**SA WG2 Meeting #S2-139E  *S2-2004454***

**01 - 12 June, 2020, Electronic, Elbonia**

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| *CR-Form-v11.2* |
| **CHANGE REQUEST** |
|  |
|  | **23.501** | **CR** | 2380  | **rev** | **2** | **Current version:** | **16.4.0** |  |
| *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:***  | Handling manipulation of CAG by VPLMN –Sol 1 |
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| ***Source to WG:*** | Samsung, Ericsson, Qualcomm Incorporated, InterDigital, Nokia, Nokia Shanghai Bell  |
| ***Source to TSG:*** | SA WG2 |
|  |  |
| ***Work item code:*** | Vertical\_LAN |  | ***Date:*** | 2020-05-21 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | Rel-16 |
|  | *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:*** | The CR captures solution 1 of the discussion paper S2-2004255. i.e. UE updates the VPLMN CAG information only when received from serving VPLMN. If received from HPLMN complete CAG information is updated.Also, as described in LS from SA3 in S3-201351, there may be a false network that reject UE requests and the UE may end up manipulating its stored CAG information with wrong information. Thus its proposed that UE should use the information received in NAS reject message to update its CAG information. The cause code in the Registration Reject message is not required in this case. |
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| ***Summary of change:*** | Specify that 1. UE updates only VPLMN CAG information received from serving VPLMN. The UE will not touch the CAG information of other PLMNs stored in the UE when CAG information is received on VPLMN.2. When received from HPLMN UE can update CAG information of all the received PLMN CAG information.3. when the UE gets rejected, the UE will update its stored CAG information based on information received in reject message. |
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| ***Consequences if not approved:*** | The CAG information can be modified by the VPLMN to keep the UE in its network although there are other high priority PLMNs available at the location. |
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| ***Clauses affected:*** | 5.30.3.3, 5.30.3.4 |
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|  | **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:*** |  |

## <<< Start of first change >>>

#### 5.30.3.3 UE configuration, subscription aspects and storage

To use CAG, the UE may be pre-configured or (re)configured with the following CAG information, included in the subscription as part of the Mobility Restrictions:

- an Allowed CAG list i.e. a list of CAG Identifiers the UE is allowed to access; and

- optionally, a CAG-only indication whether the UE is only allowed to access 5GS via CAG cells (see TS 38.304 [50] for how the UE identifies whether a cell is a CAG cell);

The HPLMN may configure or re-configure a UE with the above CAG information using the UE Configuration Update procedure for access and mobility management related parameters described in TS 23.502 [3] in clause 4.2.4.2.,

The above CAG information is provided by the HPLMN on a per PLMN basis. In a PLMN the UE shall only consider the CAG information provided for this PLMN.

When the UE is roaming and the Serving PLMN provides CAG information, the UE shall update only the CAG information provided for the Serving PLMN while the stored CAG information for other PLMNs are not updated. When the UE is not roaming and the HPLMN provides CAG information, the UE shall update the CAG information stored in the UE with the received CAG information for all the PLMNs.

The UE shall store the latest available CAG information for every PLMN for which it is provided and keep it stored when the UE is de-registered or switched off, as described in TS 24.501 [47].

NOTE: CAG information has no implication on whether and how the UE accesses 5GS over non-3GPP access.

## <<< Start of second change >>>

#### 5.30.3.4 Network and cell (re-)selection, and access control

The following is assumed for network and cell selection, and access control:

- The CAG cell shall broadcast information such that only UEs supporting CAG are accessing the cell (see TS 38.300 [27], TS 38.304 [50]);

NOTE 1: The above also implies that cells are either CAG cells or normal PLMN cells.

- In order to prevent access to NPNs for authorized UE(s) in the case of network congestion/overload, existing mechanisms defined for Control Plane load control, congestion and overload control in clause 5.19 can be used, as well as the access control and barring functionality described in clause 5.2.5, or Unified Access Control using the access categories as defined in TS 24.501 [47] can be used.

- For aspects of automatic and manual network selection in relation to CAG, see TS 23.122 [17];

- For aspects related to cell (re-)selection, see TS 38.304 [50];

- The Mobility Restrictions shall be able to restrict the UE's mobility according to the Allowed CAG list (if configured in the subscription) and include an indication whether the UE is only allowed to access CAG cells (if configured in the subscription);

- During transition from CM-IDLE to CM-CONNECTED, if the UE is accessing the 5GS via a CAG cell:

- The AMF shall verify whether UE access is allowed by Mobility Restrictions:

NOTE 2: It is assumed that the AMF is made aware of the supported CAG Identifier(s) of the CAG cell by the NG-RAN.

- If at least one of the CAG Identifier(s) received from the NG-RAN is part of the UE's Allowed CAG list, then the AMF accepts the NAS request;

- If none of the CAG Identifier(s) received from the NG-RAN are part of the UE's Allowed CAG list, then the AMF rejects the NAS request and the AMF should include CAG information in the NAS reject message. The AMF shall then release the NAS signalling connection for the UE by triggering the AN release procedure; and

- If the UE is accessing the network via a non-CAG cell and the UE's subscription contains an indication that the UE is only allowed to access CAG cells, then the AMF rejects the NAS request and the AMF should include CAG information in the NAS reject message. The AMF shall then release the NAS signalling connection for the UE by triggering the AN release procedure.

- During transition from RRC Inactive to RRC Connected state:

- When the UE initiates the RRC Resume procedure for RRC Inactive to RRC Connected state transition in a CAG cell, NG-RAN shall reject the RRC Resume request from the UE if none of the CAG Identifiers supported by the CAG cell are part of the UE's Allowed CAG list according to the Mobility Restrictions received from the AMF.

- When the UE initiates the RRC Resume procedure for RRC Inactive to RRC Connected state transition in a non-CAG cell, NG-RAN shall reject the UE's Resume request if the UE is only allowed to access CAG cells according to the Mobility Restrictions received from the AMF.

- During connected mode mobility procedures:

- Based on the Mobility Restrictions received from the AMF:

- Source NG-RAN shall not handover the UE to a target NG-RAN node if the target is a CAG cell and none of the CAG Identifiers supported by the CAG cell are part of the UE's Allowed CAG list;

- Source NG-RAN shall not handover the UE to a non-CAG cell if the UE is only allowed to access CAG cells;

- If the target cell is a CAG cell, target NG-RAN shall reject the N2 based handover procedure if none of the CAG Identifiers supported by the CAG cell are part of the UE's Allowed CAG list in the Mobility Restriction List;

- If the target cell is a non-CAG cell, target NG-RAN shall reject the N2 based handover procedure if the UE is only allowed to access CAG cells based on the Mobility Restriction List.

- Update of Mobility Restrictions:

- When the AMF receives the Nudm\_SDM\_Notification from the UDM and the AMF determines that the Allowed CAG list or the indication whether the UE is only allowed to access CAG cells have changed;

- The AMF shall update the Mobility Restrictions in the UE and NG-RAN accordingly; and

- Upon receiving Mobility Restrictions from AMF, NG-RAN determines if the UE is currently accessing a CAG cell and the CAG Identifier(s) supported by the CAG cell have been removed from the Allowed CAG list or if the UE is currently accessing a non-CAG cell and the indication that the UE is only allowed to access CAG cells has been set in the subscription, then the NG-RAN shall initiate actions for the UE (e.g. a handover or AN release) to ensure that the UE is no longer served by the current cell.

NOTE 3: When the UE is accessing the network for emergency service the conditions for AMF in clause 5.16.4.3 apply.

## <<< End of changes >>>