IEEE P802.11
Wireless LANs

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| Proposed Draft Text for Transmit Stream/Category Measurement |
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Abstract

This document contains draft text for Transmit Stream/Category Measurement for a low-latency traffic flow identified by the SCSID.

Revisions:

* Rev 0: Initial version of the document.

**Motivation:**

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 packet delivery ratio (PDR) given the delay bound. In order to guarantee it, a corresponding measurement report needs to be defined. Thus the AP or AP MLD can take actions to meet the QoS requirement 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: Add a new row in subclause 3.4 of Draft REVme 0.0 as:

3.4 Abbreviations and acronyms

PDR Packet delivery ratio

***TGbe editor: Revise the following paragraph in 9.4.2.121 P1273L61 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 and also to TIDs for traffic categories for QoS traffic without TSPECs. 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 B0 is set to 0 (#2607)) when the B0 is set to 0. 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**

Bin 0 Range indicates the delay range of the first bin (Bin 0) of the Transmit Delay Histogram, in units of TUs. The Bin 0 Range value is used to calculate the delay ranges of the other 5 bins making up the histogram. The delay range for each bin increases in a binary exponential fashion as described in 9.4.2.21.11 (Transmit Stream/Category Measurement report).

The Optional Subelements subfield contains zero or more subelements. The subelement format and ordering of subelements are defined in 9.4.3 (Subelements).

The Subelement ID field values for the defined subelements are shown in Table 9-112 (Optional subelement IDs for Transmit Stream/Category Measurement Request).

### Table 9-112—Optional subelement IDs for PDR Measurement Request field

|  |  |  |
| --- | --- | --- |
| **Subelement ID** | **Name** | **Extensible** |
| 0 | Reserved |  |
| 1 | Triggered Reporting | Yes |
| 2-220 | Reserved |  |
| 221 | Vendor Specific | Vendor defined |
| 222-255 | Reserved |  |

The Triggered Reporting subelement is used to specify measurement trigger thresholds. It is present only if requesting triggered transmit stream/category measurement reporting. The Triggered Reporting subelement format is shown in Figure 9-206 (Triggered Reporting subelement format).

|  |  |  |  |
| --- | --- | --- | --- |
|  | Subelement ID | Length | Triggered Reporting |
| Octets: | 1 | 1 | 6 |

**Figure 9-206 Triggered Reporting subelement format**

The Subelement ID field is defined in Table 9-112 (Optional subelement IDs for Transmit Stream/Category Measurement Request).

The Length field is defined in 9.4.3 (Subelements).

The Triggered Reporting field is as shown in Figure 9-207 (Triggered Reporting field format).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Trigger Conditions | Average Error | Consecutive Error Threshold | Delay Threshold | Measurement Count | Trigger Timeout |
| Octets: | 1 | 1 | 1 | 1 | 1 | 1 |

**Figure 9-207 Triggered Reporting field format**

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 | PDR | Reserved |
| Bits: | 1 | 1 | 1 | 1 | 4 |

**Figure 9-208 Traffic Identifier field format when B0 is set to 0**

* 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 PDR bit is set to 1 to request that a Transmit Stream/Category Measurement report be generated when the experienced PDR for the traffic flow given by SCSID lower than the value specified in the Packet Delivery Ratio field in the TSPEC element when the Traffic Identifier field contains an SCSID value. When the Traffic Identifier field contains a TID value, the PDR bit is reserved.

The Average Error Threshold field contains a value representing the number of discarded MSDUs to be used as the threshold value for the Average trigger condition. The field is reserved if the Average Error Threshold subfield of the Trigger Conditions bit-field is 0.

The Consecutive Error Threshold field contains a value representing the number of discarded MSDUs to be used as the threshold value for the consecutive trigger condition. The field is reserved if the Consecutive Error Threshold subfield of the Trigger Conditions bit-field is 0.

The Delay Threshold field contains two subfields as shown in Figure 9-209 (Delay Threshold subfield format). The Delay Threshold field is reserved if the Delay Threshold subfield of the Trigger Conditions bitfield is 0.

|  |  |  |
| --- | --- | --- |
|  | B0 B1 | B2 B7 |
|  | Delayed MSDU Range | Delayed MSDU Count |
| Bits: | 2 | 6 |

**Figure 9-209 Delay Threshold subfield format**

The Delayed MSDU Range field contains a value representing the MSDU transmit delay at or above which an MSDU is counted toward the Delayed MSDU Count threshold. The Delayed MSDU Range field is encoded as a value representing the lower bound of a bin in the Transmit Delay Histogram as shown in Table 9-113 (Delayed MSDU Range Definitions). The Transmit Delay Histogram is defined in 9.4.2.21.11(Transmit Stream/Category Measurement report).

### Table 9-113—Delayed MSDU Range Definitions

|  |  |
| --- | --- |
| **Delayed MSDU Range** | **Condition** |
| 0 | Transmit Delay = Lower Bound of Bin 2 |
| 1 | Transmit Delay = Lower Bound of Bin 3 |
| 2 | Transmit Delay = Lower Bound of Bin 4 |
| 3 | Transmit Delay = Lower Bound of Bin 5 |

The Delayed MSDU Count field contains a value representing the number of MSDUs to be used as the threshold value for the delay trigger condition.

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 PDR 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).

The Trigger Timeout field contains a value, in units of 100 TU, during which a measuring STA does not generate further triggered transmit stream/category measurement reports after a trigger condition has been met. See 11.10.9.8 (Transmit Stream/Category Measurement report).

The Vendor Specific subelement has the same format as the Vendor Specific element (see 9.4.2.25 (Vendor Specific element)). Zero or more Vendor Specific subelements are included in the list of optional subelements.

***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 and also to TIDs for Traffic Categories for QoS traffic without TSPECs. 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 or Delivery MSDU 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 is shown in Figure 9-204 (Measurement Request field format for Transmit Stream/Category Measurement Request).

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 | PDR 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 PDR Trigger bit set to 1 indicates that the Transmit Stream/Category Measurement report was generated as a triggered report due to the PDR exceeding the required PDR specified in the Packet Delivery Ratio field in the TSPEC element when the Traffic Identifier field contains an SCSID value. When the Traffic Identifier field contains a TID value, the PDR Trigger bit is reserved.

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 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.

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

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

The QoS CF-Polls Lost Count/Delivery MSDU Count field contains the number of QoS (+)CF-Poll frames that were transmitted where there was no response from the QoS STA only if the reporting QoS STA is contained within an AP and the TID is for a TS. If the Traffic Identifier field contains an SCSID value, the QoS CF-Polls Lost Count/Delivery MSDU Count field contains the number of MSDUs 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 TSPEC element.

The Average Queue Delay field is the average queuing delay of the frames (MSDUs) that are passed to the MAC for the indicated peer STA address and the indicated TID or SCSID. Queue Delay is expressed in TUs and is measured from the time the MSDU is passed to the MAC until the point at which the first or only corresponding MPDU begins transmission.

The Average Transmit Delay field is the average delay of the frames (MSDUs) that are successfully transmitted for the indicated Peer STA Address and TID or SCSID. Average Transmit 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. Average Transmit delay is expressed in units of TUs.

The Bin 0 Range subfield value indicates the delay range of the first bin (Bin 0) of the transmit delay histogram, in units of TUs. It is also used to calculate the delay ranges of the other five bins making up the histogram. The delay range for each bin increases in a binary exponential fashion as follows:

Bin 0 range: 0 Delay

Bin i range: Delay , for

Bin 5 range: Delay

where B0 is the Bin 0 Range field value.

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***TGbe editor: modify the following paragraph in 9.4.2.21.11 of Draft REVme 0.0 as:***

The Optional Subelements field contains zero or more subelements. The subelement format and ordering of subelements are defined in 9.4.3 (Subelements).

The Subelement ID field values for the defined subelements are shown in Table 9-136 (Optional subelement IDs for Transmit Stream/Category Measurement report).

The Vendor Specific subelements have the same format as their corresponding elements (see 9.4.2.25 (Vendor Specific element)). Zero or more Vendor Specific subelements are included in the list of optional subelements.

### Table 9-136—Optional subelement IDs for Transmit Stream/Category Measurement report

|  |  |  |
| --- | --- | --- |
| **Subelement ID** | **Name** | **Extensible** |
| 0 | Reserved |  |
| 1 | Multi-link Measurement Report | Yes |
| 2-220 | Reserved |  |
| 221 | Vendor Specific | Vendor defined |
| 222-255 | Reserved |  |

The Multi-link Measurement Report subelement is used to report the per-link measurement info. It is present only if the measurement STA is a non-AP MLD and the MSDUs for the TC or the TS specified by the TID or the SCS stream specified by the SCSID are allowed to be transmitted through multiple links. The Multi-link Measurement Report subelement format is shown in Figure 9-xxx (Multi-link Measurement Report subelement format).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Subelement ID | Length | Link Bitmap | MSDU/MPDU Transmitted Count List | MSDU/MPDU Lost Count List |
| Octets: | 1 | 1 | 6 |  |  |

**Figure 9-xxx Multi-link Measurement Report subelement format**

The Subelement ID field is defined in Table 9-136 (Optional subelement IDs for Transmit Stream/Category Measurement Request).

The Length field is defined in 9.4.3 (Subelements).

The Link Bitmap field indicates the links on which the SCS stream specified by the SCSID is transmitted.

The MSDU/MPDU Transmitted Count List cantains *N* MSDU/MPDU Transmitted Count subfield, where *N* is the number of the bits that correspond to the links of the non-AP MLDs set to 1. Each MSDU/MPDU Transmitted Count subfield indicates the number of MSDU/MPDUs transmitted on the corresponding link.

The MSDU/MPDU Lost Count List cantains *N* MSDU/MPDU Lost Count subfield, where *N* is the number of the bits that correspond to the links of the non-AP MLDs set to 1. Each MSDU/MPDU Lost Count subfield indicates the number of MSDU/MPDUs lost on the corresponding link, including either the MSDU/MPDU without acknowledgement or the MSDU/MPDU with acknowledgement set to 0.

***TGbe editor: modify the following paragraph in 11.10.9.8 of Draft REVme 0.0 as:***

11.10.9.8 Transmit Stream/Category Measurement report

The Transmit Stream/Category Measurement applies to TIDs for Traffic Streams associated with TSPECs, TIDs for Traffic Categories for QoS traffic without TSPECs, and also SCSIDs for SCS streams with or without TSPECs.

If dot11RMTransmitStreamCategoryMeasurementActivated is true and has no resource constraint that prevents it from being able to make the requested measurement, a QoS 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 traffic stream (TS) that is corresponding to the Traffic Identifier is deleted, either by a DELTS frame or by disassociation, the STA shall cease sending Radio Measurement Reports. If the SCS stream that is corresponding to the SCSID is removed, either by a SCS Request frame or by disassociation, the STA shall cease sending Radio Measurement Reports.

If dot11RMTransmitStreamCategoryMeasurementActivated is false, a STA shall reject the received Transmit Stream/Category Measurement request by returning a Transmit Stream/Category Measurement report with the Incapable bit in the Measurement Report Mode field set to 1.

The transmit stream/category measurement shall be made on traffic that is transmitted from the measuring QoS STA to the peer QoS STA and TID or SCSID indicated in the request. The Peer STA Address may be the MAC address of the QoS STA from which the Measurement Request was sent, the MAC address of another QoS STA within the BSS, or the broadcast address. (#59)A broadcast address shall be used only with a TID corresponding to a TC. In the case of a broadcast address, measurement shall be made on all traffic for the specified TC. Depending on policy, a QoS AP may disallow transmit stream/category measurement requests for traffic to other QoS STAs in the BSS. In this case the QoS AP shall respond with a matching (#1486) Radio Measurement Report frame with the Incapable subfield of the Measurement Report Mode field set to 1.

If, during the course of a Transmit Stream/Category Measurement, any counter that is included in the Transmit Stream/Category Measurement report increments to a value of 232–1, the Transmit Stream/Category Measurement shall terminate, and the Transmit Stream/Category Measurement report shall indicate the shortened, actual measurement duration.

If the measurement request included multiple transmit stream/category measurement requests for multiple TIDs or SCSIDs, the corresponding measurement report shall include a transmit stream/category measurement report for each unique TID or SCSID in the request that has been admitted. If the measurement request is for a TID that has not been admitted yet, a report is generated only after the TID becomes admitted.

The requesting and reporting STAs are QoS STAs. A non-QoS STA receiving a Transmit Stream/Category Measurement request shall reject the request by returning an indication of incapable.

A QoS STA may request that a measuring QoS STA send a transmit stream/category measurement report when the number of TID-specified or SCSID-specified MSDUs are discarded or delayed reaches a specified threshold. This is termed a triggered transmit stream/category measurement and shall be requested by setting the Enable and Report bits to 1 within a Measurement Request element containing the Transmit Stream/Category Measurement Type. The Measurement Request field shall contain a Transmit Stream/Category Measurement request with the trigger conditions specified in the Triggered Reporting subelement. One or more trigger conditions may be set with specified thresholds. See 9.4.2.20.11 (Transmit Stream/Category Measurement request).

Depending on policy, a QoS AP might not permit the establishment of triggered transmit stream/category measurement. Such a QoS AP receiving a triggered transmit stream/category measurement request shall give an incapable indication. The number of simultaneous triggered transmit stream/category measurements supported at a QoS STA is outside the scope of the standard. A STA shall respond to further requests with a refused indication if the number of simultaneous triggered QoS measurements supported by the STA is reached.

If dot11RMTriggeredTransmitStreamCategoryMeasurementActivated is true, a QoS STA shall accept a triggered Transmit Stream/Category Measurement and shall reject it otherwise. A QoS STA accepting a triggered QoS measurement shall measure the requested TC or TS or SCS stream. If a trigger condition occurs, the measuring QoS STA shall send a Transmit Stream/Category Measurement report to the requesting QoS STA. The measuring QoS STA shall not send further triggered QoS reports until the Trigger Timeout period specified in the request has expired or new trigger conditions have been requested. Measurement of transmit stream/category metrics shall continue during the reporting timeout period. Reporting shall resume following the Trigger Timeout period, or immediately following the acceptance of new trigger conditions.

If a QoS STA receives a Transmit Stream/Category Measurement request for a TC, or TS or SCS stream that is already being measured using a triggered transmit stream/category measurement, the triggered traffic stream measurement shall be suspended for the duration of the requested traffic stream measurement. When triggered measurement resumes, the traffic stream metrics shall be reset.

Traffic stream metrics reported in a triggered transmit stream/category measurement report shall be the values accumulated over the number of successfully and unsuccessfully transmitted MSDUs prior to the trigger event given in the Measurement Count field of the transmit stream/category measurement request that established the trigger condition. It is possible that a consecutive or delay trigger event occurs after acceptance of a triggered transmit stream/category measurement but before the number of MSDUs in Measurement Count has been transmitted. In this case the report shall be the values accumulated since measurement started. The measurement count value appears in the Transmitted MSDU Count field of a triggered transmit stream/ category measurement report. Measurement duration shall not be used in triggered QoS measurement, and the Measurement Duration field in both the Measurement Request and any Measurement Report shall be set to 0.

The Measurement Start Time field of a triggered transmit stream/category measurement report shall contain the value of the QoS STA TSF timer at the time the trigger condition occurred to an accuracy of 1 TU.

Once accepted by a measuring QoS STA, a triggered QoS measurement continues to be active until

* The relevant TS is deleted,
* The relevant SCS stream is removed, or
* The measuring QoS STA or QoS STA that requested the measurement disassociates or successfully reassociates, or
* The measurement is terminated by the requesting QoS STA.

All triggered QoS measurements shall be terminated at a measuring QoS STA by receiving a triggered transmit stream/category measurement request with the Enable bit equal to 1 and the Report bit equal to 0. A triggered QoS measurement request with no trigger conditions specified in the Trigger Conditions field shall terminate a triggered QoS measurement for the TC or TS or SCS stream specified in the request. A QoS STA requesting a triggered QoS measurement may update the trigger conditions by sending a triggered transmit stream/category measurement request specifying the new trigger conditions.