**3GPP TSG- Meeting # *rev1***

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **32.423** | **CR** | **0100** | **rev** | **-** | **Current version:** | **15.1.0** |  |
|  | | | | | | | | |
| *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 | **X** |

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|  | | | | | | | | | | |
| ***Title:*** | Add MDT trace record for NR measurements | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Oy LM Ericsson AB | | | | | | | | | |
| ***Source to TSG:*** | S5 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | 5GMDT | | | | |  | ***Date:*** | | | 2020-01-25 |
|  |  | | | |  | |  | | |  |
| ***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 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:*** | | The MDT measurement list for NR shall be added. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Add NR MDT trace record | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Support for NR MDT trace record would be missing | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 2, 4.X.1, 4.X.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  |  | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  |  | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  |  | 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*.

[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 32.422: "Telecommunication management; Subscriber and equipment trace: Trace control and configuration management ".

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

[5] W3C Recommendation "Extensible Markup Language (XML) 1.0" (Second Edition, 6 October 2000) http://www.w3.org/TR/2000/REC-xml-20001006

[6] W3C Recommendation "Namespaces in XML" (14 January 1999)  
http://www.w3.org/TR/1999/REC-xml-names-19990114

[7] W3C Recommendation "XML Schema Part 0: Primer" (2 May 2001)  
http://www.w3.org/TR/2001/REC-xmlschema-0-20010502

[8] W3C Recommendation "XML Schema Part 1: Structures" (2 May 2001)  
http://www.w3.org/TR/2001/REC-xmlschema-1-20010502

[9] W3C Recommendation "XML Schema Part 2: Datatypes" (2 May 2001)  
http://www.w3.org/TR/2001/REC-xmlschema-2-20010502

[10] International Standard ISO 8601: 1988 (E) "Representations of dates and times" (1988-06-15)  
http://www.iso.ch/markete/8601.pdf

[11] 3GPP TS 32.300: "Telecommunication management; Configuration Management (CM); Name convention for Managed Objects".

[12] 3GPP TS 32.622: "Telecommunication management; Configuration Management (CM); Generic network resources Integration Reference Point (IRP): Network Resource Model (NRM)".

[13] 3GPP TS 29.274: "3GPP Evolved Packet System (EPS); Evolved General Packet Radio Service (GPRS) Tunnelling Protocol for Control plane (GTPv2-C); Stage 3".

[14] 3GPP TS 29.212: "Policy and Charging Control (PCC);Reference points".

[15] 3GPP TS 29.273: "Evolved Packet System (EPS); 3GPP EPS AAA interfaces".

[16] 3GPP TS 36.413: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 Application Protocol (S1AP)".

[17] 3GPP TS 36.423 "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); X2 Application Protocol (X2AP)".

[18] 3GPP TS 23.501: "System Architecture for the 5G System; Stage 2".

[19] 3GPP TS 23.502: "Procedures for the 5G System; Stage 2"

[20] 3GPP TS 38.300: "NR and NG-RAN Overall Description; Stage 2".

[21] 3GPP TS 38.331: "NR; Radio Resource Control (RRC); Protocol specification".

[22] 3GPP TS 38.401: "NG-RAN; Architecture Description".

[23] 3GPP TS 38.413: "NG-RAN; NG Application Protocol (NGAP)".

[24] 3GPP TS 38.423: "NG-RAN; Xn Application Protocol (XnAP)".

[25] 3GPP TS 38.463: "NG-RAN; E1 Application Protocol (E1AP)".

[26] 3GPP TS 38.473: "NG-RAN; F1 Application Protocol (F1AP)".

[27] 3GPP TS 24.501: "Non-Access-Stratum (NAS) protocol for 5G System (5GS); Stage 3".

[28] 3GPP TS 36.331: "Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification".

[X] 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".

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

[B] 3GPP TS 38.314: "NR; layer 2 measurements ".

[C] 3GPP TS 28.552: "Management and orchestration; 5G performance measurements".

[D] 3GPP TS 38.213: "NR; Physical layer procedures for control".

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

[F] 3GPP TS 32.425: "Telecommunication management; Performance Management (PM); Performance measurements Evolved Universal Terrestrial Radio Access Network (E-UTRAN)".

***Next change***

## 4.X NR MDT Trace Record Content

### 4.X.1 Trace Record for Immediate MDT measurements

The following table contains the Trace record description for NR immediate MDT measurements.   
The trace record is the same for management based activation and for signalling based activation.

| MDT measurement  name | Measurement  attribute name(s) | Measurement attribute definition | Notes |
| --- | --- | --- | --- |
| M1 | RSRPs | List of RSRP values received in RRC measurement report. One value per measured cell. | 3GPP TS 32.422 [3]  3GPP TS 37.320 [X] |
| RSRQs | List of RSRQ values received in RRC measurement report. One value per measured cell. | 3GPP TS 32.422 [3]  3GPP TS 37.320 [X] |
| PCIs | List of Physical Cell Identity of measured cells. The order of PCI values in the list should be the same as the corresponding measured values in the RSRPs and RSRQs attributes. | 3GPP TS 38.331 [A] |
| Triggering event | Event that triggered the M1 measurement report, used only in case of RRM configured measurements (events A1, A2, A3, A4, A5, A6, B1 or B2) | 3GPP TS 32.422 [3]  3GPP TS 37.320 [X] |
| UE location | UE positioning information and sensors data | 3GPP TS 38.331 [A] |
| M2 | PH distr | Distribution of the power headroom samples reported by the UE during the collectionperiod. | 3GPP TS 38.213 [D]  3GPP TS 32.422 [3]  3GPP TS 37.320 [X] |
| M3 (Not supported in rel. 16) |  |  |  |
| M4 | UL volumes | List of measured UL volumes in bytes per QoS level (per QCI in option 3 or mapped 5QI in other options). One value per QoS level. | 3GPP TS 32.422 [3]  3GPP TS 37.320 [X]  3GPP TS 28.552 [C]  3GPP TS 32.425 [F] |
| DL volumes | List of measured DL volumes in bytes per QoS level (per QCI in option 3 or mapped 5QI in other options). One value per QoS level. | 3GPP TS 32.422 [3]  3GPP TS 37.320 [X]  3GPP TS 28.552 [C] |
| QoS level (QCI in option 3 or mapped 5QI in other options). | List of QoS levels of the DRBs for which the volume and throughput measurements apply. The order of QoS values in the list should be the same as the corresponding measured values in the UL volumes and DL volumes attributes. | 3GPP TS 32.422 [3]  3GPP TS 37.320 [X]  3GPP TS 28.552 [C]  3GPP TS 32.425 [F]  3GPP TS 32.425 [F] |
| M5 | UL Thp Time | Throughput time used for calculation of the uplink throughput (per UE). | 3GPP TS 38.314 [B]  3GPP TS 32.422 [3]  3GPP TS 37.320 [X] |
| UL Thp Volume | Throughput volume used for calculation of the uplink throughput (per UE). | 3GPP TS 38.314 [B]  3GPP TS 32.422 [3]  3GPP TS 37.320 [X] |
| UL LastTTI Volume | Volume transmitted in the last TTI and excluded from throughput calculation in the uplink. | 3GPP TS 38.314 [B]  3GPP TS 32.422 [3]  3GPP TS 37.320 [X] |
| DL Thp Times | List of throughput times used for calculation of the downlink throughput per QoS level (per QCI in option 3 or mapped 5QI in other options). One value per QoS level. | 3GPP TS 38.314 [B]  3GPP TS 32.422 [3]  3GPP TS 37.320 [X]  3GPP TS 32.425 [F] |
| DL Thp Volumes | List of throughput times used for calculation of the downlink throughput per QoS level (per QCI in option 3 or mapped 5QI in other options). One value per QoS level. | 3GPP TS 38.314 [B]  3GPP TS 32.422 [3]  3GPP TS 37.320 [X]  3GPP TS 32.425 [F] |
| QoS level (QCI in option 3 or mapped 5QI in other options). | List of QoS levels of the DRBs for which the volume and throughput measurements apply. The order of QoS values in the list should be the same as the corresponding measured values in the UL volumes and DL volumes attributes. | 3GPP TS 32.422 [3]  3GPP TS 37.320 [X]  3GPP TS 28.552 [C]  3GPP TS 32.425 [F] |
| DL Thp Time UE | Throughput time used for calculation of the downlink throughput (per UE). | 3GPP TS 38.314 [B]  3GPP TS 32.422 [3]  3GPP TS 37.320 [X] |
| DL Thp Volume UE | Throughput volume used for calculation of the downlink throughput (per UE). | 3GPP TS 38.314 [B]  3GPP TS 32.422 [3]  3GPP TS 37.320 [X] |
| DL LastTTI Volume | Volume transmitted in the last TTI and excluded from the throughput calculation in the downlink (per UE). | 3GPP TS 38.314 [B]  3GPP TS 32.422 [3]  3GPP TS 37.320 [X] |
| M6 | DL packet delay per QoS level (per QCI in option 3 or mapped 5QI in other options). | L2 Packet Delay for OAM performance observability or for QoS verification of MDT (per QCI). | 3GPP TS 37.320 [X]  3GPP TS 28.552 [C]  3GPP TS 32.425 [F] |
| UL packet delay per QoS level (per QCI in option 3 or mapped 5QI in other options). | Excess Packet Delay Ratio in Layer PDCP for QoS verification of MDT (per QoS). | 3GPP TS 38.314 [W]  3GPP TS 37.320 [X]  3GPP TS 28.552 [C]  3GPP TS 32.425 [F] |
| M7 | DL packet loss rate per QoS level (per QCI in option 3 or mapped 5QI in other options). | packets that are lost at Uu transmission, for OAM performance observability. | 3GPP TS 37.320 [X]  3GPP TS 28.552 [C]  3GPP TS 32.425 [F] |
| UL packet loss rate per QoS level (per QCI in option 3 or mapped 5QI in other options). | packets that are lost in the UL, for OAM performance observability or QoS verification of MDT. | 3GPP TS 38.314 [W]  3GPP TS 37.320 [X]  3GPP TS 28.552 [C]  3GPP TS 32.425 [F] |
| M8 | RSSI (WLAN, Bluetooth) | RSSI measurement by UE. | 3GPP TS 37.320 [X] |
| M9 | RTT (WLAN) | RTT measurement by UE. | 3GPP TS 37.320 [X] |

***Next change***

### 4.X.2 Trace Record for UE location information

The following table contains the Trace record description for NR UE location information. The trace record is the same for management based activation and for signalling based activation.

| MDT measurement  name | Measurement  attribute name(s) | Measurement attribute definition | Notes |
| --- | --- | --- | --- |
| UE location | GNSS pos | GNSS based coordinates, including (latitude, longitude), as reported by the UE. The IE can be any of ellipsoidPoint, ellipsoidPointWithUncertaintyCircle, ellipsoidPointWithUncertaintyEllipse, ellipsoidPointWithAltitude, ellipsoidPointWithAltitudeAndUncertaintyEllipsoid, ellipsoidArc, polygon depending on the IE present in the RRC message. | 3GPP TS 36.331 [28] |
| UE rx-tx | The UE reported UE rx-tx time difference measurement. The attribute is used to record E-CID positioning measurements, if available. | 3GPP TS 32.422 [3]  3GPP TS 37.320 [X]  3GPP TS 36.331 [28] |
| gNB rx-tx | The gNB measured gNB rx-tx time difference. The attribute is used to record E-CID positioning measurements, if available. | 3GPP TS 32.422 [3]  3GPP TS 37.320 [X]  3GPP TS 36.214 [E] |
| AoA | The gNB measured angle of arrival measurement. The attribute is used to record E-CID positioning measurements, if available. | 3GPP TS 32.422 [3]  3GPP TS 37.320 [X]  3GPP TS 36.214 [E] |
| Sensor information | The UE reported data from 3 types of sensors if available: a gyroscope, an accelerometer and a barometer data. | 3GPP TS 38.331 [A] |