**3GPP TSG-CT WG1 Meeting #123-eC1-20vpca**

**Electronic meeting, 16-24 April 2020**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
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|  | **23.122** | **CR** | **0499** | **rev** | **5** | **Current version:** | **16.5.0** |  |
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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 |  |

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| ***Title:***  | Manual CAG selection |
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| ***Source to WG:*** | Nokia, Nokia Shanghai Bell |
| ***Source to TSG:*** | C1 |
|  |  |
| ***Work item code:*** | Vertical\_LAN |  | ***Date:*** | 2020-04-05 |
|  |  |  |  |  |
| ***Category:*** | **C** |  | ***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:*** | SA1 agreed the following requirement:*The 5G system shall support a mechanism for a PLMN to control whether a user of a UE can manually select a non-public network hosted by this PLMN that the UE is not authorized to select automatically.*In other words, there should be a way to manually select a non-allowed CAG-ID. This requirement brings us the following points to consider:1. What should be displayed if, for a PLMN/RAT combination, both a non-CAG cell and a CAG cell (which the UE can select) are available?Our view is that the display needs to allow the user to select no CAG-ID.
2. Should there be a prioritization among {no CAG selection, allowed CAG-IDs, non-allowed CAG-IDs}?Our view is yes.
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| ***Summary of change:*** | Manual CAG selection is updated.In order to fulfil the consideration points above:1. We introduced "Select the PLMN/access technology combination without selecting a CAG-ID" as one element in the list of CAG-IDs displayed to the user.
2. NOTE 0 describes such a prioritization.

For example, **Example 1**for PLMN X / NG-RAN combination, if non-CAG cell is available, CAG-ID a is available and allowed, CAG-ID b is available and not allowed, and the UE is allowed to access 5GS via non-CAG cells, the UE can display information as follows:

|  |  |
| --- | --- |
| **PLMN X / 5G SA** | **CAG-ID a** |
| **Select the PLMN/access technology combination without selecting a CAG-ID** |
| CAG-ID b |

or

|  |  |
| --- | --- |
| **PLMN X / 5G SA** | **Select the PLMN/access technology combination without selecting a CAG-ID** |
| **CAG-ID a** |
| CAG-ID b |

**Example 2**for PLMN X / NG-RAN combination, if non-CAG cell is available, CAG-ID a is available and allowed, CAG-ID b is available and not allowed, and the UE is allowed to access 5GS via only CAG cells, the UE can display information as follows:

|  |  |
| --- | --- |
| **PLMN X / 5G SA** | **CAG-ID a** |
| Select the PLMN/access technology combination without selecting a CAG-ID |
| CAG-ID b |

or

|  |  |
| --- | --- |
| **PLMN X / 5G SA** | **CAG-ID a** |
| CAG-ID b |
| Select the PLMN/access technology combination without selecting a CAG-ID |

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| ***Consequences if not approved:*** | The stage 1 requirement is not fulfilled and the EN remains. |
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| ***Clauses affected:*** | 4.4.3.1.2 |
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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 ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

##### 4.4.3.1.2 Manual Network Selection Mode Procedure

The MS indicates whether there are any PLMNs, which are available using all supported access technologies. This includes PLMNs in the "forbidden PLMNs" list, "forbidden PLMNs for GPRS service" list and PLMNs which only offer services not supported by the MS. An MS which supports GSM COMPACT shall also indicate GSM COMPACT PLMNs (which use PBCCH).

If displayed, PLMNs meeting the criteria above are presented in the following order:

i)- either the HPLMN (if the EHPLMN list is not present or is empty) or, if one or more of the EHPLMNs are available then based on an optional data field on the SIM either only the highest priority available EHPLMN is to be presented to the user or all available EHPLMNs are presented to the user in priority order. If the data field is not present on the SIM, then only the highest priority available EHPLMN is presented;

ii)- PLMN/access technology combinations contained in the " User Controlled PLMN Selector with Access Technology " data file in the SIM (in priority order);

iii)- PLMN/access technology combinations contained in the "Operator Controlled PLMN Selector with Access Technology" data file in the SIM (in priority order) or stored in the ME (in priority order);

iv)- other PLMN/access technology combinations with received high quality signal in random order;

v)- other PLMN/access technology combinations in order of decreasing signal quality.

In ii and iii, an MS using a SIM without access technology information storage (i.e. the "User Controlled PLMN Selector with Access Technology" and the "Operator Controlled PLMN Selector with Access Technology" data files are not present) shall instead present the PLMNs contained in the "PLMN Selector" data file in the SIM (in priority order).

In v, requirement h) in subclause 4.4.3.1.1 applies.

In i to v, requirements j), k) and l) in subclause 4.4.3.1.1 apply.

In iii, requirement p) in subclause  4.4.3.1.1 applies.

In GSM COMPACT, the non support of voice services shall be indicated to the user.

The HPLMN may provide on the SIM additional information on the available PLMNs. If this information is provided then the MS shall indicate it to the user. This information, provided as free text may include:

- preferred partner,

- roaming agreement status,

- supported services

Furthermore, the MS may indicate whether the available PLMNs are present on the EHPLMN list, the Forbidden list, the User Controlled PLMN List or the Operator Controlled PLMN List. The MS may also indicate that the PLMN is not present on any of these lists.

In i to v, if the MS supports CAG and is provisioned with a non-empty "CAG information list", for each PLMN/access technology combination of NG-RAN access technology:

a) the MS shall present to the user the PLMN/access technology combination and a list of CAG-IDs composed of one or more CAG-IDs such that for each CAG-ID:

1) there is an available CAG cell which broadcasts the CAG-ID for the PLMN; and

2) the following is true:

i) there exists an entry with the PLMN ID of the PLMN in the "CAG information list" and the CAG-ID is included in the "Allowed CAG list" of the entry; or

ii) the available CAG cell broadcasting the CAG-ID for the PLMN also broadcasts that the PLMN allows a user to manually select the CAG-ID; and

Editor's note [Vertical\_LAN; CR# 0499]: RAN2 needs to confirm if there will be modification in the radio interface in order to enable a CAG cell's broadcasting that the PLMN allows a user to manually select a CAG-ID supported by the CAG cell.

 In addition, if there is an available NG-RAN cell which is not a CAG cell for the PLMN/access technology combination, the MS shall display, to the user, "Select the PLMN/access technology combination without selecting a CAG-ID" as one element in the list of CAG-IDs.

NOTE 0: The MS can present elements in the list of CAG-IDs according to the order shown in Table X.

Table X: Presentation order of the list of CAG-IDs

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| --- | --- | --- |
| Tier # | The entry in the "CAG information list" for the PLMN includes an "indication that the MS is only allowed access 5GS via CAG cells" or no entry for the PLMN exists in the "CAG information list" | The entry in the "CAG information list" for the PLMN exists and the entry does not include an "indication that the MS is only allowed access 5GS via CAG cells" |
| Tier 1 | - CAG-ID included in the "Allowed CAG list" of the entry- "Select the PLMN/access technology combination without selecting a CAG-ID" | - CAG-ID included in the "Allowed CAG list" of the entry |
| Tier 2 | - CAG-ID not included in Tier 1 | - "Select the PLMN/access technology combination without selecting a CAG-ID"- CAG-ID not included in Tier 1 |

b) the MS shall present to the user the PLMN/access technology combination without a list of CAG-IDs, if there is an available NG-RAN cell which is not a CAG cell for the PLMN and there exists no NG-RAN cell broadcasting any CAG-ID satisfying bullets a)-1) and a)-2) above.

Editor's note: FFS whether to indicate human-readable network name per CAG Identifier as it is subject to RAN2 agreement to specify its broadcast.

Upon selection of a PLMN (and CAG-ID if the user selected his desired CAG-ID as well) by the user, the MS initiates registration on this PLMN (and CAG-ID if the user selected his desired CAG-ID as well) using the access technology chosen by the user for that PLMN or using the highest priority available access technology for that PLMN, if the associated access technologies have a priority order (this may take place at any time during the presentation of PLMNs). For such a registration, the MS shall ignore the contents of the "forbidden location areas for roaming", "forbidden tracking areas for roaming", "5GS forbidden tracking areas for roaming", "forbidden location areas for regional provision of service", "forbidden tracking areas for regional provision of service", "5GS forbidden tracking areas for regional provision of service", "forbidden PLMNs for GPRS service" and "forbidden PLMNs" lists.

NOTE 1: It is an MS implementation option whether to indicate access technologies to the user. If the MS does display access technologies, then the access technology selected by the user is only used for initial registration on the selected PLMN. If the MS does not display access technologies, then the access technology chosen for a particular PLMN should be the highest priority available access technology for that PLMN, if the associated access technologies have a priority order, and is only used for initial registration.

If the UE has a PDU session for emergency services, manual CAG selection shall not be performed.

Once the MS has registered on a PLMN selected by the user, the MS shall not automatically register on a different PLMN unless:

i) the new PLMN is declared as an equivalent PLMN by the registered PLMN;

ii) the user selects automatic mode;

iii) the user initiates an emergency call while the MS is in limited service state and either the network does not broadcast the indication of support of emergency calls in limited service state, the registration request for emergency services is rejected by the network or the attach request for emergency bearer services is rejected by the network; or

iv) the user initiates access to RLOS, while the MS is in limited service state and either the network does not broadcast the indication of support of RLOS in limited service state, or the EPS attach request for access to RLOS is rejected by the network.

NOTE 2: If case iii) or iv) occurs, the MS can provide an indication to the upper layers that the MS has exited manual network selection mode.

If the user does not select a PLMN, the selected PLMN shall be the one that was selected before the PLMN selection procedure started. If no such PLMN was selected or that PLMN is no longer available, then the MS shall attempt to camp on any acceptable cell and enter the limited service state.

NOTE 3: High quality signal is defined in the appropriate AS specification.

If:

- the MS supports access to RLOS;

- one or more PLMNs offering access to RLOS has been found;

- registration cannot be achieved on any PLMN; and

- the MS is in limited service state,

the MS indicates the PLMNs offering access to RLOS, presented in the following order:

i) PLMNs contained in the RLOS preferred PLMN list configured in the USIM (see 3GPP TS 31.102 [40]) or in the ME (see 3GPP TS 24.368 [50]) (in priority order);

ii) other PLMNs with received high quality signal in random order; and

iii) other PLMNs in order of decreasing signal quality.

Upon selection of a PLMN by the user, the MS initiates registration for access to RLOS on the PLMN chosen by the user (this may take place at any time during the presentation of PLMNs).