) | Reserved |
| 26 (New Zealand) | 68 | 0.902 | 1 | 27, 29, 31, 33, 35, 37, 39, 41, 43 | Type 1 (915-924 MHz) | Reserved |
| 45, 47, 49, 51 | Type 2 (924-928 MHz) |
| 27 (New Zealand) | 69 | 0.902 | 2 | 28, 32, 36, 40 | Type 1 (915-924 MHz) | Reserved |
| 46, 50 | Type 2 (924-928 MHz) |
| 28 (New Zealand) | 70 | 0.902 | 4 | 30, 38 | Type 1 (915-924 MHz) | Reserved |
| 48 | Type 2 (924-928 MHz) |
| 29 (New Zealand) | 71 | 0.902 | 8 | 34 | Type 1 (915-924 MHz) | Reserved |