**SA WG2 Meeting #S2-143E S2-2100616r06**

**24 February - 9 March 2021, Electronic, Elbonia (revision of S2-210xxxx)**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
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|  | **23.501** | **CR** | **2618** | **rev** | **-** | **Current version:** | **16.7.0** |  |
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| *For* ***HE******LP*** *on using this form: comprehensive instructions can be found at http://www.3gpp.org/Change-Requests.* |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

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|  |
| ***Title:***  | KI#2 BMIC and PMIC for TSC without IEEE TSN network |
|  |  |
| ***Source to WG:*** | ZTE |
| ***Source to TSG:*** | SA WG2 |
|  |  |
| ***Work item code:*** | IIoT |  | ***Date:*** | 2021-01-20 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** | Rel-17 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP TR 21.900. | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)Rel-12 (Release 12)**Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)* |
|  |  |
| ***Reason for change:*** | The IP PDU session type is supported for the TSC. The BMIC and PMIC supporting for IP PDU session (without IEEE TSN network) is needed. |
|  |  |
| ***Summary of change:*** | Modify the PMIC and BMIC clause to support TSC without IEEE TSN network. |
|  |  |
| ***Consequences if not approved:*** | How to support IP PDU session for BMIC and PMIC is missing |
|  |  |
| ***Clauses affected:*** | 5.8.2.11.14, 5.28.3.1, 5.28.3.2 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

*FIRST CHANGE*

##### 5.8.2.11.1 General

These parameters are used by SMF to control the functionality of the UPF as well as to inform SMF about events occurring at the UPF.

The N4 session management procedures defined in clause 4.4.1 of TS 23.502 [3] will use the relevant parameters in the same way for all N4 reference points: the N4 Session Establishment procedure as well as the N4 Session Modification procedure provide the control parameters to the UPF, the N4 Session Release procedure removes all control parameters related to an N4 session, and the N4 Session Level Reporting procedure informs the SMF about events related to the PDU Session that are detected by the UPF.

The parameters over N4 reference point provided from SMF to UPF comprises an N4 Session ID and may also contain:

- Packet Detection Rules (PDR) that contain information to classify traffic (PDU(s)) arriving at the UPF;

- Forwarding Action Rules (FAR) that contain information on whether forwarding, dropping or buffering is to be applied to a traffic identified by PDR(s);

- Multi-Access Rules (MAR) that contain information on how to handle traffic steering, switching and splitting for a MA PDU Session;

- Usage Reporting Rules (URR) contains information that defines how traffic identified by PDR(s) shall be accounted as well as how a certain measurement shall be reported;

- QoS Enforcement Rules (QER), that contain information related to QoS enforcement of traffic identified by PDR(s);

- Session Reporting Rules (SRR) that contain information to request the UP function to detect and report events for a PDU session that are not related to specific PDRs of the PDU session or that are not related to traffic usage measurement.

- Trace Requirements;

- Port Management Information Container in 5GS;

- Bridge Information.

The N4 Session ID is assigned by the SMF and uniquely identifies an N4 session.

If the UPF indicated support of Trace, the SMF may activate a trace session during a N4 Session Establishment or a N4 Session Modification procedure. In that case it provides Trace Requirements to the UPF. The SMF may deactivate an on-going trace session using a N4 Session Modification procedure. There shall be at most one trace session activated per N4 Session at a time.

For the MA PDU Session, the SMF may add an additional access tunnel information during an N4 Session Modification procedure by updating MAR with addition of an FAR ID which refers to an FAR containing the additional access tunnel information for the MA PDU session for traffic steering in the UPF. For the MA PDU Session, the SMF may request Access Availability report per N4 Session, during N4 Session Establishment procedure or N4 Session Modification procedure.

A N4 Session may be used to control both UPF and NW-TT behaviour in the UPF. A N4 session support and enable exchange of TSN bridge configuration between the SMF and the UPF:

- Information that the SMF needs for bridge management (clause 5.8.2.11.9);

- Information that 5GS transparently relays between the TSN AF or NEF and the NW-TT: transparent Port Management Information Container along with the associated NW-TT port number.

- Information that 5GS transparently relays between the TSN AF or NEF and the NW-TT: transparent Bridge Management Information Container (clause 5.8.2.11.13).

When a N4 Session related with bridge management is established, the UPF allocates a dedicated port number for the DS-TT side of the PDU Session. The UPF then provides to the SMF following configuration parameters for the N4 Session:

- DS-TT port number.

- Bridge ID.

After the N4 session has been established, the SMF and UPF may at any time exchange transparent bridge Port Management Information Container over a N4 session.

*NEXT CHANGE*

##### 5.8.2.11.9 Bridge Information

The following table describes the Bridge Information (BI) that includes the information required to configure a 5GS logical bridge for TSC PDU Sessions.

Table 5.8.2.11.9-1: Bridge Management Information

|  |  |  |
| --- | --- | --- |
| Attribute | Description | Comment |
| DS-TT Port Number | Port Number allocated by the NW-TT for the DS-TT for a given PDU Session |  |
| Bridge ID | Bridge identifier of the 5GS TSN bridge | Corresponds to the Bridge ID in case of Ethernet nodes. |

*NEXT CHANGE*

##### 5.8.2.11.14 TSC Management Information

The following table describes the TSC Management Information Container (TSC MIC) that includes BMIC, PMIC and the associated NW-TT port number.

Table 5.8.2.11.13-1: TSC Management Information Container

|  |  |  |
| --- | --- | --- |
| Attribute | Description | Comment |
| Bridge Management Information Container | 5GS TSN Bridge information exchanged transparently between NW-TT and TSN AF or NEF via 5GS (as in Table 5.28.3.1-2). |  |
| Port Management Information Container | Information exchanged transparently between NW-TT and TSN AF or NEF via 5GS (as in Table 5.28.3.1-1). |  |
| NW-TT Port Number | NW-TT Port Number related to the PMIC. | Included when the PMIC information is present. |

*NEXT CHANGE*

### 5.28.1 5GS bridge management

5GS acts as a Layer 2 Ethernet Bridge. When integrated with IEEE TSN network, 5GS functions acts as one or more TSN Bridges of the TSN network. The 5GS Bridge is composed of the ports on a single UPF (i.e. PSA) side, the user plane tunnel between the UE and UPF, and the ports on the DS-TT side. For each 5GS Bridge of a TSN network, the port on NW-TT support the connectivity to the TSN network, the ports on DS-TT side are associated to the PDU Session providing connectivity to the TSN network.

The granularity of the 5GS TSN bridge is per UPF for each network instance. The bridge ID of the 5GS TSN bridge is bound to the UPF ID of the UPF as identified in TS 23.502 [3]. The TSN AF stores the binding relationship between a port on UE/DS-TT side and a PDU Session during reporting of 5GS TSN bridge information. The TSN AF also stores the information about ports on the UPF/NW-TT side. The UPF/NW-TT forwards traffic to the appropriate egress port based on the traffic forwarding information. From the TSN AF point of view, a 5GS TSN bridge has a single NW-TT entity within UPF and the NW-TT may have multiple ports that are used for traffic forwarding.

NOTE 1: How to realize single NW-TT entity within UPF is up to implementation.

NOTE 2: Ethernet PDU Session type in this release of the specification may be subject to the constraint that it supports a single N6 interface in a UPF associated with the N6 Network Instance.

There is only one PDU Session per DS-TT port for a given UPF. All PDU Sessions which connect to the same TSN network via a specific UPF are grouped into a single 5GS bridge. The capabilities of each port on UE/DS-TT side and UPF/NW-TT side are integrated as part of the configuration of the 5GS Bridge and are notified to TSN AF and delivered to CNC for TSN bridge registration and modification.

NOTE 3: It is assumed that all PDU sessions which connect to the same TSN network via a specific UPF are handled by the same TSN AF.



Figure 5.28.1-1: Per UPF based 5GS bridge

NOTE 4: If a UE establishes multiple PDU Sessions terminating in different UPFs, then the UE is represented by multiple 5GS TSN bridges.

In order to support TSN scheduled traffic (clause 8.6.8.4 in IEEE Std 802.1Q-2018 [98]) over 5GS Bridge, the 5GS supports the following functions:

- Configure the bridge information in 5GS.

- Report the bridge information of 5GS Bridge to TSN network after PDU session establishment.

- Receiving the configuration from TSN network as defined in clause 5.28.2.

- Map the configuration information obtained from TSN network into 5GS QoS information (e.g. 5QI, TSC Assistance Information) of a QoS Flow in corresponding PDU Session for efficient time-aware scheduling, as defined at clause 5.28.2.

The bridge information of 5GS Bridge is used by the TSN network to make appropriate management configuration for the 5GS Bridge. The bridge information of 5GS Bridge includes at least the following:

- Information for 5GS Bridge:

- Bridge ID

 Bridge ID is to distinguish between bridge instances within 5GS. The Bridge ID can be derived from the unique bridge MAC address as described in IEEE Std 802.1Q [98], or set by implementation specific means ensuring that unique values are used within 5GS;

- Number of Ports;

- list of port numbers.

- Capabilities of 5GS Bridge as defined in IEEE Std 802.1Qcc [95]:

- 5GS Bridge delay per port pair per traffic class, including 5GS Bridge delay (dependent and independent of frame size, and their maximum and minimum values: independentDelayMax, independentDelayMin, dependentDelayMax, dependentDelayMin), ingress port number, egress port number and traffic class.

- Propagation delay per port (txPropagationDelay), including transmission propagation delay, egress port number.

- VLAN Configuration Information.

NOTE 5: This Release of the specification does not support the modification of VLAN Configuration Information at the TSN AF.

- Topology of 5GS Bridge as defined in IEEE Std 802.1AB [97]:

- Chassis ID subtype and Chassis ID of the 5GS Bridge.

- Traffic classes and their priorities per port as defined in IEEE Std 802.1Q [98].

- Stream Parameters as defined in clause 12.31.1 in IEEE Std 802.1Q [98], in order to support PSFP:

- MaxStreamFilterInstances: The maximum number of Stream Filter instances supported by the bridge;

- MaxStreamGateInstances: The maximum number of Stream Gate instances supported by the bridge;

- MaxFlowMeterInstances: The maximum number of Flow Meter instances supported by the bridge (optional);

- SupportedListMax: The maximum value supported by the bridge of the AdminControlListLength and OperControlListLength parameters.

The following parameters: independentDelayMax and independentDelayMin, how to calculate them is left to implementation and not defined in this specification.

Bridge ID of the 5GS Bridge, port number(s) of the Ethernet port(s) in NW-TT could be preconfigured on the UPF. The UPF is selected for a PDU Session serving TSC as described in clause 6.3.3.3.

This release of the specification requires that each DS-TT port is assigned with a globally unique MAC address.

NOTE 6: The MAC address of the DS-TT port must not be used in user data traffic; it is used for identification of the PDU Session and the associated bridge port within the 3GPP system.

When there are multiple network instances within a UPF, each network instance is considered logically separate. The network instance for the N6 interface (clause 5.6.12) may be indicated by the SMF to the UPF for a given PDU session during PDU session establishment.

The TSN AF is responsible to receive the bridge information of 5GS Bridge from 5GS, as well as register or update this information to the TSN network.

*NEXT CHANGE*

### 5.28.3 Port and bridge management information exchange in 5GS

#### 5.28.3.1 General

Port number of the DS-TT for the PDU Session is assigned by the UPF during PDU session establishment. The port number of the DS-TT port for a PDU Session shall be reported to the SMF from the UPF and further stored at the SMF. The SMF provides the DS-TT port number via PCF to the TSN AF or NEF. TSN AF or NEF maintains an association between the DS-TT port number and the MAC address (with Ethernet type PDU session) or IP address (with IP type PDU Session) of the UE. If a PDU session for which SMF has reported a DS-TT port number to TSN AF or NEF is released, then SMF informs TSN AF or NEF accordingly.

NOTE: Port number can refer either to Ethernet port or PTP port. In Ethernet type PDU Sessions, it is assumed that the PTP port number is the same as the associated Ethernet port number.

5GS shall support transfer of standardized and deployment-specific port management information transparently between TSN AF or NEF and DS-TT or NW-TT, respectively inside a Port Management Information Container. NW-TT may support one or more ports. In this case, each port uses separate Port Management Information Container. 5GS shall also support transfer of standardized and deployment-specific bridge management information transparently between TSN AF or NEF and NW-TT, respectively inside a Bridge Management Information Container. Table 5.28.3.1-1 and Table 5.28.3.1-2 list standardized port management information and bridge management information, respectively.

If TSN AF is deployed, i.e. if 5GS is integrated with an IEEE TSN network, the port and bridge management information is exchanged between CNC and TSN AF. The port management information is related to ports located in DS-TT or NW-TT.

If TSN AF is not deployed, the port and bridge management information is exchanged between NEF and DS-TT/NW-TT.

Table 5.28.3.1-1: Standardized port management information

|  |  |  |  |
| --- | --- | --- | --- |
| Port management information | Applicability (see NOTE 6) | Supported operations by TSN AF | Reference |
|  | DS-TT | NW-TT | (see NOTE 1) |  |
| **General** |  |  |  |  |
| Port management capabilities (see NOTE 2) | X | X | R |  |
| **Bridge delay related information** |  |  |  |  |
| txPropagationDelay | X | X | R | IEEE Std 802.1Qcc [95] clause 12.32.2.1 |
| **Traffic class related information** |  |  |  |  |
| Traffic class table | X | X | RW | IEEE Std 802.1Q [98] clause 12.6.3 and clause 8.6.6. |
| **Gate control information** |  |  |  |  |
| GateEnabled | X | X | RW | IEEE Std 802.1Q [98] Table 12-29 |
| AdminBaseTime | X | X | RW | IEEE Std 802.1Q [98] Table 12-29 |
| AdminControlList | X | X | RW | IEEE Std 802.1Q [98] Table 12-29 |
| AdminCycleTime (see NOTE 3) | X | X | RW | IEEE Std 802.1Q [98] Table 12-29 |
| AdminControlListLength (see NOTE 3) | X | X | RW | IEEE Std 802.1Q [98] Table 12-28 |
| Tick granularity | X | X | R | IEEE Std 802.1Q [98] Table 12-29 |
| **General Neighbor discovery configuration****(NOTE 4)** |  |  |  |  |
| adminStatus | D | X | RW | IEEE Std 802.1AB [97] clause 9.2.5.1 |
| lldpV2LocChassisIdSubtype | D | X | RW | IEEE Std 802.1AB [97] Table 11-2 |
| lldpV2LocChassisId | D | X | RW | IEEE Std 802.1AB [97] Table 11-2 |
| lldpV2MessageTxInterval | D | X | RW | IEEE Std 802.1AB [97] Table 11-2 |
| lldpV2MessageTxHoldMultiplier | D | X | RW | IEEE Std 802.1AB [97] Table 11-2 |
| **NW-TT port neighbor discovery configuration** |  |  |  |  |
| lldpV2LocPortIdSubtype |  | X | RW | IEEE Std 802.1AB [97] Table 11-2 |
| lldpV2LocPortId |  | X | RW | IEEE Std 802.1AB [97] Table 11-2 |
| **DS-TT port neighbor discovery configuration** |  |  |  |  |
| lldpV2LocPortIdSubtype | D |  | RW | IEEE Std 802.1AB [97] Table 11-2 |
| lldpV2LocPortId | D |  | RW | IEEE Std 802.1AB [97] Table 11-2 |
| **Neighbor discovery information for each discovered neighbor of NW-TT** |  |  |  |  |
| lldpV2RemChassisIdSubtype |  | X | R | IEEE Std 802.1AB [97] Table 11-2 |
| lldpV2RemChassisId |  | X | R | IEEE Std 802.1AB [97] Table 11-2 |
| lldpV2RemPortIdSubtype |  | X | R | IEEE Std 802.1AB [97] Table 11-2 |
| lldpV2RemPortId |  | X | R | IEEE Std 802.1AB [97] Table 11-2 |
| TTL |  | X | R | IEEE Std 802.1AB [97] clause 8.5.4 |
| **Neighbor discovery information for each discovered neighbor of DS-TT****(NOTE 5)** |  |  |  |  |
| lldpV2RemChassisIdSubtype | D |  | R | IEEE Std 802.1AB [97] Table 11-2 |
| lldpV2RemChassisId | D |  | R | IEEE Std 802.1AB [97] Table 11-2 |
| lldpV2RemPortIdSubtype | D |  | R | IEEE Std 802.1AB [97] Table 11-2 |
| lldpV2RemPortId | D |  | R | IEEE Std 802.1AB [97] Table 11-2 |
| TTL | D |  | R | IEEE Std 802.1AB [97] clause 8.5.4.1 |
| **Stream Parameters****(NOTE 11)** |  |  |  |  |
| MaxStreamFilterInstances | X |  | R | IEEE Std 802.1Q [98] clause 12.31.1.1 |
| MaxStreamGateInstances | X |  | R | IEEE Std 802.1Q [98] clause 12.31.1.2 |
| MaxFlowMeterInstances | X |  | R | IEEE Std 802.1Q [98] clause 12.31.1.3 |
| SupportedListMax | X |  | R | IEEE Std 802.1Q [98] clause 12.31.1.4 |
| **Per-Stream Filtering and Policing information**(NOTE 10) |  |  |  |  |
| Stream Filter Instance Table(NOTE 8) |  |  |  | IEEE Std 802.1Q [98] Table 12-32 |
| > Stream Identification type | X | X | RW | IEEE 802.1CB [83] clause 9.1.1.6 |
| > Stream Identification Controlling Parameters | X | X | RW | IEEE 802.1CB [83] clauses 9.1.2, 9.1.3, 9.1.4(NOTE 12) |
| > PrioritySpec | X | X | RW | IEEE Std 802.1Q [98] Table 12-32 |
| > StreamGateInstanceID | X | X | RW | IEEE Std 802.1Q [98] Table 12-32 |
| Stream Gate Instance Table(NOTE 9) |  |  |  | IEEE Std 802.1Q [98] Table 12-33 |
| StreamGateInstance | X | X | R | IEEE Std 802.1Q [98] Table 12-33 |
| PSFPAdminBaseTime | X | X | RW | IEEE Std 802.1Q [98] Table 12-33 |
| PSFPAdminControlList | X | X | RW | IEEE Std 802.1Q [98] Table 12-33 |
| PSFPAdminCycleTime | X | X | RW | IEEE Std 802.1Q [98] Table 12-33 |
| PSFPTickGranularity | X | X | R | IEEE Std 802.1Q [98] Table 12-33 |
| NOTE 1: R = Read only access; RW = Read/Write access.NOTE 2: Indicates which standardized and deployment-specific port management information is supported by DS-TT or NW-TT.NOTE 3: AdminCycleTime and AdminControlListLength are optional for gate control information.NOTE 4: If DS-TT supports neighbor discovery, then TSN AF sends the general neighbor discovery configuration for DS-TT Ethernet ports to DS-TT. If DS-TT does not support neighbor discovery, then TSN AF sends the general neighbor discovery configuration for DS-TT Ethernet ports to NW-TT using the Bridge Management Information Container (refer to Table 5.28.3.1-2) and NW-TT performs neighbor discovery on behalf on DS-TT. When a parameter in this group is changed, it is necessary to provide the change to every DS-TT and the NW-TT that belongs to the 5GS TSN bridge. It is mandatory that the general neighbor discovery configuration is identical for all DS-TTs and the NW-TTs that belongs to the bridge.NOTE 5: If DS-TT supports neighbor discovery, then TSN AF retrieves neighbor discovery information for DS-TT Ethernet ports from DS-TT. If DS-TT does not support neighbor discovery, then TSN AF retrieves neighbor discovery information for DS-TT Ethernet ports from NW-TT, using the Bridge Management Information Container (refer to Table 5.28.3.1-2), the NW-TT performing neighbor discovery on behalf on DS-TT.NOTE 6: X = applicable; D = applicable when validation and generation of LLDP frames is processed at the DS-TT.NOTE 7: Void.NOTE 8: There is a Stream Filter Instance Table per Stream.NOTE 9: There is a Stream Gate Instance Table per Gate.NOTE 10: TSN AF indicates the support for PSFP to the CNC only if each DS-TT and NW-TT of the 5GS bridge has indicated support of PSFP. DS-TT indicates support of PSFP using port management capabilities, i.e. by indicating support for the Per-Stream Filtering and Policing information and by setting higher than zero values for MaxStreamFilterInstances, MaxStreamGateInstances, MaxFlowMeterInstances, SupportedListMax parameters. When available, TSN AF uses the PSFP information for determination of the traffic pattern information as described in Annex I. The PSFP information can be used at the DS-TT (if supported) and at the NW-TT (if supported) for the purpose of per-stream filtering and policing as defined in IEEE Std 802.1Q [98] clause 8.6.5.1.NOTE 11: TSN AF composes a Stream Parameter Table towards the CNC. It is up to TSN AF how it composes the Stream Parameter Table based on the numerical values as received from DS-TT and NW-TT port(s) and for the bridge for each individual parameter.NOTE 12: The set of Stream Identification Controlling Parameters depends on the Stream Identification type value as defined in IEEE Std 802.1CB [83] Table 9-1 and clauses 9.1.2, 9.1.3, 9.1.4. |

Table 5.28.3.1-2: Standardized bridge management information

|  |  |  |
| --- | --- | --- |
| Bridge management information | Supported operations by TSN AF(see NOTE 1) | Reference |
| **Information for 5GS Bridge** |  |  |
| Bridge Address | R |  |
| Bridge ID | R |  |
| NW-TT port numbers | R |  |
| **Traffic forwarding information**  |  |  |
| Static Filtering Entry (NOTE 3) | RW | IEEE Std 802.1Q [98] clause 8.8.1 |
| **General Neighbor discovery configuration****(NOTE 2)** |  |  |
| adminStatus | RW | IEEE Std 802.1AB [97] clause 9.2.5.1 |
| lldpV2LocChassisIdSubtype | RW | IEEE Std 802.1AB [97] Table 11-2 |
| lldpV2LocChassisId | RW | IEEE Std 802.1AB [97] Table 11-2 |
| lldpV2MessageTxInterval | RW | IEEE Std 802.1AB [97] Table 11-2 |
| lldpV2MessageTxHoldMultiplier | RW | IEEE Std 802.1AB [97] Table 11-2 |
| **DS-TT port neighbor discovery configuration for DS-TT ports (NOTE 4)** |  |  |
| **>DS-TT port neighbor discovery configuration for each DS-TT port** |  |  |
| >> DS-TT port number | RW |  |
| >> lldpV2LocPortIdSubtype | RW | IEEE Std 802.1AB [97] Table 11-2 |
| >> lldpV2LocPortId | RW | IEEE Std 802.1AB [97] Table 11-2 |
| **Discovered neighbor information for DS-TT ports****(NOTE 4)** |  |  |
| **>Discovered neighbor information for each DS-TT port****(NOTE 4)** |  |  |
| >> DS-TT port number | R |  |
| >> lldpV2RemChassisIdSubtype | R | IEEE Std 802.1AB [97] Table 11-2 |
| >> lldpV2RemChassisId | R | IEEE Std 802.1AB [97] Table 11-2 |
| >> lldpV2RemPortIdSubtype | R | IEEE Std 802.1AB [97] Table 11-2 |
| >> lldpV2RemPortId | R | IEEE Std 802.1AB [97] Table 11-2 |
| >> TTL | R | IEEE Std 802.1AB [97] clause 8.5.4.1 |
| **Stream Parameters (NOTE 5)** |  |  |
| MaxStreamFilterInstances | R | IEEE Std 802.1Q [98] |
| MaxStreamGateInstances | R | IEEE Std 802.1Q [98] |
| MaxFlowMeterInstances | R | IEEE Std 802.1Q [98] |
| SupportedListMax | R | IEEE Std 802.1Q [98] |
| NOTE 1: R = Read only access; RW = Read/Write access.NOTE 2: General neighbor discovery information is included only when NW-TT performs neighbor discovery on behalf of DS-TT. When a parameter in this group is changed, it is necessary to provide the change to every DS-TT and the NW-TT that belongs to the 5GS TSN bridge.NOTE 3: If the Static Filtering Entry information is present, NW-TT uses Static Filtering Entry information to determine the NW-TT egress port for forwarding UL TSC traffic. If the Static Filtering Entry information is not present, then the forwarding information as in clause 5.8.2.5.3 applies. This release of the specification does not support Static Filtering Entries in the downlink direction.NOTE 4: DS-TT discovery configuration and DS-TT discovery information are used only when DS-TT does not support LLDP and NW-TT performs neighbor discovery on behalf of DS-TT.NOTE 5: TSN AF indicates the support for PSFP to the CNC only if each DS-TT and NW-TT of the 5GS bridge have indicated support of PSFP. The support of PSFP at the NW-TT ports is expressed by setting higher than zero values for MaxStreamFilterInstances, MaxStreamGateInstances, MaxFlowMeterInstances, SupportedListMax parameters. |

Exchange of port and bridge management information between TSN AF or NEF and NW-TT or between TSN AF or NEF and DS-TT allows TSN AF or NEF to:

1) retrieve port management information for a DS-TT or NW-TT port or bridge management information;

2) send port management information for a DS-TT or NW-TT port or bridge management information;

3) subscribe to and receive notifications if specific port management information for a DS-TT or NW-TT port changes or bridge management information changes.

Exchange of port management information between TSN AF or NEF and NW-TT or DS-TT is initiated by DS-TT or NW-TT to:

- notify TSN AF or NEF if port management information has changed that TSN AF or NEF has subscribed for.

Exchange of bridge management information between TSN AF and NW-TT is initiated by NW-TT to:

- notify TSN AF if bridge management information has changed that TSN AF has subscribed for.

Exchange of port management information is initiated by DS-TT to:

- provide port management capabilities, i.e. provide information indicating which standardized and deployment-specific port management information is supported by DS-TT.

TSN AF or NEF indicates inside the Port Management Information Container or Bridge Management Information Container whether it wants to retrieve or send port or bridge management information or intends to (un-)subscribe for notifications.

#### 5.28.3.2 Transfer of port or bridge management information

Port management information is transferred transparently via 5GS between TSN AF or NEF and DS-TT or NW-TT, respectively, inside a Port Management Information Container (PMIC). Bridge management information is transferred transparently via 5GS between TSN AF or NEF and NW-TT inside a Bridge Management Information Container (BMIC). The transfer of port or bridge management information is as follows:

- To convey port management information from DS-TT or NW-TT to TSN AF or NEF:

- DS-TT provides a PMIC and the DS-TT port MAC address (if available) to the UE, which includes the PMIC as an optional Information Element of an N1 SM container and triggers the UE requested PDU Session Establishment procedure or PDU Session Modification procedure to forward the PMIC to the SMF. SMF forwards the PMIC and the port number of the related DS-TT Ethernet port to TSN AF or NEF as described in TS 23.502 [3] clause 4.3.3.2;

- NW-TT provides PMIC(s) and/or BMIC to the UPF, which triggers the N4 Session Level Reporting Procedure to forward the PMIC(s) and/or BMIC to SMF. UPF selects an N4 session corresponding to any of the N4 sessions for this NW-TT. SMF in turn forwards the PMIC(s) and the port number(s) of the related NW-TT port(s), or the BMIC, to TSN AF or NEF as described in TS 23.502 [3] clause 4.16.5.1.

NOTE 1: There has to be at least one established PDU session for DS-TT port before the UPF can report PMIC/BMIC information towards the AF.

- To convey port management information from TSN AF or NEF to DS-TT:

- TSN AF or NEF provides a PMIC, MAC address or UE IP address reported for a PDU Session (i.e. MAC address of the DS-TT port or IP address related to the PDU session) and the port number of the Ethernet port to manage to the PCF by using the AF Session level Procedure, which forwards the information to SMF based on the MAC or IP address using the PCF initiated SM Policy Association Modification procedure as described in TS 23.502 [3] clause 4.16.5.2. SMF determines that the port number relates to a DS-TT Ethernet port and based on this forwards the PMIC to DS-TT using the network requested PDU Session Modification procedure as described in TS 23.502 [3] clause 4.3.3.2.

- To convey port or bridge management information from TSN AF or NEF to NW-TT:

- TSN AF or NEF selects a PCF-AF session corresponding to any of the DS-TT MAC or IP addresses for the related PDU sessions of this bridge and provides a PMIC(s) and the related NW-TT port number(s) and/or BMIC to the PCF. The PCF uses the PCF initiated SM Policy Association Modification procedure to forward the information received from TSN AF or NEF to SMF as described in TS 23.502 [3] clause 4.16.5.2. SMF determines that the included information needs to be delivered to the NW-TT either by determining that the port number(s) relate(s) to a NW-TT Ethernet port(s) or based on the presence of BMIC, and forwards the container(s) and/or related port number(s) to NW-TT using the N4 Session Modification procedure described in TS 23.502 [3] clause 4.4.1.3.

*END OF CHANGES*