**3GPP TSG-SA5 Meeting #143eS5-223397**

**09 - 17 May 2022, E-meeting**

**Source: Nokia**

**Title: pCR 28.104 MDA output for proactive coverage analytics**

**Document for: Approval**

**Agenda Item: 6.6.5**

# 1 Decision/action requested

***The group is asked to discuss and agree on the proposal.***

# 2 References

[1] 3GPP TS 28.104-100 “Management and orchestration; [Management Data Analytics](https://portal.3gpp.org/ngppapp/CreateTDoc.aspx?mode=view&contributionId=1330366)”.

# 3 Rationale

TR 28.104 includes requirements for proactive coverage analytics delivered via a Radio Environment Map. This pCR introduces the related output.

# 4 Detailed proposal

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| **Start of modifications** |

## 8.4 Data definitions per MDA capability

### 8.4.1 Coverage related analytics

#### 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 coverage problem analysis 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

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| 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 | Editor’s note: to be defined in TS 28.552 |
| RSRP distribution of neighbor E-UTRA cell for an NR cell | Editor’s note: to be defined in TS 28.552 |
| 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 | Editor’s note: to be defined in TS 28.552 |
| 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) | Editor’s note: to be defined in TS 28.552 |
| 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) | Editor’s note: to be defined in TS 28.552 |
| 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). | Editor’s note: to be defined in TS 28.622/623 or 28.541.  |
| 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

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| Information element | Definition | Support qualifier | Properties |
| CoverageProblemId | The identifier of the coverage problem. | M | type: stringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: 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: enumerationmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| CoverageProblemAreas | Geographical location areas where the coverage problem occurred.  | O | type: GeoArea (see TS 28.622, to be confirmed)multiplicity: \*isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| ProblematicCells | The CGIs of cells where the coverage problem occurred.  | M | type: Integermultiplicity: \*isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: 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: RecommendedActionmultiplicity: \*isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| RadioEnvironmentMap (REM) | 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) vakues. | M | type: Listmultiplicity: \*isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| CellConfigurations | The cell configurations for a new cell or reconfigurations of existing cells derived based on the characteristics in the REM The cell configurations are the changes to the NRMs attributes affecting the cell coverage for (NG-RAN and E-UTRAN). | M | 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]. |

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| **Next modifications** |

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| **End of modifications** |