**3GPP TSG-SA5 Meeting #142eS5-222037**

**04 - 12 April 2022, E-meeting**

**Source: Nokia**

**Title: pCR 28.104 Add requirements for Pro-active RAN coverage analysis**

**Document for: Approval**

**Agenda Item: 6.6.5**

# 1 Decision/action requested

***Request Approval for the Requirements.***

# 2 References

[1] 3GPP TS 28.104-100 “Management and orchestration: Management Data Analytics”.

# 3 Rationale

Besides the capabilities to counteract the RAN coverage related problems, it is necessary for the 3GPP management system to have means to proactively avoid the occurrence of any such RAN coverage related problems.

Accordingly, the consumer of 3GPP management services may wish to know the characteristics and quality of the coverage of the RAN. For this, the provider of MDAS needs to be able to provide an analysis of the characteristics and quality of the RAN e.g. in an appropriate graphical form.

This proposal introduces requirements for request and provision of RAN coverage related analytics for a cluster of NR cells.

# 4 Detailed proposal

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| **Start of modifications** |

### 7.2.1 Coverage related analytics

#### 7.2.1.1 Coverage problem analysis

##### 7.2.1.1.1 Description

This MDA capability is for analysis of coverage related problem.

##### 7.2.1.1.2 Use case

The RAN coverage problem may cause UEs to be out of service or result in a downgrade of network performance offered to the UEs, such as failure of random access, paging, RRC connection establishment or handover, low data throughput, abnormal releases of RRC connection or UE context, and dissatisfied QoE.

There are various types of coverage problems, e.g., weak coverage, a coverage hole, a pilot pollution, an overshoot coverage, or a DL and UL channel coverage mismatch, etc., caused by different sorts of reason, such as insufficient or weak transmission power, blocked by constructions and/or restricted by terrain.

The 5G related coverage problem may exist in NR, in E-UTRA or both.

To unravel a coverage problem, it is necessary for MDAS consumer to determine the details about when and where the problem occurred or likely to occur, and the type and cause(s) of the problem. Therefore, it is desirable for MDA to correlate and analyze multifold data (such as performance measurements, MDT reports, RLF reports, RCEF reports, UE location reports, together with the geographical, terrain and configuration data of the RAN) to detect and describe the problem with detailed information.

The RAN coverage related problems can cause network performance degradation and in the extreme cases can result into service degradation. So besides identifying the problems after they have happened, it is also necessary to proactively avoid the RAN coverage related problems even when given the capabilities to counteract the problems.

To avoid coverage related problems or to proactively undertake actions to avoid their occurrence, the consumer of MDA MnS may wish to know the characteristics and quality of the coverage of the RAN. This may be expressed graphically on a Map, called a Radio Environment Map, that shows the coverage quality for a set of cells. Such a map may be constructed e.g. to show the RSRP or the SINR of the cells as derived from the observed UE performance or from radio configuration parameters of the cells including transmit powers, antenna gains, antenna tilts, etc. It is desirable that the provider of MDAS can provide the Radio Environment Map in an appropriate graphical form.

Moreover where a new RAN node is provisioned, the provider of MDAs should be able to take the coverage of existing cells as defined by a Radio Environment Map and derive the configuration of the new cell and the existing cells to optimize the coverage. Image analytics to identify the most optimized set of initial radio configurations that can be assigned to a new RAN NE

To help MDAS consumer to solve the coverage problem as quickly as possible, MDA may also provide the recommended remedy actions (e.g., reconfigure or add some cells, beams, antennas, etc.) along with the description of the problem.

##### 7.2.1.1.3 Requirements

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| **Requirement label** | **Description** | **Related use case(s)** |
| **REQ-COV\_MDA-01** | MDA capability for coverage problem analysis shall be able to provide the analytics for issues including, weak coverage, coverage holes, pilot pollution, overshoot coverage, or DL and UL channel coverage mismatch.  | Coverage problem analysis |
| **REQ-COV\_MDA-02** | MDA capability for coverage problem analysis shall be able to provide the analytics for area specific coverage problem analysis. | Coverage problem analysis |
| **3** | MDA capability for coverage problem analysis shall be able to provide a | Coverage problem analysis |
| **4** | MDA capability for coverage problem analysis shall be able to provide configurations of a  | Coverage problem analysis |

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