**SA WG2 Meeting #S2-139e S2-2003712r10**

**1 - 12 June, 2020, Electronic Meeting (revision of S2-2002773)**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
|  |
|  | **23.501** | **CR** | **2243** | **rev** | **01** | **Current version:** | **16.4.0** |  |
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| *For* ***HE******LP*** *on using this form: comprehensive instructions can be found at 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:***  | Service Area Restriction clarification |
|  |  |
| ***Source to WG:*** | Ericsson, Qualcomm |
| ***Source to TSG:*** | SA2 |
|  |  |
| ***Work item code:*** | 5G\_CIoT |  | ***Date:*** | 22/05/2020 |
|  |  |  |  |  |
| ***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. | *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 current description for signaling allowed in Non-Allowed Area in clause 5.3.4.11 is not clear enough. LS from CT1, S2-2002636 (C1-200839), requests SA2 clarification on if the restriction is applicable to CIoT 5GS optiomisation.The description needs to be updated to clarify what is allowed or not allowed in a Non-Allowed Area. |
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| ***Summary of change:*** | 1.Update clause 5.3.4.1.1 to clarify what services are not allowed and allowed in a Non-Allowed Area. 2.(Editorial)Move priority service description to the beginning of the clause for easy understanding. |
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| ***Consequences if not approved:*** | Unclear specificaiton for stage 3. |
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| ***Clauses affected:*** | 5.3.4.1.1 |
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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:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

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

##### 5.3.4.1.1 General

Mobility Restrictions restrict mobility handling or service access of a UE. The Mobility Restriction functionality is provided by the UE (only for mobility restriction categories provided to the UE), the radio access network and the core network.

Unless otherwise stated, Mobility Restrictions only apply to 3GPP access and wireline access, they do not apply to other non-3GPP accesses.

The UE and the network shall override any Forbidden Area, Non-Allowed area restrictions and Core Network type restriction whenever accessing the network for regulatory prioritized services like Emergency services and MPS.

Service Area restrictions and handling of Forbidden Areas for CM-IDLE state and, for CM-CONNECTED state when in RRC Inactive state are executed by the UE based on information received from the core network. Mobility Restrictions for CM-CONNECTED state when in RRC-Connected state are executed by the radio access network and the core network.

In CM-CONNECTED state, the core network provides Mobility Restrictions to the radio access network within Mobility Restriction List.

Mobility Restrictions consists of RAT restriction, Forbidden Area, Service Area Restrictions, Core Network type restriction and Closed Access Group information as follows:

- RAT restriction:

 Defines the 3GPP Radio Access Technology(ies), a UE is not allowed to access in a PLMN. In a restricted RAT a UE based on subscription is not permitted access to the network for this PLMN. For CM-CONNECTED state, when radio access network determines target RAT and target PLMN during Handover procedure, it should take per PLMN RAT restriction into consideration. The RAT restriction is enforced in the network, and not provided to the UE.

- Forbidden Area:

 In a Forbidden Area, the UE, based on subscription, is not permitted to initiate any communication with the network for this PLMN. The UE behaviour in terms of cell selection, RAT selection and PLMN selection depends on the network response that informs the UE of Forbidden Area. A Forbidden Area applies either to 3GPP access or to non-3GPP access.

 Further description on Forbidden Area when using wireline access is available in TS 23.316 [84].

NOTE 1: If the N3GPP TAI (see clause 5.3.2.3) is forbidden in a PLMN, non-3GPP Access is forbidden altogether in this PLMN.

NOTE 2: The UE reactions to specific network responses are described in TS 24.501 [47].

- Service Area Restriction:

 Defines areas in which the UE may or may not initiate communication with the network as follows:

- Allowed Area:

 In an Allowed Area, the UE is permitted to initiate communication with the network as allowed by the subscription.

- Non-Allowed Area:

 In a Non-Allowed Area a UE is service area restricted based on subscription. The UE and the network are not allowed to initiate Service Request, or any connection requests for user plane data, control plane data, or SM signalling (except for PS Data Off status change reporting) to obtain user services that are not related to mobility (both in CM-IDLE and in CM-CONNECTED states).

The UE shall not use the entering of a Non-Allowed Area as a criterion for Cell Reselection, a trigger for PLMN Selection or Domain selection for UE originating sessions or calls. The RRC procedures while the UE is in CM-CONNECTED with RRC Inactive state are unchanged compared to when the UE is in an Allowed Area. The RM procedures are unchanged compared to when the UE is in an Allowed Area. The UE in a Non-Allowed Area shall respond to core network paging or NAS Notification message from non-3GPP access with Service Request and RAN paging.

NOTE 3: When the services are restricted in 5GS due to Service Area Restriction, then it is assumed that the services will be also restricted in all RATs/Systems at the same location(s) using appropriate mechanisms available in the other RATs/Systems.

NOTE x: Delivery of SOR transparent container, UE policy container, UE parameters update transparent container as defined in TS 24.501[47], is part of the mobility related service and is allowed in an area with service restriction.

NOTE y: For a UE in CM-CONNECTED state then neither control plane data transmission nor, if user plane resources are already established, user plane data transmission are restricted by a non-allowed area.

- Core Network type restriction:

 Defines whether UE is allowed to connect to 5GC only, EPC only, both 5GC and EPC for this PLMN. The Core Network type restriction when received applies in the PLMN either to both 3GPP and non-3GPP Access Types or to non-3GPP Access Type only.

NOTE 4: The Core Network type restriction can be used e.g. in network deployments where the E-UTRAN connects to both EPC and 5GC as described in clause 5.17.

- Closed Access Group information:

 As defined in clause 5.30.3.

For a given UE, the core network determines the Mobility Restrictions based on UE subscription information, UE location and/or local policy (e.g. if the HPLMN has not deployed 5GC, HPLMN ID of the UE and the operator's policy are used in the VPLMN for determining the Core Network type restriction). The Mobility Restriction may change due to e.g. UE's subscription, location change and local policy. Optionally the Service Area Restrictions or the Non-Allowed Area may in addition be fine-tuned by the PCF e.g. based on UE location, PEI and network policies. Service Area Restrictions may be updated during a Registration procedure or UE Configuration Update procedure.

NOTE 5: The subscription management ensure that for MPS service subscriber the Mobility Restrictions is not included.

If the network sends Service Area Restrictions to the UE, the network sends only either an Allowed Area, or a Non-Allowed Area, but not both at the same time, to the UE. If the UE has received an Allowed Area from the network, any TA not part of the Allowed Area is considered by the UE as non-allowed. If the UE has received a Non-Allowed Area from the network, any TA not part of the Non-Allowed Area is considered by the UE as allowed. If the UE has not received any Service Area Restrictions, any TA in the PLMN is considered as allowed.

If the UE has overlapping areas between Forbidden Areas, Service Area Restrictions, or any combination of them, the UE shall proceed in the following precedence order:

- The evaluation of Forbidden Areas shall take precedence over the evaluation of Service Area Restrictions.

The UDM shall provide to the AMF the information defined in TS 23.008 [119] about the subscriber's NR or E-UTRA access restriction set by the operator determined e.g. by subscription scenario and roaming scenario:

- For NR:

- NR not allowed as primary access.

- NR not allowed as secondary access.

- NR in unlicensed bands not allowed as primary access.

- NR in unlicensed bands not allowed as secondary access.

- For E-UTRA:

- E-UTRA not allowed as primary access.

- E-UTRA not allowed as secondary access.

- E-UTRA in unlicensed bands not allowed as secondary access.

- NB-IoT not allowed as primary access.

- LTE-M not allowed as primary access.

In order to enforce all primary access restrictions, the related access has to be deployed in different Tracking Area Codes and the subscriber shall not be allowed to access the network in TAs using the particular access.

With all secondary access restrictions, the subscriber shall not be allowed to use this access as secondary access.

\* \* \* \* Second change \* \* \* \*

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