IEEE P802.11
Wireless LANs

|  |
| --- |
| CC36 CR on 5196 and 7620 |
| Date: 2021-11-27 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Guogang Huang | Huawei |  |  | huangguogang1@huawei.com |
| Ming Gan |  |  |  |
| Yuchen Guo |  |  |  |
| Yunbo Li |  |  |  |
| Yiqing Li |  |  |  |
| Zhenguo Du |  |  |  |
| Rob Sun |  |  |  |
| Mengyao Ma |  |  |  |

Abstract

This submission contains proposed comment resolutions to comments on P802.11be D1.0.

CID 5196 and 7620 are resolved.

Revisions:

* Rev 0: Initial version of the document.
* Rev 1-3: Editorial changes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| CID | Page.Line | Clause Number | Comment | Proposed Change | Resolution |
| 5196 | 297.62 | 35.6 | need to define a QoS report for the low-latency traffic stream, maybe we can reuse the existing measurement report, e.g. Transmit Stream/Category Measurement Request/Report | As in comment | REVISEDAgreed in principle. The current Transmit Stream/Category Measurement Request/Report is modified to address the measurement for the low-latency traffic stream.Instructions to the editor:Please make the changes to the spec as shown in 11/21-1273r3 |
| 7620 |  |  | The MAC needs to be able to measure the delay of data delivery, from the time when data is passed from the upper layer till successful delivery at the peer MAC. This is fundamental to see if there is improvement in delay. | As in comment. | REVISEDAgreed in principle. The current Transmit Stream/Category Measurement Request/Report is modified to address the measurement for the low-latency traffic stream.Instructions to the editor:Please make the changes to the spec as shown in 11/21-1273r3 |

**Discussion:**

We have agreed that the SCS mechanisim is used by a STA to inform the AP of the QoS requirement of a low-latency traffic flow.

For a low-latency traffic identified by the SCSID, one important QoS parameter is the MSDU delivery ratio given the delay bound. In order to try to meet the QoS requirement, a corresponding measurement report needs to be defined. Thus the AP or AP MLD can take actions to improve the experienced QoS according to the received measurement report.

For simplicity, we prefer to reuse the current Transmit Stream/Category Measurement Request/Report to realize it.

***TGbe editor: Revise the following paragraph in 9.4.2.121 P1482L61 of draft REVme 0.0:***

For a non-EHT STA, the SCSID field is set to a nonzero value identifying the SCS stream specified in this SCS Descriptor element. For an EHT STA, the SCSID field is set to a nonzero value and the B0 of the SCSID field is always set to 1.

***TGbe editor: modify the following subclause after 9.4.2.20.11 of Draft REVme 0.0 as:***

9.4.2.20.11 Transmit Stream/Category Measurement Request

The Transmit Stream/Category Measurement applies to TIDs for traffic streams associated with TSPECs, to TIDs for traffic categories for QoS traffic without TSPECs and also to SCSIDs for SCS streams with QoS Characteristics element. The Measurement Request field corresponding to a Transmit Stream/Category Measurement request is shown in Figure 9-204 (Measurement Request field format for Transmit Stream/Category Measurement Request).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Randomization Interval | Measurement Duration | Peer STA Address | Traffic Identifier | Bin 0 Range | Optional Subelements |
| Octets: | 2 | 2 | 6 | 1 | 1 | variable |

**Figure 9-204 Measurement Request field format**

The Randomization Interval field is set to the maximum random delay in the measurement start time, in units of TUs. The use of the Randomization Interval field is described in 11.10.3 (Measurement start time). When requesting a triggered Transmit Stream/Category Measurement, the randomization interval is not used and the Randomization Interval field is reserved. See 11.10.9.8 (Transmit Stream/Category Measurement report).

The Measurement Duration subfield is set to the duration of the requested measurement, in units of TUs, except when setting up a triggered measurement, where it is set to 0.

The Peer STA Address contains a MAC address indicating the RA in the MSDUs to be measured.

The Traffic Identifier field contains the TID subfield as shown in Figure 9-205 (Traffic Identifier field format when the B0 is set to 0 (#2607)). When the B0 is set to 1, then the Traffic Identifier field contains an SCSID value.

|  |  |  |  |
| --- | --- | --- | --- |
|  | B0 | B1 B3 | B4 B7 |
|  | 0 | Reserved | TID |
| Bits: | 1 | 3 | 4 |

**Figure 9-205 Traffic Identifier field format when B0 is set to 0**

***TGbe editor: modify the following subclause after 9.4.2.20.11 of Draft REVme 0.0 as:***

Trigger Conditions is a bit-field that specifies reporting triggers when requesting a triggered transmit stream/category measurement. The format of the Trigger Conditions bit-field is shown in Figure 9-208 (Trigger Conditions bit-field format).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | B0 | B1 | B2 | B3 | B4 B7 |
|  | Average | Consecutive | Delay | MSDU Delivery Ratio | Reserved |
| Bits: | 1 | 1 | 1 | 1 | 4 |

**Figure 9-208 Trigger Condition bit-field format**

* The Average bit is set to 1 to request that a Transmit Stream/Category Measurement report be generated when the number of MSDUs for the TC or TS given by the TID that are discarded out of the number of preceding MSDUs specified in Measurement Count is greater than or equal to the value given in Average Error Threshold. MSDUs discarded due to the number of transmit attempts exceeding dot11ShortRetryLimit, or due to the MSDU lifetime having been reached, are counted.
* The Consecutive bit is set to 1 to request that a Transmit Stream/Category Measurement report be generated when the number of MSDUs for the TC or TS given by the TID that are discarded in succession is greater than or equal to the value given in Consecutive Error Threshold. MSDUs discarded due to the number of transmit attempts exceeding dot11ShortRetryLimit, or due to the MSDU lifetime having been reached, are counted.
* The Delay bit is set to 1 to request that a Transmit Stream/Category Measurement report be generated when the number of consecutive MSDUs for the TC or TS given by the TID that experience a transmit delay greater than or equal to the value specified in the Delay Threshold subfield is greater than or equal to the value given in Delayed MSDU Count. Delay is measured from the time the MSDU is passed to the MAC until the point at which the entire MSDU has been successfully transmitted, including receipt of the final Ack frame from the peer STA if the QoSAck service class is being used.

The MSDU Delivery Ratio bit is set to 1 to request that a Transmit Stream/Category Measurement report be generated when the experienced MSDU delivery ratio for the SCS stream given by the SCSID being lower than the value specified in the MSDU Delivery Ratio field in the QoS Characteristics element.

***TGbe editor: modify the following subclause after 9.4.2.20.11 of Draft REVme 0.0 as:***

The Measurement Count field contains a number of MSDUs. This value is used to calculate an average discard count for the average trigger condition and the MSDU delivery ratio trigger condition. It is also used in place of measurement duration in determining the scope of the reported results when a report is triggered; see 11.10.9.8 (Transmit Stream/Category Measurement report).

***TGbe editor: modify the following subclause after 9.4.2.21.11 of Draft REVme 0.0 as:***

9.4.2.21.11 Transmit Stream/Category Measurement Report

The Transmit Stream/Category Measurement report applies to TIDs for Traffic Streams associated with TSPECs , to TIDs for Traffic Categories for QoS traffic without TSPECs and also to SCSIDs for SCS streams with QoS Characteristics element. The format of the Measurement Report field corresponding to a Transmit Stream/Category Measurement report is shown in Figure 9-257 (Measurement Report field format for Transmit Stream/Category Measurement report).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Actual Measurement Start Time | Measurement Duration | Peer STA Address | Traffic Identifier | Reporting Reason | Transmitted MSDU Count |
| Octets: | 8 | 2 | 6 | 1 | 1 | 4 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | MSDU Discarded Count | MSDU Failed Count | MSDU Multiple Retry Count | QoS CF-Polls Lost Count | Average Queue Delay | Average Transmit Delay |
| Octets: | 4 | 4 | 4 | 4 | 4 | 4 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Bin 0 Range | Bin 0 | Bin 1 | Bin 2 | Bin 3 | Bin 4 | Bin 5 | Optional Subelements |
| Octets: | 1 | 4 | 4 | 4 | 4 | 4 | 4 | variable |

**Figure 9-257 Measurement Report field format for Transmit Stream/Category Measurement report**

The Actual Measurement Start Time field is set to the TSF at the time at which the measurement started, or for a triggered Transmit Stream/Category Measurement report, the TSF value at the reporting QoS STA when the trigger condition was met.

The Measurement Duration field is set to the duration over which the Transmit Stream/Category Measurement report was measured, in units of TUs. In a triggered Transmit Stream/Category Measurement report, metrics are reported over a number of transmitted MSDUs rather than a duration; hence Measurement Duration is set to 0; see 11.10.9.8 (Transmit Stream/Category Measurement report).

The Peer STA Address field contains a MAC address indicating the RA for the measured frames.

The Traffic Identifier field contains the TID subfield as shown in Figure 9-204 (Measurement Request field format for Transmit Stream/Category Measurement Request). The TID subfield indicates the TC or TS for which traffic was measured.

The Reporting Reason field is a bit field indicating the reason that the measuring QoS STA sent the transmit stream/category measurement report. The Reporting Reason field is shown in Figure 9-258 (Reporting Reason field format).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | B0 | B1 | B2 | B3 | B4 B7 |
|  | Average Trigger | Consecutive Trigger | Delay Trigger | MSDU Delivery Ratio Trigger | Reserved |
| Bits: | 1 | 1 | 1 | 1 | 4 |

**Figure 9-258 Reporting Reason field format**

* The Average Trigger bit set to 1 indicates that the Transmit Stream/Category Measurement report was generated as a triggered report due to the Average Error trigger.
* The Consecutive Trigger bit set to 1 indicates that the Transmit Stream/Category Measurement report was generated as a triggered report due to the Consecutive Error trigger.
* The Delay Trigger bit set to 1 indicates that the Transmit Stream/Category Measurement report was generated as a triggered report due to the delay exceeding the Delay Threshold.
* The MSDU Delivery Ratio Trigger bit set to 1 indicates that the Transmit Stream/Category Measurement report was generated as a triggered report due to the MSDU delivery ratio for the SCS stream given by the SCSID being lower than the value specified in the MSDU Delivery Ratio field in the QoS Characteristics element.

When a Transmit Stream/Category Measurement report is sent as a direct response to a Transmit Stream/Category Measurement request and not as a triggered Transmit Stream/Category Measurement report, all bit fields in the Reporting Reason field are set to 0. This is termed a requested Transmit Stream/Category Measurement report. Within a triggered Transmit Stream/Category Measurement report, more than one bit field in the Reporting Reason field might be set to 1 if more than one trigger condition was met.

The Transmitted MSDU Count, MSDU Failed Count, MSDU Discarded Count, MSDU Multiple Retry Count, QoS CF-Polls Lost Count, Average Queue Delay, Average Transmit Delay, and delay histogram fields relate to transmissions to the QoS STA given in the Peer STA Address field. Metrics are reported over the Measurement Duration, or for triggered transmit stream/category measurements, over the Measurement Count. Any counter that increments to a value of $2^{31}-1$ terminates the measurement.

The Transmitted MSDU Count field contains the number of MSDUs for the TC or the TS specified by the TID that were successfully transmitted or for the SCS stream specified by the SCSID that were successfully transmitted within the delay bound specified in the Delay Bound field in the relevant QoS Characteristics element.

The MSDU Discarded Count field contains the number of MSDUs for the TC or the TS specified by the TID that were discarded due either to the number of transmit attempts exceeding dot11ShortRetryLimit, or due to the MSDU lifetime having been reached. The MSDU Discarded Count field contains the number of MSDUs for the SCS stream specified by the SCSID that were discarded due to the number of transmit attempts exceeding dot11ShortRetryLimit, the MSDU lifetime, or the MSDU delay bound having been reached.

The MSDU Failed Count field contains the number of MSDUs for the TC or the TS specified by the TID that were discarded due to the number of transmit attempts exceeding dot11ShortRetryLimit.

The MSDU Multiple Retry Count field contains the number of MSDUs for the TC or the TS specified by the TID that were successfully transmitted after more than one retransmission attempt.

The QoS CF-Polls Lost Count field contains the number of QoS (+)CF-Poll frames that were transmitted where there was no response from the QoS STA. QoS CF-Polls Lost Count are returned only if the reporting QoS STA is contained within an AP and the TID is for a TS. This field is set to 0 when QoS CF-Polls Lost Count is not returned.

…

***TGbe editor: modify the following subclause after subclause 35.3.23 Multi-link MSCS procedure as:***

35.3.24 SCS stream measurement Report

The Transmit Stream/Category Measurement applies to SCSIDs for SCS streams associated with QoS Characteristics element.

If dot11RMTransmitStreamCategoryMeasurementActivated is true and has no resource constraint that prevents it from being able to make the requested measurement for a given a SCS stream specified by the SCSID, a QoS EHT STA receiving a Transmit Stream/Category Measurement request shall respond with a Radio Measurement Report frame containing one Measurement (Transmit Stream/Category Measurement) Report element. If the SCS stream that is corresponding to the SCSID is removed, the EHT STA shall cease sending Radio Measurement Reports.