IEEE P802.11
Wireless LANs

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| Assorted CRs on REVmd draft 3.0 |
| Date: July 17, 2020 |
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Abstract

This document contains assorted comment resolutions for REVmd draft 3.0, addressing the following CIDs:

1. 4001, 4002, 4004, 4041, 4042, 4043, 4044, 4051, 4137,
2. 4143, 4144, 4148, 4149, 4150, 4151, 4152, 4153, 4168,
3. *4264*, 4270, 4271, 4289, 4291, 4294, 4315, 4326, 4345,
4. 4436, 4437, 4438, 4439, 4495, 4573, 4574, 4582, 4584,
5. 4649, 4699, *4703*, *4717*, *4718*, 4719, *4720*, **4725**, 4729,
6. 4730, *4743*, *4750*, *4754*, *4756*, 4761, 4762, 4763, 4764,
7. 4811, 4416, 4494, x, 4444, 4416, 4169

The baseline for this document is Draft P802.11REVmd D3.0.

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| **CID Identifiers** | **Comment** | **Proposed Change** | **Proposed Resolution** |

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| CID 400111.1.3.22148.2148Myles, Andrew | There has been discussion in the Coexistence SC as to whether the IEEE 802.11 WG should support the proposal in ETSI BRAN to further constrain the use of "short LBT" (like a PIFS) for short control signalling.When this proposal was made, it was believed that this would mainly affect the transmission of DRS (like a Beacon) by NR-U. Simulations seemed to show that use of "short LBT" for DRS by NR-U would have an unreasonable adverse affect on 802.11 systems.However, there was resistance to supporting the proposal from some 802.11 stakeholders, for reasons that the stakeholders did not want to discuss. It turns out that at least two 802.11 chip vendors often use PIFS without any backoff for the transmisison of Beasons. At least one 802.11 chip vendor mostly/always does not.The problem is that the 802.11 standard does not appear to support the transmission of Beacons at PIFS by these vendors. Instead, the 802.11 standard specifies (11.1.3.2) that Beacons are sent "using the the medium access rules specified in Clause 10", ie DCF or EDCA (HCCA does not seem to apply given the APs in question are not acting as HCs, and even HCs can old send a Beacon at PIFS when starting a CFP). Other clauses in 802.11 suggest that Beacons should be sent using EDCA at AC-VO. Noting that an AP can use an AIFS of 1, this means that Beacons can be sent at PIFS at least sometimes, but this is only because the random backoff is sometimes 0. | My personal view is that vendors should not be sending Beacons (or any other frame) at PIFS without a backoff, because doing so is known to cause harm to the overall system. However, I will defer to the majority view on this question at this time. That said, if it is desired that Beacons can be sent at PIFS without any backoff then it should be explicitly allowed by the 802.11 standard, so that all implementers are aware of the possibility.There are multiple locations in the 802.11 standard where this could be specified. I will leave it to the experts in 802.11 TGmd to determine the most appropriate location for this change, and therefore it most appropriate form. If desired by the BRC, I am willing to provide explicit text. | Revised - 1730.30 add"–A STA transmitting a Beacon frame, as described in 11.1.3.2 (Beacon generation in non-DMG infrastructure networks).NOTE–An extended period during which the medium is busy after the TBTT can increase the probability for collisions between PIFS transmissions from nearby STAs on the same channel. The use of a random backoff instead of PIFS can reduce the collision probability in this case."This change allows beacons to be transmitted at PIFS.It is possible that clock drift causes TBTTs at two nearby APs to line up within 9 us and that a beacon collision occurs. However, the time this happens would only be 0.009% for a 100 ms beacon period. This fraction may be increased some by CCA busy events occurring around the TBTT, but the odds will still be low.A medium busy time after the TBTT of for example 1 ms will increase this collision probability to 1%. |

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| CID 40029.4.2.3992.60Hiertz, Guido | Clarify that the total number of entries in the Supported Rates Element must not exceed eight. We are seeing implementations in the field that put nine entries into this element (bit rates 6 Mb/s ... 54 Mb/s plus a membership selector), and the first sentence of this clause may be read in a way that this is legitimate. | Replace"The Supported Rates and BSS Membership Selectors element specifies up to eight rates in the OperationalRateSet parameter, as described in the MLME-JOIN.request and MLME-START.request primitives, and zero or more BSS membership selectors. The Information field is encoded as 1 to 8 octets, where each octet describes a single supported rate or BSS membership selector (see Figure 9-147 (Supported Rates and BSS Membership Selectors element format))."with"The Supported Rates and BSS Membership Selectors element specifies up to eight BSS membership selectors or rates in the OperationalRateSet parameter, as described in the MLME-JOIN.request and MLME-START.request primitives. The total number of Supported Rates and BSS Membership Selectors does not exceed eight. The Information field is encoded as 1 to 8 octets, where each octet describes a single supported rate or BSS membership selector (see Figure 9-147 (Supported Rates and BSS Membership Selectors element format))." | New resolution, without duplicating information from Figure 9-147 (Supported Rates and BSS Membership Selectors element format), which already shows that the Supported Rates field has 1 to 8 octets.---- start of resolutionRevised - 992.60 replace the paragraph (which continues on the next page) with the following two paragraphs:"The Supported Rates and BSS Membership Selectors element specifies any combination of up to eight BSS membership selectors and rates in the OperationalRateSet parameter, as described in the MLME-JOIN.request and MLME-START.request primitives. Each octet of the Supported Rates field describes a single supported rate or BSS membership selector (see Figure 9-147 (Supported Rates and BSS Membership Selectors element format))."1007.45 delete"The Information field is encoded as 1 to 255 octets, where each octet describes a single supported rate or BSS membership selector (see Figure 9-171 (Extended Supported Rates and BSS Membership Selectors element format)).".The deleted sentence at 1007.45 is a duplication of the definition of the Information field below, which is then called Extended Supported Rates field.-------- end of resolution |

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| CID 40049.4.2.281120.5Hiertz, Guido | Submission 11-19/693 reveals that many 802.11 implementations apply TXOP Limits that exceed the limits defined in table 9-155. Furthermore, version 2.1.1 of Harmonized Standard (HS) EN 301 893 defines TXOP Limits that are larger than the once described in table 9-155. In the standard, align the TXOP Limits with the HS. | For PHYs in clause 17, 18, 19, and 21 define the TXOP Limits as follows: AC\_BK = 6.0 ms, AC\_BE = 6.0 ms, AC\_VI = 4.0 ms, AC\_VO = 2.0 ms | Table 9-155 specifies default EDCA parameters that will be included in the beacon and used by the STAs in the BSS. These values are not mandatory and also do not cover the EDCA parameters for the AP.In addition to 6 ms, ETSI allows 8 and 10 ms for AC\_BE.Discussion required.Rejected -- the group discussed the comment and is concerned with making the change. There was no technical evidence provided to support the change. Specific values may vary based on the specific regulatory domain. Document 11-13/14r1 provides the rationale for the current numbers, with the technical justification. |

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| CID 4041.Adachi, Tomoko | ATIM is not useful at all and gives only harm to IBSS operation. | Delete ATIM operation throughout the draft. | This CID was handled in another sbumission.ATIM is the frame transmitted intermittently by STAs in an IBSS, for purpose of IBSS power save. Most of the related text is in 11.2.4 (Power management in an IBSS).But ATIM is also used in DMG, described in 11.2.7.4 (ATIM frame usage for power management of non-AP STAs), which is part of 11.2.7 Power management in a PBSS and DMG infrastructure BSS.Given that the comment only cites IBSS operation, it is assumed that it is not related to ATIM operation in DMG.It is not specified what harm there is to IBSS operation.Given that deleting ATIM for IBSS may impact ATIM for DMG, this deletion may not be trivial.Rejected -- the comment does not identify a technical issue in sufficient detail. |

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| CID 40429.3.1.9.Adachi, Tomoko | It's likely that the Control Wrapper frame is not used after all. | Delete the Control Wrapper frame throughout the draft. | The Control Wrapper frame is used to wrap a Control frametogether with an HT Control field.In total, there are 24 occurrences of Control Wrapper in the spec, mainly in 9.3.1.9 (Control Wrapper frame) 10.9 (Control Wrapper operation)A deletion seems to be relatively straightforward.Rejected -- The comment does not identify a technical issue in sufficient detail. There is not sufficient evidence that Control Wrapper is indeed not used. (Stock reject will be used.) |

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| CID 404310.3.71768.31Adachi, Tomoko | The behaviour according to dot11DynamicEIFSActivated is true will be obsolete other than when the MPDU contained therein is 14 or 32 octets. HE PPDU has TXOP\_DURATION and if it has a valid value, then it will not cause EIFS. When the TXOP\_DURATION is set to UNSPECIFIED, then eq. (10-7) will be applied anyway. So, Table 10-8 will never be updated from 802.11ax. And BlockAck frame length will no further be limited to 32 octets from 802.11ax, as HE STAs use Multi-STA BlockAck and Compressed BlockAck with variable length. | Revert to the original EIFS description by deleting dot11DynamicEIFSActivated MIB variable and its related descriptions.Or, delete Table 10-8, eq. (10-8) and descriptions according to when dot11DynamicEIFSActivated is set to true except the paragraph starting with "When dot11DynamicEIFSActivated is true and the PPDU that causes the EIFS contains a single MPDU with a length equal to 14 or 32 octets, ...". Add "When dot11DynamicEIFSActivated is true, if the PPDU that causes the EIFS does not contain a single MPDU with a length equal to 14 or 32 octets, then EIFS is determined as shown in Equation (10-7)." at the end of that paragraph. | Dynamic EIFS allows to reduce the EIFS time based on a presumed duration of the response frame to the frame causing the EIFS, and to start no EIFS after what looks like a response frame. Not reducing the EIFS time has been shown to cause potential capture effects.New PHYs may make dynamic EIFS less effective in certain situations, but there may still be benefits. The change proposed by the commenter may not work because the presence or absence of a response or the length of a presumed response cannot (easily) be determined from the PHY header.Proposed resolution: reject. |

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| CID 404410.3.2.3.21728.Adachi, Tomoko | RIFS is not used by VHT, S1G, and HE STAs. There's no chance to use it also in further amendements. | Delete RIFS throughout the draft. | Rejected - RIFS is supported in products and should not be removed for this reason. RIFS is marked as obsolete for non-DMG STAs. |

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| CID 40519.4.2.20.111034.50Qi, Emily | dot11LongRetryLimit is depreciated, see 4152.5. The use of dot11LongRetryLimit should be removed. | Remove "or dot11LongRetryLimit" at 1034.50, 1034.57, 1076.41, 1076.46, 4000.38, 4000.53. At 1759.37, remove "when SLRC reaches dot11LongRetryLimit,". At 1763.65, remove "or until the LRC for the MPDU with the Type subfield equal to Data or Management is equal to dot11LongRetryLimit." | Proposed resolution -- RevisedRemove "or dot11LongRetryLimit" at 1034.50, 1034.57, 4000.38, 4000.53. Remove"or dot11LongRetryLimit (as appropriate)"at 1076.41, 1076.46At 1759.37, remove "when SLRC reaches dot11LongRetryLimit,". At 1763.65, remove "or until the LRC for the MPDU with the Type subfield equal to Data or Management is equal to dot11LongRetryLimit."At 4163.8, 4166.46, 4181.45 change"either the dot11ShortRetryLimit or dot11LongRetryLimit" to "the dot11ShortRetryLimit". |

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| CID 413723.3.8.2.2.53370.6Goodall, David | Why is bit 0 of the SIG-1 symbol of the short preamble reserved and set to 1 rather than 0? Is it reserved for future use or is it reserved for some other reason? If it will always be the value 1 then we can use it to further verify the short preamble signal field, which is protected by a weak CRC4. | Add a note saying why b0 of the S1G-1 symbol of the short preamble is reserved. | Response from Eugene Baik (Qualcomm):"There was a desire to keep the bitmaps and generation steps of the long and short preamble SIG/SIG-A fields in Sub-1GHz similar whenever possible, which is why the CRC is 4-bits across the preamble types and why B0 of the short preamble SIG is reserved.The commenter is correct in pointing out that a 4-bit CRC is pretty weak, but it was kept at 4-bits for the short preamble SIG because the long preamble SIG-A payload couldn’t accommodate a longer CRC. There was a desire to keep the CRC generation between the long and short preamble SIGs (for 2MHz and above BWs) the same (i.e. didn’t want separate generation hardware).Bit 0 of the long preamble SIG-A is used for indicating whether the PPDU is MU or SU. The short preamble SIG doesn’t need that field because it’s always SU, but in an effort to keep the bitmap ordering between short and long preamble SIGs similar (to potentially simplify the parsing out of the fields of the SIG/SIG-A payload at the receiver), the decision was to make B0 of the short SIG payload unused and hence reserved. I don’t remember why ‘1’ was chosen instead of ‘0’, but I think in general for reserved fields a value is specified."Therefore, it appears like bit 0 can indeed be used in addition to the CRC4 to check whether the SIG is correct.Proposed resolution:Revised -- agree with the comment.At 3372.63 add"NOTE -- The Extra Check Bit subfield (B0) of the SIG field of S1G format PPDUs sent with a short preamble is always 1 and can be used in addition to the CRC field to verify that the SIG field is correct."At 3369.14 change"Reserved" to "Extra Check Bit"At 3370.6 change the Field entry to "Extra Check Bit" and the Description entry to "Set to 1." |

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| CID 41439.2.4.2793.45Goodall, David | Table 9-9 states that AID 0 is used for broadcast transmission in S1G PPDU. How is it used? Should that be PV1 frames rather than S1G PPDUs, in which case it would be used in the A1 field. | Please clarify use of AID 0 for broadcast transmission by S1G STAs, e.g. it's used as an address in a particular field. Change S1G PPDUs to PV1 frames if that is correct. | Submission required. Menzo working on it. |

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| CID 41443.1170.48Aboulmagd, Osama | The IEEE 802.11e amendment added Traffic Category (TC), User Priority (UP), Traffic Stream (TS) and TSID. Among these four new additions Traffic Category seems to be redundant and can easily map to UP. TC seems to be an intermediate parameter that serves no purpose. It is also true that the term traffic category is not available in 802.1D which is the reference for the UP bits. In fact 802.1D makes use of the term "Traffic Classes" which is easier to understand that the vague Traffic Category term. | Delete Traffic Category from the draft and replace it with UP everywhere. | Osama is working on this.An MSDU can either have a relative priority referred to as Traffic Category (TC), or belong to a Traffic Stream (TS). The TC or TS is then mapped to a User Priority (UP), which is subsequently mapped to Access Category (AC), which is associated with an EDCAF.TC and TS are also used for block ack signaling.Therefore it appears that the extra level between UP and TC is required, essentially because there are also TSs on which an MSDU can be transmitted.Proposed resolution: reject. |

9.4.1.13 Block Ack Parameter Set field

The TID subfield contains the TC or TS for which the BlockAck frame is being requested.

9.2.4.5.2 TID subfield

The TID subfield identifies the TC or TS to which the corresponding MSDU (or fragment thereof) or A-MSDU in the Frame Body field belongs. The TID subfield also identifies the TC or TS of traffic for which a TXOP is being requested, through the setting of TXOP duration requested or queue size. The encoding of the TID subfield depends on the access policy (see 9.4.2.29 (TSPEC element)) and is shown in Table 9-12 (TID subfield). Additional information on the interpretation of the contents of this field appears in 5.1.1.3 (Interpretation of priority parameter in MAC service primitives).

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| CID 41489.4.2.261114.31Aboulmagd, Osama | What is Alternate EDCA? Is it another EDCA for medium access? Why it hasn't been defined as EDCA in Clause 3? The fact is there is only one EDCA and the term "Alternate EDCA" is probably a bad name for a bad design. | I believe the term "Alternate EDCA" should be deleted and replaced with something else, if necessary. | Rejected - The term alternate EDCA refers to an alternate EDCA queue rather than the primary EDCA queue. It seems to be mostly used in reference to a queue in the spec. The only exception is where it talks about the Alternative EDCA capability.Splitting between a primary queue and an alternate queue is possible because there are 8 UPs and only 4 ACs, so a mapping needs to take place where multiple UPs are mapped to a single AC, which makes it possible to have multiple separate queues on top of the AC. |

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| CID 414910.2.3.21718.1Aboulmagd, Osama | This comment is related to my previous comment. According to table 10-1 and the levels of priorities indicated in the table. Voice (alternate) is higher priority than Voice (prime) and Video (alternate) is lower priority than Video (prime). Since the words prime and alternate are not representative of any property in the queue architecture I suggest use "Higher Priority) and "Lower Priority" or other representative words. | As in comment |  |

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| CID 415010.23.2.11827.1Aboulmagd, Osama | Figure 10-25 does not add anything different from Figure 10-24 and needs to be deleted. Figure 10-25 still shows the four EDCAFs as in Figure 10-24. The only difference is in the addition of alternate queues (really different priority queues) which is insignificant difference and doesn't need to be depicted explicitly. How the queues and priorities are managed are implementation issues and Figure 10-24 is sufficient to show the main concepts. | Delete Figure 10-25 and any related description. | Rejected -- The figures are for reference implementations, and they are correct. Therefore it is fine to keep them in the spec. Having alternative queues is the whole point of Alternate EDCA, therefore Figure 10-25 is significant. |

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| CID 41514394.1Aboulmagd, Osama | Annex G is becoming obsolete and is very difficult to follow. The attribute table is totally arbitrary and doesn't follow any rules. It was written in the past by a single person and now is starting to diverge since many amendments are trying to modify the Annex. Additionally the sequences can better be followed in the corresponding Clauses which is easier to follow and perhaps more accurate. | Delete Annex G | Ok in principle to delete Annex G, but there are references to Annex G which need to be addressed also.Proposed resolution: reject. |

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| CID 4152.Aboulmagd, Osama | The draft is 4647 pages and is expected to get bigger. The group needs to think seriously what amendments are widely deployed and what amendments haven't seen deployment success, e.g. 802.11s, 802.11aa, 802.11z, 802.11ak just to mention a few. Those amendments may move to a different volume to make the main standard manageable. Few years ago there was an attempt to harmonize 802.11e with WMM and perhaps delete HCCA. I don't think the situation has changed since 2007 and maybe it makes sense now to look at HCCA and its acceptance. | Start with deleting HCCA and free valuable code points in the TID Subfield for use by other more important amendments.Discuss and possible delete other amendments that have limited or no success in deployments. | 802.11s and 802.11z are used extensively in the field, for example in Google home networks (11s) and Chromcast (TDLS). 11ak was just published.HCCA is used in video deployments.Proposed resolution: reject. |

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| CID 41539.3.1.8.1833.23Fischer, Matthew | It would be nice to have the ability to inform the transmitter of an AMPDU that missing acknowledgements for some MPDUs are not due to a poor MCS choice, but instead, to local interference that occurred during the AMPDU reception. An indication of such occurence should be signaled in the BA. | Add a mechanism in the BA frame to allow a recipient transmitting the BA to indicate to the originator that missing acknolwedgements within the BA frame are due to local interference or buffer constraints and not a poor MCS choice. | Matt is working on a proposal.This proposal was discussed extensively in a prior phase of REVmd, and ultimately rejected.Amongst the arguments for rejecting the comment was the proposed alternative of using an Action frame for the purpose of signaling a temporary limited connection (TLC), because - an Action frame can convey additional information about the nature of the interference - an Action frame can convey additional information about possible measures to take, like enable RTS/CTS, lower the MCS, shorten the transmissions, leave room in between, etc. - an Action frame can inform whether a CTS will not be sent in case of interference - there will be no BA when no data has been received, but a BA would have to be sent to provide any signaling - A BA provides no specific feedback about whether any measures taken by the transmitter are successful, or too much, etcTherefore, an action frame was considered to be a more versatile way of conveying interference mitigation.Proposed resolution: reject.  |

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| CID 416810.3.4.41763.63RISON, Mark | "Retries for failed transmission attempts shall continue until the SRC for the MPDU with the Type subfield equal to Data or Management is equal to dot11ShortRetryLimit or until the LRC for the MPDU with the Type subfield equal to Data or Management is equal to dot11LongRetryLimit. When either of these limits is reached, retry attempts shall cease, and the MPDU with the Type subfield Data (and any MSDU of which it is a part) or Management shall be discarded." is missing the lifetime limit (cf. 10.23.2.12.1 for EDCA) | Change the cited text to "Retries for failed transmission attempts shall continue until the SRC for the MPDU with the Type subfield equal to Data or Management is equal to dot11ShortRetryLimit or until the LRC for the MPDU with the Type subfield equal to Data or Management is equal to dot11LongRetryLimit, or until the transmit MSDU timer for the MSDU or any undelivered fragments of that MSDU exceeds dot11MaxTransmitMSDULifetime (see 10.4 MSDU and MMPDU fragmentation). When any of these limits is reached, retry attempts shall cease, and the MPDU with the Type subfield Data (and any MSDU of which it is a part) or Management shall be discarded." | Accepted. |

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| CID *4264*10.3.11724.15RISON, Mark | Having stuff in DCF clauses that applies to EDCA (especially stuff that cannot apply to DCF, e.g. stuff related to HT/VHT) is very confusing | Move EDCA-only stuff to EDCA clauses. Move stuff that is common to both DCF and EDCA to a common clause | Assigned to Mark Rison.It might make sense to delete DCF and move EDCA related parts to EDCA.But this might be a significant effort.Proposed resolution: reject. |

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| CID 4270.RISON, Mark | Can TDLS be used between two STAs that are in different BSSes of an ESS (since tunnelled)? If not, what happens if a TDLS STA reassociates to a different AP? | As it says in the comment | Revised - Make changes as shown in <this document> at CID 4270, which fixes the transmission of a teardown frame in case of reassociation.The cited cases are addressed in TDLS as follows:11.21 (Tunneled direct-link setup)11.21.1 (General)"To set up and maintain a direct link, both TDLS peer STAs shall be associated with the same infrastructure BSS."11.21.5 (TDLS direct-link teardown)"A TDLS Teardown frame with Reason Code LEAVING\_NETWORK\_DEAUTH shall be transmitted to all TDLS peer STAs (via the AP or via the direct path) prior to transmitting a Disassociation frame or a Deauthentication frame to the AP."However, the reassociation case appears to be missing, the proposed changes address this. |

Changes:

2351.45

A TDLS Teardown frame with Reason Code LEAVING\_NETWORK\_DEAUTH shall be transmitted to all TDLS peer STAs (via the AP or via the direct path) prior to reassociation with a different AP, deauthentication, disassociation, or association.

904.32, in the "Meaning" column

Deauthenticated because sending STA is leaving (or has left) the BSS

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| CID 4271.RISON, Mark | An AP needs 2 MIB tables for EDCA: one for itself and one for what it will signal to non-AP STAs. The former is dot11QAPEDCATable but the latter is not dot11EDCATable because this is defined as being set from an incoming EDCA Parameter Set element | Update dot11EDCATable so that at an AP it is used to define the EDCA parameters that are signalled to associated STAs | Revised - Implement changes specified in <this document> under CID 4271, which resolves the comment in the direction suggested by the commenter. |

It appears that the text already specifies the requested behavior, at 1718.52:

"The QoS AP shall announce the EDCA parameters in selected Beacon frames and in all Probe Response and (Re)Association Response frames by the inclusion of the EDCA Parameter Set element using the information from the MIB entries in dot11ECDATable."

However, the MIB variable is misspelled as E**C**DA table, which should be ED**C**A table. So one change is to fix this spelling.

The description of dot11EDCATable at 4175.42 reads as follows:

"Conceptual table for EDCA default parameter values at a non-AP STA. This table contains the four entries of the EDCA parameters corresponding to four possible ACs. Index 1 corresponds to AC\_BK, index 2 to AC\_BE, index 3 to AC\_VI, and index 4 to AC\_VO."

What is needed is to add that the AP uses this table for the advertised STA parameters, and also to add this the descriptions of the individual parameters.

The changes also improve consistency in the descriptions.

In going through these changes, it becomes clear that the MIB is in bad shape. Some MIB entries have default values, others don't. Some have units, others don't. Some variables are actually used, others are not. Some ranges make sense, others don't. The MIB is difficult to read, because it is a computer code. MIB names are also an issue, due to their non-spacing nature. And it appears that all of the information is already present in the main text, or certainly can be. And on top of all that, deprecated entries can never be deleted from the MIB...

Therefore, it appears that new amendments should not be adding to the MIB.

Changes:

1718.55, change "dot11ECDATable" to "dot11EDCATable".

4175.33, change as shown below:

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-- \* SMT EDCA Config TABLE

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dot11EDCATable OBJECT-TYPE

SYNTAX SEQUENCE OF Dot11EDCAEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Conceptual table for EDCA parameter values at a non-AP STA. This

table contains the four entries of the EDCA parameters corresponding to

four possible ACs. Index 1 corresponds to AC\_BK, index 2 to AC\_BE, index 3

to AC\_VI, and index 4 to AC\_VO.

An AP uses this table to select the values to advertise in the EDCA Parameter Set element."

REFERENCE

"IEEE Std 802.11-2012, 10.2.3.2 (HCF contention based channel access

(EDCA))"

::= { dot11mac 4 }

dot11EDCAEntry OBJECT-TYPE

SYNTAX Dot11EDCAEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An Entry (conceptual row) in the EDCA Table.

ifIndex - Each IEEE 802.11 interface is represented by an ifEntry.

Interface tables in this MIB module are indexed by ifIndex."

INDEX { ifIndex, dot11EDCATableIndex }

::= { dot11EDCATable 1 }

Dot11EDCAEntry ::=

SEQUENCE {

dot11EDCATableIndex Unsigned32,

dot11EDCATableCWmin Unsigned32,

dot11EDCATableCWmax Unsigned32,

dot11EDCATableAIFSN Unsigned32,

dot11EDCATableTXOPLimit Unsigned32,

dot11EDCATableMSDULifetime Unsigned32,

dot11EDCATableMandatory TruthValue }

dot11EDCATableIndex OBJECT-TYPE

SYNTAX Unsigned32 (1..4)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The auxiliary variable used to identify instances of the columnar objects

in the EDCA Table. The value of this variable is

1, if the value of the AC is AC\_BK.

2, if the value of the AC is AC\_BE.

3, if the value of the AC is AC\_VI.

4, if the value of the AC is AC\_VO."

::= { dot11EDCAEntry 1 }

dot11EDCATableCWmin OBJECT-TYPE

SYNTAX Unsigned32 (0..32767)

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This is a status variable at a non-AP QoS STA and a control variable at a QoS AP.

At a QoS AP, it is written by an external management entity and used to select the value to advertise in the EDCA Parameter Set element.

At a non-AP QoS STA, it is written by the MAC upon receiving an EDCA Parameter Set element.

Changes take effect as soon as practical in the implementation.

This attribute specifies the value of the minimum size of the window that

is used by a STA for a particular AC for generating a random number for

the backoff. The value of this attribute is such that it could always be

expressed in the form of 2^X - 1(#2403), where X is an integer. See

Table 9-155 (Default EDCA Parameter Set element parameter values

if dot11OCBActivated is false or (11ah)the STA is a non-sensor STA) and

Table 9-156 (Default EDCA parameter set for STA operation if dot11OCBActivated

is true)."

::= { dot11EDCAEntry 2 }

dot11EDCATableCWmax OBJECT-TYPE

SYNTAX Unsigned32 (0..32767)

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This is a status variable at a non-AP QoS STA and a control variable at a QoS AP.

At a QoS AP, it is written by an external management entity and used to select the value to advertise in the EDCA Parameter Set element.

At a non-AP QoS STA, it is written by the MAC upon receiving an EDCA Parameter Set element.

Changes take effect as soon as practical in the implementation.

This attribute specifies the value of the maximum size of the window that

is used by a STA for a particular AC for generating a random number for

the backoff. The value of this attribute is such that it could always be

expressed in the form of 2^X - 1(#2403), where X is an integer. See

Table 9-155 (Default EDCA Parameter Set element parameter values

if dot11OCBActivated is false or (11ah)the STA is a non-sensor STA) and

Table 9-156 (Default EDCA parameter set for STA operation if dot11OCBActivated

is true)."

::= { dot11EDCAEntry 3 }

dot11EDCATableAIFSN OBJECT-TYPE

SYNTAX Unsigned32 (2..15)

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This is a status variable at a non-AP QoS STA and a control variable at a QoS AP.

At a QoS AP, it is written by an external management entity and used to select the value to advertise in the EDCA Parameter Set element.

At a non-AP QoS STA, it is written by the MAC upon receiving an EDCA Parameter Set element.

Changes take effect as soon as practical in the implementation.

This attribute specifies the number of slots, after a SIFS, that the STA,

for a particular AC, senses the medium idle either before transmitting or

executing a backoff. See Table 9-155 (Default EDCA Parameter Set element

parameter values if dot11OCBActivated is false or (11ah)the STA is a nonsensor

STA) and Table 9-156 (Default EDCA parameter set for STA operation

if dot11OCBActivated is true)."

::= { dot11EDCAEntry 4 }

dot11EDCATableTXOPLimit OBJECT-TYPE

SYNTAX Unsigned32 (0..65535)

UNITS "32 microseconds"

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This is a status variable at a non-AP QoS STA and a control variable at a QoS AP.

At a QoS AP, it is written by an external management entity and used to select the value to advertise in the EDCA Parameter Set element.

At a non-AP QoS STA, it is written by the MAC upon receiving an EDCA Parameter Set element.

Changes take effect as soon as practical in the implementation.

This attribute specifies the maximum duration of an EDCA TXOP for a given

AC, for a non-AP non-OCB STA. The default value for this attribute is

given (in different units) in Table 9-155 (Default EDCA Parameter Set element

parameter values if dot11OCBActivated is false or (11ah)the STA is a

non-sensor STA).

REFERENCE IEEE Std 802.11-2016, 9.4.2.28 (EDCA Parameter Set element)"

::= { dot11EDCAEntry 5 }

dot11EDCATableMSDULifetime OBJECT-TYPE

SYNTAX Unsigned32 (0.. 4294967295)

UNITS "TUs"

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This is a control variable at a non-AP STA.

It is written by an external management entity.

Changes take effect as soon as practical in the implementation.

This attribute specifies the maximum duration an MSDU, for a given AC,

would be retained by the MAC before it is discarded."

DEFVAL { 500 }

::= { dot11EDCAEntry 6 }

dot11EDCATableMandatory OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This is a status variable at a non-AP QoS STA and a control variable at a QoS AP.

At a QoS AP, it is written by an external management entity and used to select the value to advertise in the EDCA Parameter Set element.

At a non-AP QoS STA, it is written by the MAC upon receiving an EDCA Parameter Set element.

Changes take effect as soon as practical in the implementation.

This attribute, when true, indicates that admission control is mandatory

for the given AC. When false, this attribute indicates that admission

control is not mandatory for the given AC."

DEFVAL { false }

::= { dot11EDCAEntry 7 }

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- \* End of SMT EDCA Config TABLE

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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| CID 4416C.34176.RISON, Mark | dot11EDCATableCWmax, dot11EDCATableAIFSN, dot11EDCATableMSDULifetime and dot11EDCATableMandatory should be read-only, like the other members of Dot11EDCAEntry | Change "MAX-ACCESS read-write" to "MAX-ACCESS read-only" for these MIB attributes | Revised - Instead of making these entries read-only, extend the dot11EDCATable MIB attributes so they can also be used at the AP to define the EDCA parameters to be communicated to the non-AP STAs. Make the changes specified in <this document> for CID 4271. |

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| CID 428910.23.2.71834.11RISON, Mark | "Frames from a higher priority AC may be included when at least one frame from the primary AC has been transmitted and all frames from the primary AC have been transmitted. [...] Frames from the primary AC shall be transmitted first." -- is this desirable? Shouldn't higher-priority frames go out first (while meeting the restrictions on EDCA TXOP sharing)? As long as all the primary AC traffic is put in the first PPDU (otherwise it might not go out at all, if the first PPDU is not received), this doesn't impair fairness w.r.t. other STAs | Change the cited text to "Frames from a higher priority AC may be included when at least one frame from the primary AC is transmitted in the first PPDU of the TXOP and all frames from the primary AC are transmitted in the first PPDU of the TXOP. [...]" (delete the "Frames from the primary AC shall be transmitted first.") | Rejected - It is not possible to send MPDUs from two ACs within an A-MPDU in REVmd. This proposal might be submitted to 11ax.(was: Revised - agree with the comment.1834.11 change to"Frames from a higher priority AC may be included when at least one frame from the primary AC will be transmitted and all frames from the primary AC will have been transmitted."1834.18 delete "Frames from the primary AC shall be transmitted first.") |

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| CID 4291.RISON, Mark | CID 2262 got rid of the PCF, but there are still lots of "+CF-Poll", "QoS CF-Poll", "CF-Ack", etc., which are only used under the PCF. There is also still a CF pollable definition and dot11QosCFPolls\* MIB variables. These all need to go | As it says in the comment | Revised - agree with the comment. Implement changes in <this document> under CID 4291, which corrects some vestigial occurrences of the PCF frame formats, mainly in the PICS. |

1775.35

Delete the brackets around "QoS" (3x).

3603.19

Change the following PICS items to reserved:

FT19 Data +CF-Ack

FT20 Data +CF-Poll

FT21 Data +CF-Ack + CF-Poll

FT23 CF-Ack (no data)

FT24 CF-Poll (no data)

FT25 CF-Ack +CF-Poll (no data)

3611.9

FR19 Data +CF-Ack

FR20 Data +CF-Poll

FR21 Data +CF-Ack + CF-Poll

FR23 CF-Ack (no data)

FR24 CF-Poll (no data)

FR25 CF-Ack +CF-Poll (no data)

179.46 delete

contention free (CF) pollable: A station (STA) that is able to respond to a CF poll with a Data frame if such

a frame is queued and able to be generated.(M53)(#65)

782.18 delete

— Whereas (QoS) CF-Poll frame refers to the QoS CF-Poll frame, subtype 1110, and the CF-Poll

frame, subtype 0110.

Note to commenter: MIB attributes dot11QosCFPolls must not be deleted, because the QoS-CF Poll was not deleted (as opposed to CF-Poll).

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| CID 42949.2.4.5.1797.20RISON, Mark | "QoS Data and QoS Data +CF-Ack frames sent by non-AP STAs that are not a TPU buffer STA or a TPU sleep STA in a nonmesh BSS" doesn't work or isn't clear, since a mesh STA is "not a TPU buffer STA or a TPU sleep STA in a nonmesh BSS" | Change to "QoS Data and QoS Data +CF-Ack frames sent by nonmesh non-AP STAs that are not a TPU buffer STA or a TPU sleep STA". Change the next cell down to "QoS Null frames sent by nonmesh non-AP STAs that are not a TPU buffer STA or a TPU sleep STA" | Revised - 797.20 changeQoS Data and QoS Data +CF-Ack frames sent by non-AP STAs that are not a TPU buffer STA or a TPU sleep STA in a nonmesh BSStoQoS Data and QoS Data +CF-Ack frames sent in a nonmesh BSS by non-AP STAs that are not a TPU buffer STA or a TPU sleep STA797.28 changeQoS Null frames sent by non-AP STAs that are not a TPU buffer STA or a TPU sleep STA in a nonmesh BSStoQoS Null frames sent in a nonmesh BSS by non-AP STAs that are not a TPU buffer STA or a TPU sleep STAAt 797.36/40/45/48 delete "in a nonmesh BSS".was:Rejected - the limitation is to non-AP STAs in a nonmesh BSS, excluding TPU STAs. |

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| CID 4315.RISON, Mark | PCF was deleted, but some some vestigial PCF-related references remain:STAs in a non-DMG IBSS shall use information that is not in the CF Parameter Set element f) Modification of the CF Parameter Set element A mesh STA in a mesh BSS shall use information that is not in the CF Parameter Set element The attribute describes the number of DTIM intervals between the start of CFPs.The attribute describes the maximum duration of the CFP that may be generated by the PCF.In a non-AP STA, it is written by the MAC when it receives an updated CF Parameter Set in a Beacon frame. [2x]This attribute indicates the maximum amount of time that a point coordinator (PC) may control the usage of the wireless medium (WM) | As it says in the comment | Revised - agree with the comment. Make changes as shown in <this document> under CID 4315. |

review the original meaning of the sentences where the changes are made:

information that is [not in the CF Parameter Set element], etc.

or

that is not in the [CF Parameter Set element, etc.]

**11.1.3.7 Beacon reception**

2153.14 modify as shown.

STAs in a non-DMG IBSS shall use information in any received Beacon frame for which the IBSS subfield of the Capability field is 1, the content of the SSID element is equal to the SSID of the IBSS, and the TSF value is later than the receiving STA’s TSF timer. Use of this information is specified in 11.1.5 (Adjusting STA timers).

**11.2.3.15 TIM Broadcast**

2201.12 delete

f) Modification of the CF Parameter Set element

and renumber the remaining items accordingly.

**14.13.3.2 Beacon reception for mesh STA**

2851.30 modify as shown.

A mesh STA in a mesh BSS shall use information that is not in the Timestamp field, the Beacon Interval field, the Beacon Timing element, the MCCAOP Advertisement Overview element, or the MCCAOP Advertisement element in received Beacon frames only if the mesh STA maintains a mesh peering with the transmitter of the Beacon frame.

"The attribute describes the number of DTIM intervals between the start of CFPs." -- this sentence is found in dot11CFPPeriod, which is marked as deprecated. No edit required.

"The attribute describes the maximum duration of the CFP that may be generated by the PCF." -- this sentence is found in dot11CFPMaxDuration, which is marked as deprecated. No edit required.

"In a non-AP STA, it is written by the MAC when it receives an updated CF Parameter Set in a Beacon frame. [2x]" -- these are found in dot11CFPPeriod and dot11CFPMaxDuration, both of which are marked as deprecated. No edit required.

"This attribute indicates the maximum amount of time that a point coordinator (PC) may control the usage of the wireless medium (WM)." -- I could not find this item.

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| CID 432612.6.182640.41RISON, Mark | "NOTE 2---Because the IEEE 802.11 Null frame does not derive from an MA-UNITDATA.request primitive, it is not protected." -- the real reason is that there is nothing to protect. Some TDLS frames, for example, are not derived from MA-UNITDATA.requests, but are protected nonetheless. It's not clear what the point of this NOTE is anyway | Delete the cited text at the referenced location, and delete the " 1" immediately above | Accepted. |

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| CID 43459.4.2.157.31340.1RISON, Mark | It is not clear that the requirements in the NOTEs in Table 9-273--Setting of the Supported Channel Width Set subfield and Extended NSS BW Support subfield at a STA transmitting the VHT Capabilities Information field are normatively stated or implied elsewhere | Add the missing normative requirements somewhere | Rejected - insufficient detail. |

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| CID 4436.RISON, Mark | If we are keeping non-HT immediate block ack, we need to also cover HT-immediate block ack | Change 917.1 from "The Block Ack Policy subfield is set to 1 for immediate block ack" to "The Block Ack Policy subfield is set to 1 for immediate or HT-immediate block ack". At 1874.57 change "There are two types of block ack mechanisms: immediate and (#2289)HT-delayed. Immediate block" to "There are three types of block ack mechanisms: immediate, HT-immediate and (#2289)HT-delayed. Immediate and HT-immediate block". At 2266.55 change "immediate" to "HT-immediate". At 4404.22 change "HT-delayed or immediate block ack policy" to "HT-delayed, HT-immediate or immediate block ack policy" | Accepted.The changes look good to me, but are we indeed keeping non-HT immediate Block Ack?Non-HT block ack is currently marked as obsolete.Proposed resolution: reject. |

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| CID 443711.5.2.22266.52RISON, Mark | "examining its (#2289)Block Ack and Immediate Block Ack capability bits" -- neither of these bits exists! | Change "If the peer STA is a non-DMG STA, check whether the intended peer STA is capable of participating in the block ack mechanism by discovering and examining its (#2289)Block Ack and Immediate Block Ack capability bits. (11ah)If the peer STA is an S1G STA and the recipient is capable of participating in an immediate block ack(#1512) session" to "(11ah)If the peer STA is an S1G STA " | Accepted. |

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| CID 4438.RISON, Mark | There are no implementations of HT-delayed BA. HT-delayed BA is not useful, as it impairs throughput. Note: hypothetical use of HT-delayed BA by amendments to 802.11-202x is not relevant to REVmd | Delete the HT-delayed BA feature | In Orange County, majority in TGmd indicated that HT-delayed BA should be deleted.Graham Smith prepared a first go at the deletion. Menzo to review.Discussion required.HT-delayed BA was previsouly not deleted based on possible applicability in uni-directional links.Proposed resolution: reject. --> now revised, agree with the comment.The adopted resolution is in document 11-20/650r4. |

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| CID 4439.RISON, Mark | There are no implementations of HT-delayed BA. HT-delayed BA is not useful, as it impairs throughput. Note: hypothetical use of HT-delayed BA by amendments to 802.11-202x is not relevant to REVmd | Delete 10.25.7 HT-delayed block ack extensions | In Orange County, majority in TGmd indicated that HT-delayed BA should be deleted.Graham Smith prepared a first go at the deletion. Menzo to review.Discussion required.HT-delayed BA was previsouly not deleted based on possible applicability in uni-directional links.Proposed resolution: reject. --> now revised, agree with the comment.The adopted resolution is in document 11-20/650r4. |

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| CID 449411.4.62783.63RISON, Mark | There are 3 references to "the retryCounter" but such a thing is never defined | Change "the mesh STA shall initialise a retryCounter to 0" | Revised - At 2783.63, change"When ACTOPN event occurs, the mesh STA shall set the retryCounter to 0, and perform a sndOPN action. The retryTimer shall be set and the finite state machine shall transition to OPN\_SNT state."to"When ACTOPN event occurs, the mesh STA shall initialize a retryCounter to 0, and perform a sndOPN action. The retryTimer shall be set and the finite state machine shall transition to OPN\_SNT state."This change implements what the comment suggested. |

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| CID 449511.4.62783.63RISON, Mark | The retryCounter is set to 0 or incremented, but not used for anything else (e.g. never compared against a limit) | At 2783.63 delete "set the retryCounter to 0, and".At 2784.46 delete "and the retryCounter shall be incremented". At 2785.63 delete ", increment the retryCounter," | Revised - At 2781.40 change"TOR1—This event indicates that the retryTimer has expired and dot11MeshMaxRetries has not been reached. The Mesh Peering Open frame shall be resent, an action represented in the state machine table by setR."to"TOR1—This event indicates that the retryTimer has expired and the retryCounter is less than dot11MeshMaxRetries. The Mesh Peering Open frame shall be resent, an action represented in the state machine table by setR."At 2781.44 change"TOR2—This event indicates that the retryTimer has expired and dot11MeshMaxRetries has been reached. The mesh peering instance shall be closed when TOR2 occurs."to "TOR2—This event indicates that the retryTimer has expired and the retryCounter is equal to dot11MeshMaxRetries. The mesh peering instance shall be closed when TOR2 occurs."At 2792.62 change"TOR3—This event indicates that the retryTimer has expired, the dot11MeshMaxRetries has been reached, the AMPE is enabled, but the mesh STA failed to confirm the selection of the shared mesh"to "TOR3—This event indicates that the retryTimer has expired, the retryCounter is equal to dot11MeshMaxRetries, the AMPE is enabled, but the mesh STA failed to confirm the selection of the shared mesh"This change ties the TOR1, TOR2, TOR3 events to the retryCounter explicitly, rather than implicitly. |

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| CID 457310.23.2.21828.22RISON, Mark | In our discussion of CID 2359, why did we decide that if you backoff for reason e) you should double CW? Indeed, why backoff at all, if you've been using multiple protection? You've reserved the medium to TXNAV, so you might as well just try again after SIFS, if you want, no? Using more than this, or at least more than PIFS, is just wasteful | Add a para "If the transmission by the TXOP holder of an MPDU in a non-initial PPDU of a TXOP fails, as defined in this subclause, a STA may retransmit after SIFS and without invoking the backoff procedure if it used multiple protection and the retransmission does not cause TXNAV to be exceeded." after e) | Rejected - SIFS is not a possible interval because it takes at least PIFS to discover that the response frame is not received.Also, some implementations may need more time than PIFS to determine what to transmit next, in which case a backoff seems reasonable. |

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| CID 457410.23.2.21828.11RISON, Mark | "The transmission of the MPDU in the final PPDU transmitted by the TXOP holder during the TXOP for that AC has completed" -- has a number of issues:- what does "has completed" mean (just "has been put on the air, don't care about response if needs one"?)- what is the "AC was a primary AC" about? Presumably this is the MPDU at the start of the sentence?- so you start backoff immediately, even if you then transmit a secondary AC MPDU in the TXOP? Or you don't do backoff at all if the last MPDU you transmitted in the TXOP was a secondary AC MPDU?- what does "the MPDU in the final PPDU" mean if there is more than one MPDU in the final PPDU?- what if there isn't a TXNAV (i.e. multiple protection is not being used)?- so if the TXNAV timer has not expired you need to wait until it does and then do backoff? (More plausible than "you don't do backoff at all if the TXNAV hadn't expired at the same time as the "completion" of the last transmission!) | As it says in the comment | Revised -At 1828.11, change"b) The transmission of the MPDU in the final PPDU transmitted by the TXOP holder during the TXOP for that AC has completed and the TXNAV timer has expired, and the AC was a primary AC. (See 10.23.2.7 (Sharing an EDCA TXOP))."to"b) The transmission of the final PPDU transmitted by the TXOP holder during the TXOP has completed, and the TXNAV timer has expired. (See10.23.2.7 (Sharing an EDCA TXOP))."which resolves the comment in the direction suggested by the commenter.Mark Hamilton to review whether deleting "and the AC was a primary AC" is appropriate.The reasoning on the call was that the TXOP is an activity by a single EDCAF taking traffic from queues associated with other ACs, and not a primary EDCAF granting time to another EDCAF. Therefore, the AC is necessarily the primary AC, and this doe not need to be mentioned explicitly.See also 10.23.2.7 (Sharing an EDCA TXOP) at 1835.5. |

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| CID 4582.RISON, Mark | The definition of dot11EDCATableMSDULifetime (and QAP version) needs to allow for A-MSDUs and MMPDUs, since those are/can be sent under a particular AC. Also similarly change 1763.63 in 10.3.4.4 and dot11MaxTransmitMSDU Lifetime in C.3 | As it says in the comment | Already done (doc. 20/435).Rejected - Per the definition, dot11EDCATableMSDULifetime applies to MSDUs passed to the MAC and not to anything else:A QoS STA shall maintain a transmit MSDU timer for each MSDU passed to the MAC. dot11EDCATableMSDULifetime specifies the maximum amount of time allowed to transmit an MSDU for a given AC. The transmit MSDU timer shall be started when the MSDU is passed to the MAC.A-MSDUs are formed from MSDUs, so they don't need to be covered separately. MMPDUs will have their own lifetime, because no implementation will allow them to linger around forever. Discarding an internally generated MMPDU is different from discarding an externally delivered MSDU. |

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| CID 45843.2199.52RISON, Mark | Is there any such thing as "successful transmission" of RTS frames? The current definition does not allow for this (because it talks of acknowledgment/Ack frames) | Make the changes suggested after "Otherwise the following changes would be needed:" under CID 2418 in 19/0856 | Already done. |

From 856r12, CID 2418:

Discussion:

As the comment says, the concept of a “successful” exchange is never defined.

The concept of “successful” transmission is, however, well defined:

**successful transmission**: A transmission and the reception of its expected acknowledgment or a transmission for which no acknowledgment is expected.

An unsuccessful transmission is one where an Ack frame is not received from the STA addressed by the RA field of the transmitted frame and the value of the RA field is an individual address.

[Note: this doesn’t seem to cover RTS-CTS. Presumably this is fine, because the spec does not talk of successful transmission of RTS, only of the MSDU/MMPDU protected by the RTS. Otherwise the following changes would be needed:

**3.2 Definitions specific to IEEE Std 802.11**

**successful transmission**: A transmission and the reception of its expected immediate response~~acknowledgment~~ or a transmission for which no immediate response~~acknowledgment~~ is expected.

**10.3.4.3 Backoff procedure for DCF**

In the case of unsuccessful transmissions requiring an immediate ~~acknowledgment~~response(#1442), this backoff procedure shall begin at the end of the AckTimeout interval (as defined in 10.3.2.11 (Acknowledgment procedure)) or CTSTimeout interval (as defined in 10.3.2.9 (CTS and DMG CTS procedure)). An unsuccessful transmission is one where ~~an Ack~~a control response frame is not received from the STA addressed by the RA field of the transmitted frame and the value of the RA field is an individual address.

]

It would be better to always use this term when this is about transmission. For completion of some protocol, with the protocol completing without error, “successful[ly]” seems OK. For other cases, different wording should be used.

One of the instances is in 12.6.1.1.2 PMKSA (changes show possible edits):

When the PMKSA is the result of a successful IEEE 802.1X authentication, it is derived from the EAP authentication and authorization parameters provided by the AS. When the PMKSA is the result of a successful FILS authentication, it is generated as a result of the successful completion of the FILS exchange. When the PMKSA is the result of a successful SAE authentication, it is generated as a result of the successful completion of the SAE exchange. (M84)The PMKSA is created by the Supplicant’s SME when the EAP authentication ~~or~~, FILS authentication(11ai) or SAE authentication completes successfully, or when the PSK is configured. The PMKSA is created by the Authenticator’s SME when the PMK is created from the keying information transferred from the AS in an(11ai) IEEE 802.1X authentication exchange, ~~when the FILS authentication completes successfully(11ai),~~ when the FILS or SAE exchange successfully completes, or when the PSK is configured.

However, this seems to say the same thing three times, so simplifying this also addresses the issue.

Proposed changes:

Change D2.3 as follows:

**10.46.2.3 Usage of RDS**

A source REDS or destination REDS may change the transmission mode used in a relay link following ~~a~~ successful ~~exchange~~transmission of RLS Request and RLS Response frames as described in 11.35.2.4 (RLS procedure).

**12.6.1.1.2 PMKSA**

~~When the PMKSA is the result of a successful IEEE 802.1X authentication, it is derived from the EAP authentication and authorization parameters provided by the AS. When the PMKSA is the result of a successful SAE authentication, it is generated as a result of the successful completion of the SAE exchange. (M84)~~The PMKSA is created by the Authenticator’s SME and Supplicant’s SME when ~~the~~ EAP authentication, SAE authentication or FILS authentication(11ai) completes successfully, or when the PSK is configured. ~~The PMKSA is created by the Authenticator’s SME when the PMK is created from the keying information transferred from the AS in an(11ai) IEEE 802.1X authentication exchange, when the FILS authentication completes successfully(11ai), when the SAE exchange successfully completes, or when the PSK is configured.~~***<para break>***

When the negotiated AKM uses PMKID derivation with KCK as a parameter as defined in 12.7.1.3 (Pairwise key hierarchy), the PMKID derived from the KCK during the initial 4-way handshake is not changed during the lifetime of this PMKSA.(M84)

**13.10.2 Remote request broker (RRB)**

The target AP and the current AP ~~need to~~shall reside in the same mobility domain ~~to successfully exchange Remote Request frames~~.

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| CID 464910.3.RISON, Mark | There is lots of duplication between 10.3.3 Random backoff time and 10.3.4.3 Backoff procedure for DCF | Merge the two subclauses | Rejected for insufficient detail.It might be worth considering removing DCF and moving relevant parts to EDCA. But this will be a substantial effort.Discussion required.Proposed resolution: reject. |

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| CID 4699.RISON, Mark | "remaining TXOP duration" is not well-defined. Maybe it's just TXNAV? | As it says in the comment | Rejected - "remaining TXOP duration" is used in several locations, and the meaning seems clear. It is the time remaining in the TXOP.The time remaining is not necessarily the TXNAV, which might cover only the response frame.1847.36Data (44) - ACK (0) - Data (44) - ACK (0)Should be clarified that remaining TXOP duration is the time remaining before reaching the TXOP limit.Menzo to work on it.Figure 10-28 -- check the text on the far right (Nominal end of TXOP) and CF-End.Reassigned to Mark Rison |

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| CID *4703*.RISON, Mark | There are some places that are poorly worded and suggest the EDCA Parameter Set element is not always provided at association in a QoS BSS | As it says in the comment | Reassigned to Mark Rison.Rejected - the comment fails to identify a technical issue in sufficient detail. |

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| CID *4717*10.23.2.71834.4RISON, Mark | A figure is needed to illustrate higher-AC TXOP sharing with non-A-MPDUs, since there is considerable subtlety here | Copy Figure 10-27, keep the top unchanged except for making AC\_BE the primary and only having one frame in it, and then show below a sequence where the following are under a "TXOP" arrow: the striped BE frame, an Ack frame, the spotty VO frame, an Ack frame, the lowest VI frame and an Ack frame. At the end of the referenced subclause add "An illustration of TXOP sharing with frames from a higher-priority AC is shown in Figure 10-xx." | Reassigned to Mark Rison.Emily will send the figure to Mark Rison.Rejected - the comment fails to identify a technical issue in sufficient detail. |

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| CID *4718*10.23.2.71834.4RISON, Mark | A figure is needed to illustrate higher-AC TXOP sharing with A-MPDUs, since there is considerable subtlety here | Copy Figure 10-17, keep the top unchanged except for making AC\_BE the primary, and then show below a PPDU containing the two AC\_BE frames to STA-2 and then the AC\_VO frame to STA-2, followed by BA, BAR and BA. At the end of the referenced subclause add "An illustration of TXOP sharing with A-MPDUs is shown in Figure 10-yy." | Reassigned to Mark Rison.Emily will send the figure to Mark Rison.Rejected - the comment fails to identify a technical issue in sufficient detail. |

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| CID 4719.RISON, Mark | CID 1505 followup. This got rid of QLRC and QSRC, because they were not clearly specified and not actually implemented, but did not touch LRC and SLRC and SRC and SSRC, which suffer from the same problem. Note: DCF is not deprecated | Delete "LRC" and "SLRC" and "SRC" and "SSRC" throughout | Rejected - It might be possible to delete words from the draft, but the result would not necessarily be consistent. The comment provides insufficient detail to make a complete change.DCF was not cleaned up with respect to the retry counters because it is probably of little relevance in light of EDCA.Maybe this should be taken up in a larger effort to remove DCF and move relevant parts to EDCA.Discussion required. |

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| CID *4720*.RISON, Mark | CID 1505 follow-up. There are still references to short/long retry count(er) in 10.3.3: "The SSRC shall be incremented when any short retry count (SRC)" "The SLRC shall be incremented when any long retry count (LRC)" and in 11.8.3 "The short retry counter and long retry counter for the MSDU or A-MSDU are not affected."Also "A STA shall maintain a SRC and an LRC for each MSDU or MMPDU awaiting transmission." "The SRC for an MPDU [...]. This SRC and the SSRC shall be reset when [...]. The LRC for an MPDU [...]. This LRC and the SLRC shall be reset when""Retries for failed transmission attempts shall continue until the SRC for the MPDU [...] or until the LRC for the MPDU [...]" in 10.3.4.4. Note: DCF is not deprecated | Delete all references to short/long retry count(er)s throughout | Reassigned to Mark RisonRejected - It might be possible to delete words from the draft, but the result would not necessarily be consistent. The comment provides insufficient detail to make a complete change.DCF was not cleaned up with respect to the retry counters because it is probably of little relevance in light of EDCA.Maybe this should be taken up in a larger effort to remove DCF and move relevant parts to EDCA.Discussion required. |

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| CID 472912.RISON, Mark | WEP and TKIP should be removed from the standard | Delete 12.3.2 and 12.5.2 | Rejected -- WEP and TKIP are still in products and therefore should not be deleted from the spec at this point. |

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| CID 473012.RISON, Mark | WEP and TKIP should be removed from the standard | As it says in the comment | Rejected -- WEP and TKIP are still in products and therefore should not be deleted from the spec at this point. |

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| CID *4743*.RISON, Mark | There are references to "physical carrier sense", "virtual carrier sense" and "physical CS" and "virtual CS" but the terms are never defined.Use "CS" rather than "carrier sense" except when defined etc.The terms PHYCS and PHYED are defined but barely used.There is a zoo of inconsistent terminology for "carrier sense", whch makes it hard to understand exactly what is meant where and how the various PHYs compare: CS, CCA, CS/CCA, energy detect, ED, PHYED, CCA-ED, CCA Mode 1-5."CCA-ED" just confuses everyone, because everyone thinks it means CCA using ED, when in fact it means some wacko mode of operation in wacky regulatory domains/bands.There are also issues of editorial and technical consistency between the PHYs. | As it says in the comment | Submission required.Reassigned to Mark Rison.In bin for insufficient detail. |

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| CID *4750*.RISON, Mark | Discussions related to CID 7592 and 7593 in mc have revealed that the description of legacy PS and U-APSD is hopelessly muddled in terms of things like how PS-Polls operate for U-APSD and duplication of statements and consistency of description | Refactor the wording | Submission required.Reassigned to Mark RisonIn bin for insufficient detail. |

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| CID *4754*10.6.RISON, Mark | The multirate rules are an impenetrable mess. It's impossible to determine whether they are complete, let alone whether they are correct | Rewrite as a flowchart or table, so that it can be seen that the rules are complete and correct | Submission required.Reassigned to Mark RisonIn bin for insufficient detail. |

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| CID 4756.RISON, Mark | There seem to be at least three flavours of awake window: mesh, TDLS and DMG (and there has been a suggestion in TGmd that there are also IBSS awake windows, though the term does not appear). The first seems to be so denoted, but the others not | Add "TDLS" or "DMG" before "awake window" where "mesh" is not present there | 11.2.3.12 TDLS peer power save modeClause 11.2.3.12 defines a TDLS Peer PSM Awake Window and further refers to it as Awake Window within the clause. "The timing of the periodic schedule of the TDLS Peer PSM Awake Windows is based on the Offset field, the Interval field ...."This seems fine.The DMG awake window is likely also confined to DMG clauses, so there is little chance for confusion there either.Proposed resolution: reject.In bin for insufficient detail. |

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| CID **4761**10.191816.41Sun, Li-Hsiang | the formula dec(BSSID[39:47]) is1) inconsistent with the definition on p152: "dec(A[b:c]) is the cast from binary to decimal operator, where c is the least significant bit in binary value [b:c]". Bit 47 should be MSB not LSB2) inconsistent with NOTE1 on p1817, where bit 47 is indeed calculated as MSB | Either fix all the dec() on p1816 and p1817, or revise the definition on p152 and NOTE1 on p1817 | Work is progressing on this one. |

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| CID **4725**10.3.4.4.RISON, Mark | We don't have unlucky packets, just unlucky connections. The next packet to a given peer is just as likely to fail as the previous given the same Tx vector. It makes sense to have a Tx lifetime per AC as delivering a late real-time packet is a worthless whereas best effort frames should be retried until the link times out, but for a given AC there's no point hitting a retry limit and then just moving on to the next packet to that AC+destination. | In 10.3.4.4 change "Error recovery shall be attempted by retrying transmissions for frame exchange sequences that the initiating STA infers have failed. Retries shall continue, for each failing frame exchange sequence, until the transmission is successful, or until the relevant retry limit is reached, whichever occurs first." to "Error recovery shall be attempted by retrying transmissions for frame exchange sequences that the initiating STA infers have failed. Retries shall continue, for each failing frame exchange sequence, until the transmission is successful, or until the relevant lifetime is reached, whichever occurs first.". In 10.24.2.12.1 delete from "Retries for failed transmission attempts shall continue until one or more of the following conditions occurs:" to "When any of these limits is reached, retry attempts shall cease, and the MSDU, A-MSDU, or MMPDU shall be discarded." inclusive | Revised - At 1763.38 add "or lifetime" after "retry limit".(This effectively makes the following change in 10.3.4.4:"Error recovery shall be attempted by retrying transmissions for frame exchange sequences that the initiating STA infers have failed. Retries shall continue, for each failing frame exchange sequence, until the transmission is successful, or until the relevant retry limit is reached, whichever occurs first." to "Error recovery shall be attempted by retrying transmissions for frame exchange sequences that the initiating STA infers have failed. Retries shall continue, for each failing frame exchange sequence, until the transmission is successful, or until the relevant retry limit or lifetime is reached, whichever occurs first.".)[Review to make sure that either way would still be allowed, retry limit or lifetime.]-- this seems fine.[Add a note that retry limit can be interpreted also to mean a lifetime with respect to retrying frames.]-- not sure why a note would need to be added.[The proposed deletion of the items in 10.23.2.12.1 would take a lot of detail out of EDCA, which may not be desired.]-- this detail associates the appropriate retry limit with the specific frame an MIB variable, so it should not be deleted. |

The related text in 10.23.2.12 is the following, with the proposed deletion in italics:

**10.23.2.12 (Retransmit procedures)**

A QoS STA shall maintain a transmit MSDU timer for each MSDU passed to the MAC. dot11EDCATableMSDULifetime specifies the maximum amount of time allowed to transmit an MSDU for a given AC. The transmit MSDU timer shall be started when the MSDU is passed to the MAC.

When A-MSDU aggregation is used, the HT STA maintains a single timer for the whole A-MSDU. The timer is restarted each time an MSDU is added to the A-MSDU. The result of this procedure is that no MSDU in the A-MSDU is discarded before a period of dot11EDCATableMSDULifetime has elapsed.

*Retries for failed transmission attempts shall continue until one or more of the following conditions occur:*

*—The frame retry count for the MSDU, A-MSDU, or MMPDU is equal to dot11ShortRetryLimit.*

*—The drop-eligible frame retry count for the MSDU, A-MSDU, or MMPDU is equal to dot11ShortDEIRetryLimit.*

*—The unsolicited frame retry count for the A-MSDU is equal to dot11UnsolicitedRetryLimit.*

*—The transmit MSDU timer for the MSDU or any undelivered fragments of that MSDU exceeds dot11EDCATableMSDULifetime.*

*When any of these limits is reached, retry attempts shall cease, and the associated MSDU, A-MSDU, or MMPDU shall be discarded.*

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| CID **4762**9.4.2.157.31340.44Sun, Li-Hsiang | Suggest to add reference to Table 11-25 so the meaning of this table and the field 'Supported Channel Width Set' is clearNot clear why row ('Supported Channel Width Set', 'Ext NSS BW Support') = (0,1), (1,0) are neededFor example, for 160MHz BSS, row (0,1) and (0,2) are equivalent, and should just be signaled as (0,2) | Add reference to Table 11-25delete rows (0,1), (1,0) or mark them as deprecatedDelete the text '1' and 'CCFS1' in row (1,2) column 6 and 8 | Revised.At 1340.56, at the bottom of Table 9-272, add a Note as follows:"NOTE 12—See also 11.39 (VHT BSS operation)."Table 9-272 enables extended NSS BW support, which implies support for example for a 160 MHz channel width at half the number of spatial streams relative to the 80 MHz channel width (and several similar options). Devices that are not extended NSS BW capable will be able to operate only at 80 MHz in this case, but devices that are extended NSS BW capable can also operate at 160 MHz.With respect to the proposed items in the comment:-- "Add reference to Table 11-25":Table 11-25 specifies the CCFS values based on the value of the VHT Operation element Channel Width field in combination with the (extended) VHT NSS support indicated in Table 9-272.It might indeed be good to cross reference to 11.39 (VHT BSS operation) as a whole from Table 9-272. This clause contains tables 11-24 and 11-25, and references the capabilities conveyed in Table 9-272. The editing instruction to add this reference is uncluded in the resolution for this comment.-- "delete rows (0,1), (1,0) or mark them as deprecated":The difference between row (0, 1) and (0, 2) is 1/2 NSS support in 80+80. This difference is indeed not relevant for 160 MHz operation, but it is relevant for 80+80 MHz operation. Therefore row (0,1) should not be deleted.The difference between row (1, 0) and (1, 1) is 1/2 NSS support in 80+80. The same reasoning applies here.A STA that is not capable of 80+80 would use (0, 1) or (1, 0) and not (0, 2) or (1, 1). Therefore, if the current channel width is 80+80, and the STA associates, the AP knows what support the STA will have by looking at these bits.See also Note 11 at Table 9-272:"NOTE 11—A receiving STA in which dot11VHTExtendedNSSBWCapable is false will ignore the Extended NSS BW Support subfield and effectively evaluate this table only at the entries where Extended NSS BW Support is 0."-- "Delete the text "1" and "CCFS1" in row (1,2) column 6 and 8":This requested change is not explained in the comment, but it requests for deleting the full NSS 160 MHz capability when the 80+80 MHz capability is 3/4s. It is not clear why this capability should be deleted.Maybe the commenter interpreted Table 9-272 as operating values, but they are capability values. |

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| CID 476310.42.2.3.32034.36Sun, Li-Hsiang | including any LBIFS if required', but on L23, it says each SSW is separated by SBIFS | remove ''including any LBIFS if required' |  |

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| CID **4764**9.4.2.561185.40Sun, Li-Hsiang | Suggest to add reference to Table 11-25 | as in comment | Revised.1185.41, before "and" insert ", 11.39 (VHT BSS operation)". |

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| CID **4811**9.4.2.361151.5Hamilton, Mark | The signaling of the channel center frequency segments in the Wide Bandwidth Channel Switch subelement of a Neighbor Report doesn't align with that of the VHT Operation element. The "original" and now deprecated signaling is still there. | Update Table 9-175 to reflect the "new" signaling. A possible approach is to include the HT Operation element Channel Width, the VHT Operation element Channel Width, CCFS0, CCFS1, CCFS2 and refer to Tables 9-274 and 11-25. | Revised.Make changes as specified in <this document> at CID 4811, which implements the request made in the comment. |

***1150.45 replace the last 3 fields of the Wide Bandwidth Channel subelement format with the following 5 fields:***

STA Channel Width (1 octet)

Channel Width (1 octet)

CCFS0 (1 octet)

CCFS1 (1 octet)

CCFS2 (1 octet)

***1150.56 replace***

The Channel Width, Channel Center Frequency Segment 0, and Channel Center Frequency Segment 1 subfields are defined in Table 9-175 (HT/VHT Operation Information subfields).

***with***

The STA Channel Width field is defined in Table 9-190 (HT Operation element fields and subfields).

The Channel Width field is defined in Table 9-274 (VHT Operation Information subfields).

The CCFS0 field is defined in Table 9-274 (VHT Operation Information subfields).

The CCFS1 field is defined in Table 9-274 (VHT Operation Information subfields).

The CCFS2 field is defined in Table 9-190 (HT Operation element fields and subfields).

***1151.1 delete Table 9-175 (HT/VHT Operation Information subfields)***

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| CID x10.36.5.21958.35Wentink, Menzo | This is an editorial comment that came out of the review of the HE sounding protocol, but is related to VHT. The cited sentence contains "and nor", which should be "nor":"A VHT beamformee that transmits VHT compressed beamforming feedback(#1367) shall include neither the VHT Compressed Beamforming Report information and nor the MU Exclusive Beamforming Report information if the transmission duration of the PPDU carrying the VHT Compressed Beamforming Report information and any MU Exclusive Beamforming Report information would exceed the maximum PPDU duration."This comment has no CID. | 1958.35 replace"A VHT beamformee that transmits VHT compressed beamforming feedback(#1367) shall include neither the VHT Compressed Beamforming Report information and nor the MU Exclusive Beamforming Report information if the transmission duration of the PPDU carrying the VHT Compressed Beamforming Report information and any MU Exclusive Beamforming Report information would exceed the maximum PPDU duration."with"A VHT beamformee that transmits VHT compressed beamforming feedback(#1367) shall include neither the VHT Compressed Beamforming Report information nor the MU Exclusive Beamforming Report information, if the transmission duration of the PPDU carrying the VHT Compressed Beamforming Report information and any MU Exclusive Beamforming Report information would exceed the maximum PPDU duration." | Accepted |

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| CID 444410.23.3.2.21001.3Rison, Mark | "When the HC needs access to the WM to start a TXOP, the HC shall sense the WM. When the WM is determined to be idle at the TxPIFS slot boundary as defined in 10.3.7 (DCF timing relations), the HC shall transmit the first frame of any permitted frame exchange sequence, with the duration value set to cover the TXOP."This seems to allow any AP that claims to support HCCA to always transmit after PIFS, even if the access is not for HCCA. The permission to use PIFS should be constrained to HCCA contexts" | As it says in the comment | This comment has been resolved by Graham Smith, see document 11-20/367r7.See also document 11-20/1038r0, which discusses splitting EDCA and HCCA. |