

## HTC INVENTION DISCLOSURE

Title of Invention Method and Apparatus for logged MDT reporting in a wireless communication system

### ABSTRACT

### BACKGROUND OF INVENTION

#### Title

Method and Apparatus for logged MDT reporting in a wireless communication system

#### Background of the Invention

##### 1. Field of the Invention

The present invention relates to a method utilized in a wireless communication and communication device thereof, and more particularly, to a method to report MDT logs in a wireless communication system and communication device thereof.

##### 2. Description of the Prior Art

The prior art of MDT can be found in [1].

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 shown in Figure 1. Furthermore, the indicator (possibly updated) will be provided within E-UTRAN handover and re-establishment, and UTRAN procedures SRNC (SRNC relocation involving the change of). In any case, the UE will include the indication at every transition to RRC Connected mode even though the logging period has not ended.

The network can decide to retrieve the logged measurements based on this indication. In case logged MDT measurements are retrieved before the completion of the pre-defined logging duration, the reported measurement results can be deleted, but MDT measurement logging will continue according to ongoing Logged MDT configuration.

Editor's note: It is FFS whether a guideline, allowing UE to clear non-retrieved measurements, will be specified for the case when network will not retrieve the measurements for a certain period of time after the logging duration timer expires.

For Logged MDT the measurement reporting is triggered by on-demand mechanism,

i.e. the UE is asked by the network to send the collected measurement logs via RRC signalling. The reporting may occur in different cells than which the measurement configuration is signalled.

The logged measurement report consists of measurement results for the serving cell (the measurement object and the measurement quantity), time stamp and location information.

Editor's note: It is FFS whether reporting from other neighbours is required. The measurement report is self contained, i.e. the RAN node is able to interpret the Logged MDT reporting results even if it does not have access to the logged MDT measurement configuration.

Location information is based on available location information in the UE. Thus, the Logged MDT measurements are tagged by the UE with location data in the following manner:

- ECGI of the serving cell when the measurement was taken is always included
- GNSS location information is included if available in the UE when the measurement was taken
- if GNSS location information is not available when the measurement was taken, the UE includes RF fingerprint information consisting of: PCI/PSC + RSRP/CPICH RSCP for up to 6 intra-frequency neighbour cells

Editor's note: It is FFS when GNSS location information is considered available for the logged measurement, e.g. the acceptable time lag.

For Immediate MDT, measurement results should be tagged with available location information in the same way as for Logged MDT in Idle mode. Normal RRC signalling in (E-)UTRA procedures are enhanced to support this.

### **Issue 1**

A network retrieves MDT logs stored in a UE (e.g. as shown in Figure 1). Before the UE completes sending MDT logs (e.g. UEInformationResponse), the UE is triggered to perform a cell update procedure or receives a handover command or a SRNS relocation command (e.g. RRCConnectionReconfiguration in E-UTRAN, or RADIO BEARER RECONFIGURATION, TRANSPORT CHANNEL RECONFIGURATION, PHYSICAL CHANNEL RECONFIGURATION, UTRAN MOBILITY INFORMATION in UTRAN). It is not clear how to handle the MDT procedure and the handover or SRNS relocation procedure.

### **Issue 2**

MDT logs are transmitted on SRB2 (E-UTRAN) and SRB4 (UTRAN). MDT logs may contain thousands of bytes or even more so messages transmitted on the SRB2 or SRB4 (e.g. NAS messages) may be blocked for transmission until transmission of the MDT logs finishes. This increases delay on transmission of NAS message.

### **Issue 3**

A UE may be triggered to send a Signalling Connection Release Indicator message. A network receives the Signalling Connection Release Indicator message and performs signalling connection release and RRC connection release procedure to the UE. If the network is retrieving MDT logs from the UE, the network will lose the MDT logs due to the RRC connection release procedure.

#### **Reference**

[1] R2-103456

[2] 3GPP TS 36.331

[3] 3GPP TS 25.331

#### **SUMMARY OF INVENTION**

### **Solution 1**

During a MDT reporting procedure (e.g. UEInformation procedure), when a UE is triggered to perform a cell update procedure, or receives a handover command a SRNS relocation command or a RRC connection release procedure, the UE stops the MDT reporting procedure.

#### **Solution 1.1**

Following solution 1, the UE considers the MDT reporting procedure as not performed before.

#### **Solution 1.2**

Following solution 1, the UE continues the MDT reporting procedure when completing the handover, SRNS relocation or cell update procedure.

The UE continuing the MDT reporting procedure comprises that the UE transmits MDT logs which has not been received by a network or the UE transmits the all MDT logs.

#### **Solution 1.3**

Following solution 1.1, the UE considering the MDT reporting procedure as not performed before comprises that the UE keeps MDT logs in storage before completing the MDT procedure.

#### **Solution 1.4**

Following solution 1.1 or 1.2, the UE indicates MDT logs available in a handover complete, SRNS relocation complete a cell update message or RRC connection setup complete message.

To resolve issue 1 with solution 1, the UE stops or continues the MDT procedure when the UE completes the handover or SRNS relocation procedure.

#### **Solution 2**

During a MDT reporting procedure (e.g. UEInformation procedure), a network sends a command (e.g. RRC message) to stop the MDT reporting procedure.

#### **Solution 2.1**

Following solution 2, when the UE receives the command, the UE stops the MDT reporting.

With solution 2, the network can stop the UE MDT reporting when the network wants to trigger the handover or SRNS relocation or receives the cell update request from the UE. Therefore, the network can guarantee the UE does not have a running MDT procedure collided with the handover, SRNS relocation or cell update procedures.

#### **Solution 3**

Messages (e.g. NAS messages) transmitted on a SRB used for transmitting MDT logs have higher priority than MDT logs.

Solution 3 resolves issue 2.

#### **Solution 4**

When a UE performs a RRC connection re-establishment procedure, the UE indicates MDT logs available in RRCConnectionReconfigurationComplete message responding to a RRCConnectionReconfiguration which is the first

RRCConnectionReconfiguration after successful completion of the RRC connection re-establishment procedure.

#### **Solution 5**

MDT logs are transmitted in a plurality of messages by a UE. A message of the plurality of messages containing MDT logs has a flag indicating containing last part of the MDT logs.

With the flag, a network knows the UE finishes MDT logs reporting when receiving the message with the flag.

#### **Solution 6**

A network transmits a first request message to request the UE to transmit MDT logs. The UE transmits a response message containing the MDT logs and an indicator to indicate whether the response message contains the last part of MDT logs or indicates whether the UE has more MDT logs.

##### **Solution 6.1**

Following solution 6, the network receives the indicator and determines whether the UE has MDT logs which have not been transmitted to the network.

##### **Solution 6.2**

Following solution 6.1, if the network determines the UE has more MDT logs acc, the network sends a second request message to request the UE to transmit MDT logs.

##### **Solution 6.3**

Following solution 6.1, if the network determines the UE has no more MDT logs, the network stops sending a second request message to request the UE to transmit MDT logs.

#### **Solution 7**

A UE suspends transmission of a request message (e.g. Signalling Connection Release Indication message or RRC Connection Release Request message) to a network when the UE is performing MDT logs reporting procedure (e.g. UI Information procedure).

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