**3GPP TSG-CT WG3 Meeting #117-eC3-214435**

**E-Meeting, 18th – 27th August 2021 (revision of C3-214350)**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  |  | **CR** |  | **rev** | **1** | **Current version:** |  |  |
|  |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](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:***  |  |
|  |  |
| ***Source to WG:*** | , Huawei |
| ***Source to TSG:*** | CT3 |
|  |  |
| ***Work item code:*** |  |  | ***Date:*** |  |
|  |  |  |  |  |
| ***Category:*** |  |  | ***Release:*** |  |
|  | *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](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
|  |  |
| ***Reason for change:*** | SA2 has agreed to introduce Time Sensitive Communication and Time Synchronization Function (TSCTSF) for configuration of TSC/TSF services instead in CR 2833 to TS 23.501. |
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| ***Summary of change:*** | Introduction of Time Sensitive Communication and Time Synchronization Function (TSCTSF) |
|  |  |
| ***Consequences if not approved:*** | Stage3 not aligned with stage2 |
|  |  |
| ***Clauses affected:*** | 3.2, 4.2.3.23, 4.2.3.24 |
|  |  |
|  | **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 does not impact the OpenAPI file. |
|  |  |
| ***This CR's revision history:*** |  |

\* \* \* First Change \* \* \* \*

## 3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

ADC Application Detection and Control

5G-RG 5G Residential Gateway

AF Application Function

AMF Access and Mobility Management Function

API Application Programming Interface

ATSSS Access Traffic Steering, Switching, Splitting

ATSSS-LL ATSSS Low-Layer

BBF Broadband Forum

CHEM Coverage and Handoff Enhancements using Multimedia error robustness feature

CHF Charging Function

DDD Downlink Data Delivery

DDN Downlink Data Notification

DN-AAA Data Network Authentication, Authorization and Accounting

DNN Data Network Name

DS-TT Device-side TSN translator

DTS Data Transport Service

ePDG evolved Packet Data Gateway

FN-RG Fixed Network Residential Gateway

GEO Geosynchronous Orbit

GFBR Guaranteed Flow Bit Rate

GUAMI Globally Unique AMF Identifier

HFC Hybrid Fiber Coax

HTTP Hypertext Transfer Protocol

LEO Low Earth Orbit

MA Multi-Access

MEO Medium Earth Orbit

MPTCP Multi-Path TCP Protocol

NAS Non-Access-Stratum

NEF Network Exposure Function

NF Network Function

NID Network Identifier

NRF Network Repository Function

NW-TT Network-side TSN translator

PCC Policy and Charging Control

PCF Policy Control Function

PFD Packet Flow Description

PFDF Packet Flow Description Function

PMIC Port Management Information Container

PSAP Public Safety Answering Point

QoS Quality of Service

RTT Round-Trip Time

SDF Service Data Flow

SMF Session Management Function

SNPN Stand-alone Non-Public Network

S-NSSAI Single Network Slice Selection Assistance Information

SUPL Secure User Plane for Location

TNAN Trusted Non-3GPP Access Network

TWAN Trusted WLAN Access Network

TSC Time Sensitive Communication

TSCAI Time Sensitive Communication Assistance Information

TSN Time Sensitive Networking

TSN GM TSN Grand Master

TSCTSF Time Sensitive Communication and Time Synchronization function

UDM Unified Data Management

UDR Unified Data Repository

UE User Equipment

UMIC User plane node Management Information Container

URLLC Ultra Reliable Low Latency Communication

W-5GAN Wireline 5G Access Network

W-5GBAN Wireline BBF Access Network

W-5GCAN Wireline 5G Cable Access Network

W-AGF Wireline Access Gateway Function

\* \* \* Next Change \* \* \* \*

#### 4.2.3.23 Forwarding of TSC user plane node management information and port management information received from the AF

During the lifetime of a PDU session enabling Time Sensitive Communications and Time Synchronization the PCF may receive a UMIC and/or one or more PMIC(s) from the TSN AF or TSCTSF within the service information as defined in 3GPP TS 29.514 [17]. A UMIC carries TSC user plane node management information. A PMIC carries port management information for a port located in DS-TT and/or NW-TT.

If the feature "TimeSensitiveNetworking" or "TimeSensitiveCommunication" is supported the PCF initiates the Npcf\_SMPolicyControl\_UpdateNotify request and sends possibly updated policy information about the PDU Session and/or the UMIC and/or the PMIC(s) to the SMF via the SmPolicyDecision structure, in which the UMIC is encoded in the "tsnBridgeManCont" attribute, the DS-TT PMIC is encoded in the "tsnPortManContDstt" attribute and the one or more NW-TT PMIC(s) are encoded in the "tsnPortManContNwtts" attribute.

The PMIC(s) are encoded in the "PortManagementContainer" data type, that includes the port management information in the "portManCont" attribute and the related port number in the "portNum" attribute. If the port is on DS-TT the SMF forwards the PMIC(s) to the DS-TT port. If the port is on NW-TT the SMF forwards the PMIC(s) to the NW-TT port.

The UMIC is encoded in the "BridgeManagementContainer" data type, that includes the TSC user plane node management information in the "bridgeManCont" attribute. The SMF always forwards the UMIC to the TSC user plane node functionality of the UPF/NW-TT.

Editor’s Note: How this procedure is impacted to extend the support to other Time Sensitive Communication than TSN needs to be completed.

\* \* \* Next Change \* \* \* \*

#### 4.2.3.24 Provisioning of TSCAI input information and TSC QoS related data

The PCF may receive the TSCAI input information and TSC traffic QoS related information from the TSN AF or TSCTSF.

If the feature "TimeSensitiveNetworking" or "TimeSensitiveCommunication" is supported by both the SMF and PCF as described in subclause 5.8, the PCF shall provide for the derived PCC rule(s):

- the 5G QoS parameters and the optional 5G QoS characteristics corresponding to a 5QI for a delay-critical GBR derived from the TSC traffic QoS information received from the TSN AF or TSCTSF encoded within a QosData type referred in the "refQosData" of the PCC rule; and

- the TSCAI input information container as received from the TSN AF or TSCTSF, with the periodicity, burst arrival time and survival time encoded in the "tscaiInputUl" attribute and/or "tscaiInputDl" attribute of the PCC rule and, when the feature "TimeSensitiveCommunication" is supported, the (TSN)AF (g)PTP domain encoded in the "tscaiTimeDom" attribute.

- If the "TimeSensitiveCommunication" feature is supported and the TSCAI Survival Time Information is received:

- when the "surTimeInNumMsg" attribute is received, convert the value of "surTimeInNumMsg" attribute of the "tscaiInputUl" and/or "tscaiInputDl" attributes into time units by multiplying its value by the corrected uplink TSCAI Periodicity and/or downlink TSCAI Periodicity respectively, and set the TSCAI Survival Time to the calculated value; or

- when the "surTimeInTime" is received, correct the value of "surTimeInTime" attribute of the "tscaiInputUl" and/or "tscaiInputDl" attributes based on the latest received cumulative rateRatio measurement from the UPF and set the TSCAI Survival Time to the corrected value.

The values of MDBV and PDB applied to the derived 5QI shall follow principles defined in subclause 5.27.3 of 3GPP TS 23.501 [2].

The value of the MBR, if applicable, and the GBR are derived using the Maximum Bit Rate provided by the TSN AF or TSCTSF, and the ARP is assigned a value preconfigured for TSC services.

The SMF shall convert the received TSCAI input information from the external GM into the 5G GM based on the time offset and cumulative rateRatio between external time and 5GS time as measured and reported by the UPF and, forward the derived TSCAI parameters per QoS Flow basis to the AN-RAN as follows:

- for the traffic in downlink direction, correct the value of the "burstArrivalTime" attribute of the "tscaiInputDl" attribute based on the latest received time offset measurement from the UPF and set the downlink TSCAI Burst Arrival Time as the sum of the correct value and the CN PDB as described in subclause 5.7.3.4 of 3GPP TS 23.501 [2].

- for the traffic in uplink direction, correct the value of "burstArrivalTime" attribute of the "tscaiInputUl" attribute based on the latest received time offset measurement from the UPF and set the uplink TSCAI Burst Arrival Time as the sum of correct value and the UE-DS-TT Residence Time.

- correct the value of "periodicity" attribute of the "tscaiInputUl" and/or "tscaiInputDl" based on the latest received cumulative rateRatio measurement from the UPF and set the TSCAI Periodicity as the corrected value.

If the "TimeSensitiveCommunication" feature is supported and if the Time Domain information is included in the "tscaiTimeDom" attribute of the PCC rule, then the SMF may determine the time offset and cumulative rateRatio based on received Time Domain and adjust the TSCAI information as described above. If Time Domain information is not provided or the SMF does not have synchronization information available, then the SMF will not adjust the TSCAI information.

The provisioning of TSCAI input information and TSC traffic QoS configuration per PCC Rule shall be performed using the PCC rule provisioning procedure as defined in subclause 4.2.6.2.1.

\* \* \* End Change \* \* \* \*