**3GPP TSG-SA5 Meeting #145-e *S5-225097***

e-meeting, 15 - 24 Aug 2022

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **28.104** | **CR** | **0001** | **rev** | **-** | **Current version:** | **17.0.1** |  |
|  | | | | | | | | |
| *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)*.* | | | | | | | | |
|  | | | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network | **X** | Core Network | **X** |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***Title:*** | Rel-17 CR 28.104 Rectifying attribute properties | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Nokia, Nokia Shanghai Bell | | | | | | | | | |
| ***Source to TSG:*** | S5 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | TEI17 | | | | |  | ***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)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Incorrect attribute properties specified for attributes with multiplicity 1 and more than 1 | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Incorrect attributes properties are corrected for attributes with multiplicity 1 and more than 1 | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Incorrect attribute properties for attributes with multiplicity 1 and more than 1 leading to ambiguity | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 8.4.1.1, 8.4.6, 8.5.1, 8.5.4 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 Coverage problem analysis

##### 8.4.1.1.1 MDA type

The MDA type for coverage problem analysis is: CoverageAnalytics.CoverageProblemAnalysis.

##### 8.4.1.1.2 Enabling data

The enabling data for CoverageAnalytics.CoverageProblemAnalysis MDA type are provided in table 8.4.1.1.2-1.

For general information about enabling data, see clause 8.2.1.

Table 8.4.1.1.2-1: Enabling data for coverage problem analysis

| Data category | Description | References |
| --- | --- | --- |
| Performance measurements | SS-RSRP distribution per SSB (beam) of serving NR cell | SS-RSRP distribution per SSB (clause 5.1.1.22.1 of TS 28.552 [4]). |
| SS-RSRP distribution per SSB (beam) of neighbor NR cell | SS-RSRP distribution per SSB of neighbor NR cell (clause 5.1.1.22.2 of TS 28.552 [4]) |
| RSRP distribution of neighbor E-UTRA cell for an NR cell | RSRP distribution per neighbor E‑UTRAN cell (clause 5.1.1.22.3 of TS 28.552 [4]) |
| Power headroom distribution for NR cell | Type 1 power headroom distribution (clause 5.1.1.26.1 of TS 28.552 [4]). |
| Wideband CQI distribution for NR cell | Wideband CQI distribution (clause 5.1.1.11.1 of TS 28.552 [4]). |
| Timing Advance distribution for NR cell | Timing Advance distribution for NR Cell (clause 5.1.1.33.1 of TS 28.552 [4]) |
| Number of UE Context Release Request (gNB-DU initiated) | Number of UE Context Release Request (gNB-DU initiated) (clause 5.1.3.5.1 of TS 28.552 [4]). |
| Number of UE Context Release Request per SSB (gNB-DU initiated) | Number of UE Context Release Request (gNB-DU initiated) (clause 5.1.3.5.1 of TS 28.552 [4]). |
| Number of UE Context Release Requests (gNB-CU initiated) | Number of UE Context Release Request (gNB-CU initiated) (clause 5.1.3.5.2 of TS 28.552 [4]). |
| Number of UE Context Release Requests per SSB (gNB-CU initiated) | Number of UE Context Release Request (gNB-CU initiated) (clause 5.1.3.5.2 of TS 28.552 [4]). |
| RSRP related measurements for ng-eNB | RSRP related measurements (clause 6.1 of TS 32.425 [12]). |
| UE power headroom related measurements for ng-eNB | UE power headroom related measurements (clause 6.3 of TS 32.425 [12]). |
| Wideband CQI distribution for ng-eNB | Wideband CQI distribution (clause 4.10.1.1 of TS 32.425 [12]). |
| Average sub-band CQI for ng-eNB | Average sub-band CQI (clause 4.10.1.2 of TS 32.425 [12]). |
| UE Rx - Tx time difference related measurements for ng-eNB | UE Rx - Tx time difference related measurements (clause 6.4 of TS 32.425 [12]). |
| AOA related measurements for ng-eNB | AOA related measurements (clause 6.5 of TS 32.425 [12]). |
| Timing Advance distribution for ng-eNB | Timing Advance Distribution (clause 4.10.2 of TS 32.425 [12]). |
| Number of UE CONTEXT Release Request initiated by ng-eNodeB | Number of UE CONTEXT Release Request initiated by eNodeB/RN (clause 4.1.5.1 of TS 32.425 [12]). |
| MDT reports | MDT reports containing RSRPs of the serving cell and neighbour cells, and UE location. | RSRPs and UE location of M1 measurements for NR in TS 32.422 [6] and TS 32.423 [7]. |
| RLF reports | RLF reports containing RSRPs of the last serving cell and neighbour cells, and UE location. | RLF data collection and RLF reporting in TS 32.422 [6], and rlf-Report-r16 in TS 38.331 [13]. |
| RCEF reports | RCEF reports containing RSRPs of NR cell where the RRC connection establishment failed and neighbour cells, and UE location. | RCEF data collection and RCEF reporting in TS 32.422 [6], and ConnEstFailReport-r16 in TS 38.331 [13]. |
| UE location reports | UE location information provided by the LMF services which can be used to correlate with the MDT reports. | The UE location information provided by LMF via service-based interface (see TS 23.273 [14]). |
| Geographical data | The geographical information (longitude, latitude, altitude) of the deployed RAN (NG-RAN and E-UTRAN). | The geographical information (longitude, latitude, altitude) information (see the peeParametersList attribute of the ManagedFunction IOC in TS 28.622 [19]). |
| Configuration data | The NRMs containing the attributes affecting the coverage for (NG-RAN and E-UTRAN). | 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]. |

##### 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.  The allowed value is one of the enumerated values: WeakCoverage, CoverageHole, PilotPollution, Overshoot coverage, DlUlChannelCoverageMismatch, 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, to be confirmed)  multiplicity: \*  isOrdered: N/A  isUnique: N/A  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 changes***

### 8.5.1 RecommendedAction <<dataType>>

#### 8.5.1.1 Definition

This data type specifies the type of recommended action in the analytics output.

#### 8.5.1.2 Information elements

Table 8.5.1.2-1

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Definition | Support qualifier | Properties |
| recommended3GPPActions | It contains the recommendations actions concerning 3GPP defined operations on MOIs. | O | type: Recommended3GPPAction  multiplicity: \*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |
| recommendedHumanReadableActions | It contains the recommendations on human readable actions.  NOTE: Further details of recommended human readable actions are not specified. | O | type: string  multiplicity: \*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |

***Start of next changes***

### 8.5.4 EsRecommendation <<dataType>>

#### 8.5.4.1 Definition

This data type specifies the type of energy saving recommendations in the analytics output.

#### 8.5.4.2 Information elements

Table 8.5.4.2-1

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Definition | Support qualifier | Properties |
| esRecommendationsOnNRcells | It contains the energy saving recommendations on NR cells. | M | type: EsRecommendationsOnNRcell  multiplicity: \*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |
| esRecommendationsOnUPFs | It contains the energy saving recommendations on UPFs. | M | type: EsRecommendationsOnUPF  multiplicity: \*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |

***Start of next changes***

### 8.5.13 HOTargetType <<dataType>>

#### 8.5.13.1 Definition

This data type specifies the information about the target cell and gNB for handover.

The attribute isOptimal specify if the cell (served by gNB) is optimal for handover considering the current virtual, physical and radio resource consumption by the gNB and/or the cell. The value TRUE imply that the target is not resource deprived at present and can be selected for handover.

The attribute futureOptimalInfo specify if the cell (served by the gNB) will be optimal for handover at a future point of time considering the future virtual and radio resource consumption by the gNB and/or the cell . This will also provide projection of future virtual, and radio resource consumptions.

#### 8.5.13.2 Information elements

Table 8.5.13.2-1

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Definition | Support qualifier | Properties |
| gNBId | See clause 4.4.1 of TS 28.541 [15]. | M | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| cellLocalId | See clause 4.4.1 of TS 28.541 [15]. | M | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: NULL  isNullable: False |
| isOptimal | This specifies if the cell (served by the gNB) is optimal for handover with respect to the virtual and physical resource consumption of its gNB and its own radio resource consumption. The value TRUE indicates that the gNB is optimal at present.  Allowed Values: TRUE and FALSE. | M | type: Boolean  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: TRUE  isNullable: False |
| futureOptimalInfo | This specifies related information when the cell is optimal for handover in future. | O | type: FutureOptimal  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |

***Start of next changes***

### 8.4.6 Maintenance management related analytics

#### 8.4.6.1 Maintenance management analysis

##### 8.4.6.1.1 MDA type

The MDA type for maintenance management is: Maintenance.MaintenanceAnalytics.

##### 8.4.6.1.2 Enabling data

The enabling data for Maintenance.MaintenanceAnalytics MDA type are provided in table 8.4.6.1.2-1.

For general information about enabling data, see clause 8.2.1.

Table 8.4.6.1.2-1: Enabling data for maintenance analysis

|  |  |  |
| --- | --- | --- |
| Data category | Description | References |
| Performance Measurements | Number of Active DRB | Mean number of DRBs being allocated (clause 5.1.1.10.9 of TS 28.552 [4]). |
| Number of bearers undergoing handover | Number of requested preparations for handovers from 5GS to EPS (clause 5.1.1.6.3.1 of TS 28.552 [4]).  Number of requested resource allocations for handovers from EPS to 5GS (clause 5.1.1.6.3.4 of TS 28.552 [4])  Number of requested preparations for EPS fallback handovers (clause 5.1.1.6.3.10 of TS 28.552 [4])  Number of successful executions for EPS fallback handovers (clause 5.1.1.6.3.13 of TS 28.552 [4]) |
| Number of bearers being recovered from the error state | Editors Note: to be defined in TS 28.552. |
| Number of successful bearer modification | Number of QoS flows attempted to modify (clause 5.1.1.13.4.1 of TS 28.552 [4]) |

##### 8.4.6.1.3 Analytics output

The specific information elements of the analytics output for maintenance management analysis, in addition to the common information elements of the analytics outputs (see clause 8.3), are provided in table 8.4.6.1.3-1.

Table 8.4.6.1.3-1: Analytics output for maintenance analysis

|  |  |  |  |
| --- | --- | --- | --- |
| Information element | Definition | Support qualifier | Properties |
| currentUpgradeOptimal | This data type defines whether gNB can be upgrade at present | M | type: CurrentUpgrade  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: none  isNullable: False |
| futureUpgradeOptimal | This data type defines whether the gNB can be upgrade in future and when | M | type: FutureUpgrade  multiplicity: \*  isOrdered: False  isUnique: True  defaultValue: none  isNullable: False |
| gNBID | This identifies the gNB |  | type: String  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: none  isNullable: False |

***End of changes***