**3GPP TSG-RAN WG3 Meeting #121 *R3-234607***

**Toulouse, France, 21– 25 August 2023**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **37.320** | **CR** | **x** | **rev** | **-** | **Current version:** | **17.4.0** |  |
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| *For* [***HELP***](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:*** | Introduction of MDT enhancements to support Non-Public Networks | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Nokia, Nokia Shanghai Bell | | | | | | | | | |
| ***Source to TSG:*** | R3 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_ENDC\_SON\_MDT\_enh2-Core | | | | |  | ***Date:*** | | | 2023-08-21 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***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 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)* | |
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| ***Reason for change:*** | | To facilitate MDT data collection in NPN deployments, RAN3 agreed to:   - support the following uses cases:   * Use Case 1: Enhanced area scope information should allow collection of MDT measurements in specific PNI-NPNs, i.e. MDT measurements should be collected only within specific CAGs. * Use Case 2: Enhanced area scope information should allow collection of MDT measurements both in specific PNI-NPNs (i.e. in specific CAGs) and in public network areas (e.g. specific PN cells, TAIs, etc.). * Use Case 3: Enable collection of MDT measurements in the SNPN where the UE is registered.   - support of Signaling based MDT and Management based MDT for NPNs  - support both immediate MDT and logged MDT for NPN  - introduce area scope for NPNs, i.e., a separate CAG list in MDT area scope | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Added abbreviations.  Added description of area scope for PNI-NPN and SNPN.  Clarified scope of user consent. | | | | | | | | |
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| ***Consequences if not approved:*** | | New feature not supported | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 3.3, 5.1.1.1.1, 5.1.3, 5.4.x (new) | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 Modified Subclause*

## 3.3 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905 [1].

ACK Acknowledgement

AICH Acquisition Indicator CHannel

BLER Block Error Rate

BSSID Basic Service Set Identifier

CA Carrier Aggregation

CDMA Code Division Multiple Access

CHO Conditional Handover

CN Core Network

CPICH Common Pilot CHannel

DAPS Dual Active Protocol Stack

DCH Dedicated CHannel

DL Downlink

DRX Discontinuous Reception

ECGI E-UTRAN Cell Global Identifier

E-CID Enhanced Cell-ID (positioning method)

E-DCH Enhanced Uplink DCH

EDGE Enhanced Data rates for GSM Evolution

E-RUCCH E-DCH Random Access Uplink Control CHannel

eNB Evolved NodeB

EPLMN Equivalent PLMN

E-UTRA Evolved UTRA

E-UTRAN Evolved UTRAN

FACH Forward Access CHannel

FDD Frequency Division Duplex

FIFO First Input First Output

FPACH Fast Physical Access CHannel

GERAN GSM EDGE Radio Access Network

gNB Next Generation Node B

GNSS Global Navigation Satellite System

HESSID Homogenous Extended Service Set Identifier

HOF Handover Failure

IMEI-SV International Mobile Equipment Identity Software Version

IMSI International Mobile Subscriber Identity

IP Internet Protocol

ISCP Interference on Signal Code Power

LA Location Area

LTE Long Term Evolution

MAC Medium Access Control

MBMS Multimedia Broadcast Multicast Service

MBSFN MBMS Single Frequency Network

MDT Minimization of Drive-Tests

NG-RAN Next Generation RAN

NPN Non-Public Network

NR New Radio

OAM Operation and Maintenance

P-CCPCH Primary Physical Common Control CHannel

PCH Paging CHannel

PCI Physical Cell Id

PDCP Packet Data Convergence Protocol

PH Power Headroom

PLMN Public Land Mobile Network

PNI-NPN Public Network Integrated Non-Public Network

PS Packet Switched

QCI QoS Class Identifier

QoS Quality of Service

RA Routing Area

RAB Radio Access Bearer

RAT Radio Access Technology

RB Radio Bearer

RF Radio Frequency

RLC Radio Link Control

RLF Radio Link Failure

RNC Radio Network Controller

RPLMN Registered PLMN

RRC Radio Resource Control

RRM Radio Resource Management

RSCP Received Signal Code Power

RSRP Reference Signal Received Power

RSRQ Reference Signal Received Quality

RSSI Received Signal Strength Indicator

RTT Round Trip Time

RTWP Received Total Wideband Power

SCell Secondary Cell

SIR Signal to Interference Ratio

SINR Signal to Noise plus Interference Ratio

SNPN Stand-alone Non-Public Network

SNR Signal to Noise Ratio

SON Self Organizing/Optimizing Network

SRB Signalling Radio Bearer

SRNC Serving RNC

SSB Synchronization Signal Block

SSID Service Set Identifier

TA Tracking Area

TCE Trace Collection Entity

TDD Time Division Duplex

UE User Equipment

UL Uplink

UMTS Universal Mobile Telecommunication System

UPH Uplink PH

URA UTRAN Registration Area

UTRA Universal Terrestrial Radio Access

UTRAN Universal Terrestrial Radio Access Network

*Next Modified Subclause*

##### 5.1.1.1.1 Configuration parameters

The logged measurement configuration consists of:

- configuration of downlink pilot strength measurements logging for (E-)UTRA and NR.

- configuration of MBSFN measurement logging for E-UTRA.

- configuration of the triggering of logging events:

- for (E-)UTRAN:

- periodic measurement trigger is supported, for which the logging interval is configurable. The parameter specifies the periodicity for storing MDT measurement results. It should be configured in seconds in multiples of the applied IDLE mode DRX, i.e. multiples of 1.28s which is either a factor or multiple of the IDLE mode DRX. The UE behaviour is unspecified when the UE is configured with a DRX cycle larger than the logging interval.

- for NR:

- periodic measurement trigger is supported, for which the logging interval is configurable. The parameter specifies the periodicity for storing MDT measurement results.

- for E-UTRAN and NR:

- event-based trigger is supported, for which the logging interval is configurable, which determines periodical logging of available data (e.g. time stamp, location information), and the following two types of events are supported:

- measurement quantity-based event L1, for which the event threshold, hysteresis, and time to trigger are configurable. If the configured time to trigger is not a multiple of the DRX cycle, then the UE uses the next multiple of DRX cycle duration that is larger than the time to trigger for evaluating the event L1;

- out-of-coverage detection trigger.

NOTE: The logging configuration for event-based and periodical DL pilot strength logged measurements can be configured independently. Only one type of event can be configured to the UE.

- configuration of the logging duration. This configuration parameter defines a timer activated at the moment of configuration, that continues independent of state changes, RAT or RPLMN change. When the timer expires the logging is stopped and the configuration is cleared (except for the parameters that are required for further reporting e.g. network absolute time stamp, trace reference, trace recording session reference and TCE Id).

- network absolute time stamp to be used as a time reference to UE.

- Trace Reference parameter as indicated by the OAM configuration as specified in TS 32.422 [6].

- Trace Recording Session Reference as indicated by the OAM configuration as specified in TS 32.422 [6].

- TCE Id as indicated by the OAM configuration as specified in TS 32.422 [6].

- (optionally) MDT PLMN List, indicating the PLMNs where measurement collection and log reporting is allowed. It is either the Management Based MDT PLMN List or the Signalling Based MDT PLMN List, depending on how the Logged MDT task was initiated (see 5.1.3).

- (optionally) configuration of a logging area. A UE will log measurements as long as it is within the configured logging area. The scope of the logging area may consist of one of:

- a list of up to 32 global cell identities for PLMN, and, for NR, additionally a list of up to 256 PNI-NPNs. If one or both of these lists are configured, the UE will only log measurements when camping in any of these cells.

- a list of up to 8 TAs or 8 LAs or 8 Ras for PLMN, and, for NR, a list of up to 256 PNI-NPNs. If one or both of these lists are configured, the UE will only log measurements when camping in any cell belonging to the preconfigured TA/LA/Ras.

- for NR, a list of inter-frequency neighbouring cells per frequency.

- for NR, a list of up to 256 PNI-NPNs.

- for NR, a list of up to 16 SNPNs.

- for NR, a list of up to 32 global cell identities for SNPN. If this list is configured, the UE will only log measurements when camping in any of these cells.

- for NR, a list of up to 8 TAs for SNPN. If this list is configured, the UE will only log measurements when camping in any cell belonging to the preconfigured TAs.

- The configured logging area can span one of:

- PLMNs in the MDT PLMN List. If no area is configured, the UE will log measurements throughout the PLMNs of the MDT PLMN list.

- Any configured SNPN area.

Editor’s note: Updates relative to area scope are FFS, pending corresponding stage 3 work in RAN2.

- (optionally) for NR, configuration of a list of neighbouring frequencies and/or cells, indicating the UE to include neighbouring cell's measurements as indicated in the list in the logged MDT report.

- (optionally) for E-UTRA, configuration of target MBSFN area(s) for MBSFN measurement logging. If target MBSFN area(s) is configured, UE applies it in addition to other restrictions such as the logging area. The UE will log measurements as long as it receives MBMS service from an indicated target MBSFN area and is within the configured logging area. The target MBSFN area(s) is defined by a list of up to 8 entries, where each entry indicates a carrier frequency and optionally indicates a specific MBSFN area on a carrier frequency.

- (optionally) configuration of the WLAN access point names, indicating the UE to attempt to obtain WLAN measurements associated to these access points.

- (optionally) configuration of the Bluetooth beacon names, indicating the UE to attempt to obtain Bluetooth measurements associated to these beacons.

- (optionally) for NR, configuration of the sensor names, indicating the UE to attempt to obtain sensor measurements.

- (optionally) for E-UTRA, configuration indicating the UE to attempt to obtain uncompensated barometric pressure measurements.

- (optionally) for NR, the network can use a flag to indicate if an early measurement/idle mode configuration has relevance for logged measurement purposes, indicating the UE is allowed to log the measurement results related to early measurement frequencies in the logged MDT report.

- (optionally) for NR, logged MDT type flag, indicating the logged measurement configuration is the signalling based MDT (see 5.4.0).

*Next Modified Subclause*

### 5.1.3 MDT Initiation

There are two cases that RAN should initiate a MDT measurements collection task. One is that the MDT task is initiated without targeting a specific UE by the cell traffic trace, i.e. management based trace function from OAM. The other is that the MDT task is initiated towards a specific UE by the signalling trace activation messages from CN nodes, i.e. the Initial Context Setup message, the Trace Start message or the Handover request message in E-UTRAN or NR, the CN Invoke Trace message in UTRAN. The detailed procedures to transfer the MDT configurations to RAN are specified in TS 32.422 [6].

For signalling based MDT within a PLMN, the CN shall not initiate MDT towards a particular user unless it is allowed.

For management based MDT within a PLMN, the CN indicates to the RAN whether MDT is allowed to be configured by the RAN for this user considering e.g. user consent and roaming status (see TS 32.422 [6]), by providing management based MDT allowed information. For E-UTRAN/UTRAN, the MDT allowed information consists of the Management Based MDT Allowed indication and optionally the Management Based MDT PLMN List. For NR, the MDT allowed information only consists of the Management Based MDT PLMN List. The management based MDT allowed information propagates during inter-PLMN handover or inter-PLMN UE context retrieval if the Management Based MDT PLMN List is available and includes the target PLMN.

A UE is configured with an MDT PLMN List only if user consent is valid for the RPLMN.

User consent does not apply if the UE is served by an SNPN.

*Next Modified Subclause*

### 5.4.x Support of NPN

MDT is supported in PNI-NPN and SNPN.

*End of Changes*