IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Resolution of SB000 CIDs 6118, 6119, 6202, 6210, 6221, 6224 | | | | |
| Date: 2020-02-05 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Solomon Trainin | Qualcomm |  |  | strainin@qti.qualcomm.com |
| Alecsander Eitan | Qualcomm |  |  | eitana@qti.qualcomm.com |
| Assaf Kasher | Qualcomm |  |  | akasher@qti.qualcomm.com |
| Carlos Cordeiro | Intel |  |  | carlos.cordeiro@interl.com |

Abstract

Resolution of SA ballot comments CID 6118, 6119, 6202, 6210, 6221, 6224

| **CID** | **Sub-clause** | **Page** | **Line #** | **Comment** | **Proposed Change** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- |
| 6118 | 9.4.2.278 | 171 | 24 | Instances of "if any" that should be removed as this creates ambiguity. | remove ambiguous "if any" statements. Perhaps 12 instances. | **Revised**  See below in the document |
| 6119 | 10.25.11.5 | 245 | 35 | If, after an MPDU is received, the receive buffer is full, the complete MSDU or A-MSDU with the earliest If, after an MPDU is received, the receive buffer is not full, but the sequence number of the complete MSDU | Ambiguous or confusing wording in line 35 & 37. Suggest change to:    When the receive buffer is full, and after an MPDU is received ... | **Revised**  The text is removed as per resolution of the CID6113. No changes needed |
| 6202 | 10.25.2 | 229 | 8 | On the instruction to the editor: "Change the sixth paragraph and insert a new one as follows"  Now it's 11th paragraph in REVmd D3.0. | Replace "sixth paragraph" with "eleventh paragraph" | **Accept** |
| 6210 | 9.3.1.8.9 | 97 | 11 | It is not clear in all ack context, which TID/TID group is asscoaited with the BUFCAP in a multi-TID BA with ack Type 2. | Clarify the setting or the presence of RBUFCAP for ack Type 2 | **Revised**  See below in the document |
| 6221 | 10.25.2 | 229 | 21 | The EDMG PHY supports peak rate of 37,917.00  Mbps. This is a significant improvement but we think the MAC efficiency still has a problem.  It is not very clear if the current TGay draft meets the PAR throughput requirement (i.e., supporting a maximum throughput of at least 20 gigabits per second (measured at the MAC data service access point)).  Although the EDMG STA can use 1024 bits BlockAck Bitmap, for fully utilizing the PHY improvements, the BlockAck Bitmap should be extended to a larger size. Also, the Sequence Number space should be extended to more than 12 bits. | Increase the BlockAck Bitmap size and the Sequence Number space.    If the CRC thinks that 1024 bits BlockAck Bitmap and 12 bit Sequence Number space are already sufficient for meeting the PAR throughput requirement at the maximum PHY rate, please provide how the MAC SAP throughput can be achieved. | **Reject**  See justification below in the document |
| 6224 | 3.1 | 21 | 7 | MPDU sizes should not be restricted to maximum size; MPDU size may be selected based on link adaptation, also last segment can be smaller | Remove "maximum size". | **Accept** |

CID 6118

Discussion

The commenter suggests: “remove ambiguous "if any" statements. Perhaps 12 instances.”

There are more than 12 appearances of “If any”. It is not clear what are the 12 suggested to remove. After careful analysis of the cases, we suggest removing “if any” in some places where it is not needed and rephrase in one more place.

***TGay editor make the following changes:***

Remove “if any” at P171L24, P206L9, and P286L43

***TGay editor change as follows***

*P586L37*

The PHY indicates the state of the 2.16 GHz primary channel and any secondary channels , …

CID 6210

Discussion

The spec does not assume or define any dependencies between Ack Types and Flow Control. Once the Flow Control is established per TID/Group TID the maintenance of the RBUFCAP it is kept the same with no relation which Ack Type is used. No further clarification required.

During the discussion with commenter one issue was found that indirectly related to the comment. The EDMG Multi-TID BlockAck that contains the RDUFCAP field is not listed in the column Type of BlockAckReq and BlockAck variant of the Table 11-6a – Types of block ack agreement based on capabilities and ADDBA conditions for EDMG STAs. It should be added to the table.

***TGay editor change:***

*In the Table 11-6a – Types of block ack agreement based on capabilities and ADDBA conditions for EDMG STAs, in the third column in both appearances append as follows*

Compressed BlockAckReq, EDMG Compressed BlockAck, and EDMG Multi-TID BlockAck

CID 6221

Discussion:

The EDMG PPDU Header-A provides PSDU Length field of 22 bits that allows containing up to 4,194,303 bytes in one PPDU

The maximal size that the MAC can deliver in one shot before it gets the Block Ack is equal to maximal Buffer Size x maximal MPDU length = 1024 x 8192= 8,388,608 bytes that is twice as big as the PSDU size that enables transmission of max size PSDU. The calculation of the estimated throughput presented below illustrates that the required 20 gigabits per second are achieved by transmission of 525 MPDUs in one PPDU that demonstrates that bitmap of 1024bits is enough and no extension is required.



Parameters

|  |  |
| --- | --- |
| MPDU size (bytes) | 7920 |
| CRC (bytes) | 4 |
| MPDU header (bytes) | 30 |
| Security header and MIC | 16 |
| A-MPDU delimiter (bytes) | 4 |
| SIFS (ms) | 0.003 |
| DIFS(ms) | 0.013 |
| Slot Time (us) | 0.005 |
| aCWmin (number of slots) | 15 |
| SC Preamble (ms) | 0.001891 |
| L Header (ms) | 0.00058 |
| Header-A (ms) | 0.0006 |
| Addition of EDMG preamble (ms) | 0.002182 |
| RTS/CTS (ms) Control PHY | 0.014036 |
| BA (1024)(ms) (MCS4) | 0.003964 |

Results

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| # | MCS | Channel width | Bit rate (Mbps) | MPDUs per PPDU | Goodput  (Mbps) | Utilization |
| 1 | 21 SC | 1 | 8085.00 | 525 | 7837.9 | 0.97 |
| 2 | 21 SC | 2 | 16170.00 | 525 | 15336.9 | 0.95 |
| 3 | 21 SC | 3 | 24255.00 | 525 | 22518.4 | 0.93 |
| 4 | 21 SC | 4 | 32340.00 | 525 | 29402.3 | 0.91 |
| 5 | 20 OFDM Short GI | 1 | 37 917.00 | 525 | 33986.8 | 0.90 |

**References:**

1. IEEE P802.11ay/D5.0, October 2019
2. IEEE P802.11-REVmd/D3.0, October 2019