IEEE P802.11  
Wireless LANs

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| Proposed resolution to CID 401, 402, 408, 416, 423, 424, 427, 431, 436, 437, 404, 406, 407, 409, 410, 411, 418, 419, 422, 425, 426, and 428 in LB220 | | | | |
| Date: 2016-07-26 | | | | |
| Author(s): | | | | |
| Name | Company | Address | Phone | Email |
| Jiamin Chen | Huawei/HiSilicon |  |  | [Jiamin.chen@mail01.huawei.com](mailto:Jiamin.chen@mail01.huawei.com) |
|  |  |  |  |  |

Abstract

This document proposes resolutions to 21 CIDs on TGaj D2.0: 401, 402, 408, 416, 423, 424, 427, 431, 436, 437, 404, 406, 407, 409, 410, 411, 418, 419, 422, 425, 426, and 428.

**Revision History**

R0: Initial version.

R1: Fixed a number of typos.

**General comments:**

|  |  |  |  |  |  |  |  |
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| CID | Clause | Page | Line | Type | Comment | Proposed Change | Remark |
| 401 |  |  |  | G | Agree with the current version of IEEE 802.11aj. |  |  |

Proposed resolution: **Rejected.**

Thanks for the agreement to 11aj D2.0. But it is not a valid comment because there is no valid proposed change.

**Editorial comments:**

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| CID | Clause | Page | Line | Type | Comment | Proposed Change | Remark |
| 402 | 10.42.2.2 | 138 | 31 | E | Typo: ... on the encompassing 2.16 GHz achannel... | ... on the encompassing 2.16 GHz channel... |  |

Proposed resolution: **Accepted.**

Fix the typo: “... on the encompassing 2.16 GHz ~~a~~channel...”.

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| CID | Clause | Page | Line | Type | Comment | Proposed Change | Remark |
| 408 | E.1 | 284 | 22 | E | Incorrect table number in "See Table E-5 Global operating classes" | "see Table E-4 (Global operating classes)" |  |

Proposed resolution: **Accepted.**

Fix the typo as: "See Table E-4~~5~~ (Global operating classes)".

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| CID | Clause | Page | Line | Type | Comment | Proposed Change | Remark |
| 416 | 3.2 | 2 | 4 | E | "3.2 Definitions specific to IEEE 802.11". Here "IEEE 802.11" is changed to "IEEE Std 802.11" in REVmc D5.4. | Change "IEEE 802.11" to "IEEE Std 802.11". Do the same where applicable throughout the draft based on REVmc D5.4. |  |

Proposed resolution: **Accepted.**

Change the title of subclause 3.2 as follows:

“**3.2 Definitions specific to IEEE Std 802.11**”

Do the same change where applicable throughout the draft.

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| CID | Clause | Page | Line | Type | Comment | Proposed Change | Remark |
| 423 | 25.1.1 | 161 | 16 | E | The CDMG PHY supports two modulation methods control mode and SC mode. The OFDM mode is removed. | Change "The CDMG PHY supports three modulation methods:" to "The CDMG PHY supports two modulation methods:". |  |

Proposed resolution: **Accepted.**

Change the txt here as follows:

"The CDMG PHY supports two ~~three~~ modulation methods:…"

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| CID | Clause | Page | Line | Type | Comment | Proposed Change | Remark |
| 424 | 25.3.1 | 164 | 33 | E | "The CDMG STAs compliant with the physical layer defined in Clause 25 (China Directional Multi-Gigabit (CDMG) PHY specification) operate in the channels defined in Annex E and shall support at least channel number 2, 5 and 6." Here the corresponding description for DMG STA is changed in REVmc D5.4 based on REVmc comment resolution. | Change to "The CDMG PHY operates in the channels defined in Annex E and shall support at least channel number 2, 5 and 6." in accordance with REVmc D5.4. Do the same throughout the draft. |  |

Proposed resolution: **Accepted.**

Change the sentence as follows:

"The CDMG PHY~~STAs compliant with the physical layer defined in Clause 25 (China Directional Multi-Gigabit (CDMG) PHY specification)~~ operates in the channels defined in Annex E and shall support at least channel number 2, 5 and 6."

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| CID | Clause | Page | Line | Type | Comment | Proposed Change | Remark |
| 427 | Annex B | 267 | 10 | E | Insert abbreviations used in Annex B.4 such as "CDMG-M", etc. in Annex B.2.2, | Per comment. |  |

Proposed resolution: **Reserved.**

Insert the following abbreviations in Annex B.2.2:

**“B.2.2 General abbreviations for Item and Support columns**

CDMG-M China directional multi-gigabit (CDMG) medium access control (MAC) features

CDMG-P China directional multi-gigabit (CDMG) physical layer (PHY) features

45MG-M 45 GHz multi-gigabit (45MG) medium access control (MAC) features

45MG-P 45 GHz multi-gigabit (45MG) physical layer (PHY) features”

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| CID | Clause | Page | Line | Type | Comment | Proposed Change | Remark |
| 431 | 9.4.2.132 | 147 | 49 | E | Typo in "AllocationType" | There should be a space in the "AllocationType". Correct this typo throughout the SPEC. |  |

Proposed resolution: **Revised.**

There is no space in “AllocationType” when it indicates the name of the AllocationType subfield in the Allocation field in an Extended Schedule element. So there is a typo in “Allocation Type subfield” in TGaj D2.0. Change “Allocation Type subfield” to “AllocationType subfield” throughout the draft.

|  |  |  |  |  |  |  |  |
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| CID | Clause | Page | Line | Type | Comment | Proposed Change | Remark |
| 436 | 10.36.6.6.2a | 112 | 51 | E | Typo in " 10.36.6.6.1 (Introduction)2 " | Delete the number 2 |  |

Proposed resolution: **Accepted.**

Fix the typo as follows:

“ …The source and destination CDMG STAs shall follow the rules defined in 10.36.6.6.1 (Introduction)~~2~~ to establish a DMG protected period on its current operating channel.”

|  |  |  |  |  |  |  |  |
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| CID | Clause | Page | Line | Type | Comment | Proposed Change | Remark |
| 437 |  | 6 | 12 | E | Include prior chair in list | For completeness and inclusiveness, add Xiaoming Peng's name as a chair. Should read "Xiaoming Peng and Jiamin Chen, Chairs". Note that this is what we have done in the past when over the course of development of the document there have been multiple chairs, for example in 11mb and 11v |  |

Proposed resolution: **Accepted.**

According to the usual practice, add Xiaoming Peng as a chair at P6L12 as follows:

“The following were officers of Task Group aj:

**Xiaoming PENG** and **Jiamin CHEN**, *Chairs*

**Haiming WANG**, *Vice-Chair*

**Jiamin CHEN**, *Technical Editor*

**Shiwen HE**, *Sub-Technical Editor”*

**Technical comments:**

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| CID | Clause | Page | Line | Type | Comment | Proposed Change | Remark |
| 404 | 9.4.2.1 | 41 | 42 | T | Table 9-76 shows number of Element ID Extension values as being assigned to P802.11aj. However, those do not seem to exist in the latest ANA database (11-11-0270-34). Were these properly assigned? If so, why is there no ANA database update showing that? | Either get ANA to update the database with matching Element ID Extension assignment or replace all the not-really-yet-assigned values in P802.11aj Table 9-76 with "<ANA>" to indicate that these need to be assigned by ANA. |  |

Proposed resolution: **Rejected**

Actually the values for the Element ID Extension in Table 9-76 were assigned by ANA authority after May meeting. The authority updated the ANA database in 11-11/0270r35 (URL: <https://mentor.ieee.org/802.11/dcn/11/11-11-0270-35-0000-ana-database.xls>). Anyway thanks the commenter for reminding.

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| CID | Clause | Page | Line | Type | Comment | Proposed Change | | Remark |
| 406 | 25.3.1 | 164 | 41 | T | The formula seems to have an error. According to the formula and the parameters in Annex E, the center frequencies of channel number 2,3,5,6,7, and 8 are calculated as 63.72, 65.88, 60.48, 61.56, 62.64, and 59.40 [GHz] respectively and they don't match with the figure in 11-16/0719r01. | For 2.16 GHz band, DMG specification (i.e. 20.3.1 Channelization) can be referred.  For 1.08 GHz band, suggest the following formula and parameters: Channel center frequency = Channel starting frequency + Channel spacing x (Channel number mod 32) where Channel starting frequency is 56.70 GHz, Channel spacing = 1080 MHz, and Channel numbers are {35,36,37,38} instead of {5,6,7,8} respectively. This re-numbering enables regular numbering, and also avoids conflict with 11ay channelization seen in 11-15-1358-04-00ay(11ay SFD). | |  |
| 407 | E.1 | 284 | 27 | T | The channel starting frequencies for operating class 10 and 11 may be incorrect. The channel starting frequencies and/or the formula in 25.3.1 (Channelization) should be corrected. | | As the same as CID 406 |  |

Proposed resolution: **Accepted.**

Change the starting frequency from “59.4 GHz” to “56.16 GHz” and “59.4 GHz” to “56.70” for Operating class 10 and 11 respectively.

Change the formula in clause 25.3.1 in 11aj is as follows:

“Channel center frequency = Channel starting frequency + Channel spacing × (Channel number mod 32~~4~~)”

Change Table E-5 in Annex E as follows:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| * Operating classes in China | | | | | | |
| Operating class | Global operating class (See Table E-4 Global operating classes) | Channel starting frequency  (GHz) | Channel  spacing  (MHz) | Channel  set | Channel  center  frequency  index | Behavior limits set |
| 10 | 180 | 56.16~~59.4~~ | 2160 | 2,3 | — | — |
| 11 |  | 56.70~~59.4~~ | 1080 | 35, 36, 37, 38 | — | — |
| 12 |  | 42.66 | 540 | 1,2,3,4,5,6,7,8 | — | LicenseExemptBehavior |
| 13 |  | 47.52 | 540 | 9,10 | — | LicenseExemptBehavior |
| 14 |  | 42.93 | 1080 | 11,12,13,14 | — | LicenseExemptBehavior |
| 15 |  | 47.79 | 1080 | 15 | — | LicenseExemptBehavior |
| <16>~127 | Reserved | Reserved | Reserved | Reserved | — | Reserved |
| ... | ... | ... | ... | ... | ... | ... |

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| CID | Clause | Page | Line | Type | Comment | Proposed Change | Remark |
| 409 |  |  |  | T | To ensure coexistence, 11aj should use the same BW mode and compatible preamble structure as 11ad when operating in bands where 11ad can also operate in. | To ensure coexistence, 11aj should use the same BW mode and compatible preamble structure as 11ad when operating in bands where 11ad can also operate in. |  |

Proposed resolution: **Rejected.**

802.11aj was formed as a platform for collaboration between 802.11 and China wireless personal area network (CWPAN) working group. According to the radio regulations in China, there are only two physical 2.16 GHz bandwidth unlicensed channels available in 60 GHz band. When developing Chinese 60GHz national standard, the China radio regulation committee pointed out that only two physical channels will generate serious co-channel interference for many scenarios. So the China wireless personal area network (CWPAN) working group suggested further splitting two 2.16 GHz channels into four 1.08 GHz channels. The benefits would include: providing up to 4 physical channels to avoid or mitigate inter-BSS interferences and improve spectrum efficiency; more suitable for low-power portable devices such as smart phone/watch because the instantaneous power requirement is lower for battery powered devices operating on a 1.08 GHz bandwidth channel. So there exist the need and benefits to have 11aj (60 GHz). A CDMG STA a DMG STA with additional features, which means it supports both 2.16 and 1.08 GHz bandwidth channels. When operating on a 2.16 GHz channel, it uses exactly the same PHY as DMG STAs. Also In order to improve backward compatibility with DMG STA, some new rules such as Dynamic Bandwidth Control and enhanced clustering mechanisms including transmitting DMG beacons and PPDU length information both on 1.08 and 2.16 GHz channels, etc. are defined in 11aj. Similar comments were discussed and resolved in document [11-16/0719r1](https://mentor.ieee.org/802.11/dcn/16/11-16-0719-01-00aj-proposed-resolution-to-cid-100-101-102-etc-in-lb217.docx) for reference.

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| CID | Clause | Page | Line | Type | Comment | Proposed Change | Remark |
| 410 |  |  |  | T | Insufficient comment resolution; e.g. "ACCEPTED. See details in the corresponding submission." does a) not specific the resolution text, i.e., the submission; and b) should be a revised if an additional submission is required | Provide a sufficient resolution for all comments of the previous ballot. A resolution has to allow a balloter to identify clearly the changes made to the draft in response to a specific comment. |  |
| 411 |  |  |  | T | Insufficient comment resolution does not detail the changes to the draft, e.g. "REVISED. See details in corresponding submission." does not specify the corresponding document nor does it specify the changes made to the draft | Provide a sufficient resolution for all comments of the previous ballot. A resolution has to allow a balloter to identify clearly the changes made to the draft in response to a specific comment. |  |

Proposed resolution: **Revised.**

The document number of the submission that contains the resolution to a comment is shown in the column “Submission” in the LB217 comments database 11-16/0193r4. As noted in the comment, in order to make the resolution more clear and easy to learn the changes made to the draft, the comments database 11-16/0193r4 for LB217 is updated to 11-16/0193r5. Thanks the commenter’s reminder.

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| CID | Clause | Page | Line | Type | Comment | Proposed Change | Remark |
| 418 |  | 47 | 11 | T | CDMG MCS index range should be 0 to 23 because OFDM mode is removed from 11aj. | Change "0-35" to "0-23". Fix the similar errors throughout the draft. |  |

Proposed resolution: **Accepted.**

The OFDM mode is removed from 11aj, so the CDMG MCS index range needs to be changed from "0-35" to "0-23".

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| CID | Clause | Page | Line | Type | Comment | Proposed Change | Remark |
| 419 | 9.4.2.175.2 | 47 | 29 | T | The value here are copy from 11ad spec and need to be updated based on Table 25-10 (CDMG SC mode modulation and coding scheme for SC). Ditto at P47L34. | Change "0-3" to "0-8". |  |

Proposed resolution: **Accepted.**

CDMG MCS 9 and below are mandatory for each Tx and Rx of in 11aj. So the values 0-8 of this subfield are reserved in the Maximum SC Rx CDMG MCS subfield. Change the txt at P47L29 as follows:

“The Maximum SC Rx CDMG MCS subfield contains the value of the maximum CDMG MCS index the CDMG STA supports for reception of single-carrier frames. Values 0-8~~3~~ of this subfield are reserved. Possible values for this subfield are shown in Table 25-10 (Modulation and coding scheme for SC).”

Do the same change at P47L34

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| CID | Clause | Page | Line | Type | Comment | Proposed Change | Remark |
| 422 | 10.7 | 87 | 47 | T | There is no multirate support for CDMG STAs. | Insert txt to enable multirate support for CDMG STAs. |  |

Proposed resolution: **Revised.**

In general, CDMG STAs follow the same rule regarding the multirate support defined for DMG STAs in 10.7 (Multirate support). While some parameters of CDMG STAs are different from those of DMG STAs in PHY layer, so some changes are necessary to support this feature for CDMG STAs. Change Table 10-6—Modulation classes as follows:

**10.7.9 Modulation classes**

***Insert the following rows at the end of Table 10-6:***

|  |  |  |  |
| --- | --- | --- | --- |
| * Modulation classes | | | |
| **Description of modulation** | **Condition that selects this modulation class** | | |
| **Clause 15 (DSSS PHY specification for the 2.4 GHz band designated for ISM applications) to Clause 18(Extended Rate PHY specification) PHYs or Clause 20 (Directional multi-gigabit (DMG) PHY specification) or Clause 25 (China Directional Multi-gigabit (CDMG) PHY specification) or Clause 26 (45 Multi-gigabit (45MG) PHY specification)** | **Clause 19 (High Throughput (HT)**  **PHY specification) PHY** | **Clause 21 (Very High**  **Throughput (VHT) PHY**  **specification) PHY** |
| … | … | … | … |
| CDMG Control | Clause 25 (China Directional multi-gigabit (CDMG) PHY specification) transmission and MCS is 0 | NA | NA |
| CDMG SC | Clause 25 (China Directional multi-gigabit (CDMG) PHY specification) transmission and 1 ≤ MCS ≤ 16 | NA | NA |
| CDMG Low-power SC | Clause 25 (China Directional multi-gigabit (CDMG) PHY specification) transmission and 17 ≤ MCS ≤ 23 | NA | NA |
| 45MG Control | Clause 26 (45 GHz Multiple Gigabit (45MG) PHY specification) transmission and MCS is 0. | NA | NA |
| 45MG SC | Clause 26 (45 GHz Multiple Gigabit (45MG) PHY specification) transmission and | NA | NA |
| 45MG OFDM | Clause 26 (45 GHz Multiple Gigabit (45MG) PHY specification) transmission and | NA | NA |

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| CID | Clause | Page | Line | Type | Comment | Proposed Change | Remark |
| 425 | 25.1.2 | 161 | 37 | T | "Depending on the CDMG MCSs, these STAs support a mixture of DMG SC mode, low-power SC mode, and DMG control mode." Copy and paste errors. Here "DMG" should be "CDMG". | Change to "Depending on the CDMG MCSs, these STAs support a mixture of CDMG SC mode, CDMG low-power SC mode, and CDMG control mode." Correct the similar error throughout the draft. |  |

Proposed resolution: **Accepted.**

Change the sentence as follows:

"Depending on the CDMG MCSs, these STAs support a mixture of CDMG SC mode, CDMG low-power SC mode, and CDMG control mode."

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| --- | --- | --- | --- | --- | --- | --- | --- |
| CID | Clause | Page | Line | Type | Comment | Proposed Change | Remark |
| 426 | 25.3.4 | 167 | 22 | T | Remove OFDM mode related parameters in the table because OFDM mode is removed from 11aj. | Remove OFDM mode related parameters in Table 25-4 (Timing-related parameters). Do the same throughout the draft. |  |

Proposed resolution: **Revised.**

Change Table 25-4 and delete Table 25-5 as follows:

|  |  |  |  |
| --- | --- | --- | --- |
| * Timing-related parameters | | | |
| **Parameter** | | **Value** | |
| *~~N~~~~SD~~*~~: Number of data subcarriers~~ | | ~~336~~ | |
| *~~N~~~~SP~~*~~: Number of pilot subcarriers~~ | | ~~16~~ | |
| *~~N~~~~DC~~*~~: Number of DC subcarriers~~ | | ~~3~~ | |
| *~~N~~~~ST~~*~~: Total Number of subcarriers~~ | | ~~355~~ | |
| *~~N~~~~SR~~*~~: Number of subcarriers occupying half of the overall BW~~ | | ~~177~~ | |
| *NGI*: | | 64 | |
| *NSPB*: | | 448 | |
| *~~Δ~~~~F~~*~~: subcarrier frequency spacing~~ | | ~~2.5781 MHz (1320 MHz/512)~~ | |
| *Fs*: OFDM sample rate | | 1320 MHz | |
| *Fc*: SC chip rate | | 880 MHz = ⅔ *Fs* | |
| *Ts*: OFDM Sample Time | | 0.76ns=1/*Fs* | |
| *Tc*: SC Chip Time | | 1.14ns=1/*Fc* | |
| *~~T~~~~DFT~~*~~: IDFT/DFT period~~ | | ~~0.388 µs~~ | |
| *TGI*: guard interval duration | | 97 ns= *TDFT*/4 | |
| *Tseq* | | 14.6 ns=128×*Tc* | |
| *TSTF*: Detection sequence duration | | 3054.5 ns=21× *Tseq* | |
| *TCE*: Channel Estimation sequence duration | | 1309.1 ns=9×*Tseq* | |
| *~~T~~~~SYM~~*~~: Symbol Interval~~ | | ~~0.485µs=~~ *~~T~~~~DFT~~*~~+~~*~~T~~~~GI~~* | |
| *THEADER*: Header Duration | | 0.485 µs=*TSYM* (OFDM)  1.75 µs =3×512×*Tc (SC)* | |
| *FCCP*: control mode chip rate | | 880 MHz | |
| *TCCP*: control mode chip time | | 1.14 ns = 1/*FCP* | |
| *TSTF-CP*: control mode short training field duration | | 7.5636 µs =52× *Tseq* | |
| *TCE-CP*: control mode channel estimation field duration | | 1309.1 ns=9×*Tseq* | |
| *TData* | | *~~N~~~~SYM~~*~~×~~*~~T~~~~SYM~~* ~~(OFDM)~~  *NBLKS*×(512+64)×*Tc* (SC)  NOTE—*~~N~~~~SYM~~* ~~is defined in 21.5.3.2.3.3 (LDPC encoding process) and~~ *NBLKS* is defined in 21.6.3.2.3.3 (LDPC encoding process). | |
| * ~~Frequently used parameters~~ | | |
| **~~Symbol~~** | **~~Explanation~~** | |
| *~~N~~~~CBPS~~* | ~~Number of coded bits per symbol~~ | |
| *~~N~~~~DBPS~~* | ~~Number of data bits per symbol~~ | |
| *~~N~~~~BPSC~~* | ~~Number of coded bits per single carrier~~ | |
| *~~R~~* | ~~Code rate~~ | |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| CID | Clause | Page | Line | Type | Comment | Proposed Change | Remark |
| 428 | Annex C | 279 | 62 | T | There is a copy and paste error here. "This is an entry in the dot11CDMGBeamformingConfig Table...." should be "This is an entry in the dot11CDMGOperation Table....". | Change to "This is an entry in the dot11CDMGOperation Table. ...". |  |

Proposed resolution: **Revised.**

Change the txt at P279L62 as follows:

"This is an entry in the dot11CDMGOperation~~BeamformingConfig~~ Table...."

Fix the similar error at P280L44:

"This is an entry in the dot1145MGOperation~~BeamformingConfig~~ Table...."