**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 | **X** | Core Network | **X** |

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| ***Title:*** | SNPN selection for access to SNPNs using credentials from an entity separate from the SNPN | | | | | | | | | |
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| ***Source to WG:*** | Qualcomm Incorprorated, Intel | | | | | | | | | |
| ***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 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-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 introduces changes into TS 23.501 to enabe SNPN selection for access to SNPNs using credentials from an entity separate from the SNPN in line with the conclusions for Key Issue #1 in TR 23.700-07. | | | | | | | | |
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| ***Summary of change:*** | | * Introduce two new indications ("access using credentials from a separate entity is supported" and "whether the SNPN allows registration attempts from UEs that are not explicitly configured to select the SNPN") and List of supported Group IDs per NID in SIB in clause 5.30.2.2 * Update clause 5.30.2.3 to introduce user-controlled prioritized list of preferred SNPNs, separate entity controlled prioritized list of preferred SNPNs and separate entity-controlled prioritized list of Group IDs in UE configuration and subscription aspects for SNPN-enabled UEs * Create new clause 5.30.2.3a SNPN access mode to shorten the UE configuration clause * Clarify that an SNPN-enabled UE that supports access to an SNPN using credentials from a separate entity and that is equipped with a USIM holding a PLMN subscription needs needs to first enter SNPN access mode to be able to select SNPN * Update clause 5.30.2.4 to reflect agreements for automatic and manual network selection as concluded for key issue #1 in TR 23.700-07 | | | | | | | | |
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| ***Consequences if not approved:*** | | No support for SNPN selection for access to SNPNs using credentials from an entity separate from the SNPN | | | | | | | | |
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| ***Clauses affected:*** | | 5.30.2.2, 5.30.2.3, 5.30.2.3a (new), 5.30.2.4, 5.30.2.4.1 (new), 5.30.2.4.2 (new), 5.30.2.4.3 (new), | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | | Limited service state aspects are included in a separate CR (CR#...) on emergency call support in SNPNs. | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

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

#### 5.30.2.2 Broadcast system information

NG-RAN nodes which provide access to SNPNs broadcast the following information:

- One or multiple PLMN IDs

- List of NIDs per PLMN ID identifying the non-public networks NG-RAN provides access to

NOTE 1: It is assumed that an NG-RAN node supports broadcasting a total of twelve NIDs. Further details are defined in TS 38.331 [28].

NOTE°2: The presence of a list of NIDs for a PLMN ID indicates that the related PLMN ID and NIDs identify SNPNs.

- Optionally:

- A human-readable network name per NID.

NOTE 3: The human-readable network name per NID is only used for manual SNPN selection. The mechanism how human-readable network name is provided (i.e. whether it is broadcasted or unicasted) to the UE is specified in TS 38.331 [28].

- Information, as described in TS 38.300 [27], TS 38.331 [28] and in TS 38.304 [50], to prevent UEs not supporting SNPNs from accessing the cell, e.g. if the cell only provides access to non-public networks.

- An indication per NID of whether access using credentials from a separate entity is supported

- List of supported Group IDs per NID

- An indication per NID of whether the SNPN allows registration attempts from UEs that are not explicitly configured to select the SNPN

NOTE 4: Further details (including number of supported Group IDs per NID) are defined in TS 38.331 [28].

#### 5.30.2.3 UE configuration and subscription aspects

An SNPN-enabled UE is configured with the following information for each subscribed SNPN:

- PLMN ID and NID of the SNPN

- Subscriber identifier (SUPI) and credentials.

- Optionally, an N3IWF FQDN and an identifier of the country where the configured N3IWF is located.

- Optionally, if the UE supports access to an SNPN using credentials from a separate entity:

- User controlled prioritized list of preferred SNPNs

- Separate entity controlled prioritized list of preferred SNPNs

- Separate entity controlled prioritized list of Group IDs

A subscriber of an SNPN is either:

- identified by a SUPI containing a network-specific identifier that takes the form of a Network Access Identifier (NAI) using the NAI RFC 7542 [20] based user identification as defined in TS 23.003 [19] clause 28.7.2. The realm part of the NAI may include the NID of the SNPN; or

- identified by a SUPI containing an IMSI.

An SNPN-enabled UE that supports access to an SNPN using credentials from a separate entity and that is equipped with a USIM holding a PLMN subscription may additionally be configured with the following information for SNPN selection und registration using the PLMN subscription in SNPN access mode:

- User controlled prioritized list of preferred SNPNs

- Separate entity controlled prioritized list of preferred SNPNs

- Separate entity controlled prioritized list of supported Group IDs (GIDs)

#### 5.30.2.3a SNPN access mode

An SNPN-enabled UE supports the SNPN access mode. When the UE is set to operate in SNPN access mode the UE only selects and registers with SNPNs over Uu as described in clause 5.30.2.4.

Emergency services are not supported in SNPN access mode.

NOTE 1: Voice support with emergency services in SNPN access mode is not specified in this release.

If a UE is not set to operate in SNPN access mode, even if it is SNPN-enabled, the UE does not select and register with SNPNs. A UE not set to operate in SNPN access mode performs PLMN selection procedures as defined in clause 4.4 of TS 23.122 [17]. For a UE capable of simultaneously connecting to an SNPN and a PLMN, the setting for operation in SNPN access mode is applied only to the Uu interface for connection to the SNPN. Annex D.4 provides more details.

An SNPN-enabled UE that supports access to an SNPN using credentials from a separate entity and that is equipped with a USIM holding a PLMN subscription needs to enter SNPN access mode in order to select SNPNs. Once the UE has entered SNPN access mode, SNPN selection is performed as described in clause 5.30.2.4. Once an SNPN has been selected the UE attempts registration using the PLMN credentials.

NOTE 2: Details of activation and deactivation of SNPN access mode are up to UE implementation.

#### 5.30.2.4 Network selection in SNPN access mode

##### 5.30.2.4.1 General

When a UE is set to operate in SNPN access mode the UE does not perform normal PLMN selection procedures as defined in clause 4.4 of TS 23.122 [17].

UEs operating in SNPN access mode read the information described in clause 5.30.2.2 from the broadcast system information and take them into account during network selection.

##### 5.30.2.4.2 Automatic network selection

NOTE 1: If the UE has multiple SNPN subscriptions it is assumed that the subscription to use for automatic selection is determined by implementation specific means prior to network selection.

For automatic network selection the UE selects and attempts registration on available and allowable SNPNs in the following order:

- the SNPN the UE was last registered with (if available);

- the SNPN identified by the PLMN ID and NID for which the UE has SUPI and credentials.;

- If the UEs supports access to an SNPN using credentials from a separate entity then the UE continues in the following order:

- SNPNs, which broadcast the indication that access using credentials from a separate entity is supported and an SNPN ID contained in the user-controlled list of preferred SNPNs (in priority order);

- SNPNs, which broadcast the indication that access using credentials from a separate entity is supported and an SNPN ID contained in the separate entity controlled list of preferred SNPNs (in priority order);

- SNPNs, which broadcast the indication that access using credentials from a separate entity is supported and a Group ID contained in the separate entity controlled list of supported Group IDs (in priority order);

NOTE 2: If multiple SNPNs are available that broadcast the same Group ID, the order in which the UE selects and attempts a registration with those SNPNs is implementation specific.

- SNPNs, which broadcast an indication that the SNPN allows registration attempts from UEs that are not explicitly configured to select the SNPN.

NOTE 3: If multiple SNPNs are available that broadcast the indication that the SNPN allows registration attempts from UEs that are not explicitly configured to select the SNPN, the order in which the UE selects and attempts a registration with those SNPNs is implementation specific.

Editor's note: The SNPN selection details listed above will be replaced by a reference to TS 23.122 [17] once SNPN selection in TS 23.122 [17] has been updated in line with the above.

When a UE performs Initial Registration to an SNPN, the UE shall indicate the selected NID and the corresponding PLMN ID to NG-RAN. NG-RAN shall inform the AMF of the selected PLMN ID and NID.

##### 5.30.2.4.3 Manual network selection

For manual network selection UEs operating in SNPN access mode provide to the user the list of SNPNs (each is identified by a PLMN ID and NID) and related human-readable names (if available) of the available SNPNs the UE has respective SUPI and credentials for. If the UEs supports access to an SNPN using credentials from a separate entity, the UE also presents available SNPNs which broadcast the "access using credentials from a separate entity is supported" indication.NOTE: The details of SNPN selection is defined in TS 23.122 [17].

When a UE performs Initial Registration to an SNPN, the UE shall indicate the selected NID and the corresponding PLMN ID to NG-RAN. NG-RAN shall inform the AMF of the selected PLMN ID and NID.

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