IEEE P802.11
Wireless LANs

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| Proposed resolutions LB173 SCS Comments |
| Date: 2011-03-07 |
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Abstract

This document contains proposed text changes to address the comments from LB173 in the SCS category. This document is based upon P802.11aa D3.01. Changes are shown using Word’s change tracking feature. Changes have (#CID) tags to indicate which comment they address. The first use of the (#CID) tag has a Word comment giving the commenter’s comment and suggested resolution.

**4.3.aa12.2 Stream Classification Service**

The stream classification service (SCS) enables the establishment of a classification using layer 2 and/or layer 3 signaling to match incoming unicast MSDUs. Once classified, unicast MSDUs matching the classification are assigned to an access category and are tagged with their drop eligibility. When intra-access category(prioritization is enabled (see ) SCS allows MSDUs matching the classification(#2001) to be assigned to the primary or alternate EDCA transmit queues, so that finer grained prioritization can be applied.

8.2.4.6 HT Control field

Change as shown:

EDITORIAL NOTE— this figure replaces reserved bit 29 with a DEI bit field.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | B0 | B15 | B16 | B17 | B18 | B19 | B20 | B21 | B22 | B23 | B24 | B25 | B28 | B29 | B30 | B31 |
|  | Link Adaptation Control | Calibration Position | Calibration Sequence | Reserved | CSI / Steering | NDP Announcement | Reserved | DEI | AC Constraint | RDG/More PPDU |
| Bits | 16 | 2 | 2 | 2 | 2 | 1 | 4 | 1 | 1 | 1 |
| **Figure 8-5—HT Control field** |

 Insert the following paragraph after the 10th paragraph of :

The DEI subfield is 1 bit in length and is used by the transmitting STA to indicate if the corresponding MSDU, A-MSDU(#2317), or fragment thereof, is eligible to be discarded if there are insufficient resources at the receiving STA. The DEI subfield is set to 1 to indicate that the MSDU, A-MSDU, or fragment thereof is eligible to be discarded and set to zero to indicate that the MSDU, A-MSDU or fragment thereof is not eligible for discarding, or that its eligibility is unknown(#2093). In an MMPDU the DEI subfield is reserved. The mechanisms for determining whether the resources are insufficient or when to discard MSDUs, A-MSDUs, or fragments thereof(#2317) are beyond the scope of this standard.

8.4.2 Information elements

Insert the following additional Element IDs <ANA> rows before the “Reserved” entry of Table 8-51 and adjust the “Reserved” entries as appropriate (note that the entire table is not shown here):

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| Table 8-51—Element IDs |
| Information Element | Element ID | Length (in octets) | Extensible |
| Intra-access Category Priority (see )  | <ANA> | 3(#2311) | Yes |
| SCS Descriptor (see )  | <ANA> | 4(#2312) to 257 | Yes |
| QLoad Report (see 7.3.2.aa93) | <ANA> | 12 - 44 | Yes |
| HCCA TXOP Update Count (see 7.3.2.aa94)  | <ANA> | 3 | No |
| Higher Layer Stream ID (See 7.3.2.aa95)  | <ANA> | Variable | Yes |

9. MAC sublayer functional description

9.2 MAC architecture

9.2.4 Hybrid coordination function (HCF)

9.2.4.2 HCF contention-based channel access (EDCA)

Change the first paragraph of as follows:

The EDCA mechanism provides differentiated, distributed access to the WM for STAs using eight different UPs. The EDCA mechanism defines four access categories (ACs) that provide support for the delivery of traffic with UPs at the STAs. The AC is derived from the UPs as shown in Table 9-1 and Table 9-aa1. Table 9-1 is used when dot11AlternateEDCAActivated is false or not present. Table 9-aa1 is used when dot11AlternateEDCAActivated is true.

Change Table 9-1 as follows:

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| Table 9-1 – UP-to-AC mappings (dot11AlternateEDCAActivated false or not present) |
| Priority  | UP (Same as 802.1D user priority) | 802.1D designation | AC Queue | Designation (informative) |
| Lowest | 1 | BK | AC\_BK | Background |
|  | 2 | - | AC\_BK | Background |
|  | 0 | BE | AC\_BE | Best Effort |
|  | 3 | EE | AC\_BE | Best Effort |
|  | 4 | CL | AC\_VI | Video |
|  | 5 | VI | AC\_VI | Video |
|  | 6 | VO | AC\_VO | Voice |
| Highest | 7 | NC | AC\_VO | Voice |

Insert Table 9-aa1 after Table 9-1:

|  |
| --- |
| Table 9-aa1 – UP-to-AC mappings (dot11AlternateEDCAActivated true) |
| Priority  | UP (Same as 802.1D user priority) | 802.1D designation | AC Queue | Designation (informative) |
| Lowest | 1 | BK | AC\_BK | Background |
|  | 2 | - | AC\_BK | Background |
|  | 0 | BE | AC\_BE | Best Effort |
|  | 3 | EE | AC\_BE | Best Effort |
|  | 4 | CL | AAC\_VI(#2319) | Video (alternate) |
|  | 5 | VI | AC\_VI | Video (primary) |
|  | 6 | VO | AAC\_VO | Voice (alternate) |
| Highest | 7 | NC | AC\_VO | Voice (primary) |

Insert the following paragraphs at the end of

The AAC\_VI and AAC\_VO queues share the same EDCAF as AC\_VI and AC\_VO respectively. When dot11AlternateEDCAActivated is true, there is a scheduling function above the VI and VO EDCAFs that selects an MSDU, an A-MSDU(#2320) or an MMPDU from the primary and alternate queues(#2017). The default algorithm to prioritize between MSDU, A-MSDU(#2320) and MMPDU in the AAC\_VI and AC\_VI queues, and between MSDU, A-MSDU and MMPDU in the AAC\_VO and AC\_VO queues, is:

1. For each EDCAF, an MSDU, A-MSDU or MMPDU is selected for transmission using the transmission selection procedures defined in 8.6.8 of IEEE P802.1Qav using two queues, the primary and alternate.
2. For a given AC queue, the order in which frames are selected for transmission shall maintain the requirements specified in 9.8.

Alternative prioritization algorithms that meet the requirements of 9.8 may be used.

Once an MSDU, A-MSDU or MMPDU has been selected from the primary or alternate queue, it is appended to the QVI or QVO intermediate queue. The QVO intermediate queue is used for MSDUs, A-MSDUs and MMPDUs selected from the AAC\_VO and AC\_VO transmit queues. The QVI intermediate queue is used for MSDUs, A-MSDUs and MMPDUs selected from the AAC\_VI and AC\_VI transmit queues. Each of the QVI and QVO intermediate queues shall contain at most dot11IntermediateQueueLength MSDUs, A-MSDUs or MMPDUs. MSDUs, A-MSDUs and MMPDUs in the intermediate queues shall not be re-ordered, except when an MSDU, A-MSDU or MMPDU is removed from an intermediate queue and discarded due to reaching its lifetime or retry limit.(#2096)

MSDUs, A-MSDUs and MMPDUs assigned to AAC\_VI use the VI EDCAF and use the same parameters to control its operation as AC\_VI. MSDUs, A-MSDUs and MMPDUs assigned to AAC\_VO use the VO EDCAF and use the same parameters to control its operation as AC\_VO.

The dot11QosMPDUsReceivedCount[VO] shall be incremented for each received MPDU with a TID field that indicates the AC\_VO or the AAC\_VO UP. The dot11QosMPDUsReceivedCount[VI] shall be incremented for each received MPDU with a TID field that indicates the AC\_VI or the AAC\_VI UP. The dot11QosTransmittedFrameCount[VO] shall be incremented for each transmitted MSDU with a TID field that indicates the AC\_VO or the AAC\_VO UP. The dot11QosTransmittedFrameCount[VI] shall be incremented for each transmitted MSDU with a TID field that indicates the AC\_VI or the AAC\_VI UP.(#2350)

9.9 HT Control field operation

Add the following paragraph to the end of 9.9 (#2316)

When dot11AlternateEDCAImplemented is set to true STA shall set dot11HTControlFieldSupported to true.

9.19 HCF

9.19.2 HCF contention-based channel access (EDCA)

9.19.2.1 Reference implementation

Change the second paragraph of 9.19.2.1 as follows:

A model of the reference implementation is shown in Figure 9-19 when dot11AlternateEDCAActivated is false or not present and in Figure 9-17aa when dot11AlternateEDCAActivated is true, and illustrates a mapping from frame type or UP to AC: the four AC transmit queues and the four independent EDCAFs, one for each queue. The mapping of UP to the AC and the mapping of AC to EDCAF are is described in , and Table 9-1, and Table 9-1aa. The mapping of frame types to ACs is described in .

***Change title of Figure 9-19 as shown:***

**Figure 9-19—Reference implementation model when dot11AlternateEDCAActived is false or not present**

Insert Figure 9-aa17 after Figure 9-19:

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**Figure 9-aa17—Reference implementation model when dot11AlternateEDCAActivated is true.**

9.19.2.6 Retransmit procedures

Change the first paragraph of 9.19.2.6 as indicated:

QoS STAs shall maintain a short retry counter and a long retry counter for each MSDU, A-MSDU, or MMPDU that belongs to a TC requiring acknowledgment. The initial value for the short and long retry counters shall be zero. QoS STAs also maintain a short retry counter and a long retry counter for each AC. They are defined as QSRC[AC] and QLRC[AC], respectively, and each is initialized to a value of zero.

Change the second paragraph of 9.19.2.6 and divide it in to five paragraphs as indicated:

After transmitting a frame that requires an immediate acknowledgment, the STA shall perform eitherof the acknowledgment procedures, as appropriate, that are defined in 9.3.2.9 (ACK procedure) and 9.20.3 (Data and acknowledgment transfer using immediate Block Ack policy and delayed Block Ack policy). The short retry count for an MSDU or A-MSDU that is not part of a Block Ack agreement or for an MMPDU shall be incremented every time transmission of a frame of length less than or equal to dot11RTSThreshold fails for that MSDU, A-MSDU, or MMPDU.(#2282)

QSRC[AC] shall be incremented every time transmission of an A-MPDU or frame of length less than or equal to dot11RTSThreshold fails, regardless of the presence or value of the DEI field. When dot11RobustAVStreamingImplemented is true, QSDRC[AC] shall be incremented every time transmission of an A-MPDU or frame in which(#2284) the HT Control field is present, the DEI field is set to 1 and the length of the frame is less than or equal to dot11RTSThreshold fails. This short retry count and the QoS STA QSRC[AC] shall be reset when an A-MPDU or frame of length less than or equal to dot11RTSThreshold succeeds. When dot11RobustAVStreamingImplemented is true, QSDRC[AC] shall be reset when an A-MPDU or frame of length less than or equal to dot11RTSThreshold succeeds, regardless of the presence or value of the DEI field.

The long retry count for an MSDU or A-MSDU that is not part of a Block Ack agreement or for an MMPDU shall be incremented every time transmission of a MAC frame of length greater than dot11RTSThreshold fails for that MSDU, A-MSDU, or MMPDU. (#2282)

QLRC[AC] shall be incremented every time transmission of an A-MPDU or frame of length greater than or equal to dot11RTSThreshold fails, regardless of the presence or value of the DEI field. This long retry count and the QLRC[AC] shall be reset when an A-MPDU or frame of length greater than dot11RTSThreshold succeeds. When dot11RobustAVStreamingImplemented is true, QLDRC[AC] shall be incremented every time transmission of an A-MPDU or frame of length greater than dot11RTSThreshold fails in which(#2285) the HT Control field is present and the DEI field is set to 1. The QLDRC[AC] shall be reset when an A-MPDU or frame of length greater than dot11RTSThreshold succeeds, regardless of the presence or value of the DEI field.

All retransmission attempts for an MPDU that is not sent under a Block Ack agreement and that has failed the acknowledgment procedure one or more times shall be made with the Retry field set to 1 in the data or management frame.

Change the third paragraphs of 9.19.2.6 as follows:

EDITORIAL NOTE: The change indicated below to the third paragraph also includes a change from a paragraph to a dashed list.

Retries for failed transmission attempts shall continue until:(#2287)

* the short retry count for the MSDU, AMSDU, or MMPDU is equal to dot11ShortRetryLimit, or
* until the long retry count for the MSDU, AMSDU, or MMPDU is equal to dot11LongRetryLimit, or
* (#2039)the short drop-eligible retry count for the MSDU, AMSDU, or MMPDU is equal to dot11ShortDEIRetryLimit, or
* the long drop-eligible retry count for the MSDU, AMSDU, or MMPDU is equal to dot11LongDEIRetryLimit.

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

Change the fourth paragraphs of 9.19.2.6 as follows:

For internal collisions occurring with the EDCA access method, the appropriate retry counters (short retry counter for MSDU, A-MSDU, or MMPDU and QSRC[AC] or long retry counter for MSDU, AMSDU, or MMPDU and QLRC[AC]) are incremented. For internal collisions occurring with the EDCA access method where dot11RobustAVStreamingImplemented is true, the appropriate drop-eligible retry counters ( QSDRC[AC](#2282), and QLDRC[AC]) are incremented when the collision occurs for an MSDU, A-MSDU or MMPDU that has drop eligibility set to one. For transmissions that use Block Ack, the rules in (Data and acknowledgment transfer using immediate Block Ack policy and delayed Block Ack policy) also apply. STAs shall retry failed transmissions until the transmission is successful or until the relevant retry limit is reached.

10. MLME

10.ae1 Management Frame QoS

10.ae1.2 Management frame QoS policy configuration procedures

10.ae1.2.1 Management frame QoS policy configuration in a BSS (#2081)

Add the following paragraph to the end of 10.ae1.2.1

An AP for which dot11AlternateEDCAActivated is true shall not use the alternate video (AAC\_VI) nor alternate voice (AAC\_VO) queues in its MFQ policy.

Annex C

(normative)

ASN.1 encoding of the MAC and PHY MIB

dot11IntermediateQueueLength OBJECT-TYPE

SYNTAX INTEGER (1..32)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This is a capability variable.

Its value is determined by device capabilities.

This attribute indicates the maximum number of MSDUs, A-MSDUs and MPDUs in the QVI and QVO intermediate queues."

::= { dot11StationConfig <ANA> }

**References:**