**3GPP TSG-SA5 Meeting #129-e *S5-201407rev2***

**Online, , 24th Feb 2020 - 4th Mar 2020**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
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|  | **32.422** | **CR** | **0317** | **rev** | **-** | **Current version:** | **16.0.0** |  |
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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 |  | Radio Access Network | **X** | Core Network | **X** |

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|  |
| ***Title:***  | Add MDT management activation and deactionvation mechanism for 5G |
|  |  |
| ***Source to WG:*** | Oy LM Ericsson AB |
| ***Source to TSG:*** | S5 |
|  |  |
| ***Work item code:*** | 5GMDT |  | ***Date:*** | 2020-02-08 |
|  |  |  |  |  |
| ***Category:*** | B |  | ***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 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-12 (Release 12)**Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)* |
|  |  |
| ***Reason for change:*** | Add MDT management activation and deactionvation mechanism for 5G |
|  |  |
| ***Summary of change:*** | Add management activation and deactivation mechanism for 5G. Update the reference list. |
|  |  |
| ***Consequences if not approved:*** |  MDT management activation and deactivation mechanism for 5G would be missing. |
|  |  |
| ***Clauses affected:*** | 2, 4.1.1.9, 4.1.1.9a,4.1.1.9b, 4.1.3.X |
|  |  |
|  | **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***

# 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*.

NOTE: Overall management principles are defined in 3GPP TS 32.101 [1].

[1] 3GPP TS 32.101: "Telecommunication management; Principles and high level requirements".

[2] 3GPP TS 32.421: "Telecommunication management; Subscriber and equipment trace: Trace concepts and requirements".

[3] 3GPP TS 32.423: "Telecommunication management; Subscriber and equipment trace: Trace data definition and management".

[4] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[5] 3GPP TS 52.008: "Telecommunication management; GSM subscriber and equipment trace".

[6] 3GPP TS 23.060: "General Packet Radio Service (GPRS) Service description; Stage 2".

[7] 3GPP TS 23.205: "Bearer-independent circuit-switched core network; Stage 2".

[8] 3GPP TS 23.108: "Mobile radio interface layer 3 specification, core network protocols; Stage 2 (structured procedures)".

[9] 3GPP TS 23.246: "Multimedia Broadcast/Multicast Service (MBMS); Architecture and functional description".

[10] 3GPP TS 29.232: "Media Gateway Controller (MGC) - Media Gateway (MGW); interface; Stage 3".

[11] 3GPP TS 29.002: "Mobile Application Part (MAP) specification".

[12] 3GPP TS 29.060: "General Packet Radio Service (GPRS); GPRS Tunnelling Protocol (GTP) across the Gn and Gp interface".

[13] 3GPP TS 25.413: "UTRAN Iu interface Radio Access Network Application Part (RANAP) signalling".

[14] 3GPP TS 23.218: "IP Multimedia (IM) session handling; IM call model; Stage 2".

[15] 3GPP TS 23.228: "IP Multimedia Subsystem (IMS); Stage 2".

[16] 3GPP TS 29.228: "IP Multimedia (IM) Subsystem Cx and Dx Interfaces; Signalling flows and message contents".

[17] 3GPP TS 29.328: "IP Multimedia Subsystem (IMS) Sh interface; Signalling flows and message contents".

[18] Enabler Release Definition for OMA Device Management Specifications, version 1.2, The Open Mobile Alliance™ (URL:http://www.openmobilealliance.org/).

[19] 3GPP TS 32.240: "Telecommunication management; Charging management; Charging architecture and principles".

[20] 3GPP TS 32.260: "Telecommunication management; Charging management; IP Multimedia Subsystem (IMS) charging".

[21] 3GPP TS 23.401: "General Packet Radio Service (GPRS) enhancements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access".

[22] 3GPP TS 23.402: "Architecture enhancements for non-3GPP accesses".

[23] 3GPP TS 36.401: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Architecture description".

[24] 3GPP TS 32.442: "Telecommunication management; Trace management Integration Reference Point (IRP); Information Service (IS)".

[25] 3GPP TS 29.273: "Evolved Packet System (EPS); 3GPP EPS AAA interfaces".

[26] 3GPP TS 29.272: "Evolved Packet System (EPS); Mobility Management Entity (MME) and Serving GPRS Support Node (SGSN) related interfaces based on Diameter protocol".

[27] 3GPP TS 32.615: "Telecommunication management; Configuration Management (CM); Bulk CM Integration Reference Point (IRP): eXtensible Markup Language (XML) definitions".

[28] 3GPP TS 32.342: "Telecommunication management; File Transfer (FT) Integration Reference Point (IRP): Information Service (IS)".

[29] 3GPP TS 29.212: " Policy and Charging Control (PCC);Reference points".

[30] 3GPP TS 37.320: "Universal Terrestrial Radio Access (UTRA) and Evolved Universal Terrestrial Radio Access (E-UTRA); Radio measurement collection for Minimization of Drive Tests (MDT);Overall description; Stage 2".

[31] 3GPP TS 25.331: "Radio Resource Control (RRC); Protocol specification"

[32] 3GPP TS 36.331: "Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification".

[33] 3GPP TS 24.301: "Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3".

[34] 3GPP TS 29.274: "3GPP Evolved Packet System (EPS); Evolved General Packet Radio Service (GPRS) Tunnelling Protocol for Control plane (GTPv2-C); Stage 3".

[35] 3GPP TS 32.622: "Telecommunication management; Configuration Management (CM); Generic network resources Integration Reference Point (IRP): Network Resource Model (NRM)".

[36] 3GPP TS 36.413: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 Application Protocol".

[37] 3GPP TS 36.300: "Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN): Overall description stage 2".

[38] 3GPP TS 36.214: "Evolved Universal Terrestrial Radio Access (E-UTRA); Physical layer - Measurements".

[39] 3GPP TS 32.130: "Network sharing; Concepts and requirements".

[40] 3GPP TS 23.501: "System Architecture for the 5G System; Stage 2".

[41] 3GPP TS 23.502: "Procedures for the 5G System; Stage 2"

[42] 3GPP TS 38.300: "NR and NG-RAN Overall Description; Stage 2".

[43] 3GPP TS 38.331: "NR; Radio Resource Control (RRC); Protocol specification".

[44] 3GPP TS 38.401: "NG-RAN; Architecture Description".

[45] 3GPP TS 24.501: "Non-Access-Stratum (NAS) protocol for 5G System (5GS); Stage 3".

[46] 3GPP TS 28.541: "Network Resource Model (NRM); Stage 2 and stage 3”

[Y] 3GPP TS 38.314: "NR; Layer 2 measurements".

***Next change***

#### 4.1.1.9 NG-RAN activation mechanisms

##### 4.1.1.9.X General

In NG-RAN the Management Based Trace Activation can be fulfilled with the NG-RAN Cell Traffic trace functionality. In this case the Trace Session Activation is done to one or a list NG-RAN cells within one NG-RAN node, where Trace Session is activated.

The following trace control and configuration parameters of the Trace Session are received by NG-RAN node in the Trace Session activation message from the management system:

- Trace Reference.

- Trace Depth.

- NG-RAN cells list.

- List of interfaces for NG-RAN node.

- IP address of Trace Collection Entity.

When NG-RAN node receives the Trace Session Activation message from the management system for a given or a list of NG-RAN cell(s) the NG-RAN node shall start a Trace Session for the given or list of NG-RAN cell(s).

#### 4.1.1.9a NG-RAN activation mechanisms for management based MDT data collections without IMSI/IMEI(SV)/SUPI selection in the case of non-split architecture

For management based MDT data collection with no IMSI/IMEI(SV)/SUPI criteria in the case of non-split architecture, the UE selection can be done in the radio network at gNB based on the input information received from management system and the user consent information stored in the gNB. This mechanism works for the following OAM input parameters:

- Area information only

The following figure summarizes the flow as an example how the MDT configuration is done utilising the cell traffic trace functionality for this scenario:



Figure 4.1.1.9a.1: Example for management based MDT activation in NG-RAN in the case of non-split architecture

Whenever the gNodeB receives the Management based MDT allowed IE in Initial Context Setup Request or in Handover Request message, it shall save it for possible later usage.

1) The management system sends a Trace Session activation request to the gNodeB. This request includes the parameters for configuring UE measurements:

- Job type

- Area scope where the UE measurements should be collected: list of NG-RAN cells. Tracking Area should be converted to NG-RAN cell.

- List of measurements

- Reporting Trigger

- Report Interval

- Report Amount

- Event Threshold

- Logging Interval

- Logging Duration

- Trace Reference

- IP address of TCE

- Anonymization of MDT data.

- Measurement period NR (if either of the measurements M4, M5 is requested)

- Collection period for RRM measurements NR (present only if any of M2 or M3 measurements are requested).

- Positioning method

- MDT PLMN List

- MDT report type (periodical logged or event-triggered measurement) for logged MDT only

- MDT specific events list for event-triggered measurement for logged MDT only

- Area Confoguration for neighbouring cells for logged MDT only

- Sensor information for logged MDT and immediate MDT

Note that at the same time not all the parameters can be present. The criteria for which parameters are present are described in clause 5 of the present document.

2) When gNB receives the Trace Session activation request from its management system, it shall start a Trace Session and should save the parameters associated to the Trace Session.

3) gNB shall select the suitable UEs for MDT data collection. The selection is based on the area received from the management system and the area where UE is located, user consent information received from the core network as part of the Management Based MDT Allowed IE (As described in section in 4.6. of this document). If the user is not in the specified area or if the Management Based MDT Allowed IE is not present in the UE context the UE shall not be selected by the gNB for MDT data collection. During UE selection, the gNB shall take into account also the UE capability (MDT capability) when it selects UE for logged MDT configuration. If the UE does not support logged MDT, the UE shall not be selected.
If M4 or M5 measurements are requested in the MDT configuration, gNB should start the measurement according to the received configuration. Details of the measurements are defined in TS 38.314 [Y].

4) gNB shall activate the MDT functionality to the selected UEs. When gNB selects a UE, it shall take into account the availability of Management Based MDT Allowed IE in the user context and the area scope parameter received in MDT configuration (Trace Session activation). Detailed description about user consent handling and how it is provided to the gNB is described in section 4.6.2. If there is no Management Based MDT Allowed IE in the user context or the user is outside the area scope defined in the MDT configuration, the UE shall not be selected for MDT data collection. The gNB shall assign Trace Recording Session Reference corresponding to the selected UE. The gNB shall send at least the following configuration information to the UE in case of Logged MDT:

- Trace Reference

- Trace Recording Session Reference

- TCE Id (The value signalled as IP address of TCE from the EM is mapped to a TCE Id, using a configured mapping in the gNB)

- Logging Interval

- Logging Duration

- Absolute time reference

- Area scope where the UE measurements should be collected: list of NG-RAN cells/TA.

- MDT PLMN List

NOTE: For UEs currently being in idle mode and camping in the cell the logged MDT configuration cannot be sent. These UEs may be configured when they initiate some activity (e.g., Service Request or Tracking Area Update) at next time.

In case of Immediate MDT, the following parameters shall be sent to the UE:

- List of measurements

- Reporting trigger

- Report Interval

- Report Amount

- Event Threshold

Note that at the same time not all the parameters can be present. Conditions of the parameters are described in clause 5 of the present document.

If positioning method indicates GNSS positioning, gNB should activate the GNSS module of the UE via RRC as specified in TS 38.331 [43]. If positioning method indicates NG-RAN-Cell ID positioning, the gNB should collect the UE reported UE Rx-Tx time difference measurements as specified in TS 38.331[43] measurement procedures, as well as, any available gNB measured gNB Rx-Tx time difference, Angle of Arrival measurements as specified in TS 38.214 [38] and capture it in MDT trace record.

If Reporting Trigger parameter indicates that all configured RRM measurement trigger should be reported in MDT, then gNB should ask the UE to provide the "best effort" location information together with the measurement reporting by setting the *includeLocationInfo* IE in all RRC measurement reporting configurations.

5) When UE receives the MDT activation it shall start the MDT functionality based on the received configuration parameters.

6) The gNB shall not retrieve MDT report from the UE if UE’s rPLMN does not match the PLMN where TCE used to collect MDT data resides (e.g. gNB’s primary PLMN). When the eNodeB receives the MDT report from UE, the gNB shall get the Trace Recording Session Reference, Trace Reference and TCE Id from the report, and compare the Trace PLMN (PLMN portion of Trace Reference) with the PLMN where TCE used to collect MDT data resides (e.g. its primary PLMN) and discard MDT report in case of a mismatch. Otherwise if the MDT anonymization requires the IMEI-TAC in the MDT record eNodeB shall send the Trace Recording Session Reference, Trace Reference, serving cell CGI, and TCE IP address in the CELL TRAFFIC TRACE message to the AMF via the NG connection. When AMF receives this NG signalling message containing the Trace Recording Session Reference , Trace Reference, serving cell CGI, and the Privacy Indicator (that shall be set to *Logged MDT* or *Immediate MDT* depending on the configured job type) if so indicated in the privacy indicator, the AMF shall look up the subscriber identities (IMEI (SV)) of the given call from its database, and send the IMEI-TAC together with the Trace Recording Session Reference and Trace Reference and for immediate MDT also the serving cell CGI to the TCE, as described in section 4.7 of the present document. For logged MDT, MME will send the IMEI-TAC together with the Trace Recording Session Reference, Trace Reference to the TCE.

NOTE: For management based Immediate MDT, TRSR may be duplicated among different eNodeBs when multiple cells are selected as the area scope for the same MDT job. In this case, the combination of TRSR and the UE’s serving cell CGI in the MDT report can uniquely identify one trace recording session.

7) For Immediate MDT when the gNB receives the MDT report from the UE in the RRC message the gNB shall capture it and put the UE’s serving cell CGI together with the MDT report from the UE to the trace record. A UE configured to perform Logged MDT measurements in IDLE indicates the availability of MDT measurements, by means of a one-bit indicator, in *RRCConnectionSetupComplete* message during connection establishment as specified in 3GPP TS 32.421 [2]. The gNB can decide to retrieve the logged measurements based on this indication by sending the UEInformationRequest message to the UE. The UE can answer with the collected MDT logs in UEInformationResponse message.

8) The gNB shall forward the Trace Records to the Trace Collection Entity (TCE). In case of logged MDT, the TCE Id is indicated in the MDT report is translated to the actual IP address of the TCE by the gNB before it forwards the measurement records. (The address translation is using configured mapping in the gNB.) In case of immediate MDT, the IP address of the TCE is indicated for the gNB in the trace configuration.

The Immediate MDT measurement configuration is deleted in the UE together with the RRC context when entering idle or inactive mode.

The Logged MDT trace session is preserved in the UE until the duration time of the trace session expires, including also multiple idle periods interrupted by various state transistions such as idle-connected-idlestate transitions.

The Logged MDT trace session context of the UE is stored in the network as long as the trace session is active, including also the periods when the UE is in connected state.

Management system shall validate that the MCC and MNC specified in the Trace reference is the same as the PLMN supported by all the cells specified in the area scope. If the gNB receives a request with a PLMN in the TraceReference that does not match any PLMN in its list, it shall ignore the request.

***Next change***

#### 4.1.3.X NG-RAN deactivation mechanisms for MDT

 When the gNB receives the indication from management system for MDT trace session deactivation, it shall deactivate the trace session for those NG-RAN cells that have been indicated in the message. In case of immediate MDT trace session, the gNB shall deactivate the corresponding MDT RRC measurements in the UEs that have been configured for immediate MDT as part of the given trace session.

***End of changes***