**3GPP TSG-CT WG1 Meeting #122-eC1-200593**

**Electronic meeting, 20-28 February 2020**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **24.501** | **CR** | **1967** | **rev** | **-** | **Current version:** | **16.3.0** |  |
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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:*** | Service area restrictions for UEs using CIoT 5GS optimization | | | | | | | | | |
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| ***Source to WG:*** | Samsung | | | | | | | | | |
| ***Source to TSG:*** | C1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | 5G\_CIoT | | | | |  | ***Date:*** | | | 2020-02-16 |
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| ***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 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-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 service area restrictions in TS 24.501 (see section 5.3.5.2) have not considered UEs that are using CIoT 5GS optimization. As these UEs may be in a “non-allowed tracking area” or may not be in an “allowed tracking area”, the service restrictions need to be defined. | | | | | | | | |
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| ***Summary of change:*** | | Update section 5.3.5.2 on service area restrictions to consider UEs that use CIoT 5SG optimization.  1) The UE in 5GMM-IDLE mode with suspend indication is added to the existing restrictions that are defined for a UE in 5GMM-IDLE mode. Additionally, the UE shall not request lower layers to resume a suspended connection except if the UE is responding to paging or the upper layers require user-plane resources for exception data reporting.  2) For a UE in 5GMM-CONNECTED mode or 5GMM-CONNECTED mode with RRC inactive indication, the following restrictions are added:  a) the UE shall not initiate a service request except if there is data for an exceptional event  b) not initiate the NAS transport procedure to send a CIoT user data container except if the UE had transitioned to 5GMM-CONNECTED mode in response to a paging, for sending user data that is related to an exceptional event, or a DL NAS TRANSPORT message with the Payload container type IE to set to "CIoT user data container" has been received. | | | | | | | | |
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| ***Consequences if not approved:*** | | The behavior of a UE that is using CIoT 5GS optimization remains undefined. | | | | | | | | |
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| ***Clauses affected:*** | | 5.3.5.2 | | | | | | | | |
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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:*** | |  | | | | | | | | |

\*\*\*\*\*\* START CHANGE \*\*\*\*\*\*

#### 5.3.5.2 3GPP access service area restrictions

The service area restrictions consist of tracking areas forming either an allowed area, or a non-allowed area. The tracking areas belong to either the registered PLMN or its equivalent PLMNs in the registration area. The allowed area can contain up to 16 tracking areas or include all tracking areas in the registered PLMN and its equivalent PLMN(s) in the registration area. The non-allowed area can contain up to 16 tracking areas. The network conveys the service area restrictions to the UE by including either an allowed area, or a non-allowed area, but not both, in the Service area list IE of a REGISTRATION ACCEPT message or a CONFIGURATION UPDATE COMMAND message.

If the network does not convey the service area restrictions to the UE in the Service area list IE of a REGISTRATION ACCEPT message, the UE shall treat all tracking areas in the registered PLMN and its equivalent PLMN(s) in the registration area as allowed area and delete the stored list of "allowed tracking areas" or the stored list of "non-allowed tracking areas"

When the UE receives a Service area list IE with an allowed area indication during a registration procedure or a generic UE configuration update procedure:

a) if the "Type of list" included in the Service area list IE does not indicate "all TAIs belonging to the PLMNs in the registration area are allowed area", the UE shall delete the old list of "allowed tracking areas" and store the tracking areas in the allowed area as the list of "allowed tracking areas". If the UE has a stored list of "non-allowed tracking areas", the UE shall delete that list; or

b) if the "Type of list" included in the Service area list IE indicates "all TAIs belonging to the PLMNs in the registration area are allowed area", the UE shall treat all tracking areas in the registered PLMN and its equivalent PLMN(s) as allowed area and delete the stored list of "allowed tracking areas" or the stored list of "non-allowed tracking areas".

When the UE receives a Service area list IE with a non-allowed area indication during a registration procedure or a generic UE configuration update procedure, the UE shall delete the old list of "non-allowed tracking areas" and store the tracking areas in the non-allowed area as the list of "non-allowed tracking areas". If the UE has a stored list of "allowed tracking areas", the UE shall delete that list.

If the UE is successfully registered to a PLMN and has a stored list of "allowed tracking areas":

a) while camped on a cell whose TAI is in the list of "allowed tracking areas", the UE shall stay or enter the state 5GMM-REGISTERED.NORMAL-SERVICE and is allowed to initiate any 5GMM and 5GSM procedures; and

b) while camped on a cell which is in the registered PLMN or a PLMN from the list of equivalent PLMNs and whose TAI is in the registration area and is not in the list of "allowed tracking areas", the UE shall enter the state 5GMM-REGISTERED.NON-ALLOWED-SERVICE, and:

1) if the UE is in 5GMM-IDLE mode or 5GMM-IDLE mode with suspend indication over 3GPP access, the UE:

i) shall not perform the registration procedure for mobility and periodic registration update with Uplink data status IE except for emergency services or for high priority access; and

ii) shall not initiate a service request procedure except for emergency services, high priority access, responding to paging or notification or indicating a change of 3GPP PS data off UE status; and

iii) shall not request the lower layers to resume a suspended connection except for emergency services or for high priority access; and

2) if the UE is in 5GMM-CONNECTED mode or 5GMM-CONNECTED mode with RRC inactive indication over 3GPP access, the UE:

i) shall not perform the registration procedure for mobility and periodic registration update with Uplink data status IE except for emergency services or for high priority access; and

ii) shall not initiate a service request procedure except for emergency services, high priority access or for responding to paging or notification over non-3GPP access; and

iii) shall not initiate a 5GSM procedure except for emergency services, high priority access or indicating a change of 3GPP PS data off UE status; and

iv) shall not initiate the NAS transport procedure to send a CIoT user data container.

If the UE is successfully registered to a PLMN and has a stored list of "non-allowed tracking areas":

a) while camped on a cell which is in the registered PLMN or a PLMN from the list of equivalent PLMNs and whose TAI is not in the list of "non-allowed tracking areas", the UE shall stay or enter the state 5GMM-REGISTERED.NORMAL-SERVICE and is allowed to initiate any 5GMM and 5GSM procedures; and

b) while camped on a cell whose TAI is in the list of "non-allowed tracking areas", the UE shall enter the state 5GMM-REGISTERED.NON-ALLOWED-SERVICE, and:

1) if the UE is in 5GMM-IDLE mode or 5GMM-IDLE mode with suspend indication over 3GPP access, the UE:

i) shall not perform the registration procedure for mobility and periodic registration update with Uplink data status IE except for emergency services or for high priority access; and

ii) shall not initiate a service request procedure except for emergency services, high priority access, responding to paging or notification or indicating a change of 3GPP PS data off UE status;

iii) shall not request the lower layers to resume a suspended connection except for except for emergency services or for high priority access; and

2) if the UE is in 5GMM-CONNECTED mode or 5GMM-CONNECTED mode with RRC inactive indication over 3GPP access, the UE:

i) shall not perform the registration procedure for mobility and registration update with the Uplink data status IE except for emergency services or for high priority access; and

ii) shall not initiate a service request procedure except for emergency services, high priority access or for responding to paging or notification over non-3GPP access; and

iii) shall not initiate a 5GSM procedure except for emergency services, high priority access or indicating a change of 3GPP PS data off UE status; and

iv) shall not initiate the NAS transport procedure to send a CIoT user data container.

The list of "allowed tracking areas", as well as the list of "non-allowed tracking areas" shall be erased when:

a) the UE is switched off; and

b) the UICC containing the USIM is removed.

When a tracking area is added to the list of "5GS forbidden tracking areas for roaming" or to the list of "5GS forbidden tracking areas for regional provision of service" as specified in the subclauses 5.5.1.2.5 or 5.5.1.3.5, the tracking area shall be removed from the list of "allowed tracking areas" if the tracking area is already present in the list of "allowed tracking areas" and from the list of "non-allowed tracking areas" if the tracking area is already present in the list of "non-allowed tracking areas".

\*\*\*\*\*\* END CHANGES \*\*\*\*\*\*