**3GPP TSG-SA5 Meeting #156 *S5-244921***

**Maastricht, Netherlands, 19 – 23 August 2024**

|  |
| --- |
| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **28.623** | **CR** | **0404** | **rev** | **1** | **Current version:** | **19.0.1** |  |
|  |
| *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 |  | Radio Access Network |  | Core Network | **X** |

|  |
| --- |
|  |
| ***Title:***  | Rel-19 CR TS 28.623 Add missing interface and Trigger events for core functions |
|  |  |
| ***Source to WG:*** | Nokia, Ericsson |
| ***Source to TSG:*** | S5 |
|  |  |
| ***Work item code:*** | 5GMDT\_Ph2 |  | ***Date:*** | 2024-08-08 |
|  |  |  |  |  |
| ***Category:*** | **A** |  | ***Release:*** | Rel-19 |
|  | *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-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
|  |  |
| ***Reason for change:*** | TS 23.501 defines the reference point N28, N40, N41 and N42. The stage 3 support for the interfaces and the trigger events for tracing are missing. |
|  |  |
| ***Summary of change:*** | Adding N28, N40, N41 and N42 interfaces and the missing trigger events for tracing. |
|  |  |
| ***Consequences if not approved:*** | N28, N40, N41 and N42 interfaces cannot be traced by 3GPP trace functionality. Misalignment with TS 23.501. |
|  |  |
| ***Clauses affected:*** | NA (Stage 3 code is in forge) |
|  |  |
|  | **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 32.421 CR 0142TS 32.423 CR 0191 |
|  |  |
| ***Other comments:*** | Forge MR link: <https://forge.3gpp.org/rep/sa5/MnS/-/merge_requests/1254> |
|  |  |
| ***This CR's revision history:*** |  |

Forge MR link: <https://forge.3gpp.org/rep/sa5/MnS/-/merge_requests/1254> at commit 76f60d83de03cfd3e1c4cdcee74226f1f3c2ff39

\*\*\* START OF CHANGE 1 \*\*\*

\*\*\* OpenAPI/TS28623\_TraceControlNrm.yaml \*\*\*

<CODE BEGINS>

openapi: 3.0.1

info:

 title: Trace Control NRM

 version: 19.0.0

 description: >-

 OAS 3.0.1 definition of the Trace Control NRM fragment

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externalDocs:

 description: 3GPP TS 28.623; Generic NRM,Trace Control NRM

 url: http://www.3gpp.org/ftp/Specs/archive/28\_series/28.623/

paths: {}

components:

 schemas:

 #-------- Definition of types for name-containments ------

 SubNetwork-ncO-TraceControlNrm:

 type: object

 properties:

 TraceJob:

 $ref: '#/components/schemas/TraceJob-Multiple'

 ManagedElement-ncO-TraceControlNrm:

 type: object

 properties:

 TraceJob:

 $ref: '#/components/schemas/TraceJob-Multiple'

 #-------Definition of generic IOCs ----------#

#-------- Definition of types used in Trace control NRM fragment------------------

 jobType-Type:

 type: string

 description: Specifies whether the TraceJob represents only MDT, Logged MBSFN MDT, Trace or a combined Trace and MDT job. Applicable for Trace, MDT, RCEF and RLF reporting. See 3GPP TS 32.422 clause 5.9a for additional details.

 enum:

 - IMMEDIATE\_MDT\_ONLY

 - LOGGED\_MDT\_ONLY

 - TRACE\_ONLY

 - IMMEDIATE\_MDT\_AND\_TRACE

 - RLF\_REPORT\_ONLY

 - RCEF\_REPORT\_ONLY

 - LOGGED\_MBSFN\_MDT

 - 5GC\_UE\_LEVEL\_MEASUREMENTS\_ONLY

 - TRACE\_AND\_5GC\_UE\_LEVEL\_MEASUREMENTS

 - IMMEDIATE\_MDT\_AND\_5GC\_UE\_LEVEL\_MEASUREMENTS

 - TRACE\_AND\_IMMEDIATE\_MDT\_AND\_5GC\_UE\_LEVEL\_MEASUREMENTS

 default: TRACE\_ONLY

 listOfInterfaces-Type:

 description: The interfaces to be recorded in the Network Element. See 3GPP TS 32.422 clause 5.5 for additional details.

 type: object

 properties:

 MSCServerInterfaces:

 type: array

 items:

 type: string

 enum:

 - A

 - IU-CS

 - MC

 - MAP-G

 - MAP-B

 - MAP-E

 - MAP-F

 - MAP-D

 - MAP-C

 - CAP

 MGWInterfaces:

 type: array

 items:

 type: string

 enum:

 - MC

 - NB-UP

 - IU-UP

 RNCInterfaces:

 type: array

 items:

 type: string

 enum:

 - IU-CS

 - IU-PS

 - IUR

 - IUB

 - UU

 SGSNInterfaces:

 type: array

 items:

 type: string

 enum:

 - GB

 - IU-PS

 - GN

 - MAP-GR

 - MAP-GD

 - MAP-GF

 - GE

 - GS

 - S6D

 - S4

 - S3

 - S13

 GGSNInterfaces:

 type: array

 items:

 type: string

 enum:

 - GN

 - GI

 - GMB

 S-CSCFInterfaces:

 type: array

 items:

 type: string

 enum:

 - MW

 - MG

 - MR

 - MI

 P-CSCFInterfaces:

 type: array

 items:

 type: string

 enum:

 - GM

 - MW

 I-CSCFInterfaces:

 type: array

 items:

 type: string

 enum:

 - CX

 - DX

 - MG

 - MW

 MRFCInterfaces:

 type: array

 items:

 type: string

 enum:

 - Mp

 - Mr

 MGCFInterfaces:

 type: array

 items:

 type: string

 enum:

 - MG

 - MJ

 - MN

 IBCFInterfaces:

 type: array

 items:

 type: string

 enum:

 - IX

 - MX

 E-CSCFInterfaces:

 type: array

 items:

 type: string

 enum:

 - MW

 - ML

 - MM

 - MI/MG

 BGCFInterfaces:

 type: array

 items:

 type: string

 enum:

 - MI

 - MJ

 - MK

 ASInterfaces:

 type: array

 items:

 type: string

 enum:

 - DH

 - SH

 - ISC

 - UT

 HSSInterfaces:

 type: array

 items:

 type: string

 enum:

 - MAP-C

 - MAP-D

 - GC

 - GR

 - CX

 - S6D

 - S6A

 - SH

 - N70

 - N71

 - NU1

 EIRInterfaces:

 type: array

 items:

 type: string

 enum:

 - MAP-F

 - S13

 - MAP-GF

 BM-SCInterfaces:

 type: array

 items:

 type: string

 enum:

 - GMB

 MMEInterfaces:

 type: array

 items:

 type: string

 enum:

 - S1-MME

 - S3

 - S6A

 - S10

 - S11

 - S13

 SGWInterfaces:

 type: array

 items:

 type: string

 enum:

 - S4

 - S5

 - S8

 - S11

 - GXC

 PDN\_GWInterfaces:

 type: array

 items:

 type: string

 enum:

 - S2A

 - S2B

 - S2C

 - S5

 - S6B

 - GX

 - S8

 - SGI

 eNBInterfaces:

 type: array

 items:

 type: string

 enum:

 - S1-MME

 - X2

 en-gNBInterfaces:

 type: array

 items:

 type: string

 enum:

 - S1-MME

 - X2

 - UU

 - F1-C

 - E1

 AMFInterfaces:

 type: array

 items:

 type: string

 enum:

 - N1

 - N2

 - N8

 - N11

 - N12

 - N14

 - N15

 - N20

 - N22

 - N26

 - N41

 - N42

 AUSFInterfaces:

 type: array

 items:

 type: string

 enum:

 - N12

 - N13

 NEFInterfaces:

 type: array

 items:

 type: string

 enum:

 - N29

 - N30

 - N33

 NRFInterfaces:

 type: array

 items:

 type: string

 enum:

 - N27

 NSSFInterfaces:

 type: array

 items:

 type: string

 enum:

 - N22

 - N31

 PCFInterfaces:

 type: array

 items:

 type: string

 enum:

 - N5

 - N7

 - N15

 - N28

 SMFInterfaces:

 type: array

 items:

 type: string

 enum:

 - N4

 - N7

 - N10

 - N11

 - S5-C

 - N16

 - N16a

 - N38

 - N40

 SMSFInterfaces:

 type: array

 items:

 type: string

 enum:

 - N20

 - N21

 UDMInterfaces:

 type: array

 items:

 type: string

 enum:

 - N8

 - N10

 - N13

 - N21

 - NU1

 UPFInterfaces:

 type: array

 items:

 type: string

 enum:

 - N4

 ng-eNBInterfaces:

 type: array

 items:

 type: string

 enum:

 - NG-C

 - XN-C

 - UU

 gNB-CU-CPInterfaces:

 type: array

 items:

 type: string

 enum:

 - NG-C

 - XN-C

 - UU

 - F1-C

 - E1

 - X2-C

 gNB-CU-UPInterfaces:

 type: array

 items:

 type: string

 enum:

 - E1

 gNB-DUInterfaces:

 type: array

 items:

 type: string

 enum:

 - F1-C

 listOfNeTypes-Type:

 description: The Network Element types where Trace Session activation is needed. See 3GPP TS 32.422 clause 5.4 for additional details.

 type: array

 items:

 type: string

 enum:

 - MSC\_SERVER

 - SGSN

 - MGW

 - GGSN

 - RNC

 - BM\_SC

 - MME

 - SGW

 - PGW

 - ENB

 - EN\_GNB

 - GNB\_CU\_CP

 - GNB\_CU\_UP

 - GNB\_DU

 - AMF

 - PCF

 - SMF

 - UPF

 - AUSF

 - SMSF

 - HSS

 - UDM

 plmnTarget-Type:

 type: object

 description: 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 (this means that shared cells and not shared cells are allowed for the specified PLMN. Note that the PLMN Target might differ from the PLMN specified in the Trace Reference, as that specifies the PLMN that is containing the management system requesting the Trace Session from the NE. See 3GPP TS 32.422 clause 5.9b for additional details.

 properties:

 mcc:

 $ref: 'TS28623\_ComDefs.yaml#/components/schemas/Mcc'

 mnc:

 $ref: 'TS28623\_ComDefs.yaml#/components/schemas/Mnc'

 required:

 - mcc

 - mnc

 listOfTraceMetrics:

 description: The trace metrics to be reported. See 3GPP TS 32.422 clause 10 for additional details.

 type: array

 items:

 type: string

 traceDepth-Type:

 description: Specifies how detailed information should be recorded in the Network Element. The Trace Depth is a paremeter for Trace Session level, i.e., the Trace Depth is the same for all of the NEs to be traced in the same Trace Session. See 3GPP TS 32.422 clause 5.3 for additional details.

 type: string

 enum:

 - MINIMUM

 - MEDIUM

 - MAXIMUM

 - VENDORMINIMUM

 - VENDORMEDIUM

 - VENDORMAXIMUM

 default: MAXIMUM

 traceReference-Type:

 type: object

 description: The Trace Reference parameter shall be globally unique, therefore the Trace Reference shall compose as follows - MCC+MNC+Trace ID, where the MCC and MNC are coming with the Trace activation request from the management system to identify one PLMN containing the management system, and Trace ID is a 3 byte Octet String. See 3GPP TS 32.422 clause 5.6 for additional details.

 properties:

 mcc:

 $ref: 'TS28623\_ComDefs.yaml#/components/schemas/Mcc'

 mnc:

 $ref: 'TS28623\_ComDefs.yaml#/components/schemas/Mnc'

 traceId:

 type: string

 required:

 - mcc

 - mnc

 - traceId

 traceReportingFormat-Type:

 type: string

 description: Specifies whether file-based or streaming reporting shall be used for this Trace Session. See 3GPP TS 32.422 clause 5.11 for additional details.

 enum:

 - FILE-BASED

 - STREAMING

 default: FILE-BASED

 traceTarget-Type:

 type: object

 description: Trace target conveying both the type and value of the target ID. For additional details see 3GPP TS 32.422

 properties:

 TargetIdType:

 type: string

 enum:

 - IMSI

 - IMEI

 - IMEISV

 - PUBLIC\_ID

 - UTRAN\_CELL

 - E-UTRAN\_CELL

 - NG-RAN\_CELL

 - ENB

 - RNC

 - GNB

 - SUPI

 TargetIdValue:

 type: string

 required:

 - TargetIdType

 - TargetIdValue

 triggeringEvents-Type:

 type: object

 description: Specifies when to start a Trace Recording Session and which message shall be recorded first, when to stop a Trace Recording Session and which message shall be recorded last respectively. See 3GPP TS 32.422 clause 5.1 for additional detials.

 properties:

 MSC\_SERVER:

 type: array

 items:

 type: string

 enum:

 - MO\_MT\_CALLS

 - MO\_MT\_SMS

 - LU\_IMSIATTACH\_IMSIDETACH

 - HANDOVER

 - SS

 SGSN:

 type: array

 items:

 type: string

 enum:

 - PDPCONTEXT

 - MO\_MT\_SMS

 - RAU\_GPRSATTACH\_GPRSDETACH

 - MBMSCONTEXT

 MGW:

 type: array

 items:

 type: string

 enum:

 - CONTEXT

 GGSN:

 type: array

 items:

 type: string

 enum:

 - PDPCONTEXT

 - MBMSCONTEXT

 IMS:

 type: array

 items:

 type: string

 enum:

 - SIPSESSION\_STANDALONETRANSACTION

 BM\_SC:

 type: array

 items:

 type: string

 enum:

 - MBMSACTIVATION

 MME:

 type: array

 items:

 type: string

 enum:

 - UE\_INITIATEDPDN\_CONNECTIVITY\_REQUEST

 - SERVICE\_REQUEST

 - INITIALATTACH\_TAU\_DETACH

 - UE\_INITIATEDPDN\_DISCONNECTION

 - BEAR\_ACTIVIATION\_MODIFICATION\_DELETION

 - HANDOVER

 SGW:

 type: array

 items:

 type: string

 enum:

 - PDN\_CONNECTION\_CREATION

 - PDN\_CONNECTION\_TERMINATION

 - BEAR\_ACTIVATION\_MODIFICATION\_DELETION

 PGW:

 type: array

 items:

 type: string

 enum:

 - PDN\_CONNECTION\_CREATION

 - PDN\_CONNECTION\_TERMINATION

 - BEAR\_ACTIVATION\_MODIFICATION\_DELETION

 AMF:

 type: array

 items:

 type: string

 enum:

 - REGISTRATION

 - SERVICE\_REQUEST

 - HANDOVER

 - UE\_DEREGISTRATION

 - NETWORK\_DEREGISTRATION

 - UE\_MOBILITY\_FROM\_EPC

 - UE\_MOBILITY\_TO\_EPC

 - CONVERGED\_CHARGING\_SERVICE

 SMF:

 type: array

 items:

 type: string

 enum:

 - PDU\_SESSION\_ESTABLISHMENT

 - PDU\_SESSION\_MODIFICATION

 - PDU\_SESSIOON\_RELEASE

 - PDU\_SESSION\_UP\_ACTIVATION\_DEACTIVATION

 - MOBILITY\_BTW\_3GPP\_AND\_N3GPP\_TO\_5GC

 - MOBILITY\_FROM\_EPC

 - MOBILITY\_BTW\_ISMF\_OR\_VSMF

 - CONVERGED\_CHARGING\_SERVICE

 - OFFLINE\_ONLY\_CHARGING

 PCF:

 type: array

 items:

 type: string

 enum:

 - AM\_POLICY

 - SM\_POLICY

 - AUTHORIZATION

 - BDT\_POLICY

 - SPENDING\_LIMIT\_CONTROL

 UPF:

 type: array

 items:

 type: string

 enum:

 - N4SESSION

 AUSF:

 type: array

 items:

 type: string

 enum:

 - UE\_AUTHENTICATION

 NEF:

 type: array

 items:

 type: string

 enum:

 - EVENT\_EXPOSURE

 - PFD\_MANAGEMENT

 - PARAMETER\_PROVISION

 - TRIGGER

 NRF:

 type: array

 items:

 type: string

 enum:

 - NF\_MANAGEMEENT

 - NF\_DISCOVERY

 NSSF:

 type: array

 items:

 type: string

 enum:

 - NS\_SELECTION

 - NSSAI

 SMSF:

 type: array

 items:

 type: string

 enum:

 - SMSERVICE

 UDM:

 type: array

 items:

 type: string

 enum:

 - UE\_CONTEXT

 - SUBSCRIBER\_DATA

 - UE\_AUTHENTICATION

 - EVENT\_EXPOSURE

 anonymizationOfMdtData-Type:

 description: Specifies level of MDT anonymization. For additional details see 3GPP TS 32.422 clause 5.10.12.

 type: string

 enum:

 - NO\_IDENTITY

 - TAC\_OF\_IMEI

 default: NO\_IDENTITY

 beamLevelMeasurement-Type:

 description: Determines whether beam level measurements shall be included in case of immediate MDT M1 measurement in NR. For additional details see 3GPP TS 32.422 clause 5.10.40.

 type: boolean

 collectionPeriodRrmLte-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.20.

 type: string

 enum:

 - 100ms

 - 1000ms

 - 1024ms

 - 1280ms

 - 2048ms

 - 2560ms

 - 5120ms

 - 10000ms

 - 10240ms

 - 60000ms

 collectionPeriodM6Lte-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.32.

 type: string

 enum:

 - 1024ms

 - 2048ms

 - 5120ms

 - 10240ms

 collectionPeriodM7Lte-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.33.

 type: integer

 minimum: 1

 maximum: 60

 collectionPeriodRrmUmts-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.21.

 type: string

 enum:

 - 100ms

 - 250ms

 - 500ms

 - 1000ms

 - 2000ms

 - 3000ms

 - 4000ms

 - 6000ms

 collectionPeriodRrmNr-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.30.

 type: string

 enum:

 - 1024ms

 - 2048ms

 - 5120ms

 - 10240ms

 - 60000ms

 collectionPeriodM6Nr-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.34.

 type: string

 enum:

 - 120ms

 - 240ms

 - 480ms

 - 640ms

 - 1024ms

 - 2048ms

 - 5120ms

 - 10240ms

 - 20480ms

 - 40960ms

 - 1min

 - 6min

 - 12min

 - 30min

 collectionPeriodM7Nr-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.35.

 type: integer

 minimum: 1

 maximum: 60

 eventListForEventTriggeredMeasurement-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.28.

 type: string

 enum:

 - OUT\_OF\_COVERAGE

 - A2\_EVENT

 eventThreshold-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.7, 5.10.7a, 5.10.13 and 5.10.14.

 type: object

 properties:

 EventThresholdRSRP:

 oneOf:

 - type: integer

 minimum: 0

 maximum: 97

 - type: integer

 minimum: 0

 maximum: 127

 EventThresholdRSRQ:

 oneOf:

 - type: integer

 minimum: 0

 maximum: 34

 - type: integer

 minimum: 0

 maximum: 127

 EventThreshold1F:

 type: object

 properties:

 CPICH\_RSCP:

 type: integer

 minimum: -120

 maximum: 25

 CPICH\_EcNo:

 type: integer

 minimum: -24

 maximum: 0

 PathLoss:

 type: integer

 minimum: 30

 maximum: 165

 EventThreshold1I:

 type: integer

 minimum: -120

 maximum: 25

 listOfMeasurements-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.3 for details.

 type: object

 properties:

 UMTS:

 type: array

 items:

 type: string

 enum:

 - M1

 - M2

 - M3

 - M4

 - M5

 - M6\_DL

 - M6\_UL

 - M7\_DL

 - M7\_UL

 LTE:

 type: array

 items:

 type: string

 enum:

 - M1

 - M2

 - M3

 - M4

 - M5

 - M1\_EVENT\_TRIGGERED

 - M6

 - M7

 - M8

 - M9

 NR:

 type: array

 items:

 type: string

 enum:

 - M1

 - M2

 - M3

 - M4

 - M5

 - M6

 - M7

 - M1\_EVENT\_TRIGGERED

 - M8

 - M9

 loggingDuration-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.9.

 type: string

 enum:

 - 600s

 - 1200s

 - 2400s

 - 3600s

 - 5400s

 - 7200s

 loggingInterval-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.8.

 type: object

 properties:

 UMTS:

 type: array

 items:

 type: string

 enum:

 - 1.28s

 - 2.56s

 - 5.12s

 - 10.24s

 - 20.48s

 - 30.72s

 - 40.96s

 - 61.44s

 LTE:

 type: array

 items:

 type: string

 enum:

 - 1.28s

 - 2.56s

 - 5.12s

 - 10.24s

 - 20.48s

 - 30.72s

 - 40.96s

 - 61.44s

 NR:

 type: array

 items:

 type: string

 enum:

 - 0.32s

 - 0.64s

 - 1.28s

 - 2.56s

 - 5.12s

 - 10.24s

 - 20.48s

 - 30.72s

 - 40.96s

 - 61.44s

 - INFINITY

 eventThresholdL1-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.X.

 type: object

 properties:

 RSRP:

 type: integer

 minimum: 0

 maximum: 127

 RSRQ:

 type: integer

 minimum: 0

 maximum: 127

 hysteresisL1-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.Y.

 type: integer

 minimum: 0

 maximum: 30

 timeToTriggerL1-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.Z.

 type: string

 enum:

 - 0ms

 - 40ms

 - 64ms

 - 80ms

 - 100ms

 - 128ms

 - 160ms

 - 256ms

 - 320ms

 - 480ms

 - 512ms

 - 640ms

 - 1024ms

 - 1280ms

 - 2560ms

 - 5120ms

 measurementPeriodLte-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.23.

 type: string

 enum:

 - 1024ms

 - 2048ms

 - 5120ms

 - 10240ms

 - 1min

 measurementPeriodUmts-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.22.

 type: string

 enum:

 - 1000ms

 - 2000ms

 - 3000ms

 - 4000ms

 - 6000ms

 - 8000ms

 - 12000ms

 - 16000ms

 - 20000ms

 - 24000ms

 - 28000ms

 - 32000ms

 - 64000ms

 measurementQuantity-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.15.

 type: string

 enum:

 - CPICH\_ECNO

 - CPICH\_RSCP

 - PATHLOSS

 eventThresholdUphUmts-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.A.

 type: integer

 minimum: 0

 maximum: 31

 plmnList-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.24.

 type: array

 items:

 type: object

 properties:

 mcc:

 $ref: 'TS28623\_ComDefs.yaml#/components/schemas/Mcc'

 mnc:

 $ref: 'TS28623\_ComDefs.yaml#/components/schemas/Mnc'

 required:

 - mcc

 - mnc

 maxItems: 16

 positioningMethod-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.19.

 type: string

 enum:

 - GNSS

 - E-CELL\_ID

 reportAmount-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.6.

 type: string

 enum:

 - 1

 - 2

 - 4

 - 8

 - 16

 - 32

 - 64

 - INFINITY

 reportAmountM1LTE-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.6.

 type: string

 enum:

 - 1

 - 2

 - 4

 - 8

 - 16

 - 32

 - 64

 - INFINITY

 reportAmountM4LTE-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.6.

 type: string

 enum:

 - 1

 - 2

 - 4

 - 8

 - 16

 - 32

 - 64

 - INFINITY

 reportAmountM5LTE-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.6.

 type: string

 enum:

 - 1

 - 2

 - 4

 - 8

 - 16

 - 32

 - 64

 - INFINITY

 reportAmountM6LTE-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.6.

 type: string

 enum:

 - 1

 - 2

 - 4

 - 8

 - 16

 - 32

 - 64

 - INFINITY

 reportAmountM7LTE-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.6.

 type: string

 enum:

 - 1

 - 2

 - 4

 - 8

 - 16

 - 32

 - 64

 - INFINITY

 reportAmountM1NR-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.6.

 type: string

 enum:

 - 1

 - 2

 - 4

 - 8

 - 16

 - 32

 - 64

 - INFINITY

 reportAmountM4NR-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.6.

 type: string

 enum:

 - 1

 - 2

 - 4

 - 8

 - 16

 - 32

 - 64

 - INFINITY

 reportAmountM5NR-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.6.

 type: string

 enum:

 - 1

 - 2

 - 4

 - 8

 - 16

 - 32

 - 64

 - INFINITY

 reportAmountM6NR-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.6.

 type: string

 enum:

 - 1

 - 2

 - 4

 - 8

 - 16

 - 32

 - 64

 - INFINITY

 reportAmountM7NR-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.6.

 type: string

 enum:

 - 1

 - 2

 - 4

 - 8

 - 16

 - 32

 - 64

 - INFINITY

 reportingTrigger-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.4.

 type: array

 items:

 type: string

 enum:

 - PERIODICAL

 - A2\_FOR\_LTE\_NR

 - 1F\_FOR\_UMTS

 - 1I\_FOR\_UMTS\_MCPS\_TDD

 - A2\_TRIGGERED\_PERIODIC\_FOR\_LTE\_NR

 - ALL\_CONFIGURED\_RRM\_FOR\_LTE\_NR

 - ALL\_CONFIGURED\_RRM\_FOR\_UMTS

 reportInterval-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.5.

 type: object

 properties:

 UMTS:

 type: array

 items:

 type: string

 enum:

 - 250ms

 - 500ms

 - 1000ms

 - 2000ms

 - 3000ms

 - 4000ms

 - 6000ms

 - 8000ms

 - 12000ms

 - 16000ms

 - 20000ms

 - 24000ms

 - 28000ms

 - 32000ms

 - 64000ms

 LTE:

 type: array

 items:

 type: string

 enum:

 - 120ms

 - 240ms

 - 480ms

 - 640ms

 - 1024ms

 - 2048ms

 - 5120ms

 - 10240ms

 - 60000ms

 - 360000ms

 - 720000ms

 - 1800000ms

 - 3600000ms

 NR:

 type: array

 items:

 type: string

 enum:

 - 120ms

 - 240ms

 - 480ms

 - 640ms

 - 1024ms

 - 2048ms

 - 5120ms

 - 10240ms

 - 20480ms

 - 40960ms

 - 60000ms

 - 360000ms

 - 720000ms

 - 1800000ms

 reportType-Type:

 description: Report type for logged NR MDT. See details in 3GPP TS 32.422 clause 5.10.27.

 type: string

 enum:

 - PERIODICAL

 - EVENT\_TRIGGERED

 sensorInformation-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.29.

 type: array

 items:

 type: string

 enum:

 - BAROMETRIC\_PRESSURE

 - UE\_SPEED

 - UE\_ORIENTATION

 traceCollectionEntityId-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.11. Only TCE Id value may be sent over the air to the UE being configured for Logged MDT.

 type: integer

 excessPacketDelayThreshold-Type:

 description: Excess Packet Delay Threshold for NR MDT. See details in 3GPP TS 32.422 clause 4.1.1 and 4.1.2.

 type: object

 properties:

 fiveQIValue:

 type: integer

 excessPacketDelayThresholdValue:

 type: string

 enum:

 - 0.25MS

 - 0.5MS

 - 1MS

 - 2MS

 - 4MS

 - 5MS

 - 10MS

 - 20MS

 - 30MS

 - 40MS

 - 50MS

 - 60MS

 - 70MS

 - 80MS

 - 90MS

 - 100MS

 - 150MS

 - 300MS

 - 500MS

 excessPacketDelayThresholds-Type:

 description: Array of type excessPacketDelayThreshold-Type.

 type: array

 items:

 $ref: '#/components/schemas/excessPacketDelayThreshold-Type'

 minItems: 0

 maxItems: 255

 traceConfig-Type:

 description: Trace configuration parameters for NR. See details in 3GPP TS 28.622 clause 4.3.30.

 type: object

 properties:

 listOfInterfaces:

 $ref: '#/components/schemas/listOfInterfaces-Type'

 listOfNeTypes:

 $ref: '#/components/schemas/listOfNeTypes-Type'

 traceDepth:

 $ref: '#/components/schemas/traceDepth-Type'

 triggeringEvents:

 $ref: '#/components/schemas/triggeringEvents-Type'

 immediateMDTConfig-Type:

 description: Immediate MDT configuration parameters. See details in 3GPP TS 28.622 clause 4.3.30.

 type: object

 properties:

 listOfMeasurements:

 $ref: '#/components/schemas/listOfMeasurements-Type'

 reportingTrigger:

 $ref: '#/components/schemas/reportingTrigger-Type'

 reportAmount:

 $ref: '#/components/schemas/reportAmount-Type'

 reportAmountM1LTE:

 $ref: '#/components/schemas/reportAmountM1LTE-Type'

 reportAmountM4LTE:

 $ref: '#/components/schemas/reportAmountM4LTE-Type'

 reportAmountM5LTE:

 $ref: '#/components/schemas/reportAmountM5LTE-Type'

 reportAmountM6LTE:

 $ref: '#/components/schemas/reportAmountM6LTE-Type'

 reportAmountM7LTE:

 $ref: '#/components/schemas/reportAmountM7LTE-Type'

 reportAmountM1NR:

 $ref: '#/components/schemas/reportAmountM1NR-Type'

 reportAmountM4NR:

 $ref: '#/components/schemas/reportAmountM4NR-Type'

 reportAmountM5NR:

 $ref: '#/components/schemas/reportAmountM5NR-Type'

 reportAmountM6NR:

 $ref: '#/components/schemas/reportAmountM6NR-Type'

 reportAmountM7NR:

 $ref: '#/components/schemas/reportAmountM7NR-Type'

 reportInterval:

 $ref: '#/components/schemas/reportInterval-Type'

 eventThreshold:

 $ref: '#/components/schemas/eventThreshold-Type'

 collectionPeriodRrmLte:

 $ref: '#/components/schemas/collectionPeriodRrmLte-Type'

 collectionPeriodM6Lte:

 $ref: '#/components/schemas/collectionPeriodM6Lte-Type'

 collectionPeriodM7Lte:

 $ref: '#/components/schemas/collectionPeriodM7Lte-Type'

 collectionPeriodRrmUmts:

 $ref: '#/components/schemas/collectionPeriodRrmUmts-Type'

 collectionPeriodRrmNr:

 $ref: '#/components/schemas/collectionPeriodRrmNr-Type'

 collectionPeriodM6Nr:

 $ref: '#/components/schemas/collectionPeriodM6Nr-Type'

 collectionPeriodM7Nr:

 $ref: '#/components/schemas/collectionPeriodM7Nr-Type'

 eventThresholdUphUmts:

 $ref: '#/components/schemas/eventThresholdUphUmts-Type'

 measurementPeriodUmts:

 $ref: '#/components/schemas/measurementPeriodUmts-Type'

 measurementPeriodLte:

 $ref: '#/components/schemas/measurementPeriodLte-Type'

 measurementQuantity:

 $ref: '#/components/schemas/measurementQuantity-Type'

 beamLevelMeasurement:

 $ref: '#/components/schemas/beamLevelMeasurement-Type'

 positioningMethod:

 $ref: '#/components/schemas/positioningMethod-Type'

 excessPacketDelayThresholds:

 $ref: '#/components/schemas/excessPacketDelayThresholds-Type'

 loggedMDTConfig-Type:

 description: Logged MDT configuration parameters. See details in 3GPP TS 28.622 clause 4.3.30.

 type: object

 properties:

 traceCollectionEntityId:

 $ref: '#/components/schemas/traceCollectionEntityId-Type'

 loggingDuration:

 $ref: '#/components/schemas/loggingDuration-Type'

 loggingInterval:

 $ref: '#/components/schemas/loggingInterval-Type'

 eventThresholdL1:

 $ref: '#/components/schemas/eventThresholdL1-Type'

 hysteresisL1:

 $ref: '#/components/schemas/hysteresisL1-Type'

 timeToTriggerL1:

 $ref: '#/components/schemas/timeToTriggerL1-Type'

 mbsfnAreaList:

 type: array

 items:

 $ref: '#/components/schemas/MbsfnArea'

 reportType:

 $ref: '#/components/schemas/reportType-Type'

 plmnList:

 $ref: '#/components/schemas/plmnList-Type'

 eventListForEventTriggeredMeasurement:

 $ref: '#/components/schemas/eventListForEventTriggeredMeasurement-Type'

 areaConfigurationForNeighCell:

 $ref: '#/components/schemas/AreaConfig'

 nPNIdentityList:

 type: array

 items:

 $ref: 'TS28623\_GenericNrm.yaml#/components/schemas/NpnId-Type'

 mdtConfig-Type:

 description: MDT config parameters. See details in 3GPP TS 28.622 clause 4.3.30.

 type: object

 properties:

 anonymizationOfMdtData:

 $ref: '#/components/schemas/anonymizationOfMdtData-Type'

 areaScope:

 type: array

 items:

 $ref: '#/components/schemas/AreaScope'

 sensorInformation:

 $ref: '#/components/schemas/sensorInformation-Type'

 immediateMDTConfig:

 $ref: '#/components/schemas/immediateMDTConfig-Type'

 loggedMDTConfig:

 $ref: '#/components/schemas/loggedMDTConfig-Type'

 UECoreMeasConfig-Type:

 description: UE level measurements configuration parameters for 5G system. See details in 3GPP TS 28.622 clause 4.3.x.

 type: object

 properties:

 ueCoreMeasurements:

 type: string

 ueCoreMeasGranularityPeriod:

 type: integer

 nfTypeToMeasure:

 type: string

 objectInstances:

 $ref: 'TS28623\_ComDefs.yaml#/components/schemas/DnList'

 rootObjectInstances:

 $ref: 'TS28623\_ComDefs.yaml#/components/schemas/DnList'

 AreaScope:

 oneOf:

 - type: array

 items:

 $ref: 'TS28623\_ComDefs.yaml#/components/schemas/EutraCellId'

 - type: array

 items:

 $ref: 'TS28623\_ComDefs.yaml#/components/schemas/NrCellId'

 - type: array

 items:

 $ref: 'TS28623\_ComDefs.yaml#/components/schemas/Tac'

 - type: array

 items:

 $ref: '#/components/schemas/Tai'

 - type: array

 items:

 $ref: 'TS28623\_GenericNrm.yaml#/components/schemas/NpnId-Type'

 Tai:

 type: object

 properties:

 mcc:

 $ref: 'TS28623\_ComDefs.yaml#/components/schemas/Mcc'

 mnc:

 $ref: 'TS28623\_ComDefs.yaml#/components/schemas/Mnc'

 tac:

 $ref: 'TS28623\_ComDefs.yaml#/components/schemas/Tac'

 AreaConfig:

 type: object

 properties:

 freqInfo:

 $ref: '#/components/schemas/FreqInfo'

 pciList:

 type: array

 items:

 type: integer

 FreqInfo:

 description: specifies the carrier frequency and bands used in a cell.

 type: object

 properties:

 arfcn:

 type: integer

 freqBands:

 type: array

 items:

 type: integer

 MbsfnArea:

 type: object

 properties:

 mbsfnAreaId:

 type: integer

 minimum: 1

 earfcn:

 type: integer

 minimum: 1

 TraceJob-Attr:

 type: object

 description: abstract class used as a container of all TraceJob attributes

 properties:

 jobType:

 $ref: '#/components/schemas/jobType-Type'

 plmnTarget:

 $ref: '#/components/schemas/plmnTarget-Type'

 nPNTarget:

 $ref: 'TS28623\_GenericNrm.yaml#/components/schemas/NpnId-Type'

 listOfTraceMetrics:

 type: array

 traceReportingConsumerUri:

 $ref: 'TS28623\_ComDefs.yaml#/components/schemas/Uri'

 traceCollectionEntityIpAddress:

 $ref: 'TS28623\_GenericNrm.yaml#/components/schemas/IpAddr'

 traceReference:

 $ref: '#/components/schemas/traceReference-Type'

 jobId:

 type: string

 traceReportingFormat:

 $ref: '#/components/schemas/traceReportingFormat-Type'

 traceTarget:

 $ref: '#/components/schemas/traceTarget-Type'

 traceConfig:

 $ref: '#/components/schemas/traceConfig-Type'

 mdtConfig:

 $ref: '#/components/schemas/mdtConfig-Type'

 ueCoreMeasConfig:

 $ref: '#/components/schemas/UECoreMeasConfig-Type'

#-------- end of Definition of types used in Trace control NRM fragment ----------

#-------- Definition of concrete IOCs --------------------------------------------

 TraceJob-Single:

 allOf:

 - $ref: 'TS28623\_GenericNrm.yaml#/components/schemas/Top'

 - type: object

 properties:

 attributes:

 $ref: '#/components/schemas/TraceJob-Attr'

 Files:

 $ref: 'TS28623\_FileManagementNrm.yaml#/components/schemas/Files-Multiple'

#-------- Definition of YAML arrays for name-contained IOCs ----------------------

 TraceJob-Multiple:

 type: array

 items:

 $ref: '#/components/schemas/TraceJob-Single'

#-------- Definitions in TS 28.623 for TS 28.532 ---------------------------------

 resources-traceControlNrm:

 oneOf:

 - $ref: '#/components/schemas/TraceJob-Single'

<CODE ENDS>

\*\*\* END OF CHANGE 1 \*\*\*