**3GPP TSG-SA5 Meeting #157 *S5-246182***

**Hyderabad, India, 14 – 18 October 2024**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **28.104** | **CR** | **0134** | **rev** | **1** | **Current version:** | **17.9.0** |  |
|  | | | | | | | | |
| *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 | **X** | Core Network | **X** |

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| ***Title:*** | Rel-17 CR TS 28.104 Aligning ENUM literals as per the guidelines | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Nokia, Huawei | | | | | | | | | |
| ***Source to TSG:*** | S5 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | eMDAS | | | | |  | ***Date:*** | | | 2024-02-10 |
|  |  | | | |  | |  | | |  |
| ***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-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | TS 32.156 clause 5.3.5.3 proposes rules to name the ENUM literals. According to that, the ENUM literals should be in capital letters with words separated by a underscore character. The ENUM literals in TS 28.104 are not follolwing this rule. | | | | | | | | |
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| ***Summary of change:*** | | Aligning the ENUM literals as per the rules mentioned in 32.156.. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | ENUM definitions are violating the rules specified in 32.156 causing inconsistency across specifications. | | | | | | | | |
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| ***Clauses affected:*** | | 8.4.1.1.3, 8.4.2.1.3, 8.4.2.2.3, 8.4.2.4.3, 8.4.2.5.3, 8.4.3.1.3, 8.4.4.1.3, 8.5.2.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | |  | | | | | | | | |

***Start of First change***

##### 8.4.1.1.3 Analytics output

The specific information elements of the analytics output for coverage problem analysis, in addition to the common information elements of the analytics outputs (see clause 8.3), are provided in table 8.4.1.1.3-1.

Table 8.4.1.1.3-1: Analytics output for coverage problem analysis

| Information element | Definition | Support qualifier | Properties |
| --- | --- | --- | --- |
| coverageProblemId | The identifier of the coverage problem. | M | type: String  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| coverageProblemType | Indication of type of the coverage Problem.  allowedValues:  WEAK\_COVERAGE, COVERAGE\_HOLE, PILOT\_POLLUTION, OVERSHOOT\_COVERAGE, DL\_ULCHANNEL\_COVERAGE\_MISMATCH, OTHER. | M | type: enumeration  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| coverageProblemAreas | Geographical location areas where the coverage problem occurred. | O | type: GeoArea (see TS 28.622 [19])  multiplicity: \*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |
| problematicCells | The CGIs of cells where the coverage problem occurred. | M | type: Integer  multiplicity: \*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |
| recommendedActions | The recommended actions to solve the coverage problem.  The recommended action may be (but not limited to):  - creation of new beam(s), or cell(s);  - change the transmission power of the NR sector carrier;  - delete some unwanted beam(s) or cell(s). | M | type: RecommendedAction  multiplicity: \*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |
| radioEnvironmentMap | The graphical description of the observed radio coverage characteristics. The graphic may be for the RSRP or SINR of the selected cluster of cells mapped against the physical geographical information (longitude, latitude, altitude) of the area where the RAN (NG-RAN and E-UTRAN) cells are deployed.  It is a list of paired tuples of geographical information (longitude, latitude, altitude) and coverage (RSRP or SINR) values. | O | type: List  multiplicity: \*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |
| cellConfigurations | The cell configurations for a new cell or reconfigurations of existing cells derived based on the characteristics in the radioEnvironmentMap.  The cell configurations are the changes to the NRMs attributes affecting the cell coverage (NG-RAN and E-UTRAN). | O | type: may differ as defined in  NRCellDU IOC, NRSectorCarrier IOC, BWP IOC, CommonBeamformingFunction IOC, and Beam IOC in TS 28.541 [15]; EUtranGenericCell IOC in TS 28.658 [16];  SectorEquipmentFunction IOC, AntennaFunction IOC, and  TMAFunction IOC in TS 28.662 [17].  multiplicity: \*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |

***Start of next change***

##### 8.4.2.1.3 Analytics output

The specific information elements of the analytics output for service experience analysis, in addition to the common information elements of the analytics outputs (see clause 8.3), are provided in table 8.4.2.1.3-1.

Table 8.4.2.1.3-1: Analytics output for Service experience analysis

|  |  |  |  |
| --- | --- | --- | --- |
| Information element | Definition | Support qualifier | Properties |
| serviceExperienceId | The identifier indicates the analytics report is related with service experience analysis. | M | type: String  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| serviceExperienceIssueType | Indication of the service experience issue type.  allowedValues:  - RAN\_ISSUE;  - CN\_ISSUE;  - OTHER\_ISSUE | M | type: ENUM  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| affectedObjects | The managed object instances where the service experience is applicable, e.g. SubNetwork Instance, NetworkSlice Instance. | O | type: DN  multiplicity: 1..\*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |
| serviceExperienceStatistics | The statistics of the level of service experience for a service in a certain time period, e.g. there are five levels which are represented by 1, 2, 3, 4, 5 where level 1 represents the users are enduring bad experience while level 5 represents the users' requirements are perfectly satisfied.  allowedValues:LEVEL\_1, LEVEL\_2, LEVEL\_3, LEVEL\_4, LEVEL\_5 | O | type: ENUM  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| serviceExperiencePredictions | The predictions of the level of service experience for a service in a certain time period. | O | type: ENUM  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |

***Start of next change***

##### 8.4.2.2.3 Analytics output

The specific information elements of the analytics output for network slice throughput analysis, in addition to the common information elements of the analytics outputs (see clause 8.3), are provided in table 8.4.2.2.3-1.

Table 8.4.2.2.3-1: Analytics output for network slice throughput analysis

|  |  |  |  |
| --- | --- | --- | --- |
| Information element | Definition | Support qualifier | Properties |
| networkSliceThroughputAnalysisId | Network slice throughput analysis identifier | M | type: String  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| networkSliceThroughputIssueType | Indication of the network slice throughput issue type  allowedValues: NONE, RAN\_ISSUE, CN\_ISSUE, BOTH\_RAN\_CN\_ISSUE | M | type: ENUM  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| networkSliceThroughputUserStatistics | The statistics of the UL and/or DL network slice throughput in a certain time period. The value indicates  the average percentage of users, for which the required SLS throughput is met.  allowedValues: 0 to 100 | O | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| networkSliceThroughputTimeStatistics | The statistics of the UL and/or DL network slice throughput in a certain time period. The value indicates the  average percentage of time, during which the required SLS throughput is met.  allowedValues: 0 to 100 | O | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| networkSliceThroughputUserPredictions | The predictions of the UL and/or DL network slice throughput in a certain time period. The value indicates the average percentage of users, for which the required SLS throughput is predicted to be met.  allowedValues: 0 to 100 | O | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| networkSliceThroughputTimePredictions | The predictions of the UL and/or DL network slice throughput in a certain time period. The value indicates the average percentage of time, during which the required SLS throughput is predicted to be met.  allowedValues: 0 to 100 | O | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |

***Start of next change***

##### 8.4.2.4.3 Analytics output

The specific information elements of the analytics output for E2E latency analysis, in addition to the common information elements of the analytics outputs (see clause 8.3), are provided in table 8.4.2.4.3-1.

**Table 8.4.2.4.3-1: Analytics output for E2E latency analysis**

|  |  |  |  |
| --- | --- | --- | --- |
| Information element | Definition | Support qualifier | Properties |
| e2ELatencyIssueId | The identifier indicates the output is for E2E latency issue analysis | M | type: String  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| e2ELatencyIssueType | Indication the type of the E2E latency issue.  allowedValues: RAN\_LATENCY\_ISSUE, CN\_LATENCY\_ISSUE | M | type: ENUM  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| affectedObjects | The managed object instances of subnetwork, managed elements or network slices where the latency issue happens | O | type: DN  multiplicity: 1..\*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |

***Start of next change***

##### 8.4.2.5.3 Analytics output

The specific information elements of the analytics output for network slice load analysis, in addition to the common information elements of the analytics outputs (see clause 8.3), are provided in table 8.4.2.5.3-1.

Table 8.4.2.5.3-1: Analytics output for network slice load analysis

|  |  |  |  |
| --- | --- | --- | --- |
| Information element | Definition | Support qualifier | Properties |
| networkSliceLoadIssueId | The identifier indicates the output is for Network slice instance load analysis | M | type: String  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| networkSliceLoadIssueDomain | Indicates the domain of the network slice instance load issue  allowedValues:  - RAN\_ISSUE;  - CN\_ISSUE | M | type: ENUM  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| networkSliceLoadIssuePhase | Indicates the phase of the network slice instance load issue  allowedValues: HISTORIC\_NETWORK\_SLICE\_LOAD\_ISSUE, ONGOING\_NETWORK\_SLICE\_LOAD\_ISSUE, POTENTIAL\_NETWORK\_SLICE\_LOAD\_ISSUE | M | type: ENUM  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| networkSliceLoadIssueType | Indicates the type of the network slice instance load issue  allowedValues: OVERLOAD\_NETWORK\_SLICE\_LOAD\_ISSUE, UNDERUTILIZED\_NETWORK\_SLICE\_LOAD\_ISSUE | M | type: ENUM  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| affectedObjects | The managed object instances involved in the network slice instance load problem | O | type: DN  multiplicity: 1..\*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |
| networkSliceLoadDistribution | Describes the detailed load distribution or predictive distribution, e.g. load distribution for a network slice instance at a certain location or in a certain time period | O | type: Integer  multiplicity: \*  isOrdered: True  isUnique: False  defaultValue: None  isNullable: False |

***Start of next change***

##### 8.4.3.1.3 Analytics output

The specific information elements of the analytics output for failure prediction analysis, in addition to the common information elements of the analytics outputs (see clause 8.3), are provided in table 8.4.3.1.3-1.

Table 8.4.3.1.3-1: Analytics output for failure prediction analysis

|  |  |  |  |
| --- | --- | --- | --- |
| Information element | Definition | Support qualifier | Properties |
| failurePredictionObject | Indication of NR cells or NFs where the failure related issues occurred or potentially occur. | M | type: DN  multiplicity: 1..\*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |
| potentialFailureType | Indication of type of issues that can cause the failures.  NOTE 1: The values can be defined as a list of example values: "Operational Violation", "Physical Violation" and "Time Domain Violation". See alarmType described in TS 28.532 [11]. | M | type: String  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| eventTime | This field holds the time of potential failure predicted.  Examples: "20:15:00", "20:15:00-08:00" (for 8 hours behind UTC). | M | type: DateTime  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| issueID | This filed holds the ID of this failure prediction which is reported.  When reports, this identifier can be used to provide the information to management system to maintain. | M | type: String  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| perceivedSeverity | This field holds the value to indicate relative level of urgency for operator attention.  NOTE 2: The value can be CRITICAL, MAJOR, MINOR, WARNING, INTERMEDIATE, CLEARED, see Recommendation ITU-T X.733 [27]. | M | type: ENUM  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |

***Start of next change***

##### 8.4.4.1.3 Analytics output

The specific information elements of the analytics output for energy saving analysis, in addition to the common information elements of the analytics outputs (see clause 8.3), are provided in table 8.4.4.1.3-1.

Table 8.4.4.1.3-1: Analytics output for energy saving analysis

| Information element | Definition | Support qualifier | Properties |
| --- | --- | --- | --- |
| energyEfficiencyProblematicObject | Indication of NR cells or NFs where the energy efficiency issues occurred or potentially occur. | M | type: DN  multiplicity: 1..\*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |
| energyEfficiencyProblemType | Indication of type of the energy efficiency issues.  allowedValues: HIGH\_ENERGY\_CONSUMPTION, LOW\_ENERGY\_CONSUMPTION, OTHER, UNKNOWN. | M | type: enumeration  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| trafficLoadTrends | The predictions of the trends of traffic load in a certain time period. The predictions include the traffic load of the issue cell(s) and neighboring cell(s). | M | type:TrafficLoadTrend  multiplicity: 1..\*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |
| rANenergySavingRecommendations | For ES on NR cells. It may contain a set of:  - Recommended NR Cell (ES-Cell) to enter energySaving state.  - Recommended candidate cells with precedence for taking over the traffic of the ES-Cell.  - The time to enter and terminate the energy saving state.  - The load threshold to enter and terminate the energy saving state for the ES-Cell.  This exist only in case of RAN energy saving is supported. | CM | type: EsRecommendationsOnNRcell  multiplicity: 1..\*  isOrdered: True  isUnique: True  defaultValue: None  isNullable: False |
| cNenergySavingRecommendations | For ES on UPFs. It contains a set of:  - Recommended UPF (ES-UPF) to conduct energy saving.  - Recommended candidate UPFs with precedence for taking over the traffic of the ES-UPF.  - The time to conduct energy saving for the ES-UPF.  This exist only in case of CN energy saving is supported.. | CM | type: EsRecommendationsOnUPF  multiplicity: 1..\*  isOrdered: True  isUnique: True  defaultValue: None  isNullable: False |
| statisticsOfCellsEsState | The statistic result of current energy saving state of the cells at a certain time, which can be used by consumers to make analysis (e.g. observed service experience analysis made by NWDAF) or to make decision (e.g. enter/exit the energy saving state based on the current energy saving state). | O | type: StatisticOfCellEsState  multiplicity: 1..\*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |

***Start of next change***

##### 8.4.5.1.3 Analytics output

The specific information elements of the analytics output (MDA report) for mobility performance analysis, in addition to the common information elements of the analytics outputs (see clause 8.3), are provided in table 8.4.5.1.3‑1.

Table 8.4.5.1.3-1: Analytics output for Mobility Performance analysis

|  |  |  |  |
| --- | --- | --- | --- |
| Information element | Definition | Support qualifier | Properties |
| mobilityPerformance IssueIdentifier | The identifier of the mobility performance issue analysis; | M | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| mobilityPerformance IssueRootCause | The root cause of mobility performance issues.  allowedValues: TOO\_LONG\_MOBILITY\_INTERRUPTION\_TIME, POOR\_COVERAGE\_OF\_THE\_CELL\_EDGE, INAPPROPRIATE\_HANDOVER\_PARAMETERS, OTHER. | M | type: ENUM  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| mobilityPerformance IssueLocation | Geographical location areas where the mobility performance issue occurred. | O | type: GeoArea (see TS 28.622 [19])  multiplicity: \*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |

***End of Changes***