**3GPP TSG-RAN WG2 Meeting #118-e *R2-220xxxx***

**Electronic meeting, 9th May – 20th May 2022**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **37.320** | **CR** |  | **rev** |  | **Current version:** | **17.0.0** |  |
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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 | **X** | Radio Access Network | **X** | Core Network |  |

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| ***Title:*** | Corrections on TS37.320 | | | | | | | | | |
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| ***Source to WG:*** | CATT | | | | | | | | | |
| ***Source to TSG:*** | R2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_ENDC\_SON\_MDT\_enh-Core | | | | |  | ***Date:*** | | | 2022-05-19 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-17 |
|  | *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-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Capture the agreed TP of R2-2204943 in TS37.320.  Change #1  CEF report contains the RA information of field *perRAInfoList* in the granularity of per RA attempt. Therefore, the 2-step RA information in the granularity of per RA attempt should be introduced for RACH failed report in section 5.1.6 of TS37.320. The current specification for RACH failed report in section 5.1.6 of TS37.320 does not only contain the RA information per RA attempt, but also contain the RA information per RA procedure. Therefore, the related RA information (i.e. measured RSRP of DL pathloss reference, indication of RA switching point, payload size available in the UE buffer and PUSCH resource information) per RA procedure should be removed  Change #2  In section 5.4.1.2 of TS37.320, the 2-step RA related information introduced in NR RLF report is directly quoted the related information in section 5.1.6. However, the RA related information in RLF report should be the information in *ra-InformationCommon* which is not same as information in *perRAInfoList* for CEF report.  Change #3  The following agreement is achieved in RAN2 117-e meeting:  Agreement:  Inclusion of one or more of the following PUSCH resource parameters only when the UE uses random access resources provided in dedicated signalling, or only when configured with CFRA:  a. msgA-MCS (4 bits)  b. nrofPRBs-PerMsgA-PO (5 bits)  c. msgA-PUSCH-TimeDomainAllocation (4 bits)  d. frequencyStartMsgA-PUSCH (9 bits)  e. nrofMsgA-PO-FDM (2 bits)  However, dedicated signaling can also be used to configure CBRA resource, it will make confusion that whether the UE should include the PUSCH resource of CBRA. Meanwhile, the CFRA resource should be configured by dedicated signaling, the description of dedicated signaling is redundant. Therefore, the dedicated signaling should be deleted when capture this agreement in TS37.320.  Change #4  The following agreement is achieved in RAN2 #117-e meeting:  => All the immediate MDT configurations and reporting in EN-DC scenario (i.e. section 5.4.1.3 Immediate MDT for MR-DC in TS 37.320) are also applicable for (NG)EN-DC, NE-DC and NR-DC.  However, this agreement has not been captured in TS37.320. | | | | | | | | |
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| ***Summary of change:*** | | 1. Remove the 2-step RA related information (i.e. measured RSRP of DL pathloss reference, indication of RA switching point, payload size available in the UE buffer and PUSCH resource information) per RA procedure for RACH failed report in section 5.1.6 of TS37.320. 2. Remove the description of quoting 2-step RA information of the section 5.1.6 in NR RLF report in current TS37.320 running CR. Add the description of 2-step RA related information in *ra-InformationCommon* for RACH fail report in section 5.4.1.2 of TS37.320. 3. When capturing the agreement of including MSGA PUSCH resources in RA report in stage 2 specification, the only condition for including PUSCH resource is that the UE uses random access resources configured with CFRA. 4. Capture the agreement of “All the immediate MDT configurations and reporting in EN-DC scenario (i.e. section 5.4.1.3 Immediate MDT for MR-DC in TS 37.320) are also applicable for (NG)EN-DC, NE-DC and NR-DC.” in TS37.320.   **Impact analysis**  Impacted 5G architecture options:  (NG)EN-DC, NR-DC, NE-DC  Impacted functionality:  CFE report, RLF report, immediate MDT in MR-DC  Inter-operability: | | | | | | | | |
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| ***Consequences if not approved:*** | | The description for 2-setp RA information of CEF report and RLF report in stage 2 specification is not correct and whether the immediate MDT can be used for MR-DC is confusing. | | | | | | | | |
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| ***Clauses affected:*** | | 5.1.6, 5.4.1.2, 5.4.1.3 | | | | | | | | |
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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:*** | |  | | | | | | | | |

*First change*

5.1.6 Accessibility measurements

The UE logs failed RRC connection establishments for LTE, UMTS and NR, i.e. a log is created when the RRC connection establishment procedure fails. For NR, UE logs any failed connection establishment attempt, i.e. a log is created when the RRC setup or resume procedure fails. The UE logs failed RRC connection establishments without the need for prior configuration by the network.

The UE stores the Selected PLMN on the RRC connection establishment failure or RRC resume procedure failure. Only if that PLMN is the same as the RPLMN, the UE may report the log.

NOTE: There is no expected performance degradation for networks using EPLMNs.

The trigger for creating a log related to a failed RRC connection establishment is for NR when timer T300 expires, for LTE when timer T300 expires and for UMTS when V300 is greater than N300. The trigger for creating log related to a failed RRC resume procedure is for NR when timer T319 expires.

The UE can store the following information related to the failed RRC connection establishment or failed RRC resume procedure:

- Time stamp, which is the elapsed time between logging and reporting the log.

- The global cell identity of the serving cell when the RRC connection establishment or resume fails, i.e. the cell which the UE attempted to access.

- The latest available radio measurements for any frequency or RAT

- The latest detailed location information, if available.

- For LTE:

- Number of Random Access Preambles transmitted;

- Indication whether the maximum transmission power was used;

- Contention detected;

- The latest WLAN measurement results, if available;

- The latest Bluetooth measurement results, if available.

- For UMTS FDD:

- Number of RRC Connection Request attempts (e.g. T300 expiry after receiving ACK and AICH)

- For UMTS 1.28 Mcps TDD:

- Number of RRC Connection Request attempts.

- Whether the FPACH is received or whether the maximum number Mmax of synchronisation attempts is reached.

- Failure indication of the E-RUCCH transmission. It is only applied when common E-DCH is supported by UE and network.

- For NR:

- SSB index of the downlink beams of serving cell;

- The latest number of consecutive connection failures in the last failed cell the UE has experienced independent of RRC state transitions;

- RACH failure report:

- Tried SSB index and number of Random Access Preambles transmitted for each tried SSB in chronological order of attempts;

- Contention detected as per RACH attempt;

- Indication whether the selected SSB is above or below the rsrp-ThresholdSSB threshold, as per RACH attempt;

- TAC of the cell in which the UE performs the RA procedure;

- For 2-step RACH, the following information can be additionally included:

- Indication that fallback from 2-step RA to 4-step RA was performed by the UE, as per RACH attempt;

- The latest WLAN measurement results, if available;

- The latest Bluetooth measurement results, if available;

- The latest sensor information, if available.

In addition, the CEF report may include additional information required for RACH Optimization solutions, as specified in TS 38.300 [22].

For NR, the UE can store multiple CEF reports to solve the problem about UL/DL coverage imbalance. For the failures happening consecutively, the UE stores one CEF report entry in the multiple CEF report list, as specified in TS 38.331 [15]. For the failures happening consecutively in the same cell, the UE replaces the last information related to the failed RRC connection establishment or failed RRC resume procedure with the new one, while the number of consecutive connection failures is increased. All the entries in the multiple CEF report list correspond to one PLMN. Upon detecting a cell with a different RPLMN, the UE clears stored CEF report entries.

*Next change*

5.4.1.2 Radio Link Failure report

The Radio Link Failure report contains information related to the latest connection failure experienced by the UE. The connection failure can be Radio Link Failure (RLF), or Handover Failure (HOF). The contents of the RLF report and the procedure for retrieving it by a gNB are specified in TS 38.331 [15], including failure information related to CHO, or DAPS Handover Failure (DAPS HOF). In case of consecutive connection failures associated to CHO or DAPS, the UE stores and reports both failure related information in the RLF report.

RLF report can contain latest two consecutive failures, in case one of the failures is related to CHO. In case of consecutive failures, the UE stores and reports both failure related information in the RLF report. The consecutive failure scenarios concern the following sequence of events:

a. A UE that has CHO configuration (as specified in TS 36.331 [5]) detects RLF in the source cell. The UE selects a configured candidate CHO target cell for connection re-establishment. The UE fails to re-establish to the selected CHO candidate cell.

b. A UE that has CHO configuration, executes the CHO towards the target cell upon fulfilling the configured condition and experiences a HO failure. The UE selects a configured candidate CHO target cell for connection re-establishment. The UE fails to re-establish to the selected CHO candidate cell.

c. A UE that has CHO configuration executes the normal HO towards the target cell and experiences a HO failure. The UE selects for connection re-establishment a configured candidate CHO target cell. The UE fails to re-establish to the selected CHO candidate cell using CHO procedure.

For DAPS, two consecutive failure information concern the following scenarios:

a. A UE detects a connection failure at the source (RLF) while performing access to DAPS target cell and fails to access the target (HOF).

b. A UE detects a connection failure at the target cell (HOF) and fails to perform fallback (RLF at source).

NR RLF report content required for MDT includes:

- Latest radio measurement results of the serving and neighbouring cells, including SSB/CSI-RS index and associated measurements in the serving and neighbouring cells;

NOTE: The measure quantities are sorted through the same RS type depending on the availability, according to the following priority: RSRP, RSRQ, SINR.

- For CHO, UE includes the latest radio measurement results of the candidate target cells;

- WLAN and Bluetooth measurement results, if were configured prior RLF and are available for reporting;

- "No suitable cell is found" flag when T311 expires;

- Indication per SSB/CSI-RS beams reporting whether it is configured to RLM purpose;

- Available sensor information;

- Available detailed location information;

- RACH failure report (in case, the cause for RLF is random access problem or Beam Failure Recovery failure):

- Tried SSB/CSI-RS index and number of Random Access Preambles transmitted for each tried SSB/CSI-RS in chronological order of attempts;

- Contention detected as per RACH attempt;

- Indication whether the selected SSB is above or below the rsrp-ThresholdSSB threshold, as per RACH attempt;

- TAC of the cell in which the UE performs the RA procedure;

- Frequency location related information of the RA resources used by the UE as specified in TS 38.331 [15];

- For 2-step RA, the following information can be additionally included:

- The measured RSRP of DL pathloss reference obtained just before performing RACH procedure (per RA procedure);

- Indication that fallback from 2-step RA to 4-step RA was performed by the UE, as per RACH attempt;

- Indication of RA switching point (as defined by the field *msgA-TransMax* in TS 38.331 [15]);

- The payload size available in the UE buffer at the time of initiating the 2-step RA procedure, without considering the padding (per RA procedure);

- MSGA PUSCH resources for 2-step RACH as specified in TS 38.331 [15] are can be included in case the UE uses random access resources configured with CFRA.

If detailed location information (e.g. GNSS location information) is available the reported location information in *rlf-Report* consists of:

- Latitude, longitude (mandatory);

- Altitude (conditional on availability);

- Velocity (conditional on availability);

- Uncertainty (conditional on availability);

- Confidence (conditional on availability);

- Direction (conditional on availability).

If sensor information is available, the sensor information may convey uncompensated barometric pressure, UE speed, and UE orientation.

In addition, the RLF report may include additional information required for MRO solutions, as specified in TS 38.300 [22].

*Next change*

5.4.1.3 Immediate MDT for MR-DC

Immediate MDT is supported for (NG)EN-DC, NE-DC and NR-DC scenario.

In signalling based immediate MDT, MME provides MDT configuration for both MN and SN towards MN including multi RAT SN configuration, specifically E-UTRA and NR MDT configuration. MN then forwards the NR MDT configuration towards SN (EN-DC scenario, SN is always NR).

In management-based immediate MDT, OAM provides the MDT configuration to both MN and SN independently. For both MN and SN, Management based MDT should not overwrite signalling based MDT.

For immediate MDT configuration, MN and SN can independently configure and receive measurement from the UE.

For MN terminated SCG bearer and SN terminated MCG bearer, the terminated node, e.g., MN in case of MN terminated SCG bearer, configures the configuration to UE.

For configuring packet delay measurement D1 specified in TS 38.314 [18] in case of split bearer: only one node can configure the measurement to UE, and the UE reports the measurement result to corresponding node where the configuration was received from.

*End of change*