**3GPP TSG-WG2 Meeting #164 *S2-2409202***

**Maastricht, The Netherlands, August 19 – 23, 2024**

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUESTR** | | | | | | | | |
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|  | **23.501** | **CR** | **5495** | **rev** | **1** | **Current version:** | **19.0.0** |  |
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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 |  | Radio Access Network |  | Core Network | **X** |

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| ***Title:*** | Access restrictions for satellite access in the context of 5GC-EPC interworking | | | | | | | | | |
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| ***Source to WG:*** | Ericsson | | | | | | | | | |
| ***Source to TSG:*** | SA2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | IoT\_SAT\_ARCH\_EPS, NR\_NTN\_solutions, LTE\_NBIOT\_eMTC\_NTN | | | | |  | ***Date:*** | | | 2024-08-09 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **A** |  | | | | | ***Release:*** | | | Rel-19 |
|  | *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-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
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| ***Reason for change:*** | | The access restriction values for NB-IoT (LEO/MEO/GEO/OTHERSAT) and LTE-M (LEO/MEO/GEO/OTHERSAT) provided from UDM to AMF cannot be neforced by AMF. It is thus misleading to include these values in the list of accesses that can be restricted. | | | | | | | | |
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| ***Summary of change:*** | | Remove the access restriction values for NB-IoT (LEO/MEO/GEO/OTHERSAT) and LTE-M (LEO/MEO/GEO/OTHERSAT) | | | | | | | | |
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| ***Consequences if not approved:*** | | Access restriction values that cannot be enforced may lead to unexpected system behaviour. | | | | | | | | |
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| ***Clauses affected:*** | | 5.3.4.1.1 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 \*\*\*\*

#### 5.3.4.1 Mobility Restrictions

##### 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 Mobility restriction as specified in clause 5.16.4.3 when accessing the network for Emergency Services. For MPS and MCX, based on operator policy or regional/national regulations, service area restrictions do not apply, as specified in TS 24.501 [47].

For UE requesting Disaster Roaming service, the UE is only allowed to receive services in the area with Disaster Condition as specified in clause 5.40.4. The other areas within the PLMN shall be considered as forbidden area for the UE registered for Disaster Roaming service.

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 and non-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 3GPP access and CM-CONNECTED state, when radio access network determines target RAT and target PLMN during Handover or redirection 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].

Support for Forbidden Area with NR satellite access is described in clause 5.4.11.8.

Forbidden Areas should not be used for Untrusted or Trusted non-3GPP access.

NOTE 1: If a UE receives that the UE is accessing from a forbidden tracking area when registering over untrusted non-3GPP access or trusted non-3GPP access, the UE cannot determine the corresponding TAI and thus needs to consider that access to untrusted non-3GPP access and to trusted non-3GPP access in this PLMN is forbidden until the forbidden area list is removed as described in TS 24.501 [47].

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, exception data reporting, or SM signalling (except for PS Data Off status change reporting) to obtain user services that are not related to mobility.

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 may initiate MA PDU Session establishment or activation over a non-3GPP access other than wireline access, but the User Plane resources on the 3GPP access for the MA-PDU shall not be established or activated. The handling of Non-Allowed Area when using wireline access is described in TS 23.316 [84].

The UE in a Non-Allowed Area:

- shall respond with a Service Request to core network paging indicating 3GPP access type or to a NAS Notification message received over non-3GPP access indicating 3GPP access type or when RAN paging failed, but the UE shall not request User Plane resource establishment, except for emergency services or when the UE is MPS-subscribed or MCX-subscribed.

- shall respond with Service Request to core network paging indicating non-3GPP access type or NAS Notification message received over 3GPP access indicating non-3GPP access type but the UE shall not request User Plane resource establishment, except when the UE is MPS-subscribed.

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 4: Delivery of SOR transparent container, UE policy container, UE parameters update transparent container as defined in TS 24.501 [47], or removal of any stored Paging Restriction Information from network via Registration Request (see clause 5.38), is part of the mobility related service and is allowed in an area with service restriction.

NOTE 5: 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 6: 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. When the Core Network type restriction applies to non-3GPP Access Type, the UE is restricted from using any connectivity to an N3IWF.

- 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.

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 RAT, however any of the NR categories listed below may still be allowed.

- NR not allowed as secondary RAT.

- NR in unlicensed bands not allowed as primary RAT.

- NR in unlicensed bands not allowed as secondary RAT.

- NR(LEO) satellite access not allowed as primary RAT.

- NR(MEO) satellite access not allowed as primary RAT.

- NR(GEO) satellite access not allowed as primary RAT.

- NR(OTHERSAT) satellite access not allowed as primary RAT.

- NR RedCap not allowed as primary RAT.

- NR eRedCap not allowed as primary RAT.

- For E-UTRA:

- E-UTRA not allowed as primary RAT.

- E-UTRA not allowed as secondary RAT.

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

- NB-IoT not allowed as primary RAT.

- LTE-M not allowed as primary RAT.

- WB-E-UTRAN (LEO) satellite access not allowed as primary access.

- WB-E-UTRAN (MEO) satellite access not allowed as primary access.

- WB-E-UTRAN (GEO) satellite access not allowed as primary access.

- WB-E-UTRAN (OTHERSAT) satellite access not allowed as primary access.

- LTE-M (LEO) satellite access not allowed as primary access.

- LTE-M (MEO) satellite access not allowed as primary access.

- LTE-M (GEO) satellite access not allowed as primary access.

- LTE-M (OTHERSAT) satellite access not allowed as primary access.

NOTE 7: The use of WB-E-UTRAN satellite accesses, NB-IoT satellite accesses or LTE-M satellite accesses to connect to 5GC is not supported in this Release of the specification. The access restriction data for LTE-M satellite accesses above is supported only to allow the AMF to provide it to MME in case of mobility from 5GS to EPS.

In order to enforce all primary RAT restrictions, the related RAT 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 RAT.

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

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