**3GPP TSG-SA1 Meeting #99e *S1-222346***

**Electronic Meeting,** **22 Aug – 1 Sept 2022** *(revision of S1-222102)*

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  |  | **CR** | **0645** | **Rev** | **1** | **Current version:** | **18.6.1** |  |
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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 | **X** | ME | **X** | Radio Access Network | **X** | Core Network | **X** |

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| ***Title:*** | Add requirements on Minimization of Service Interruption During Core Network Failure | | | | | | | | | |
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| ***Source to WG:*** | China Telecom, ZTE | | | | | | | | | |
| ***Source to TSG:*** | S1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | MINT\_Ph2 | | | | |  | ***Date:*** | | | 2022-08-22 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | B |  | | | | | ***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-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)*  *Rel-19 (Release 19)* | |
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| ***Reason for change:*** | | In 5G system, ensuring the availability of communication service is critical. TS 22.261 highlights the need for disaster mitigation services when a 5G system fails to serve its users due to RAN failure. TS 22.261 also specifies the requirements of Disaster Roaming where a user that is applicable to Disaster Condition roams to another PLMN to resume connectivity service. However, the requirements of supporting communication service under core network failure are not covered. Therefore, it is proposed that two core network failure scenarios and their mitigation service requirements be included in TS 22.261. It is noted that any core network failure that leads to not operational user authentication is excluded as user authentication is required for disaster mitigation services.  In order to avoid the repeated construction of 5G network infrastructure and save cost, multi operator core network (MOCN) network sharing scenario, where only the RAN is shared, has been introduced to 5G system. With the shared-RAN configuration, when one operator’s 5G core network fails, the service interruption can be minimized by temporarily using the service provided by the core network of the cooperative operator.  National roaming is allowed in some regions to accelerate 5G rollout. That is, a UE roams into a 5G VPLMN which has a roaming agreement with the UE's 5G HPLMN, and the HPLMN and the VPLMN are in the same country. It is noted that the UE can also be an international roamer who has a 5G-only roaming access to the 5G VPLMN. Subject to roaming agreement, national roaming may be forbidden in EPS (i.e. a UE can register with a 5G VPLMN but it cannot register with the EPC of this VPLMN). The legacy 4G core network which is not virtualized and implemented isolated from 5G can function well when 5G core network fails. Such legacy 4G deployment is particularly common in the areas where 5G national roaming is allowed (e.g. rural areas). When a Disaster Condition applies to the VPLMN, the UE shall be allowed to register with the EPC of the VPLMN to resume 4G connectivity service. | | | | | | | | |
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| ***Summary of change:*** | | Stage 1 specifications to be updated to support disaster mitigation services in shared-RAN and national roaming scenarios. | | | | | | | | |
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| ***Consequences if not approved:*** | | A user experiences communication service interruption during core network failure. | | | | | | | | |
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| ***Clauses affected:*** | | 6.31.1, 6.31.2.1 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | |  | | | | | | | | |

Begin First Change

## 6.31 Minimization of Service Interruption

### 6.31.1 Description

A mobile network can fail to provide service in the event of a disaster (for example a fire.) The requirements listed in this clause provide the 5GS with the capability to mitigate interruption of service. UEs can obtain service in the event of a disaster, if there are PLMN operators prepared to offer service. The minimization of service interruption is constrained to a particular time and place. To reduce the impact to the 5G System and EPS of supporting Disaster Roaming, the potential congestion resulting from an influx or outflux of Disaster Inbound Roamers is taken into account.

Scenarios where network failures render the network subject to a disaster unable to authenticate its subscribers are excluded.

### 6.31.2 Requirements

#### 6.31.2.1 General

Subject to regulatory requirements or operator's policy, 3GPP system shall be able to enable a UE of a given PLMN to obtain connectivity service (e.g. voice call, mobile data service) from another PLMN for the area where a Disaster Condition applies.

Subject to regulatory requirements, operator's policy or UE capabilities, the 3GPP system shall be able to support a UE, with 5G-only national roaming access to a VPLMN, to obtain 4G connectivity service (e.g. voice call, mobile data service) from that VPLMN in the area where a Disaster Condition applies.

Subject to regulatory requirements or operator's policy, in case of shared RAN between participating PLMNs, the 3GPP system shall be able to support a UE of a given PLMN to obtain connectivity service (e.g. voice call, mobile data service) from another participating network when a Disaster Condition applies to the UE’s PLMN.

#### 6.31.2.2 Disaster Condition

The 3GPP system shall enable UEs to obtain information that a Disaster Condition applies to a particular PLMN or PLMNs.

NOTE: If a UE has no coverage of its HPLMN, then obtains information that a Disaster Condition applies to the UE's HPLMN, the UE can register with a PLMN offering Disaster Roaming service.

The 3GPP system shall support means for a PLMN operator to be aware of the area where Disaster Condition applies.

The 3GPP system shall be able to support provision of service to Disaster Inbound Roamer only within the specific region where Disaster Condition applies.

The 3GPP system shall be able to provide efficient means for a network to inform Disaster Inbound roamers that a Disaster Condition is no longer applicable.

Subject to regulatory requirements or operator’s policy, the 3GPP system shall support a PLMN operator to be made aware of the failure or recovery of other PLMN(s) in the same country when the Disaster Condition is applies, or when the Disaster Condition is not applicable.

#### 6.31.2.3 Disaster Roaming

The 3GPP system shall be able to provide means to enable a UE to access PLMNs in a forbidden PLMN list if a Disaster condition applies and no other PLMN is available except for PLMNs in the forbidden PLMN list.

The 3GPP system shall provide means to enable that a Disaster Condition applies to UEs of a specific PLMN.

The 3GPP system shall be able to provide a resource efficient means for a PLMN to indicate to potential Disaster Inbound Roamers whether they can access the PLMN or not.

Disaster Inbound Roamers shall perform network reselection when a Disaster Condition has ended.

The 3GPP system shall minimize congestion caused by Disaster Roaming.

The 5G system and EPS shall support a mechanism for the HPLMN to control whether a UE, with HPLMN subscription, should apply Disaster Roaming when a Disaster Condition arises (in the HPLMN or a VPLMN).

3GPP system shall be able to collect charging information for a Disaster Inbound Roamer with information about the applied disaster condition.

End First Change