IEEE P802.11
Wireless LANs

|  |
| --- |
| Resolution for CID 2904 related to TSPEC (CC34) |
| Date: April 9, 2021 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Duncan Ho | Qualcomm Inc. | 5665 Morehouse Dr. San Diego CA 92121 USA | +1 (858) 845-3214 | dho@qti.qualcomm.com |
| Abhishek Patil |  |  |  |
| George Cherian |  |  |  |
| Alfred Asterjadhi |  |  |  |
| Gaurang Naik |  |  |  |
| Yanjun Sun |  |  |  |
| Dibakar Das | Intel |  |  | Dibakar.das@intel.com |
| Chunyu Hu | Facebook | 1 Hacker Way, Menlo Park, CA 95034 |  | chunyuhu07@gmail.com |

 Abstract

This submission proposes resolutions for CID 2904 received for TGbe (CC34):

Revisions:

* Rev 0: Initial version of the document.

Interpretation of a Motion to Adopt

A motion to approve this submission means that the editing instructions and any changed or added material are actioned in the TGbe Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGbe Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

***TGbe Editor: Editing instructions preceded by “TGbe Editor” are instructions to the TGaxbe editor to modify existing material in the TGbe draft. As a result of adopting the changes, the TGbe editor will execute the instructions rather than copy them to the TGbe Draft.***

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Pg/Ln** | **Section** | **Comment** | **Proposed Change** | **Resolution** |
| 2904 | SunHee Baek | 69.41 | 9.4.2.29 | (The part of PDT about quality of service for latency sensitive traffic was approved, and a motion of SP#1 about restricted TWT in 20/1046r11 was passed.) Even if there are many existing information in TSPEC, they aren't related to low latency STA (and latency sensitive traffic) That is, AP/STAs could not achieve enough information about low latency STA (and latency sensitive traffic). | In TSPEC, new parameters can be added to deliver characteristics of latency sensitive traffic such as Delay jitter, Required Packet Loss, Packet Loss Requirement, Mean Delay, etc. | **Revised**Agree in principle with the comment. Proposed resolution is to define a variant of the TSPEC IE which includes some additional parameters that are specifically tailored for latency sensitive traffic streams. In addition, the proposed resolution amends and/or removes existing fields of the TSPEC IE so that the mechanism relying on this variant of the TSPEC is simpler while covering the use cases of interest. These have been discussed in the past in the doc 11-20/1693.**TGbe editor, please make changes as shown in doc 11-21/0619r0** |

* General

***TGbe editor: Change Table 9-94 as shown below:***

* Element IDs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Element | Element ID | Element ID Extension | Extensible | Fragmentable(11ai) |
|  |  |  |  |  |
| TSPEC (see 9.4.2.29 (TSPEC element)) | 13 | N/A | In a non-DMG and non-EHT BSS: noIn a DMG or EHT BSS: yes | No(11ai) |

* TSPEC element

***TGbe editor: Change the subclause below as follows:***

The TSPEC element contains the set of parameters that define the characteristics and QoS expectations of a traffic flow, in the context of a particular STA, for use by the HC or PCP and STA(s) or a mesh STA and its peer mesh STAs in support of QoS traffic transfer using the procedures defined in 11.4 (TS operation) and 11.22.16.3 (GCR procedures) and in the context of a particular EHT non-AP STA, for use by the EHT AP and the non-AP STA in support of QoS traffic transfer using the procedures defined in 11.25.2 (SCS procedures) and 35.x (Low latency operation).

The TSPEC element allows a set of parameters more extensive than might be needed, or might be available, for any particular instance of parameterized QoS traffic. Unless indicated otherwise, fields that follow the TS Info field are set to 0 for any unspecified parameter values. STAs set any parameters to unspecified if they have no information for setting that parameter.

The element information format comprises the items as defined in this subclause, and the structure is define in Figure 9-299 (TS Info field format(#1491))..

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|    | Element ID | Length | TS info | NominalMSDUSize | MaximumMSDUSize | Minimum Service Interval | Maximum Service Interval | Inactivity Interval | Suspension Interval | Service Start Time |
| Octets: | 1 | 1 | 3 | 0 or 2 | 2 | 4 | 4 | 0 or 4 | 0 or 4 | 4 |
|  | Minimum Data Rate | Mean Data Rate | Peak Data Rate | Burst Size | Delay Bound | Minimum PHY Rate | Surplus Bandwidth Allowance | Medium Time | DMG Attributes | EHT Attributes |
| Octets: | 4 | 4 | 0 or 4 | 4 | 4 | 0 or 4 | 0 or 2 | 0 or 2 | 0 or 2 | 0 or 6 |
|  |  | TSPEC element format |

The structure of the TS Info field is defined in Figure 9-299 (TS Info field format(#1491)).

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | B0 | B1 B4 | B5 B6 | B7 B8 | B9 | B10 | B11 B13 | B14 B15 | B16 | B17 B20 | B20 B23 |
|  | Traffic Type | TSID | Direction | Access Policy | Aggregation | APSD | User -Priority | TS Info Ack Policy | Schedule | Type | Reserved |
| Bits: | 1 | 4 | 2 | 2 | 1 | 1 | 3 | 2 | 1 | 4 | 3 |
| * TS Info field format(#1491)
 |

The Element ID field is defined in 9.4.2.1 (General).The subfields of the TS Info field are defined as follows:

* The Traffic Type subfield is set to 1 for a periodic traffic pattern (e.g., isochronous TS of MSDUs or A‑MSDUs, with constant or variable sizes, that are originated at fixed rate) or set to 0 for an -aperiodic, or unspecified, traffic pattern (e.g., asynchronous TS of low-duty cycles).
* The TSID subfield contains a value that is a TSID. When the Type subfield is set to “0000”, the MSB (bit 4 in TS Info field) of the TSID subfield is always set to 1 when the TSPEC element is included within an ADDTS Response frame. When the Type subfield is set to “0001”, the MSB (bit 4 in TS Info field) of the TSID subfield is always set to 0 and the rest of the bits are set to the same value of the User Priority subfield (0~7) in this TSPEC element or the UP subfield in the TCLAS element if this TSPEC element is included in an SCS Request frame.
* The Direction subfield specifies the direction of data carried by the TS as defined in Table 9-158 (Direction subfield encoding).

|  |
| --- |
| * Direction subfield encoding
 |
| Bit 5 | Bit 6 | Usage |
| 0 | 0 | Uplink, defined as follows: * Non-DMG BSS: MSDUs or A‑MSDUs are sent from the non-AP STA to HC
* DMG BSS: MSDUs or A‑MSDUs are sent by the (#1312)originator of the ADDTS Request frame
 |
| 1 | 0 | Downlink, defined as follows: * Non-DMG BSS: MSDUs or A‑MSDUs are sent from the HC to the non-AP STA
* DMG BSS: MSDUs or A‑MSDUs are sent by the (#1312)recipient of the ADDTS Request frame
 |
| 0 | 1 | Direct link (MSDUs or A‑MSDUs are sent from the non-AP STA to another non-AP STA) |
| 1 | 1 | Bidirectional link (equivalent to a downlink request plus an uplink request, each -direction having the same parameters).The fields in the TSPEC element specify resources for a single direction. Double the specified resources are required to support both streams. |

* The Access Policy subfield (#2494)specifies the access method to be used for the TS, and is defined in Table 9-159 (Access Policy subfield). The Access Policy subfield is setto Contention based channel access (EDCA) if the Type subfield is set to “0001.

|  |
| --- |
| * Access Policy subfield
 |
| Bit 7 | Bit 8 | Usage |
| 0 | 0 | Reserved |
| 1 | 0 | Contention based channel access (EDCA) |
| 0 | 1 | Controlled channel access (HCCA for non-DMG STAs and SPCA for DMG STAs) |
| 1 | 1 | Controlled and contention based channel access (HCCA, EDCA mixed mode (HEMM) for non-DMG STAs; SPCA, EDCA mixed mode (SEMM) for DMG STAs)  |

*
* (#2494)The Aggregation subfield is valid only when the access method is HCCA or SPCA or when the access method is EDCA and the Schedule subfield is equal to 1 and the Type subfield is set to “0000”. It is set to 1 by a non-AP STA to indicate that an aggregate schedule is required. It is set to 1 by the AP if an aggregate schedule is being provided to the STA. It is set to 0 otherwise. In all other cases, the Aggregation subfield is reserved.
* The APSD subfield(#2494) is set to 1 to indicate that automatic PS delivery is to be used for the traffic associated with the TSPEC and set to 0 otherwise. The APSD subfield is reserved if the Type subfield is set to “0001”.
* The UP subfield(#2494) indicates the actual value of the UP to be used for the transport of MSDUs or A‑MSDUs belonging to this TS when relative prioritization is required. When the TCLAS or intra-AC Priority element is present in the request, the UP subfield in TS Info field of the TSPEC element is reserved.
* The TS Info Ack Policy subfield (#2494)indicates whether MAC acknowledgments are required for MPDUs or A‑MSDUs belonging to this TSID and the form of those acknowledgments. The encoding of the TS Info Ack Policy subfield is shown in Table 9-160 (TS Info Ack Policy subfield encoding). The TS Info Ack Policy subfield is reserved if the Type subfield is set to “0001”.

|  |
| --- |
| * TS Info Ack Policy subfield encoding
 |
| Bit 14 | Bit 15 | Usage |
| 0 | 0 | Normal AcknowledgmentThe addressed recipient returns an Ack or QoS +CF-Ack frame after a SIFS, according to the procedures defined in 10.3.2.11 (Acknowledgment procedure) and 10.23.3.5 (HCCA transfer rules).(Ed#65) |
| 1 | 0 | No Ack: The recipient(s) do not acknowledge the transmission. |
| 0 | 1 | Reserved |
| 1 | 1 | Block Ack: A separate block ack mechanism described in 10.25 (Block acknowledgment (block ack)) is used. |

* The Schedule subfield (#2494)specifies the requested type of schedule. The setting of the subfield when the access policy is EDCA is shown in Table 9-161 (Setting of Schedule subfield). When the Access Policy subfield is equal to any value other than EDCA, the Schedule subfield is reserved. When the Schedule and APSD subfields are equal to 1, the AP sets the Aggregation subfield(#2612) to 1, indicating that an aggregate schedule is being provided to the STA. The Schedule subfield is reserved if the Type subfield is set to “0001”.

|  |
| --- |
| * Setting of Schedule subfield
 |
| APSD | Schedule | Usage |
| 0 | 0 | No Schedule |
| 1 | 0 | Unscheduled APSD |
| 0 | 1 | Scheduled PSMP or GCR-SP |
| 1 | 1 | Scheduled APSD |

* The Type subfield is set to “0001” if the recipient of the TSPEC element is a STA affiliated with an MLD.

The Nominal MSDU Size field is present in a TSPEC element when the Type subfield is set to “0000”; otherwise absent. The Nominal MSDU Size field contains an unsigned integer that specifies the nominal size, in octets, of MSDUs or (where A‑MSDU aggregation is employed) A‑MSDUs belonging to the TS under this TSPEC element(M101) and is defined in Figure 9-300 (Nominal MSDU Size field format(#2607)). If the Fixed subfield is equal to 1, then the size of the MSDU or A‑MSDU is fixed and is indicated by the Size subfield. If the Fixed subfield is equal to 0, then the size of the MSDU or A‑MSDU might not be fixed and the Size subfield indicates the nominal MSDU size. If both the Fixed and Size subfields are equal to 0, then the nominal MSDU or A‑MSDU size is unspecified.

|  |  |  |
| --- | --- | --- |
|  | B0 B14 | B15 |
|  | Size | Fixed |
| Bits: | 15 | 1 |
| * Nominal MSDU Size field format(#2607)
 |

The Maximum MSDU Size field is 2 octets long and contains an unsigned integer that specifies the maximum size, in octets, of MSDUs or A‑MSDUs belonging to the TS under this TSPEC element(M101).

The Minimum Service Interval field is 4 octets long and contains an unsigned integer that specifies the minimum interval, in microseconds, between the start of two successive SPs. If the TSPEC element is included within a GCR Request subelement that has the GCR delivery method equal to GCR-SP, (MDR2)a Minimum Service Interval field set to 0 indicates that SPs up to the maximum service interval are requested, including the continuous SP used by the GCR-A delivery method.

The Maximum Service Interval field is 4 octets long and contains an unsigned integer that, when the TSPEC element(M101) is for the admitting of HCCA streams, specifies the maximum interval, in microseconds, between the start of two successive SPs. If the TSPEC element is intended for EDCA Admission Control, the Maximum Service Interval field is used to indicate a latency limit, which limits the amount of aggregation (A‑MSDU or A-MPDU) used, so that excessive latency does not occur (see K.4.3.1 (Scheduled traffic)). The Maximum Service Interval field is greater than or equal to the Minimum Service Interval field. If the TSPEC element is included within a GCR Request subelement that has the GCR delivery method equal to GCR-SP, (MDR2)a Maximum Service Interval field set to 0 indicates that the continuous SP used by the GCR-A delivery method is requested.

K.4.3.2 (Use of Maximum Service Interval with Aggregation of Packets) provides guidance on the use of the Maximum Service Interval field(M101) to determine the limit of aggregation of nominal MSDUs.

The Inactivity Interval field is 4 octets long and is present in a TSPEC element when the Type subfield is set to “0000”; otherwise it is absent. When present, it contains an unsigned integer that specifies the minimum amount of time, in microseconds, that can elapse without arrival or transfer of an MPDU belonging to the TS before this TS is deleted by the MAC entity at the HC.

The Suspension Interval field is 4 octets long and is present in a TSPEC element when the Type subfield is set to “0000”; otherwise it is absent. When present, it contains an unsigned integer that specifies the minimum amount of time, in microseconds, that can elapse without arrival or transfer of an MSDU belonging to the TS before the generation of successive QoS(+)CF-Poll is stopped for this TS. A value of 4 294 967 295 (= 232 – 1) disables the suspension interval, indicating that polling for the TS is not to be interrupted based on inactivity. (MDR2)The suspension interval is always less than or equal to the inactivity interval.

The Service Start Time field is 4 octets and contains an unsigned integer that specifies the time, expressed in microseconds, when the first scheduled SP starts. The service start time indicates to the AP the time when a STA first expects to be ready to send frames and a power saving(M101) STA needs to be awake to receive frames. This might help the AP to schedule service so that the MSDUs encounter small delays in the MAC and help the power saving(M101) STAs to reduce power consumption. The field represents the four lower order octets of the TSF timer at the start of the SP. If APSD and Schedule subfields are 0, this field is also set to 0 (-unspecified).

The Minimum Data Rate field is 4 octets long and indicates the lowest data rate specified at the MAC SAP, for transport of MSDUs or A‑MSDUs belonging to this TS within the bounds of this TSPEC element(M101). The field is encoded as a piecewise linear function described as follows:



where

*Rmin* is the minimum data rate (in units of bits per second)

*Fmin* is the value of the Minimum Data Rate field

The Mean Data Rate[[1]](#footnote-2) field is 4 octets long and indicates the average data rate specified at the MAC SAP, for transport of MSDUs or A‑MSDUs belonging to this TS within the bounds of this TSPEC element(M101). The field is encoded as a piecewise linear function described as follows:



where

*Rmean* is the mean data rate (in units of bits per second)

*Fmean* is the value of the Mean Data Rate field

The Peak Data Rate field is 4 octets long is present in a TSPEC element when the Type subfield is set to “0000”; otherwise absent. The Peak Data Rate field indicates the maximum allowable data rate specified at the MAC SAP for transport of MSDUs or A‑MSDUs belonging to this TS within the bounds of this TSPEC element(M101). The field is encoded as a piecewise linear function described as follows:



where

*Rpeak* is the peak data rate (in units of bits per second)

*Fpeak* is the value of the Peak Data Rate field

If p is the peak rate in bits per second, then the maximum amount of data, belonging to this TS, arriving in any time interval [t1,t2], where t1 < t2 and t2 – t1 > 1 TU, does not exceed p × (t2 – t1) bits.

The Minimum, Mean and Peak Data Rates do not include the MAC and PHY overheads incurred in transporting the MSDUs or A‑MSDUs, with the exception of the MAC overheads specific to A‑MSDUs (A‑MSDU subframe header and padding). K.4.4 (Minimum, Mean, and Peak Data Rate) provides guidance on how to determine the standard deviation of the TS and how to calculate the total traffic when there are multiple TSs.

The Burst Size field is 4 octets long and contains an unsigned integer that specifies the maximum burst, in octets, of the MSDUs or A‑MSDUs belonging to this TS that arrive at the MAC SAP at the peak data rate. (MDR2)A Burst Size field set to 0 indicates that there are no bursts.

The Delay Bound field is 4 octets long and contains an unsigned integer that specifies the maximum amount of time, in microseconds, allowed to transport an MSDU or A‑MSDU belonging to the TS in this TSPEC element(M101), measured between the time marking the arrival of the MSDU, or the first MSDU of the MSDUs constituting an A‑MSDU, at the local MAC sublayer from the local MAC SAP and the time of completion of the successful transmission or retransmission of the MSDU or A‑MSDU to the destination. The completion of the MSDU or A‑MSDU transmission includes the relevant acknowledgment frame transmission time, if present.

The Minimum PHY Rate field is present in a TSPEC element when the Type subfield is set to “0000”; otherwise absent. The Minimum PHY Rate field indicates the minimum PHY rate for transport of MSDUs or A‑MSDUs belonging to this TS within the bounds of this TSPEC element(M101).[[2]](#footnote-3) See 11.4.2 (TSPEC construction) for constraints on the selection of this field. The field is encoded as a piecewise linear function described as follows:



where

*Rminphy* is the minimum PHY rate (in units of bits per second)

*Fminphy* is the value of the Minimum PHY Rate field

The Surplus Bandwidth Allowance field is present in a TSPEC element when the Type subfield is set to “0000”; otherwise absent. The Surplus Bandwidth Allowance field specifies the excess allocation of time (and bandwidth) over and above the stated application rates required to transport an MSDU or A‑MSDU belonging to the TS in this TSPEC. This field is represented as an unsigned binary number and, when specified, is greater than 0. The 13 least significant bits (LSBs) indicate the decimal part while the three MSBs indicate the integer part of the number. This field takes into account the retransmissions, as the rate information does not include retransmissions. It represents the ratio of over-the-air bandwidth (i.e., time that the scheduler allocates for the transmission of MSDUs or A‑MSDUs at the required rates) to bandwidth of the transported MSDUs or A‑MSDUs required for successful transmission (i.e., time that would be necessary at the minimum PHY rate if there were no errors on the channel) to meet throughput and delay bounds under this TSPEC, when specified. As such, it should be greater than unity. (MDR2)A Surplus Bandwidth Allowance field set to 1 indicates that no additional allocation of time is requested. K.4.2 (Surplus Bandwidth Allocation) provides guidance on how to calculate the value for Surplus Bandwidth Allowance element(M101).

The Medium Time field is (#123)an unsigned integer is present in a TSPEC element when the Type subfield is set to “0000”; otherwise absent. The Medium Time field contains the amount of time admitted to access the medium, in units of 32 ms/s. This field is reserved in the ADDTS Request frame and is set by the HC in the ADDTS Response frame. The derivation of this field is described in K.2.2 (Deriving medium time). This field is not used for controlled channel access.

The UP, Minimum Data Rate, Mean Data Rate, Peak Data Rate, Burst Size, Minimum PHY Rate, and Delay Bound fields in a TSPEC element express the QoS expectations requested by a STA, if this TSPEC element(M101) was issued by that STA, or provided by the HC, if this TSPEC element(M101) was issued by the HC, when these fields are specified with nonzero values. Unspecified parameters in these fields as indicated by a value of 0 indicate that the STA does not have specific requirements for these parameters if the TSPEC element(M101) was issued by that STA or that the HC does not provide any specific values for these parameters if the TSPEC element(M101) was issued by the HC. Annex K provides guidance on the use of the TSPEC element(M101) and the settings of values of the various fields.

The DMG Attributes field is defined in Figure 9-301 (DMG Attributes field format). The DMG Attributes field is present in a TSPEC element(M101) when the BSS to which the TSPEC element(M101) applies is a DMG BSS; otherwise absent.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | B0 B3 | B4 B5 | B6 | B7 | B8 B9 | B10 B15 |
|  | Allocation ID | Reserved | Allocation Direction | A‑MSDU Subframe | Reliability | Reserved |
| Bits: | 4 | 2 | 1 | 1 | 2 | 6 |
| * DMG Attributes field format
 |

* (#2494-Ed)Traffic streams can share an allocation through TSPEC aggregation (see Annex V). The Allocation ID subfield is used as follows:
* When setting up a TS, the DMG STA that transmits an ADDTS Request frame containing a TSPEC or PTP TSPEC element sets the Allocation ID subfield to a nonzero value to identify the allocation it requires to carry the TS. Alternatively, the same DMG STA sets the Allocation ID subfield to 0 to indicate any CBAP allocation with the broadcast AID as Source AID.
* When setting up a TS, the DMG STA that transmits the ADDTS Response frame containing the TSPEC or PTP TSPEC element sets the Allocation ID subfield to a nonzero value that identifies the allocation carrying the TS. Alternatively, the same DMG STA sets the Allocation ID subfield to 0 to indicate any CBAP allocation with the broadcast AID as Source AID and Destination AID.
* When deleting a TS, the DMG STA that transmits the DELTS frame containing a TSPEC or PTP TSPEC element sets the Allocation ID subfield to a nonzero value to identify the allocation that is carrying the TS to be deleted. Alternatively, the same DMG STA sets the Allocation ID subfield to 0 to indicate no allocation exists to carry the TS to be deleted.
* The Allocation Direction subfield is (#2494)equal to 1 when the originator of the ADDTS request is also the source of the allocation identified by the Allocation ID subfield and is equal to 0 otherwise. The Allocation Direction subfield is equal to 0 when the Allocation ID subfield is equal to 0.
* The A‑MSDU Subframe subfield (#2494)contains a value that indicates the A‑MSDU subframe structure to be used for this TS. The A‑MSDU Subframe subfield is set to 0 to indicate the Basic A‑MSDU subframe structure and set to 1 to indicate the Short A‑MSDU subframe structure.
* The Reliability subfield (#2494)contains an expected reliability index. The reliability index refers to the PHY PER (PSDU error rate as in 20.3.3.8 (Receive sensitivity)). The relation between the reliability index and the PER is shown in Table 9-162 (Reliability subfield values).

The Reliability subfield in an ADDTS Request frame that has the Direction subfield set to downlink or in an ADDTS Response frame that has the Direction field set to uplink indicates the expectation of the PER of the destination DMG STA for this TS. The Reliability subfield in an ADDTS Request frame that has the Direction subfield set to uplink or in an ADDTS Response frame that has the Direction field set to downlink is reserved. The reliability information is provided by the SME using the MLME-ADDTS.request primitive and MLME-ADDTS.response primitives. Together with the link margin (10.42.9 (CDMG enhanced beam tracking(11aj))) and other implementation-specific information, this value can be used by the source DMG STA of this TS to estimate the MCS to be used for this particular TS.

|  |
| --- |
| * Reliability subfield values
 |
| Reliability index | PER |
| 0 | Not specified |
| 1 | 10-2 |
| 2 | 10-3 |
| 3 | 10-4 |

The EHT Attributes field is defined in Figure 9-301x (EHT Attributes field format). The EHT Attributes field is present in a TSPEC element(M101) when the Type subfield is set to “0001”; otherwise absent.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | B0 B31 | B32 B35 | B36 B59 | B60 B63 |
|  | MSDU Lifetime | Packet Delivery Ratio | Averaging Window | Reserved |
| Bits: | 32 | 4 | 24 | 4 |

Figure 9-301a--EHT Attributes field format

The MSDU Lifetime field contains an unsigned integer that specifies the time, in units of microseconds, that specifies the maximum amount of time since the arrival of the MSDU at the MAC data service interface beyond which the MSDU is not useful and can be discarded at the sender.

The Packet Delivery Ratio field indicates the percentage of packets that are expected to be delivered within the delay bound specified in the Delay Bound field and its encoding is defined in Table 9-xxx

|  |
| --- |
| Table 9-xxx Packet Delivery Ratio field values |
| Value | Packet delivery ratio |
| 0 | Not specified |
| 1 | 99% |
| 2 | 99.9% |
| 3 | 99.99% |
| 4 | 99.999% |
| 5 | 99.9999% |
| 6 - 15 | Reserved |

The Averaging Window field contains an unsigned integer that specifies the time window, in milliseconds, for which the minimum data rate as specified in the Minimum Data Rate field and mean data rate as specified in the Mean Data Rate fields are measured.

5.1.1.3 Interpretation of priority parameter in MAC service primitives

***TGbe editor: Change the subclause below as follows:***

The value of the priority parameter in the MAC service primitives (see 5.2 (MAC data service specification)) may be a noninteger value of Contention or may be any integer value in the range 0 to 15.

When the priority parameter has an integer value, it is used in the TID subfields that appear in certain frames that are used to deliver and to control the delivery of QoS data across the WM.

Priority parameter and TID subfield values 0 to 7 are interpreted as UPs for the MSDUs if there are no TSPECs defined for which the TSID value of the TPSEC is equal to this Priority parameter/TID value. Outgoing MSDUs with UP values 0 to 7 are handled by MAC entities at STAs in accordance with the UP.

Priority parameter and TID subfield values 0 to 15 specify TIDs that are also TS identifiers (TSIDs) and select the TSPEC for the TS designated by the TID. Outgoing MSDUs with priority parameter values 0 to 15 are handled by MAC entities at STAs in accordance with the UP value determined from the UP subfield as well as other parameter values in the selected TSPEC. When an MSDU arrives with a priority value between 8 and 15 and for which there is no TSPEC defined, then the MSDU shall be sent with priority parameter set to 0.

The noninteger value of the priority parameter is allowed at all non-QoS STAs. The integer values of the priority parameter (i.e., TID) are supported only at QoS STAs that are in a QoS BSS. A range of 0 to 15 is supported by QoS STAs associated in a QoS BSS; whereas a range of 0 to 7 is supported by QoS STAs that are members of a QoS IBSS. If a QoS STA is associated in a non-QoS BSS, the STA is functioning as a non-QoS STA, so the priority value is always Contention.

At QoS STAs associated in a QoS BSS, MSDUs with a priority of Contention are considered equivalent to MSDUs with TID 0. At STAs associated in a non-QoS BSS, all MSDUs with an integer priority are considered equivalent to MSDUs with a priority of Contention.

The received individually addressed frames at a QoS STA may be as follows:

a) Non-QoS subtypes, in which case the STA shall assign to them a priority of Contention.

b) QoS subtypes, in which case the STA shall determine the UP value as follows:

- If there is a TPSEC defined for which its TSID value is equal to the TID value, the STA shall extract the UP value in the UP subfield of the TS Info field in the associated TSPEC or from the UP field in the associated TCLAS (traffic classification) element, as applicable.

- Otherwise, the STA shall infer the UP value from the TID in the QoS Control field directly for TID values between 0 and 7.

QoS APs deliver the UP with the received MSDUs to the DS or bridge port.

9.2.4.5.2 TID subfield

***TGbe editor: Change the subclause below as follows:***

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).

|  |
| --- |
| * TID subfield
 |
| Access policy | Usage | Allowed values(#2421) |
| EDCA | UP for either TC or TS, regardless of whether admission control is requiredTSID, in which case the UP is the value indicated in the TSID subfield of the TS Info field in the associated TSPEC | 0–7 |
| HCCA, SPCA | TSID  | 8–15 |
| HEMM, SEMM | TSID, regardless of the access mechanism used | 8–15 |

In QoS Data +CF-Poll frames, the TID subfield in the QoS Control field indicates the TID of the data. In QoS (+)CF-Poll frames of subtype Null, the TID subfield in the QoS Control field indicates the TID for which the poll is intended. The requirement to respond to that TID is nonbinding, and a STA can respond with any frame (see 10.23.3.5.1 (General)). For STAs where dot11OCBActivated is true, traffic streams are not used and the TID always corresponds to a TC.

Do you agree to the resolution provided in doc 11-21/0619r0 for CID 2904?

1. The mean data rate, the peak data rate, and the burst size are the parameters of the token bucket model, which provides standard terminology for describing the behavior of a traffic source. The token bucket model is described in IETF RFC 2212 [B26], IETF RFC 2215 [B27], and IETF RFC 3290 [B33]. [↑](#footnote-ref-2)
2. This rate information is intended to confirm that the TSPEC parameter values resulting from an admission control negotiation are sufficient to provide the required throughput for the TS. In a typical implementation, a TS is admitted only if the defined traffic volume can be accommodated at the specified rate within an amount of WM occupancy time that the admissions control entity is willing to allocate to this TS. [↑](#footnote-ref-3)