**3GPP TSG-SA5 Meeting #145-e *S5-225170rev2***

**Online, , 15th Aug 2022 - 24th Aug 2022**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **28.622** | **CR** | **0169** | **rev** | **1** | **Current version:** | **17.2.0** |  |
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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 |  |

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| ***Title:*** | Rel-17 CR TS 28.622 add excess packet delay threshould for signalling-based and management-based MDT | | | | | | | | | |
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| ***Source to WG:*** | Huawei | | | | | | | | | |
| ***Source to TSG:*** | S5 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | e\_5GMDT | | | | |  | ***Date:*** | | | 2022-08-04 |
|  |  | | | |  | |  | | |  |
| ***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-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
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| ***Reason for change:*** | | To support RAN2 and RAN3 for calculation of the PDCP Excess Packet Delay in the UL as LS R3-224079 described, this contribution proposes to add Excess packet delay thresholds for signalling-based and management-based MDT. | | | | | | | | |
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| ***Summary of change:*** | | Add Excess packet delay thresholds in the trace job. | | | | | | | | |
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| ***Consequences if not approved:*** | | Cannot support calculation of the PDCP Excess Packet Delay in the UL. | | | | | | | | |
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| ***Clauses affected:*** | | 4.3.30.1, 4.3.30.2, 4.3.30.3, 4.X.3,4.4.1 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | |  | | | | | | | | |

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| **1st modified section** |

### 4.3.30 TraceJob

#### 4.3.30.1 Definition

A TraceJob instance represents the Trace Control and Configuration parameters of a particular Trace Job (see TS 32.421 [29] and TS 32.422 [30] for details). It can be name-contained by SubNetwork, ManagedElement, ManagedFunction.

To activate Trace Jobs, a MnS consumer has to create TraceJob object instances on the MnS producer. A MnS consumer can activate a Trace Job for another MnS consumer since it is not required the value of traceCollectionEntityIpAddress or traceReportingConsumerUri to be his own.

For the details of Trace Job activation see clauses 4.1.1.1.2 and 4.1.2.1.2 of TS 32.422 [30].

When a MnS consumer wishes to deactivate a Trace Job, the MnS consumer shall delete the corresponding TraceJob instance. For details of management Trace Job deactivation see clauses 4.1.3.8 to 4.1.3.11 and 4.1.4.10 to 4.1.4.13 of TS 32.422 [30].

The attribute traceReference specifies a globally unique ID and identifies a Trace session. One Trace Session may be activated to multiple Network Elements.

The attribute traceRecordingSessionReference identifies a Trace Recording Session within a Trace Session. Two different trace sessions could e.g. be caused by two different trigger events.

The jobId attribute presents the job identifier of a TraceJob instance. The jobId can be used to associate multiple TraceJob instances. For example, it is possible to configure the same jobId value for multiple TraceJob instances required to produce the data (e.g. RSRP values of M1 and RLF reports) for a specific network analysis.

The attribute traceReportingFormat defines the method for reporting the produced measurements. The selectable options are file-based or stream-based reporting. In case of file-based reporting the attribute traceCollectionEntityIpAddress is used to specify the IP address to which the trace records shall be transferred, while in case of stream-based reporting the attribute traceReportingConsumerUri specifies the streaming target.

The mandatory attribute traceTarget determines the target object of the TraceJob. Dependent on the network element to which the Trace Session is activated different types of the target object are possible. The attribute plmnTarget defines the PLMN for which sessions shall be selected in the Trace Session in case of management based activation when several PLMNs are supported in the RAN.

The attribute jobType specifies the kind of data to collect. Dependent on the selected type various parameters shall be available. The attributes jobType, traceReference, traceRecordingSessionReference, traceCollectionEntityIpAddress, traceTarget and traceReportingFormat are mandatory for all job types. If streaming reporting is selected for traceReportingFormat, traceReportingConsumerUri shall be present additionally. The attribute plmnTarget shall be present if trace activation method is management based.

For the different job types the attributes are differentiated as follows:

- In case of TRACE\_ONLY additionally the following attributes shall be available: listOfNeTypes, traceDepth, and triggeringEvents.

For this case the optional attribute listOfInterfaces allows to specify the interfaces to be recorded.

- In case of IMMEDIATE\_MDT\_ONLY additionally the following attributes shall be available:

- anonymizationOfMdData,

- listOfMeasurements,

- collectionPeriodRrmUmts (conditional for M4 and M5 in UMTS),

- measurementPeriodUmts (conditional for M6 and M7 in UMTS),

- collectionPeriodRrmLte (conditional for M3 in LTE),

- measurementPeriodLte (conditional for M4 and M5 in LTE),

- collectionPeriodM6Lte (conditional for M6 in LTE),

- collectionPeriodM7Lte (conditional for M7 in LTE),

- collectionPeriodRrmNr (conditional for M4 and M5 in NR),

- collectionPeriodM6Nr (conditional for M6 in NR),

- collectionPeriodM7Nr (conditional for M7 in NR),

- beamLevelMeasurement (conditional for M1 in NR),

- reportInterval (conditional for M1 in LTE or NR and M1/M2 in UMTS),

- reportAmount (conditional for M1 in LTE or NR and M1/M2 in UMTS),

- reportingTrigger (conditional for M1 in LTE or NR and M1/M2 in UMTS),

- eventThreshold (conditional for A2 event reporting or A2 event triggered periodic reporting),

- measurementQuantity (conditional for 1F event reporting).

- excessPacketDelayThresholds (conditional for M6 UL measurement in NR).

For this case the optional attribute areaScope allows to specify the area in terms of cells or Tracking Area/Routing Area/Location area where the MDT data collection shall take place and the optional attributes positioningMethod, sensorInformation allow to specify the positioning methods to use or the sensor information to include.

- In case of IMMEDIATE\_MDT\_AND\_TRACE both additional attributes of TRACE\_ONLY and IMMEDIATE\_MDT\_ONLY shall apply.

- In case of LOGGED\_MDT\_ONLY additionally the following attributes shall be available: anonymizationOfMdtData, traceCollectionEntityId, loggingInterval, loggingDuration, reportType, eventListForEventTriggeredMeasurements.

For this case the optional attribute tjMDTAreaScope allows to specify the area in terms of cells or Tracking Area/Routing Area/Location area where the MDT data collection shall take place, the optional attribute plmnList allows to specify the PLMNs where measurement collection, status indication and log reporting is allowed, the optional attribute areaConfigurationForNeighCell allows to specify the area for which UE is requested to perform measurements logging for neighbour cells which have list of frequencies and the optional attribute sensorInformation allows to specify the sensor information to include.

- In case of RLF\_REPORT\_ONLY and RCEF\_REPORT\_ONLY the optional attribute areaScope allows to specify the eNB or list of eNBs or gNB or list of gNBs where the reports should be collected.

- In case of LOGGED\_MBSFN\_MDT additionally the following attributes shall be available: anonymizationOfMdtData, loggingInterval, loggingDuration, mbsfnAreaList.

Reporting of measurements and messages can be periodical, event triggered or event triggered periodic depending on the selected job type.

- For trace the reporting is event based, where the triggering event is configured with attribute triggeringEvents. For each triggering event the first and last message (start/stop triggering event) to record are specified.

- For immediate MDT, the reporting is dependent on the configured measurements:

- For measurement M1 in LTE or NR, it is possible to select between periodical, event triggered, event triggered periodic reporting or reporting according to all configured RRM event triggers. For M1 and M2 measurement in UMTS, it is possible to select between periodical, event triggered reporting or reporting according to all configured RRM event triggers. Parameter reportingTrigger determines which of the reporting methods is selected and in case of event triggered or event-triggered periodic, which is the decisive event type. For periodical reporting, parameters reportInterval and reportAmount determine the interval between two successive reports and the number of reports. This means the periodical reporting terminates after reportAmount reports have been sent as long as reportAmount is configured with a value different from infinity. For event-triggered periodic reporting, these two parameters apply in addition to parameter eventThreshold which determines the threshold of the event. In this case up to reportAmount reports are sent with a periodicity of reportInterval after the entering condition is fulfilled. The reporting is stopped, if the leaving condition is fulfulled and is restarted if the configured event reoccurs. For event based reporting, there is only one report sent after the event occurs. The parameters to configure are reportingTrigger and eventThreshold. In case of UMTS and 1f event reporting, additionally parameter measurementQuantity is necessary in order to determine for which measurement(s) the event threshold is applicable.   
Parameter beamLevelMeasurement determines whether beam level measurements shall be included in case of NR.

- For measurement M2 in LTE or NR, reporting is according to RRM configuration, see TS 38.321 [36], TS 36.321 [37] and TS 38.331 [38], TS 36.331 [39]. For measurement M4 in UMTS, reporting is either according to RRM configuration, see TS 25.321 [40] and TS 25.331 [41] or periodic or event triggered periodic using parameter collectionPeriodRrmUmts and eventThresholdUphUmts.

- For measurement M3 in UMTS, the reporting is done upon availability, see TS 37.320 [43].

- For measurements M4, M5, M6 and M7 in NR, for measurements M3, M4, M5, M6 and M7 in LTE and for measurements M5, M6 and M7 in UMTS periodical reporting is applied. The configurable parameter is the interval between two measurements (collectionPeriodRrmNr, collectionPeriodM6Nr, collectionPeriodM7Nr, collectionPeriodRrmLte, measurementPeriodLte, collectionPeriodM6Lte, collectionPeriodM7Lte, collectionPeriodRrmUmts, tjMDTMeasurementPeriodUMTS). If no collection period is configured for M5 in UMTS, all available measurements are logged according to RRM configuration.

- For logged MDT in UMTS and LTE, the reporting is periodical. Parameter loggingInterval determines the interval between the reports and parameter loggingDuration determines how long the configuration is valid meaning after this duration has passed no further reports are sent. In NR, the reporting can be periodical or event based, determined by parameter reportType. For periodical reporting the same parameters as in LTE and UMTS apply. For event based reporting, parameter eventListForEventTriggeredMeasurement configures the event type, namely ‘out of coverage’ or ‘L1 event’. In case ‘L1 event’ is selected as event type, the logging is performed according to parameter loggingInterval at regular intervals only when the conditions indicated by eventThresholdL1, hysteresisL1, timeToTriggerL1 (defining the thresholds, hysteresis and time to trigger) are met and if UE is ‘camped normally’ state (TS 38.331 [38], TS 38.304 [42]). In case ‘out of coverage’ is selected as event type, the logging is performed according to parameter loggingInterval at regular intervals only when the UE is in ‘any cell selection’ state. Furthermore, logging is performed immediately upon transition from the ‘any cell selection’ state to the ‘camped normally’ state ( TS 38.331 [38], TS 38.304 [42]).

Creation and deletion of TraceJob instances by MnS consumers is optional; when not supported, the TraceJob instances may be created and deleted by the system or be pre-installed.

#### 4.3.30.2 Attributes

The TraceJob IOC includes attributes inherited from Top IOC (defined in clause 4.3.29) and the following attributes:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute Name | S | isReadable | isWritable | isInvariant | isNotifyable |
| jobType | M | T | T | F | T |
| listOfInterfaces | CO | T | T | F | T |
| listOfNeTypes | CM | T | T | F | T |
| plmnTarget | CM | T | T | F | T |
| traceReportingConsumerUri | CM | T | T | F | T |
| traceCollectionEntityIpAddress | CM | T | T | F | T |
| traceDepth | CM | T | T | F | T |
| traceReference | M | T | T | F | T |
| traceRecordingSessionReference | M | T | T | F | T |
| jobId | OM | T | T | T | T |
| traceReportingFormat | M | T | T | F | T |
| traceTarget | M | T | T | F | T |
| triggeringEvents | CM | T | T | F | T |
| anonymizationOfMdtData | CM | T | T | F | T |
| areaConfigurationForNeighCell | CO | T | T | F | T |
| areaScope | CO | T | T | F | T |
| collectionPeriodRrmLte | CM | T | T | F | T |
| collectionPeriodM6Lte | CM | T | T | F | T |
| collectionPeriodM7Lte | CM | T | T | F | T |
| collectionPeriodRrmUmts | CM | T | T | F | T |
| collectionPeriodRrmNr | CM | T | T | F | T |
| collectionPeriodM6Nr | CM | T | T | F | T |
| collectionPeriodM7Nr | CM | T | T | F | T |
| beamLevelMeasurement | CM | T | T | F | T |
| eventListForEventTriggeredMeasurement | CM | T | T | F | T |
| eventThreshold | CM | T | T | F | T |
| listOfMeasurements | CM | T | T | F | T |
| loggingDuration | CM | T | T | F | T |
| loggingInterval | CM | T | T | F | T |
| eventThresholdL1 | CM | T | T | F | T |
| hysteresisL1 | CM | T | T | F | T |
| timeToTriggerL1 | CM | T | T | F | T |
| mbsfnAreaList | CM | T | T | F | T |
| measurementPeriodLte | CM | T | T | F | T |
| measurementPeriodUmts | CM | T | T | F | T |
| measurementQuantity | CM | T | T | F | T |
| eventThresholdUphUmts | CO | T | T | F | T |
| plmnList | CO | T | T | F | T |
| positioningMethod | CO | T | T | F | T |
| reportAmount | CM | T | T | F | T |
| reportingTrigger | CM | T | T | F | T |
| reportInterval | CM | T | T | F | T |
| reportType | CM | T | T | F | T |
| sensorInformation | CO | T | T | F | T |
| traceCollectionEntityId | CM | T | T | F | T |
| excessPacketDelayThreshoulds | CM | T | T | F | T |

#### 4.3.30.3 Attribute constraints

|  |  |
| --- | --- |
| Name | Definition |
| listOfInterfaces (support qualifier) | This attribute shall be present when jobType includes Trace. |
| listOfNeTypes (support qualifier) | This attribute shall be present only for Trace with Signalling Based Activation |
| plmnTarget (support qualifier) | This attribute shall be present for management based activation when several PLMNs are supported in the RAN. |
| traceReportingConsumerUri (support qualifier) | This attribute shall be present if streaming trace data reporting is supported and traceReportingFormat set to "streaming". |
| traceCollectionEntityIpAddress (support qualifier) | This attribute shall be present if file based trace data reporting is supported and traceReportingFormat set to "file based" or when jobType is set to Logged MDT or Logged MBSFN MDT. |
| traceDepth (support qualifier) | This attribute shall be present when jobType includes Trace. |
| triggeringEvents (support qualifier) | This attribute shall be present when jobType includes Trace. |
| anonymizationOfMdtData (support qualifier) | This attribute shall be present only if MDT is supported and the areaScope attribute is present. This attribute is only applicable for management based activation. |
| areaConfigurationForNeighCell (support qualifier) | This attribute shall be present only if NR MDT is supported and the jobType attribute is set to Logged MDT. |
| areaScope (support qualifier) | This attribute shall be present if MDT is supported. |
| collectionPeriodRrmLte (support qualifier) | This attribute shall be present only if MDT is supported and the jobType attribute is set to Immediate MDT or combine Trace and Immediate MDT and the listOfMeasurements attribute has any of M2, M3 measurement set in case of LTE. |
| collectionPeriodRrmUmts (support qualifier) | This attribute shall be present only if MDT is supported and the jobType attribute is set to Immediate MDT or combine Trace and Immediate MDT and the listOfMeasurements attribute has any of M3, M4, M5 measurement set in case of UMTS. |
| eventListForEventTriggeredMeasurement (support qualifier) | This attribute shall be present only if NR MDT is supported and the jobType attribute is set to Logged MDT. |
| eventThreshold (support qualifier) | This attribute shall be present only if MDT is supported and the jobType attribute is set to Immediate MDT and the reportingTrigger attribute is configured for A2EventReporting in LTE and NR or 1f/1IEventReporting in UMTS. |
| listOfMeasurements (support qualifier) | This attribute shall be present only if MDT is supported and the jobType attribute is set to Immediate MDT. |
| loggingDuration (support qualifier) | This attribute shall be present only if MDT is supported and the jobType attribute is set to Logged MDT or Logged MBSFN MDT. |
| loggingInterval (support qualifier) | This attribute shall be present only if MDT is supported and the jobType attribute is set to Logged MDT or Logged MBSFN MDT. |
| eventThresholdL1 (support qualifier) | This attribute shall be present only if NR MDT is supported and the jobType attribute is set to Logged MDT. |
| hysteresisL1 (support qualifier) | This attribute shall be present only if NR MDT is supported and the jobType attribute is set to Logged MDT. |
| timeToTriggerL1 (support qualifier) | This attribute shall be present only if NR MDT is supported and the jobType attribute is set to Logged MDT. |
| mbsfnAreaList (support qualifier) | This attribute shall be present only if Logged MBSFN MDT is supported and the jobType attribute is set to Logged MBSFN MDT. This is applicable only for eUTRAN. |
| measurementPeriodLte (support qualifier) | This attribute shall be present only if MDT is supported and the jobType attribute is set to Immediate MDT or combine Trace and Immediate MDT and the listOfMeasurements attribute for LTE has either M4 or M5 measurement set. |
| collectionPeriodM6Lte (support qualifier) | This attribute shall be present only if MDT is supported and the jobType attribute is set to Immediate MDT or combine Trace and Immediate MDT and the listOfMeasurements attribute for LTE has M6 measurement set. |
| collectionPeriodM7Lte (support qualifier) | This attribute shall be present only if MDT is supported and the jobType attribute is set to Immediate MDT or combine Trace and Immediate MDT and the listOfMeasurements attribute for LTE has M7 measurement set. |
| measurementPeriodUmts (support qualifier) | This attribute shall be present only if MDT is supported and the jobType attribute is set to Immediate MDT or combine Trace and Immediate MDT and the listOfMeasurements attribute for UMTS has M6 or M7 measurements set. |
| collectionPeriodRrmNr (support qualifier) | This attribute shall be present only if MDT is supported and the jobType attribute is set to Immediate MDT or combine Trace and Immediate MDT and the listOfMeasurements attribute has any of M4, M5 measurement set in case of NR. |
| collectionPeriodM6Nr (support qualifier) | This attribute shall be present only if MDT is supported and the jobType attribute is set to Immediate MDT or combine Trace and Immediate MDT and the listOfMeasurements attribute has M6 measurement set in case of NR. |
| collectionPeriodM7Nr (support qualifier) | This attribute shall be present only if MDT is supported and the jobType attribute is set to Immediate MDT or combine Trace and Immediate MDT and the listOfMeasurements attribute has any of M7 measurement set in case of NR. |
| beamLevelMeasurement (support qualifier) | This attribute shall be present only if MDT is supported and the jobType attribute is set to Immediate MDT or combine Trace and Immediate MDT and the listOfMeasurements attribute has M1 measurement set in case of NR. |
| measurementQuantity (support qualifier) | This attribute shall be present only if MDT is supported and the jobType attribute is set to Immediate MDT or combined Trace and Immediate MDT and the reportingTrigger parameter is set to event 1F. |
| eventThresholdUphUmts (support qualifier) | This attribute shall be present only if MDT is supported and the jobType attribute is set to Immediate MDT or combined Trace and Immediate MDT and the listOfMeasurements attribute has M4 measurement set in case of UMTS. |
| plmnList (support qualifier) | This attribute shall be present only if MDT is supported, several PLMNs are supported in the RAN and the jobType attribute is set to Logged MDT. |
| positioningMethod (support qualifier) | This attribute shall be present only if MDT is supported and the jobType attribute is set to Immediate MDT or combine Trace and Immediate MDT. |
| reportAmount (support qualifier) | This attribute shall be present only if MDT is supported and the jobType attribute is set to Immediate MDT and the reportingTrigger attribute is configured for periodic measurements or event triggered periodic measurements. |
| reportingTrigger (support qualifier) | This attribute shall be present only if MDT is supported and the jobType attribute is set to Immediate MDT and the listOfMeasurements attribute is configured for M1 (for UMTS, LTE and NR) or M2 (only for UMTS). |
| reportInterval (support qualifier) | This attribute shall be present only if MDT is supported and the jobType attribute is set to Immediate MDT, the listOfMeasurements attribute is configured for M1 (for UMTS, LTE and NR) or M2 (only for UMTS) and the reportingTrigger is configured for periodic measurements or event triggered periodic measurements. |
| reportType (support qualifier) | This attribute shall be present only if NR MDT is supported and the jobType attribute is set to Logged MDT. |
| sensorInformation (support qualifier) | This attribute shall be present only if NR MDT is supported. |
| traceCollectionEntityId (support qualifier) | This attribute shall be present only if MDT is supported and the jobType attribute is set to Logged MDT. |
| excessPacketDelayThreshoulds | This attribute shall be present only if MDT is supported and the jobType attribute is set to Immediate MDT and the listOfMeasurements attribute is configured for M6 for UL in NR. |

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| **2nd modified section** |

### 4.3.X ExcessPacketDelayThresholdInfo <<dataType>>

#### 4.3.X.1 Definition

This <<dataType>> defines a excess packet delay threshold information to enable the calculation of the PDCP Excess Packet Delay in the uplink in case of M6 uplink measurements are requested. The excess packet delay threshold information is specified with the 5QI value and excess packet delay threshold value.

#### 4.3.X.2 Attributes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | S | isReadable | isWritable | isInvariant | isNotifyable |
| fiveQIValue | M | T | T | F | T |
| excessPacketDelayThresholdValue | M | T | T | F | T |

#### 4.3.X.3 Attribute constraints

None

#### 4.3.X.4 Notifications

The subclause 4.5 of the <<IOC>> using this <<dataType>> as one of its attributes, shall be applicable.

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| **3rd modified section** |

### 4.4.1 Attribute properties

The following table defines the properties of attributes specified in the present document.

| Attribute Name | Documentation and Allowed Values | Properties |
| --- | --- | --- |
| numberOfFiles | Number of files in a file collection.  allowedValues: NA | Type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| …… | …… | …… |
| excessPacketDelayThreshoulds | Excess packet delay thresholds info for M6 UL measurement. | type: ExcessPacketDelayThresholdInfo  multiplicity: 1..\*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |
| fiveQIValue | It indicates a list of 5QI value.  allowedValues: 0 - 255 | type: Integer  multiplicity: 1  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |
| excessPacketDelayThresholdValue | Value of excess packet delay threshold for M6 UL measurement.  allowedValues: ms0.25, ms0.5, ms1, ms2, ms4, ms5, ms10, ms20, ms30, ms40, ms50, ms60, ms70, ms80, ms90, ms100, ms150, ms300,ms500, … | type: ENUM  multiplicity: 1  isOrdered: NA  isUnique: NA  defaultValue: None  isNullable: False |

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| **End modified section** |