**3GPP TSG-SA WG2 Meeting #162S2-2405067**

**15 – 19 April 2024, Changsha, China (revision of S2-2404524)**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
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|  | **23.401** | **CR** | **3776** | **rev** | **1** | **Current version:** | **18.5.0** |  |
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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 | **X** |

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| ***Title:***  | Clarification on Discontinous coverage for satellite access |
|  |  |
| ***Source to WG:*** | Google |
| ***Source to TSG:*** | SA2 |
|  |  |
| ***Work item code:*** | 5GSAT\_Ph2 |  | ***Date:*** | 2024-04-05 |
|  |  |  |  |  |
| ***Category:*** | F |  | ***Release:*** | Rel-18 |
|  | *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)* |
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| ***Reason for change:*** | Currently, the feature of discontinous network coverage for satellite access has been supported. To allow sucessful communication, the service link and feeder link need to be available simultaneously. However in current specification, it is not clear whether the satellite coverage availability information consider either service link or feeder link, or both.  |
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| ***Summary of change:*** | In order to enable this, introduce the following:* Add service link and feeder link defintion based on TS36.300
* Clarify the satellite coverage availability information provisioned to the UE or AMF via O&M describes when and where satellite coverage with service link and/or feeder link availability is expected to be available in an area.

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| ***Consequences if not approved:*** | The satellite coverage availability information is unclear  |
|  |  |
| ***Clauses affected:*** | 3.1, 4.13.8.3, 4.13.8.4 |
|  |  |
|  | **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 of changes\*\*\*\*\*\*\***

## 3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [1].

**MME Pool Area:** An MME Pool Area is defined as an area within which a UE may be served without need to change the serving MME. An MME Pool Area is served by one or more MMEs ("pool of MMEs") in parallel. MME Pool Areas are a collection of complete Tracking Areas. MME Pool Areas may overlap each other.

**Serving GW Service Area:** A Serving GW Service Area is defined as an area within which a UE may be served without need to change the Serving GW. A Serving GW Service Area is served by one or more Serving GWs in parallel. Serving GW Service Areas are a collection of complete Tracking Areas. Serving GW Service Areas may overlap each other.

**PDN Connection:** The association between a PDN represented by an APN and a UE, represented by one IPv4 address and/or one IPv6 prefix (for IP PDN Type) or by the UE Identity (for Non-IP and Ethernet PDN Types).

**Default Bearer:** The EPS bearer which is first established for a new PDN connection and remains established throughout the lifetime of the PDN connection.

**Default APN:** A Default APN is defined as the APN which is marked as default in the subscription data and used during the Attach procedure and the UE requested PDN connectivity procedure when no APN is provided by the UE.

**eCall Only Mode:** A UE configuration option that allows the UE to attach at EPS and register in IMS to perform only eCall Over IMS, and an IMS call to a non-emergency MSISDN or URI for test and/or terminal reconfiguration services. For a short period following either such call, an incoming call (e.g. callback from a PSAP or HPLMN operator) or other incoming session (e.g. for USIM reconfiguration) is possible. At other times when the UE is configured in this mode, the UE is required to refrain from any signalling to a network. Use of eCall Only Mode is configured in the USIM for the UE.

**PDN Connection to the SCEF:** The association between a UE, represented by the UE Identity, and a PDN represented by an APN to external packet data network via SCEF to allow transfer of Non-IP data. It includes establishment and persistence of T6 connection between MME and SCEF (see TS 29.128 [79]).

**Emergency attached UE:** A UE which only has bearer(s) related to emergency bearer service.

NOTE 1: The above term is equivalent to the term "attached for emergency bearer services" as specified in TS 24.301 [46].

**LIPA PDN connection:** a PDN Connection for local access (e.g. for IP or Ethernet access) for a UE connected to a HeNB.

**en-gNB:** As defined in TS 37.340 [85].

**SIPTO at local network PDN connection:** a PDN connection for SIPTO at local network for a UE connected to a (H)eNB.

**Correlation ID:** For a LIPA PDN connection, Correlation ID is a parameter that enables direct user plane path between the HeNB and L-GW.

**SIPTO Correlation ID:** For a SIPTO at local network PDN connection, SIPTO Correlation ID is a parameter that enables direct user plane path between the (H)eNB and L-GW when they are collocated.

**Local Home Network:** A set of (H)eNBs and L-GWs in the standalone GW architecture, where the (H)eNBs have IP connectivity for SIPTO at the Local Network via all the L-GWs.

**Local Home Network ID:** An identifier that uniquely identifies a Local Home Network within a PLMN.

**Presence Reporting Area:** An area defined within 3GPP Packet Domain for the purposes of reporting of UE presence within that area due to policy control and/or charging reasons. In the case of E-UTRAN, a Presence Reporting Area may consist in a set of neighbor or non-neighbor Tracking Areas, or eNodeBs and/or cells. There are two types of Presence Reporting Areas: "UE-dedicated Presence Reporting Areas" and "Core Network pre-configured Presence Reporting Areas" that apply to an MME pool.

**RAN user plane congestion:** RAN user plane congestion occurs when the demand for RAN resources exceeds the available RAN capacity to deliver the user data for a prolonged period of time.

NOTE 2: Short-duration traffic bursts is a normal condition at any traffic load level, and is not considered to be RAN user plane congestion. Likewise, a high-level of utilization of RAN resources (based on operator configuration) is considered a normal mode of operation and might not be RAN user plane congestion.

**IOPS-capable** eNodeB**:** an eNodeB that has the capability of IOPS mode operation, which provides local connectivity (e.g. for IP or Ethernet) and public safety services to IOPS-enabled UEs via a Local EPC when the eNodeB has lost backhaul to the Macro EPC or it has no backhaul to the Macro EPC.

**IOPS network:** an IOPS network consists of one or more eNodeBs operating in IOPS mode and connected to a Local EPC.

**Local EPC:** a Local EPC is an entity which provides functionality that eNodeBs in IOPS mode of operation use, instead of the Macro EPC, in order to support public safety services.

**Macro EPC:** the EPC which serves an eNodeB when it is not in IOPS mode of operation.

**Nomadic EPS:** a deployable system which has the capability to provide radio access (via deployable IOPS-capable eNodeB(s)), local connectivity (e.g. for IP or Ethernet) and public safety services to IOPS-enabled UEs in the absence of normal EPS

**Multi-USIM UE:** a UE with multiple USIMs, capable of maintaining a separate registration state with a PLMN for each USIM at least over 3GPP Access and supporting one or more of the features described in clause 4.3.33.

**IOPS-enabled UE:** is an UE that is configured to use networks operating in IOPS mode.

**Cellular IoT:** Cellular network supporting low complexity and low throughput devices for a network of Things. Cellular IoT supports IP, Ethernet and Non-IP traffic. Unless otherwise stated in this specification, Cellular IoT and all functionality applicable to Cellular IoT also apply to satellite access.

**Narrowband-IoT:** a 3GPP Radio Access Technology that forms part of Cellular IoT. It allows access to network services via E-UTRA with a channel bandwidth limited to 180 kHz (corresponding to one PRB). Unless otherwise indicated in a clause, Narrowband-IoT is a subset of E-UTRAN. Unless otherwise stated in this specification, Narrowband-IoT also includes satellite access.

**LTE-M:** a 3GPP RAT type Identifier used in the Core Network only, which is a sub-type E-UTRAN RAT type, and defined to identify in the Core Network the E-UTRAN when used by a UE indicating Category M in its UE radio capability. Unless otherwise stated in this specification, LTE-M also includes satellite access.

**WB-E-UTRAN:** in the RAN, WB-E-UTRAN is the part of E-UTRAN that excludes NB-IoT. In the Core Network, the WB-E-UTRAN also excludes LTE-M. Unless otherwise stated in this specification, WB-E-UTRAN also includes satellite access.

**DCN-ID:** DCN identity identifies a specific dedicated core network (DCN).

For the purposes of the present document, the following terms and definitions given in TS 23.167 [81] apply:

**eCall Over IMS:** See TS 23.167 [81].

**RLOS attached UE:** A UE is attached only for accessing Restricted Local Operator Services (see TS 23.221 [27]).

**IAB-donor:** For the purposes of this specification, this is a NR Secondary RAN node is further described in TS 37.340 [85] that supports Integrated access and backhaul (IAB) feature and provides connection to the core network to IAB-nodes. It supports the CU function of the CU/DU architecture for IAB defined in TS 38.401 [90].

**IAB-node:** A relay node that supports wireless in-band and out-of-band relaying of NR access traffic via NR Uu backhaul links. It supports the UE function and the DU function of the CU/DU architecture for IAB defined in TS 38.401 [90].

**Feeder link**: as defined in TS 36.300 [6].

**Service link**:as defined in TS 36.300 [6]

**\*\*\*\*\*\*\*2nd change\*\*\*\*\*\*\***

#### 4.13.8.3 Coverage availability information provisioning to the UE

A UE may use satellite coverage availability information for satellite access to support discontinuous coverage operations. Satellite coverage availability information can be provided to a UE by an external server via a PDN Connection or SMS. The protocol and format of satellite coverage availability information via PDU Connection or SMS is not defined in this release of the specification, but some examples on the information that constitutes the satellite coverage availability information is defined in Annex N.

NOTE: The satellite coverage availability information provisioned to the UE describes when and where satellite coverage with service link and feeder link availability is expected to be available in an area.

**\*\*\*\*\*\*\* 3rd change \*\*\*\*\*\*\***

#### 4.13.8.4 Coverage availability information provisioning to the MME

The MME may use satellite coverage availability information to support satellite access by UEs with discontinuous coverage operation. Satellite coverage availability information regarding enabling gNB operation for feeder/service link switch over may be provisioned to the MME by O&M [6].

NOTE: In this release of the specification there is no support for provisioning of satellite coverage availability information to an MME from an AF.

NOTE: The satellite coverage availability information provisioned to the MME describes when and where satellite coverage with service link and feeder link availability is expected to be available in an area.

The satellite coverage availability information is not UE specific and can be applied by the MME for any UE in the affected area.

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