**3GPP TSG-SA WG2 Meeting #143-e (e-meeting) *S2-210xxxx***

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

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
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|  | **23.501** | **CR** | **xxxx** | **rev** | **-** | **Current version:** | **16.7.0** |  |
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| *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 | **X** | Radio Access Network |  | Core Network | **X** |

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| ***Title:***  | Support for normal IMS voice over SNPN |
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| ***Source to WG:*** | Qualcomm Incorprorated |
| ***Source to TSG:*** | SA2 |
|  |  |
| ***Work item code:*** | eNPN |  | ***Date:*** | 2021-02-24 |
|  |  |  |  |  |
| ***Category:*** | **C** |  | ***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](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-12 (Release 12)**Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)* |
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| ***Reason for change:*** | This CR is introducing changes in TS 23.501 for support of “normal” IMS voice (non-emergency) for SNPNs based on the conclusions of Key Issue #3 in TR 23.700-07.  |
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| ***Summary of change:*** | * Support for IMS voice over PS support indication for SNPN
* P-CSCF address discovery
* Indicate that there is no support for T-ADS
* Support for IMS voice when access to SNPN is via PLMN
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| ***Consequences if not approved:*** | No support for IMS voice for SNPN |
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| ***Clauses affected:*** | 5.16.3.2, 5.16.3.4, 5.16.3.6, 5.30.2.8 |
|  |  |
|  | **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 ...  |
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| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

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

#### 5.16.3.2 IMS voice over PS Session Supported Indication over 3GPP access

The serving PLMN AMF shall send an indication toward the UE during the Registration procedure over 3GPP access to indicate if an IMS voice over PS session is supported or not supported in 3GPP access and non-3GPP access. The serving SNPN AMF shall send an indication toward the UE during the Registration procedure over NR access to indicate if an IMS voice over PS session is supported or not supported in NR access and when accessed via PLMN as defined in clause 5.30.28. A UE with "IMS voice over PS" voice capability over 3GPP access should take this indication into account when performing voice domain selection, as described in clause 5.16.3.5.

The serving PLMN AMF may only indicate IMS voice over PS session supported over 3GPP access in one of the following cases:

- If the network and the UE are able to support IMS voice over PS session in the current Registration Area with a 5G QoS Flow that supports voice as specified in clause 5.7.

- If the network or the UE are not able to support IMS voice over PS session over NR connected to 5GC, but is able for one of the following:

- If the network and the UE are able to support IMS voice over PS session over E-UTRA connected to 5GC, and the NG-RAN supports a handover or redirection to E-UTRA connected to 5GC for this UE at QoS Flow establishment for IMS voice;

- If the UE supports handover to EPS, the EPS supports IMS voice, and the NG-RAN supports a handover to EPS for this UE at QoS Flow establishment for IMS voice; or

- If the UE supports redirection to EPS, the EPS supports IMS voice, and the NG-RAN supports redirection to EPS for this UE at QoS Flow establishment for IMS voice.

- If the network is not able to provide a successful IMS voice over PS session over E-UTRA connected to 5GC, but is able for one of the following:

- If the UE supports handover to EPS, the EPS supports IMS voice, and the NG-RAN supports a handover to EPS for this UE at QoS Flow establishment for IMS voice; or

- If the UE supports redirection to EPS, the EPS supports IMS voice, and the NG-RAN supports redirection to EPS for this UE at QoS Flow establishment for IMS voice.

The serving SNPN AMF may only indicate IMS voice over PS session supported NR access if the network and the UE are able to support IMS voice over PS session in the current Registration Area with a 5G QoS Flow that supports voice as specified in clause 5.7.

NOTE 1: There is no support for EPS fallback or RAT fallback in case of SNPN.

The serving PLMN provides this indication based e.g. on local policy, UE capabilities, HPLMN, whether IP address preservation is possible, whether NG-RAN to UTRAN SRVCC is supported and how extended NG-RAN coverage is, and the Voice Support Match Indicator from the NG-RAN (see TS 23.502 [3] clause 4.2.8a). The AMF in serving PLMN shall indicate that IMS voice over PS is supported only if the serving PLMN has a roaming agreement that covers support of IMS voice with the HPLMN. This indication is per Registration Area.

NOTE 2: If the network supports EPS fallback for voice the 5GC can be configured not to perform the Voice Support Match Indicator procedure in order to set the IMS voice over PS session Supported Indication.

The serving SNPN provides this indication based e.g. on local policy, UE capabilities, Home SP, whether IP address preservation is possible, how extended NR coverage is, and the Voice Support Match Indicator from the NG-RAN (see TS 23.502 [3] clause 4.2.8a). The AMF in serving SNPN shall indicate that IMS voice over PS is supported only if the serving PLMN has an SLA that covers support of IMS voice with the Home SP. This indication is per Registration Area.

NOTE 3: Since in SNPN access mode there is only support for NR and the "voice centric" UE cannot reselect to another RAT in the same registered SNPN if the first TA-list that the UE tries to register from cannot support IMS voice, it is recommended that support for IMS voice is provided homogeneously in the whole SNPN if at all.

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

#### 5.16.3.4 P-CSCF address delivery

At PDU Session Establishment procedure related to IMS, SMF shall support the capability to send the P-CSCF address(es) to UE. The SMF is located in VPLMN if LBO is used. This is sent by visited SMF if LBO is used. For Home routed, this information is sent by the SMF in HPLMN. P-CSCF address(es) shall be sent transparently through AMF, and in the case of Home Routed also through the SMF in VPLMN. The P-CSCF IP address(es) may be locally configured in the SMF, or discovered using NRF as described in clause 5.16.3.11.

NOTE 1: Other options to provide P-CSCF to the UE as defined in TS 23.228 [15] is not excluded.

NOTE 2: PDU Session for IMS is identified by "APN" or "DNN".

For SNPN access the SMF is always located in the serving SNPN and LBO is used; therefore, the serving SMF sends the P-CSCF address(es) to the UE even when IMS in the Home SP is used.

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

#### 5.16.3.6 Terminating domain selection for IMS voice

When requested by IMS, the UDM/HSS shall be able to query the serving AMF for T-ADS related information. T-ADS is a functionality located in the IMS and is performed as specified in TS 23.221 [23].

The AMF shall respond to the query with the following information unless the UE is detached:

- whether or not IMS voice over PS Session is supported in the registration area (s) where the UE is currently registered;

- whether or not IMS voice over PS Session Supported Indication over non-3GPP access is supported in the WLAN where the UE is currently registered;

- the time of the last radio contact with the UE; and

- the current Access Type and RAT type.

NOTE: T-ADS is a functionality is not needed for IMS voice in SNPN.

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

#### 5.30.2.8 Access to stand-alone non-public network services via PLMN

To access SNPN services, a UE that has successfully registered with a PLMN over 3GPP access may perform another registration via the PLMN User Plane with an SNPN (using the credentials of that SNPN) following the same architectural principles as specified in clause 4.2.8 (including the optional support for PDU Session continuity between PLMN and SNPN using the Handover of a PDU Session procedures in TS 23.502 [3] clauses 4.9.2.1 and 4.9.2.2) and the PLMN taking the role of "Untrusted non-3GPP access" of the SNPN, i.e. using the procedures for Untrusted non-3GPP access in clause 4.12.2 of TS 23.502 [3]. Annex D, clause D.3 provides additional details. The case where UE that has successfully registered with a PLMN over non-3GPP access to access SNPN services is not specified in this Release.

NOTE: QoS differentiation in the PLMN can be provided on per-IPsec Child Security Association basis by using the UE or network requested PDU Session Modification procedure described in TS 23.502 [3] clause 4.3.3.2. In the SNPN, N3IWF determines the IPsec child SAs as defined in TS 23.502 [3] clause 4.12. The N3IWF is preconfigured by SNPN to allocate different IPsec child SAs for QoS Flows with different QoS profiles.

 To support QoS differentiation in the PLMN with network-initiated QoS, the mapping rules between the PLMN and the SNPN are assumed to be governed by an SLA including: 1) mapping between the DSCP markings for the IPsec child SAs on NWu and the corresponding QoS, which is the QoS requirement of the SNPN and is expected to be provided by the PLMN, and 2) N3IWF IP address(es) in the SNPN. The non-alteration of the DSCP field on NWu is also assumed to be governed by an SLA and by transport-level arrangements that are outside of 3GPP scope. The packet detection filters in the PLMN can be based on the N3IWF IP address and the DSCP markings on NWu.

 To support QoS differentiation in the PLMN with UE-requested QoS, the UE can request for an IPsec SA the same 5QI from the PLMN as the 5QI provided by the SNPN. It is assumed that UE-requested QoS is used only when the 5QIs used by the SNPN are from the range of standardized 5QIs. The packet filters in the requested QoS rule can be based on the N3IWF IP address and the SPI associated with the IPsec SA.

When accessing the SNPN via PLMN, the serving SNPN AMF shall send an indication toward the UE during the Registration procedure to indicate whether an IMS voice over PS session is supported or not supported when the SNPN is accessed via PLMN. A UE with "IMS voice over PS" voice capability over PLMN should take this indication (received in the Registration procedure performed over either NR access or via PLMN) into account when performing the selection for N3IWF described in clause 6.3.6.

\*\*\* End of Changes \*\*\*\*