**3GPP TSG-CT WG1 Meeting #131-eC1-21xxxx**

**E-meeting, 19-27 August 2021 (was C1-214351)**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
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|  | **23.122** | **CR** | **0742** | **rev** | **1** | **Current version:** | **17.3.0** |  |
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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:***  | Provisioning of “list of PLMN(s) to be used in disaster condition” in the UE |
|  |  |
| ***Source to WG:*** | Qualcomm Incorporated |
| ***Source to TSG:*** | C1 |
|  |  |
| ***Work item code:*** | MINT |  | ***Date:*** | 2021-08-19 |
|  |  |  |  |  |
| ***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 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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
|  |  |
| ***Reason for change:*** | CT1 agreed the following conclusions in MINT TR 24.811:- The UE shall perform disaster roaming only if HPLMN has configured the UE with a 'list of PLMN(s) to be used in disaster condition' with at least one entry in it. The list is either pre-configured in the USIM or provided by the HPLMN following a successful registration procedure.- The UE shall not perform disaster roaming if HPLMN has not configured the UE with a 'list of PLMN(s) to be used in disaster condition' or the number of elements in the list is zero.- While roaming, the Registered PLMN may provide the 'list of PLMN(s) to be used in disaster condition' after a successful registration procedure. The UE shall ignore this information if 'list of PLMN(s) to be used in disaster condition' is empty .- Registered PLMN(s) may provision 'list of PLMN(s) to be used in disaster condition' over non-3GPP access before a disaster condition.This needs to be reflected in TS 23.122. |
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| ***Summary of change:*** | * Text was added to specify that the UE can be pre-configured with a “list of PLMN(s) to be used in disaster condition” in the USIM, similarly to how the UE can be pre-configured with a “CAG information list” in the USIM, which the UE copies to the ME
* Text was added to specify that the “list of PLMN(s) to be used in disaster condition” can be updated by the network via NAS signalling
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|  |  |
| ***Consequences if not approved:*** | The UE cannot be configured with a ”list of PLMN(s) to be used in disaster condition” and thus cannot perform disaster roaming. |
|  |  |
| ***Clauses affected:*** | 1.2, 3.X (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 ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

\*\*\* First change \*\*\*

## 1.2 Definitions and abbreviations

For the purposes of the present document, the abbreviations defined in 3GPP TR 21.905 [36] apply.

**(A/Gb mode only):** Indicates this clause applies only to a GSM system which operates in A/Gb mode. For multi system case this is determined by the current serving radio access network.

**(Iu mode only):** Indicates this clause applies only to UMTS. For multi system case this is determined by the current serving radio access network.

NOTE 1: In accordance with the description of packet services in Iu mode in 3GPPS TS 24.008 [23], the terms 'CS/PS mode of operation' and 'PS mode of operation' are not used in the present document. Instead the terms 'MS operation mode A' and 'MS operation mode C' are used.

**(S1 mode only):** Indicates this clause applies only to an EPS. For multi system case this is determined by the current serving radio access network.

**Acceptable Cell:** This is a cell that the MS may camp on to make emergency calls or to access RLOS. It must satisfy criteria which are defined for A/Gb mode in 3GPP TS 43.022 [35], for Iu mode in 3GPP TS 25.304 [32], for S1 mode in 3GPP TS 36.304 [43], and for NR access in N1 mode in 3GPP TS 38.304 [61] and for E-UTRA access in N1 mode in 3GPP TS 36.304 [43]. For an MS in eCall only mode, an acceptable cell must further satisfy the criteria defined in clause 4.4.3.1.1.

**Access Technology:** The access technology associated with a PLMN or SNPN. The MS uses this information to determine what type(s) of radio carrier to search for when attempting to select a specific PLMN or SNPN (e.g., GSM, UTRAN, GSM COMPACT, E-UTRAN or NG-RAN). A PLMN may support more than one access technology. SNPNs only support NG-RAN.

NOTE 2: Access technology "E-UTRAN" maps to core network type "EPC" and access technology "NG-RAN" maps to core network type "5GCN", see 3GPP TS 24.501 [64].

**ACDC:** Application specific Congestion control for Data Communication, see 3GPP TS 22.011 [9].

**Allowable PLMN:** In the case of an MS operating in MS operation mode A or B, this is a PLMN which is not in the list of "forbidden PLMNs" in the MS. In the case of an MS operating in MS operation mode C or an MS not supporting A/Gb mode and not supporting Iu mode, this is a PLMN which is not in the list of "forbidden PLMNs" and not in the list of "forbidden PLMNs for GPRS service" in the MS.

**Allowable SNPN:** In the case of an MS operating in SNPN access mode, this is an SNPN which is not in the list of "permanently forbidden SNPNs" which is, if the MS supports access to an SNPN using credentials from a credentials holder, associated with the selected entry of the "list of subscriber data" or the selected PLMN subscription, and is not in the list of "temporarily forbidden SNPNs" which is, if the MS supports access to an SNPN using credentials from a credentials holder, associated with the selected entry of the "list of subscriber data" or the selected PLMN subscription.

**Allowable PLMN/access technology** **combination:** For an MS operating in MS operation mode C or an MS not supporting A/Gb mode and not supporting Iu mode, this is an allowable PLMN in any specific access technology. For an MS operating in MS operation mode A or B, this is a PLMN/access technology combination where:

- the PLMN is an allowable PLMN and the specific access technology is supporting non-GPRS services; or

- the PLMN is not in the list of "forbidden PLMNs" and not in the list of "forbidden PLMNs for GPRS service" in the MS and the specific access technology is only supporting GPRS services.

EXAMPLE: E-UTRAN, satellite NG-RAN (see 3GPP TS 22.261 [74]) and NG-RAN are access technologies that are only supporting GPRS services.

**Available PLMN:** For GERAN A/Gb mode see 3GPP TS 43.022 [35]. For UTRAN see 3GPP TS 25.304 [32]. For E-UTRAN see 3GPP TS 36.304 [43]. For NG-RAN see 3GPP TS 36.304 [43] and 3GPP TS 38.304 [61]. For cdma2000® 1xRTT and cdma2000® HRPD see 3GPP2 C.S0016 [44].

Editor's note: conditions that make a PLMN available when a UE is accessing NR via satellite access, are FFS.

**Available SNPN:** For NG-RAN see 3GPP TS 38.304 [61].

**Available PLMN/access technology** **combination:** This is an available PLMN in a specific access technology.

**Camped on a cell:** The MS (ME if there is no SIM) has completed the cell selection/reselection process and has chosen a cell from which it plans to receive all available services. Note that the services may be limited, and that the PLMN or the SNPN may not be aware of the existence of the MS (ME) within the chosen cell.

**Country:** A country is identified by a single MCC value defined in ITU-T recommendation E.212 [76], with the exception of the following MCC ranges that identify a single country:

- values 310 through 316 (USA);

- values 404 through 406 (India);

- values 440 through 441 (Japan);

- values 460 through 461 (China); and

- values 234 through 235 (United Kingdom).

**Permitted CSG list:** See 3GPP TS 36.304 [43].

**Current serving cell:** This is the cell on which the MS is camped.

**CTS MS:** An MS capable of CTS services is a CTS MS.

**EAB:** Extended Access Barring, see 3GPP TS 22.011 [9].

**Extended Coverage in GSM for Internet of Things (EC-GSM-IoT):** Extended coverage in GSM for IoT is a feature which enables extended coverage operation. See 3GPP TS 43.064 [55].

**EHPLMN:** Any of the PLMN entries contained in the Equivalent HPLMN list.

**Equivalent HPLMN list:** To allow provision for multiple HPLMN codes, PLMN codes that are present within this list shall replace the HPLMN code derived from the IMSI for PLMN selection purposes. This list is stored on the USIM and is known as the EHPLMN list. The EHPLMN list may also contain the HPLMN code derived from the IMSI. If the HPLMN code derived from the IMSI is not present in the EHPLMN list then it shall be treated as a Visited PLMN for PLMN selection purposes.

**Generic Access Network (GAN):** See 3GPP TS 43.318 [35A].

**GAN mode:** See 3GPP TS 43.318 [35A].

**GPRS MS:** An MS capable of GPRS services is a GPRS MS.

**MS operation mode:** See 3GPP TS 23.060 [27].

**High quality signal:** The high quality signal limit is used in the PLMN selection procedure. It is defined in the appropriate AS specification: 3GPP TS 43.022 [35] for the GSM radio access technology, 3GPP TS 25.304 [32] for the UMTS radio access technology (FDD or TDD mode), 3GPP TS 36.304 [43] for the E‑UTRAN radio access technology (WB-S1 mode, NB-S1 mode, WB-N1 mode or NB-N1 mode), 3GPP TS 36.304 [43] and 3GPP TS 38.304 [61] for the NG-RAN radio access technology. For 3GPP2 access technologies the high quality signal limit is defined in 3GPP2 C.S0011 [45] for cdma2000® 1xRTT and in 3GPP2 C.S0033 [46] for cdma2000® HRPD. A mobile station attempting to find a cell that supports EC-GSM-IoT (see 3GPP TS 43.064 [55]) does not use high quality signal limit in the PLMN selection procedure, i.e. for the purpose of PLMN selection, when attempting to find a cell that supports EC-GSM-IoT, any found cell supporting EC-GSM-IoT is considered to be received with high quality signal. A UE attempting to find a cell that supports enhanced coverage when operating in any WB-S1 or WB-N1 enhanced coverage mode does not use high quality signal limit in the PLMN selection procedure, i.e. for the purpose of PLMN selection, when attempting to find a cell that supports enhanced coverage, any found cell supporting enhanced coverage and satisfying the coverage specific quality signal limit defined for CE mode (see 3GPP TS 36.304 [43]) is considered to be received with high quality signal.

**Home PLMN:** This is a PLMN where the MCC and MNC of the PLMN identity match the MCC and MNC of the IMSI. Matching criteria are defined in Annex A.

**In A/Gb mode,...:** Indicates this clause applies only to a GSM system which operates in A/Gb mode. For multi system case this is determined by the current serving radio access network.

**In Iu mode,...:** Indicates this clause applies only to UMTS. For multi system case this is determined by the current serving radio access network.

**In N1 mode,...:** Indicates this clause applies only to an 5GS. For multi system case this is determined by the current serving radio access network.

**In NB-N1 mode:** Indicates this paragraph applies only to a system which operates in NB-N1 mode. For a multi-access system this case applies if the current serving radio access network provides access to 5G network services via E-UTRA connected to 5GCN by NB-IoT (see 3GPP TS 36.300 [56], 3GPP TS 36.331 [42], 3GPP TS 36.306 [54]).

**In WB-N1 mode:** Indicates this paragraph applies only to a system which operates in WB-N1 mode. For a multi-access system this case applies if the system operates in N1 mode with E-UTRA connected to 5GCN, but not in NB-N1 mode.

**In S1 mode,...:** Indicates this clause applies only to an EPS. The S1 mode includes WB-S1 mode and NB-S1 mode. For multi system case this is determined by the current serving radio access network.

**In NB-S1 mode:** Indicates this paragraph applies only to a system which operates in NB-S1 mode. For a multi-access system this case applies if the current serving radio access network provides access to network services via E-UTRA by NB-IoT (see 3GPP TS 36.300 [56], 3GPP TS 36.331 [22], 3GPP TS 36.306 [54]).

**In WB-S1 mode:** Indicates this paragraph applies only to a system which operates in WB-S1 mode. For a multi-access system this case applies if the system operates in S1 mode, but not in NB-S1 mode.

**Limited Service State:** See clause 3.5.

**Localised Service Area (LSA):** A localised service area consists of a cell or a number of cells. The cells constituting a LSA may not necessarily provide contiguous coverage.

**Location Registration (LR):** An MS which is IMSI attached to non-GPRS services only performs location registration by the Location Updating procedure. A GPRS MS which is IMSI attached to GPRS services or to GPRS and non-GPRS services performs location registration by the Routing Area Update procedure only when in a network of network operation mode I. Both location updating and routing area update procedures are performed independently by the GPRS MS when it is IMSI attached to GPRS and non-GPRS services in a network of network operation mode II (see 3GPP TS 23.060 [27]). An MS which is attached via the E-UTRAN performs location registration by the tracking area update procedure. An MS which is registered via the NG-RAN performs location registration by the mobility registration update procedure.

**MINT:** Minimization of service interruption (see 3GPP TS 22.261 [71).

**MS:** Mobile Station. The present document makes no distinction between MS and UE.

**N1 mode capability:** Capability of the UE associated with an N1 NAS signalling connection between the UE and network. The present document refers to the N1 mode capability over 3GPP access only (see 3GPP TS 24.501 [64]).

**NarrowBand Internet of Things (NB-IoT):** NB-IoT is a non-backward compatible variant of E-UTRAN supporting a reduced set of functionality. NB-IoT allows access to EPC or 5GCN network services via E-UTRA with a channel bandwidth limited to 180 kHz (see 3GPP TS 36.300 [20], 3GPP TS 36.331 [42], 3GPP TS 36.306 [44]).

**Network Type:** The network type associated with HPLMN or a PLMN on the PLMN selector (see 3GPP TS 31.102 [40]). The MS uses this information to determine what type of radio carrier to search for when attempting to select a specific PLMN. A PLMN may support more than one network type.

**Onboarding services in SNPN**: Onboarding services in SNPN allow an MS to access an SNPN indicating that onboarding is allowed, using default UE credentials in order for the MS to be configured with one or more entries of the "list of subscriber data".

NOTE 3: When the MS is registered for onboarding services in SNPN, services other than the onboarding services in SNPN are not available. When the MS is not registered for onboarding services in SNPN, onboarding services in SNPN are not available.

**Registered PLMN (RPLMN):** This is the PLMN on which certain LR outcomes have occurred (see table 1). In a shared network the RPLMN is the PLMN defined by the PLMN identity of the CN operator that has accepted the LR.

**Registered SNPN (RSNPN):** This is the SNPN on which certain LR outcomes have occurred. In a shared network the RSNPN is the SNPN defined by the SNPN identity of the CN operator that has accepted the LR.

**Registration:** This is the process of camping on a cell of the PLMN or the SNPN and doing any necessary LRs.

**Registration Area:** A registration area is an area in which mobile stations may roam without a need to perform location registration. The registration area corresponds to location area (LA) for performing location updating procedure, to routing area for performing the GPRS attach or routing area update procedures, and to a list of tracking areas (TAs) for performing the EPS attach, tracking area update, or 5GS registration procedure.

The PLMN to which a cell belongs (PLMN identity):

- for GERAN, in the system information (MCC + MNC part of LAI) broadcast as specified in 3GPP TS 44.018 [34];

- for UTRA, see the broadcast information as specified in 3GPP TS 25.331 [33];

- for E-UTRA, see the broadcast information as specified in 3GPP TS 36.331 [42]; and

- for NR, see the broadcast information as specified in 3GPP TS 38.331 [65].

The SNPN to which a cell belongs (SNPN identity):

- for NR, see the broadcast information as specified in 3GPP TS 38.331 [65].

In a shared network, a cell belongs to all PLMNs given in the system information broadcasted as specified in 3GPP TS 44.018 [34] for GERAN, in 3GPP TS 25.331 [33] for UTRAN, and in 3GPP TS 36.331 [42] for E-UTRAN, and a cell belongs to all PLMNs, all SNPNs, or all PLMNs and all SNPNs, given in the system information broadcasted as specified in 3GPP TS 36.331 [42] for E-UTRA connected to 5GCN, and in 3GPP TS 38.331 [65] for NR.

**Secured packet:** In this specification, a secured packet contains the list of preferred PLMN/access technology combinations and optionally SOR-CMCI, encapsulated with a security mechanism as described in 3GPP TS 31.115 [67].

**Selected PLMN:** This is the PLMN that has been selected according to clause 3.1, either manually or automatically.

**Selected SNPN:** This is the SNPN that has been selected according to clause 3.9, either manually or automatically.

**Shared Network:** An MS considers a cell to be part of a shared network, when multiple PLMN identities are received as specified in 3GPP TS 44.018 [34] for GERAN, in 3GPP TS 25.331 [33] for UTRAN, and in 3GPP TS 36.331 [42] for E-UTRAN, and when multiple PLMN identities, multiple SNPN identities or one or more PLMN identities and one or more SNPN identities are received as specified in 3GPP TS 36.331 [42] for E-UTRA connected to 5GCN, and in 3GPP TS 38.331 [65] for NR.

**SIM:** Subscriber Identity Module (see 3GPP TS 21.111 [38]). The present document makes no distinction between SIM and USIM.

**SNPN identity**: a PLMN ID and an NID combination.

**SoLSA exclusive access:** Cells on which normal camping is allowed only for MS with Localised Service Area (LSA) subscription.

**Subscribed SNPN:** An SNPN for which the UE has a subscription.

**Suitable Cell:** This is a cell on which an MS may camp. It must satisfy criteria which are defined for GERAN A/Gb mode in 3GPP TS 43.022 [35], for UTRAN in 3GPP TS 25.304 [32], for E-UTRAN in 3GPP TS 36.304 [43] and for NG-RAN see 3GPP TS 36.304 [43] and 3GPP TS 38.304 [61]. For 3GPP2 access technologies the criteria are defined in 3GPP2 C.S0011 [45] for cdma2000® 1xRTT and in 3GPP2 C.S0033 [46] for cdma2000® HRPD. For an MS in eCall only mode, a suitable cell must further satisfy the criteria defined in clause 4.4.3.1.1.

**Steering of Roaming (SOR):** A technique whereby a roaming UE is encouraged to roam to a preferred roamed-to-network indicated by the HPLMN.

**Steering of Roaming application function (SOR-AF):** An application function that can provide UDM with one of the following:

a) one or both of the following:

- list of preferred PLMN/access technology combinations.

- SOR-CMCI, together with the "Store the SOR-CMCI in the ME" indicator;

b) a secured packet; or

c) neither of a) or b),

generated dynamically based on operator specific data analytics solutions.

**Steering of Roaming information:** This consists of the following HPLMN protected information (see 3GPP TS 33.501 [66]):

a) the following indicators, of whether:

- the UDM requests an acknowledgement from the UE for successful reception of the steering of roaming information.

- the UDM requests the UE to store the SOR-CMCI in the ME, which is provided along with the SOR-CMCI; and

b) one of the following:

1) one or both of the following:

- list of preferred PLMN/access technology combinations with an indication that it is included.

- SOR-CMCI;2) a secured packet with an indication that it is included; or

3) the HPLMN indication that 'no change of the "Operator Controlled PLMN Selector with Access Technology" list stored in the UE is needed and thus no list of preferred PLMN/access technology combinations is provided', and SOR-CMCI, if any.

**Steering of roaming connected mode control information (SOR-CMCI):** HPLMN information to control the timing for a UE in connected mode to move to idle mode in order to perform steering of roaming.

Editor's Note: The detailed parameters of SOR-CMCI is FFS.

**Visited PLMN**: This is a PLMN different from the HPLMN (if the EHPLMN list is not present or is empty) or different from an EHPLMN (if the EHPLMN list is present).

For the purposes of the present document, the following terms and definitions given in 3GPP TS 23.167 [57] apply:

**eCall over IMS**

**EPC**

**E-UTRAN**

For the purposes of the present document, the following terms and definitions given in 3GPP TS 23.401 [58] apply:

**eCall only mode**

For the purposes of the present document, the following terms and definitions given in 3GPP TS 23.221 [69] apply:

**Restricted local operator services (RLOS)**

For the purposes of the present document, the following terms and definitions given in 3GPP TS 23.501 [62] apply:

**Closed Access Group (CAG)**

**Credentials holder**

**Default UE credentials**

**Network identifier (NID)**

**NG-RAN**

**Stand-alone Non-Public Network (SNPN)**

**SNPN access mode**

For the purposes of the present document, the following terms and definitions given in 3GPP TS 24.501 [64] apply:

**5GCN**

**CAG cell**

**Emergency PDU session**

**Initial registration for emergency services**

**Initial registration for onboarding services in SNPN**

**Non-CAG cell**

**Registered for emergency services**

**Registered for onboarding services in SNPN**

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

## 3.X Minimization of service interruption

The MS may support Minimization of service interruption (MINT).

MINT is not applicable in SNPNs.

If the MS supports MINT, the MS can be provisioned by the HPLMN, EHPLMN or a VPLMN with a "list of PLMN(s) to be used in disaster condition ", consisting of zero or more entries, each containing a PLMN ID. The PLMNs are listed in order of decreasing priority, with the first PLMN being the highest priority PLMN.

The "list of PLMN(s) to be used in disaster condition" provisioned by the HPLMN, EHPLMN or a VPLMN is stored in the non-volatile memory of the ME, as specified in 3GPP TS 24.501 [64] annex C.

In addition, the MS can also be pre-configured with a "list of PLMN(s) to be used in disaster condition" stored in the USIM (see 3GPP TS 31.102 [40]).

Editor's note (WI MINT, CR#0742): The encoding of the "list of PLMN(s) to be used in disaster condition" in the USIM needs to be specified by CT6.

3GPP TS 24.501 [64] annex C specifies the conditions under which the "list of PLMN(s) to be used in disaster condition" stored in the ME is deleted. Additionally, when a USIM is inserted, if:

- no "list of PLMN(s) to be used in disaster condition" is stored in the non-volatile memory of the ME; or

- the SUPI from the USIM does not match the SUPI stored together with the "list of PLMN(s) to be used in disaster condition " in the non-volatile memory of the ME;

and the MS has a "list of PLMN(s) to be used in disaster condition" stored in the USIM (see 3GPP TS 31.102 [22]), the MS shall store the "list of PLMN(s) to be used in disaster condition" from the USIM into the ME, as specified in 3GPP TS 24.501 [64] annex C.

NOTE: The MS ignores the "list of PLMN(s) to be used in disaster condition" stored in the USIM except when the USIM is inserted.

If the MS has neither stored a "list of PLMN(s) to be used in disaster condition" from the USIM with at least one entry into the ME, nor been provisioned by the HPLMN or EHPLMN with a list of PLMN(s) to be used in disaster condition" with at least one entry, disaster roaming is disabled at the MS. In this case, the UE shall not perform disaster roaming and the MS shall ignore any "list of PLMN(s) to be used in disaster condition" received from a PLMN other than the HPLMN or EHPLMN.

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