**3GPP TSG-SA2#143E <MTG\_SEQ**>**<MTG\_TITLE> *S2-21xxxxx***

**<Location>, <Country>, <Start\_Date> - <End\_Date>**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **23.503** | **CR** | **<CR#>** | **rev** |  | **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:*** | Support of IMS voice service for SNPN | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson | | | | | | | | | |
| ***Source to TSG:*** | SA2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | eNPN | | | | |  | ***Date:*** | | | <Res\_date> |
|  |  | | | |  | |  | | |  |
| ***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 can be 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:*** | | Conclusions of KI#3 states: “It is recommended for normative work to support voice services with SNPN based on existing mechanisms as defined in TS 23.501 [4] clause 5.16.3”. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Clarify that BSF is required in a SNPN (clause 6.1.1.2.1).  Clarify that when the AF (e.g. P-CSCF) requests the PLMN identifier where the UE is located, the PCF provides the PLMN identifier when the UE is located in a PLMN or the PLMN identifier + NID when UE is located in a SNPN. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Incomplete specification of IMS voice in a SNPN. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 6.1.1.2.1 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 \* \* \* \*

##### 6.1.1.2.1 General

When multiple and separately addressable PCFs have been deployed in a PLMN or a SNPN, a network functionality is required in order to ensure that an AF needing to send policies about UE traffic identified by an UE address can reach over N5 the PCF holding the corresponding PDU Session information. This network functionality has the following characteristics:

- It has information about the user identity, the DNN, the UE (IP or MAC) address(es), the S-NSSAI and the selected PCF address for a certain PDU Session.

- For IP PDU Session type, it shall receive information when an IP address is allocated or released for a PDU Session.

- For Ethernet PDU Sessions supporting binding of AF request based on MAC address, it shall receive information when a MAC address is detected as being used by the UE over the PDU Session (this detection takes place at the UPF under control of SMF and is defined in TS 23.501 [2] clause 5.8.2). In addition, it receives the DS-TT port MAC address in case of IEEE TSN integration (as described in clause 5.28.2 of TS 23.501 [2]).

- The functionality determines the PCF address and if available the associated PCF instance ID and PCF set ID, selected by the PCF discovery and selection function described in TS 23.501 [2], according to the information provided by the AF or the NEF.

A private IPv4 address may be allocated to different PDU Sessions, e.g.:

- The same UE IPv4 address is allocated to different PDU Sessions to the same DNN and different S-NSSAI;

- The same UE IPv4 address is allocated to different PDU Sessions to the same S-NSSAI and different DNN.

In the case of private IPv4 address being used for the UE, the AF or the NEF may send DNN S-NSSAI, in addition, in Npcf\_PolicyAuthorization\_Create request and Nbsf\_Management\_Discovery request. The DNN and S-NSSAI can be used by the PCF for session binding, and they can be also used to help selecting the correct PCF.

\* \* \* \* Next change \* \* \* \*

#### 6.1.3.18 Event reporting from the PCF

The AF may subscribe/unsubscribe to notifications of events from the PCF for the PDU Session to which the AF session is bound.

The events that can be subscribed by the AF are listed in Table 6.1.3.18-1.

Table 6.1.3.18-1: Events relevant for reporting from the PCF

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Event | Description | Conditions for reporting | Availability for Rx PDU Session (NOTE 2) | Availability for N5 PDU Session | Availability for Bulk Subscription  (NOTE 1) |
| PLMN Identifier Notification  (NOTE 4) | The PLMN identifier or SNPN identifier where the UE is currently located. | AF | Yes | Yes | Yes |
| Change of Access Type | The Access Type and, if applicable, the RAT Type of the PDU Session has changed. | AF | Yes | Yes | Yes |
| EPS fallback | EPS fallback is initiated | AF | Yes | Yes | No |
| Signalling path status | The status of the resources related to the signalling traffic of the AF session. | AF | Yes | Yes | No |
| Access Network Charging Correlation Information | The Access Network Charging Correlation Information of the resources allocated for the AF session. | AF | Yes | Yes | No |
| Access Network Information Notification | The user location and/or timezone when the PDU Session has changed in relation to the AF session. | AF | Yes | Yes | No |
| Reporting Usage for Sponsored Data Connectivity | The usage threshold provided by the AF has been reached; or the AF session is terminated. | AF | Yes | Yes | No |
| Service Data Flow deactivation | The resources related to the AF session are released. | AF | Yes | Yes | No |
| Resource allocation outcome | The outcome of the resource allocation related to the AF session. | AF | Yes | Yes | No |
| QoS targets can no longer (or can again) be fulfilled | The QoS targets can no longer (or can again) be fulfilled by the network for (a part of) the AF session. | AF | No | Yes | No |
| QoS Monitoring parameters | The QoS Monitoring parameter(s) (e.g. UL packet delay, DL packet delay or round trip packet delay) are reported to the AF according to the QoS Monitoring reports received from the SMF. | AF | No | Yes | No |
| Out of credit | Credit is no longer available. | AF | Yes | Yes | No |
| Reallocation of credit | Credit has been reallocated after the former out of credit indication. | AF | Yes | Yes | No |
| 5GS Bridge information Notification  (NOTE 3) | 5GS Bridge information that has been received by PCF from SMF. | AF | No | Yes | No |
| NOTE 1: Additional parameters for the subscription as well as reporting related to these events are described in TS 23.502 [3].  NOTE 2: Applicability of Rx is described in Annex C.  NOTE 3: 5GS Bridge information is described in clause 6.1.3 UE-DS-TT Residence Time is only provided if a DS-TT port is detected.  NOTE 4: For a PDU session established over a SNPN, the combination of the PLMN id and the NID to identifies the SNPN. | | | | | |

If an AF requests the PCF to report the PLMN identifier where the UE is currently located, then the PCF shall provide the PLMN identifier or the SNPN identifier to the AF if available. Otherwise, the PCF shall provision the corresponding PCC rules, and the Policy Control Request Trigger to report PLMN change to the SMF. The PCF shall, upon receiving the PLMN identifier from the SMF forward this information to the AF.

If an AF requests the PCF to report on the change of Access Type, the PCF shall provide the corresponding Policy Control Request Trigger to the SMF to enable the report of the Change in Access Type to the PCF. The PCF shall, upon reception of information about the Access Type the user is currently using and upon indication of change of Access Type, notify the AF on changes of the Access Type and forward the information received from the SMF to the AF. The change of the RAT Type shall also be reported to the AF, even if the Access Type is unchanged. For MA PDU Session the Access Type information may include two Access Type information that the user is currently using.

If an AF requests the PCF to report on the signalling path status, for the AF session, the PCF shall, upon indication of removal of PCC Rules identifying signalling traffic from the SMF report it to the AF.

If an AF requests the PCF to report Access Network Charging Correlation Information, the PCF shall provide to the AF the Access Network Charging Correlation Information, which allows to identify the usage reports that include measurements for the Service Data Flow(s), once the Access Network Charging Correlation Information is known at the PCF.

If an AF requests the PCF to report Access Network Information (i.e. the User Location Report and/or the UE Timezone Report) at AF session establishment, modification or termination, the PCF shall set the Access Network Information report parameters in the corresponding PCC rule(s) and provision them together with the corresponding Policy Control Request Trigger to the SMF. For those PCC rule(s) based on preliminary service information the PCF may assign the 5QI and ARP of the QoS Flow associated with the default QoS rule to avoid signalling to the UE. The PCF shall, upon receiving an Access Network Information report corresponding to the AF session from the SMF, forward the Access Network Information as requested by the AF (if the SMF only reported the serving PLMN identifier or the SNPN identifier to the PCF, as described in clause 6.1.3.5, the PCF shall forward it to the AF). For AF session termination the communication between the AF and the PCF shall be kept alive until the PCF report is received.

If an AF requests the PCF to report the Usage for Sponsored Data Connectivity, the PCF shall provision the corresponding PCC rules, and the Policy Control Request Trigger to the SMF. If the usage threshold provided by the AF has been reached or the AF session is terminated, the PCF forwards such information to the AF.

If an AF requests the PCF to report the Service Data Flow deactivation, the PCF shall report the release of resources corresponding to the AF session. The PCF shall, upon being notified of the removal of PCC Rules corresponding to the AF session from the SMF, forward this information to the AF. The PCF shall also forward, if available, the reason why the resources are released, the user location information and the UE Timezone.

If an AF requests the PCF to report the Resource allocation outcome, the PCF shall report the outcome of the resource allocation of the Service Data Flow(s) related to the AF session. The AF may request to be notified about successful or failed resource allocation and the PCF shall instruct the SMF accordingly (as described in clause 4.2.6.5.5 of TS 29.512 [32]). If the SMF has notified the PCF that the resource allocation of a Service Data Flow is successful and the currently fulfilled QoS matches an Alternative QoS parameter set (as described in clause 6.2.2.1), the PCF shall also provide to the AF the QoS reference parameter corresponding to the Alternative QoS parameter set referenced by the SMF.

If an AF requests the PCF to report when the QoS targets can no longer (or can again) be fulfilled for a particular media flow, the PCF shall set the QNC indication in the corresponding PCC rule(s) that includes a GBR or delay critical GBR 5QI value and provision them together with the corresponding Policy Control Request Trigger to the SMF. At the time, the SMF notifies that GFBR can no longer (or can again) be guaranteed for a QoS Flow to which those PCC Rule(s) are bound, the PCF shall report to the AF the affected media flow and provides the indication that QoS targets can no longer (or can again) be fulfilled. If additional information is received with the notification from SMF (see clause 5.7.2.4 of TS 23.501 [2]), the PCF shall also provide to the AF the QoS reference parameter corresponding to the Alternative QoS parameter set referenced by the SMF. If the SMF has indicated that the lowest priority Alternative QoS parameter set cannot be fulfilled, the PCF shall indicate to the AF that the lowest priority QoS reference of the Alternative Service Requirements cannot be fulfilled.

If the AF has subscribed to be notified of the QoS Monitoring information, the PCF further sends the QoS Monitoring report to the AF.

If an AF requests the PCF to report on the Out of credit event for the associated service data flow(s), the PCF shall inform the AF (when it gets informed by the SMF) that credit is no longer available for the services data flow(s) related to the AF session together with the applied termination action.

If an AF requests the PCF to report on the Reallocation of credit event for the associated service data flow(s), the PCF shall inform the AF (when it gets informed by the SMF) that credit has been reallocated after credit was no longer available and the termination action was applied for the service data flow(s) related to the AF session.

If an AF requests the PCF to report on the event of the 5GS Bridge information Notification, for the AF session, the PCF shall, request the SMF to report on the trigger of 5GS Bridge information available as described in the clause 6.1.3.5. Upon reception of the 5G bridge information, the PCF forwards this information to the TSN AF.

\* \* \* \* End of changes \* \* \* \*