IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Proposed resolution to 11ay related CIDs | | | | |
| Date: 2017-08-01 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Oren Kedem | Intel |  |  | Oren.kedem@intel.com |
|  |  |  |  |  |

Abstract

This submission proposes a resolution to several CIDs submitted on the 11ay draft text.

The discussion is in reference to Draft IEEE P802.11ay/D0.3.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 104 | 10.3.1 | 43.13 | What is the definition of "fast" in the term "fast collision inference"? | Please clarify |

**Discussion:**

Traditional Wi-Fi TXOP could be gained by receiving Ack on transmited PPDU. In case Data PPDU was not acknowledged, the originator would infer that the medium was busy and reinitiate its Carrier Sense and Back-off procedure again.

The use of RTS/CTS in that sense is considered a faster way to infer on medium busy due to the short size of RTS/CTS messages.

In case of WiGig, initiating TXOP is likely to occur with RTS/CTS that are transmitted in CPHY modulation since the responder need to adjact its antenna beam to the originator.

**Proposed resolution**: Revised

*Change the first paragraph in 10.3.1 as follows*

The RTS/CTS exchange also performs both a type of fast collision inference and a transmission path check.  
If the return CTS frame is not detected by the STA originating the RTS, the originating STA may repeat the process (after observing the other medium-use rules) more quickly than if the long Data frame had been transmitted and a return Ack frame had not been detected. An RTS/CTS exchange by VHT STAs also performs fast collision inference on the secondary 20 MHz channel, secondary 40 MHz channel, and secondary 80 MHz channel and helps the VHT STA transmitting the RTS to determine the available bandwidth at the responder. Similarly, an RTS/DMG CTS exchange by EDMG STAs performs fast collision inference on the secondary 2.16 GHz channel, secondary 4.32 GHz channel, and secondary 6.48 GHz channel and helps the EDMG STA transmitting the RTS to determine the available bandwidth at the responder.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 153 | 42.02 | 9.7.1 | A-MPDU for EDMG needs to be updated for MU-MIMO (like VHT). | Suggest following VHT format or developing a new format. |
| 377 | 42.03 | 9.7.1 | 11ay AP sends DL MU PPDU to different STAs, so the MPDU should be padded if too short in duration compared to others | change the baseline text and add to draft: The EOF Padding field is shown in Figure 9-742. This is present only in a VHT PPDU and EDMG PPDU.  In Table 23, specify PSDU length as the PSDU length pre-EOF padding  Specify for EDMG MU-PPDU, aggregation in L-header is set to 1 |
| 444 | 42.02 | 9.7.1 | The structure of MPDU delimeter should be defined to support EOF field in A-MPDU for MU-MIMO | Define the A-MPDU format field in MPDU delimeter for EDMG |
| 445 | 46.24 | 10.13.6 | A-MPDU padding procedure should be defined for EDMG A-MPDU length alignment that enables MU-MIMO. | Define how to support EOFpadding for A-MPDU in EDMG |
| 446 | 46.15 | 10.13.3 | A-MPDU length limit rule should be defined for EDMG A-MPDU length alignment that enables MU-MIMO. | Propose to update this subsection for supporting MAC padding for EDMG |

**Disscution:**

Comment relate to MU-MIMO padding done by adding delimiters after MPDUs same as was done in VHT. Draft 0.4 incorporate adding zero delimiters with EOF after MPDUs were transmitted to specific MU participated STA (contribution 2017-TECH-LG-0005-01-Aggregate MPDU format).

**Proposed resolution**: Reject

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 195 |  | 44.00 | There is no virtual CCA term in IEEE 802.11-2016 spec. The correct term should be "virtual CS" | Change "virtual CCA" to "virtual CS" |

**Proposed resolution**: Revised

*Change the third paragraph in 10.3.2.7 as follows*

* The STA shall set the Duration, NAV-RA and NAV-TA fields of the DMG DTS frame to 0 if the  
  38 STA’s NAV is 0 or a virtual CS ~~CCA~~ is not maintained by the STA on the channel.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 196 | 53.20 | 20 | It is not clear how the secondary channel is defined for EDMG BSS, especially considering there are two types of communication modes: channel bonding and channel aggregation. | Define the secondary channels for channel bonding supported STAs and channel aggregation supported STAs. Define the related indications for the sencondary channel. |
| 450 | 10.01 |  | Figure 3 --The channel-list parameter element for 4.32 GHz, 6.48 GHz and 8.64 GHz channel width illustrates cases with primary channel on the edge. The primary channel may reside in the middle as well. | Add few more figures to illustrate missed cases or provide relevant text to make it clear. |

**Discussion:** Contribution 11-17/0865 adopted in D0.5 addresses those two comments.

With new definition, the issue raised by the comment is resolved as follow:

The location of the Secondary, Secondary1, Secondary2 channels depends the location of the Primary channel which is diffrenciate by the *EDMG Primary Channel Offset* indication.

Below are diagram that shows the locations of secondaries channgels in case of channel bonding.



The channel-list parameter for 4.32 GHz, 6.48 GHz and 8.64 GHz channel width for EDMG Primary Channel Offset=0



The channel-list parameter for 4.32GHz, 6.48GHz and 8.64GHz channel width when EDMG Primary Channel Offset=1



**The channel-list parameter element for 2.16+2.16 GHz and 4.32+4.32 GHz channel  
width**

**Proposed resolution**: Reject

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 212 | 12.00 | 9.3.1.3.1 | Since the subfield is not used by other BA Types, then why not leave it as reserved in those cases. | Replace last sentence with "This subfield is reserved if the BlockAck variant used is not EDMG Multi-TID BlockAck variant" |
| 449 | 12.04 |  | "The Management ACK subfield is set to one to indicate that frames of type Management that are not Action No Ack are acknowledged. Otherwise, it is set to zero. If the Management ACK subfield is set to one, the BlockAck variant used is the EDMG Multi-TID BlockAck variant." Last sentence of the text is confusing and not needed because the EDMG Multi\_TID Block Ack variant is defined in Table 9-24--BlockAck frame variant encoding | "In EDMG Multi-TID BlockAck variant the Management ACK subfield is set to one to indicate that frames of type Management that are not Action No Ack are acknowledged. Otherwise, it is set to zero." Remove "If the Management ACK subfield is set to one, the BlockAck variant used is the EDMG Multi-TID BlockAck variant" |

**Proposed resolution**: Revised

The Management ACK subfield is set to one to indicate that frames of type Management that are not Action No Ack are acknowledged. ~~If the Management ACK subfield is set to one, the BlockAck variant used is the EDMG Multi-TID BlockAck variant.~~ This subfield is reserved if the BlockAck variant used is not EDMG Multi-TID BlockAck variant

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 254 | 10.13.2 | 48.00 | "There may be conflict between the text related to maximum A-MPDU exponent in EDMG and DMG capabilities element. For example, the base spec says: ""A DMG STA shall not transmit an A-MPDU that is longer than the value indicated by | Clarify EDMG STA behaviour to address conflict |

**Discussion:** This comment (CID 254) is resolved with the changes proposed in response to CID 253.

**Proposed resolution**: Reject

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 267 | 8.3.5.12.2 | 9.12 | How the channel busy for Secondary 2.16 GHz is defined? Table 8-5 | Define the rules for channel busy or provide reference. |
| 268 | 8.3.5.12.3 | 9.12 | How the channel busy for Secondary 4.32 GHz is defined? Table 8-6 | Define the rules for channel busy or provide reference. |
| 269 | 8.3.5.12.4 | 9.12 | How the channel busy for Secondary 6.48 GHz is defined? Table 8-7 | Define the rules for channel busy or provide reference. |

**Discussion:** This comment (CID 267-269) are discussing the definition of the CCA threshold for EDMG channels and would be resolved by CID 69.

**Proposed resolution**: Reject

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 138 | 14.03 | 9.3.1.9.8 | Define BA starting sequence number field | As noted |
| 214 | 13.15 | 9.3.1.9.8 | Should it be "up to eight"? | Insert " up to" before "eight" |
| 339 | 9.3.1.9.8 | 13.22 | If the buffer size negotiated for a TID is larger than 128, in addition to the BlockAck Bitmap subfield, the BlockAck Starting Sequence Control subfield is also present multiple times per TID. | "Change |
| 451 |  | 13.01 | Wrong definition: "The BlockAck Bitmap subfield of the BA Information field is used to indicate the received status of up to 8 times the size of the subfield, where each entry represents an MSDU or an A-MSDU." | Replace by: "The BlockAck Bitmap subfield of the BA Information field is used to indicate the received status of MSDU's, where each entry represents an MSDU or an A-MSDU." |
| 471 | 12.20 | 9.3.1.9.7 | Reserved should be more explicitly stated as set to 0 | as suggested |
| 472 | 13.13 | 9.3.1.9.8 | "The BA Information field is a concatenation of eight Per-TID BA Information subfields. The Per-TID BA 16 Information subfield is formatted as indicated in Figure 6." why this has to be the concatenation of 8 Per-TID BA Information subfields or it should consists of one or more of the Per TID Info BA Information subfileds? Also, there is no Per TID info subfield in the frame | Calrify |

**Discussion:** Comments are resolved in 2017-TECH-Intel-0059-01-EDMG Multi-TID Block Ack Support.docx contribution

**Proposed resolution**: Revised

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 379 | 10.22.2.12 | 49.27 | "In fig 59, if in EDMG operation element, BSS operating channels is '111000' and operating channel width is '0101', and primary channel is #2, what does it mean to have PHY-CCA.indication =(BUSY, {secondary})? Is it #1 CCA busy, #3 CCA busy, or both? | redefine channel list parameter element as a bitmap in table 5 and in 8-5 |

**Discussion:**

Contribution 11-17/0865 addresses this comment.

With new definition accepted for D0.5 the issue raised by the comment is resolved as follow;

BSS Operating Channels = “111000” indicate that channel 1-3 are utilized by the BSS.

Operating Channel Width (Channel BW Configuration subfield) = “0101” indicate that 2.16GHz and 4.31GHz channel bonding is supported

Channel 2 = Primary channel , Channel 1 = Secondary and channel 3 = Secondary1

CCA indication is given per each of the utilized channels (up to 4), meaning the MAC will get from the PHY 3 CCA indications, Primary, Secondary and Secondary1

My understanding is that CCA.indication =(BUSY, {secondary}) means that only Secondary channel is busy, Secondary1 and Primary are Idle.

In this case, STA can perform Link Access only on #2, #10 channels BW

If #3 (Secondary1) is busy and secondary is idle, STA can perform Link Access only on #2, #9 channels BW

**Proposed resolution**: Reject

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 448 | 45.10 | 10.5 | Fragmentation and Defragmentation method should be defined to support MSDU frgamentation concept for EDMG STA. | Define the method of MSDU fragmentation and reassembly. |

**Discussion:**

Comment relate to MSDU Segmentation concept which is not incorporated into 11ay Draft yet.

**Proposed resolution**: Reject

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 451 |  | 13.01 | Wrong definition: "The BlockAck Bitmap subfield of the BA Information field is used to indicate the received status of up to 8 times the size of the subfield, where each entry represents an MSDU or an A-MSDU." | Replace by: "The BlockAck Bitmap subfield of the BA Information field is used to indicate the received status of MSDU's, where each entry represents an MSDU or an A-MSDU." |

**Proposed resolution**: Accept

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 463 | 50.09 |  | a) Transmit a 8.64 GHz mask PPDU if the secondary, secondary4.32 and secondary6.48 channels were idle during an interval of PIFS immediately preceding the start of the TXOP  b) Transmit a 6.48 GHz mask PPDU if the secondary and secondary4.32 channels were idle during an interval of PIFS immediately preceding the start of the TXOP  It is unclear why more than one secondary channel shall be idle as condition to use it for transmission. Provide definition of secondary channels that should use the same approach as in (21.3.7.3 Channel frequencies) and fix the definitions | a) Transmit a 8.64 GHz mask PPDU if the secondary6.48 channel is idle during an interval of PIFS immediately preceding the start of the TXOP  b) Transmit a 6.48 GHz mask PPDU if the secondary4.32 channel is idle during an interval of PIFS immediately preceding the start of the TXOP |

**Discussion:** Contribution 11-17/0865 adopted in D0.5 addresses this comment.

With new definition, the issue raised by the comment is resolved as follow:

CCA indication is given per 2.16GHz channel width, hence in order to transmit a 8.64 GHz Mask PPDU, all secondaries channel should be idle. In order to transmit a 6.48 GHz Mask PPDU, secondary and secondary1 should be idle.

D0.4 respective text is as follow:

a) Transmit a 8.64 GHz mask PPDU or 4.32+4.32 GHz mask PPDU if the secondary, secondary1 and secondary2 channels were idle during an interval of PIFS immediately preceding the start of the TXOP.

b) Transmit a 6.48 GHz mask PPDU if the secondary and secondary1 channels were idle during  
an interval of PIFS immediately preceding the start of the TXOP or if EDMG Primary Channel Offset is 1 and secondary1 and secondary2 channels were idle during an interval of PIFS immediately preceding the start of the TXOP

**Proposed resolution**: Reject

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 469 | 11.00 | 9.3.1.8.1 | GLK-GCR BlockAckReq in Table 9-22 is undefined and not in 802.11-2016 spec too. | Clarify |
| 470 | 12.00 | 9.3.1.9.1 | GLK-GCR BlockAck and Multi-STA BlockAck in Table 9-24 are undefined and not in 802.11-2016 spec too. | Clarify |

**Discussion:**

Multi-STA Block Ack is defined in 11ax

GLK-GCR BlockAck is defined in 11ak.

11ay should be based on the latest 802.11 amendments even though they are not yet incorporated to the baseline standard yet

**Proposed resolution**: Rejected

**References:**