**3GPP TSG-SA3 Meeting #103-e *S3-211681-r1***

**e-meeting, 17 - 28 May 2021** Revision of S3-20xxxx

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **33.511** | **CR** | **0023** | **rev** |  | **Current version:** | **16.6.0** |  |
|  | | | | | | | | |
| *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 | **x** | Core Network |  |

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|  | | | | | | | | | | |
| ***Title:*** | Update conditions of testcases | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei, Hisilicon, | | | | | | | | | |
| ***Source to TSG:*** | S3 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | SCAS\_5G | | | | |  | ***Date:*** | | | 2021.05.17 |
|  |  | | | |  | |  | | |  |
| ***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 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)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | RAN2 has specified that PDCP COUNT does not allow to wrap around In TS 38.300 clause 6.4.1, so the corresponding test cases on PDCP COUNT wrap around is not needed any more. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Add to NOTEs to say the testcase is not needed. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Wrong specification | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 2;4.2.2.1.13;4.2.2.1.18 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 the 1st change\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 33.501 (Release 15): "Security architecture and procedures for 5G system".

[3] 3GPP TS 33.117: "Catalogue of general security assurance requirements".

[4] 3GPP TS 33.216: "Security Assurance Specification (SCAS) for the evolved Node B (eNB) network product class".

[5] 3GPP TR 33.926: "Security Assurance Specification (SCAS) threats and critical assets in 3GPP network product classes".

[6] 3GPP TS 38.331: "NR; Radio Resource Control (RRC) protocol specification".

[7] 3GPP TS 38.300: "NR; NR and NG-RAN Overall Description; Stage 2".

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

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Start of the 2nd change\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

##### 4.2.2.1.13 Key refresh at the gNB

*Requirement Name*: Key refresh at the gNB

*Requirement Reference:* TS 33.501 [2], clause 6.9.4.1; TS 38.331 [6], clause 5.3.1.2

*Requirement Description*: *"Key refresh shall be possible for KgNB, KRRC-enc, KRRC-int, KUP-int, and KUP-enc and shall be initiated by the gNB when a PDCP COUNTs are about to be re-used with the same Radio Bearer identity and with the same KgNB."* as specified in TS 33.501 [2], clause 6.9.4.1.

"The network is responsible for avoiding reuse of the COUNT with the same RB identity and with the same key, e.g. due to the transfer of large volumes of data, release and establishment of new RBs, and multiple termination point changes for RLC-UM bearers. In order to avoid such re-use, the network may e.g. use different RB identities for RB establishments, change the AS security key, or an RRC\_CONNECTED to RRC\_IDLE/RRC\_INACTIVE and then to RRC\_CONNECTED transition." as specified in TS 38.331 [6], clause 5.3.1.2.

*Threat References*: TR 33.926 [5], clause D.2.2.7 Key Reuse

*Test Case:*

**Test Name:** TC\_GNB\_KEY\_REFRESH\_DRB\_ID

**Purpose:**

Verify that the gNB performs KgNB refresh when DRB-IDs are about to be reused under the following conditions:

- the successive Radio Bearer establishment uses the same RB identity while the PDCP COUNT is reset to 0, or

- the PDCP COUNT is reset to 0 but the RB identity is increased after multiple calls and wraps around.

**Pre-Conditions:**

The UE, AMF and SMF may be simulated.

**Execution Steps**

1) The gNB sends the AS Security Mode Command message to the UE.

2) The UE responds with the AS Security Mode Complete message.

3) A DRB is set up.

4) DRB is set up and torn down for multiple times within one active radio connection without the UE going to idle (e.g. by the UE making multiple IMS calls, or by the SMF requesting PDU session modification and deactivation via the AMF), until the DRB ID is reused.

**Expected Results:**

Before DRB ID reuse, the gNB takes a new KgNB into use by e.g. triggering an intra-cell handover or triggering a transition from RRC\_CONNECTED to RRC\_IDLE or RRC\_INACTIVE and then back to RRC\_CONNECTED.

**Expected format of evidence:**

Part of log that shows all the DRB identities and the intra-cell handover or the transition from RRC\_CONNECTED to RRC\_IDLE or RRC\_INACTIVE and then back to RRC\_CONNECTED. This part can be presented, for example, as a screenshot.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*End of the 2nd changes\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Start of the 3rd change\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

##### 4.2.2.1.18 Key update at the gNB on dual connectivity

*Requirement Name*: Key update at the gNB on dual connectivity

*Requirement Reference:* TS 33.501 [2], clause 6.10.2.1; clause 6.10.2.2.1.

*Requirement Description*: "When executing the procedure for adding subsequent radio bearer(s) to the same SN, the MN shall, for each new radio bearer, assign a radio bearer identity that has not previously been used since the last KSN change. If the MN cannot allocate an unused radio bearer identity for a new radio bearer in the SN, due to radio bearer identity space exhaustion, the MN shall increment the SN Counter and compute a fresh KSN, and then shall perform a SN Modification procedure to update the KSN" as specified in TS 33.501 [2], clause 6.10.2.1.

"The SN shall request the Master Node to update the KSN over the Xn-C, when uplink and/or downlink PDCP COUNTs are about to wrap around for any of the SCG DRBs or SCG SRB" as specified in TS 33.501 [2], clause 6.10.2.2.1.

NOTE: The following testcases are only tested when the NR-NR DC, NE-DC and EN-DC scenarios are deployed.

*Threat References*: TR 33.926 [5], clause D.2.2.7 Key Reuse

*Test Case:*

**Test Name:** TC\_GNB\_DC\_KEY\_UPDATE\_DRB\_ID

**Purpose:**

Verify that the gNB under test acting as a Master Node (MN) performs KSN update when DRB-IDs are about to be reused.

**Pre-Conditions:**

- Test environment with a gNB or ng-eNB acting as the Secondary Node (SN), which may be simulated

- Test environment with a UE, SMF and AMF, which may be simulated

**Execution Steps**

1. The gNB under test establishes RRC connection and AS security context with the UE.

2. The gNB under test establishes security context between the UE and the SN for the given AS security context shared between the gNB under test and the UE; and generates a KSN sent to the SN.

3. A SCG bearer is set up between the UE and the SN.

4. The gNB under test is triggered to execute the SN Modification procedure to provide additional available DRB IDs to be used for SN terminated bearers (e.g. by the UE making multiple IMS calls, or by the SMF requesting PDU session modification and deactivation via the AMF), until the DRB IDs are reused.

**Expected Results:**

- Before DRB ID reuse, the gNB under test generates a new KSN and sends it via the SN Modification Request message to the SN.

**Expected format of evidence:**

Evidence suitable for the interface, e.g. text representation of the captured SN Modification Request message.

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