**3GPP** **TSG SA WG5 Meeting 137-e TDoc S5-213406**

**electronic meeting, online, 10 - 19 April 2021**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **28.313** | **CR** | **0017** | **rev** | **2** | **Current version:** | **17.0.0** |  |
|  |
| *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)*.* |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network | **X** | Core Network |  |

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|  |
| ***Title:***  | Requirements, use cases and services for C-PCI |
|  |  |
| ***Source to WG:*** | S5 |
| ***Source to TSG:*** | Ericsson |
|  |  |
| ***Work item code:*** | eSON\_5G |  | ***Date:*** | 2021-04-30 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***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 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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
|  |  |
| ***Reason for change:*** | A complete solution for centralized PCI optimization is missing. |
|  |  |
| ***Summary of change:*** | Addition and changes of requirements, use cases and services for Centralized PCI optimization. The solution consists of existing Performance Managmenet and existing Trace services. |
|  |  |
| ***Consequences if not approved:*** | Centralized PCI optimization is incomplete. |
|  |  |
| ***Clauses affected:*** | 2, 6.1.2.1, 6.4.2.1.2, 7.2.1.1, 7.2.1.2.2, 7.2.1.3.2, 7.2.1.3.x |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  |  |
| ***affected:*** |  | **X** |  Test specifications |  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications |  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

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| **First change** |

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 32.500: "Telecommunication Management; Self-Organizing Networks (SON); Concepts and requirements".

[3] 3GPP TS 28.532: "Management and orchestration; Generic management services"

[4] 3GPP TS 38.321 "NR; Medium Access Control (MAC) protocol specification".

[5] 3GPP TS 28.552 "Management and orchestration; 5G performance measurements".

[6] 3GPP TS 32.511 " Telecommunication management; Automatic Neighbour Relation (ANR) management; Concepts and requirements".

[7] 3GPP TS 38.300 "NR; Overall description; Stage-2".

[8] Void

[9] 3GPP TS 38.331: "NR; Radio Resource Control (RRC) protocol specification".

[10] Void

[11] 3GPP TS 28.531 "Management and orchestration; Provisioning".

[12] 3GPP TS 28.550: "Management and orchestration; Performance assurance".

[13] 3GPP TS 28.541: "Management and orchestration; 5G Network Resource Model (NRM); Stage 2 and stage 3".

[14] Void

[15] 3GPP TS 32.508: "Telecommunication management; Procedure flows for multi-vendor plug-and-play eNodeB connection to the network".

[16] 3GPP TS 38.133: "NR; Requirements for support of radio resource management".

[17] Void

[Y] 3GPP TS 32.423: "Telecommunication management; Subscriber and equipment trace; Trace data definition and management"

[X] 3GPP TS 38.423: "NG-RAN; Xn Application Protocol (XnAP)"

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| **Next change** |

#### 6.1.2.1 PCI configuration

**REQ- CPCI-CONFIG-FUN-1** producer of provisioning MnS should have a capability allowing an authorized consumer to configure or re-configure the PCI value(s) for NR cell(s).

**REQ- CPCI-CONFIG-FUN-2** producer of provisioning MnS should have a capability to notify the authorized consumer with the PCI value(s) being assigned to NR cell(s).

**REQ-CPCI-CONFIG-FUN-3** producer of performance assurance MnS should have a capability to notify the authorized consumer about handover degradation which may be caused by PCI collision or PCI confusion problems for NR cells.

**REQ-CPCI-CONFIG-FUN-X** Trace data producer MnS should have a capability to supply the authorized consumer with data allowing it to detect PCI collision or PCI confusion problems for NR cells.

**REQ-CPCI-CONFIG-FUN-Y** Producer of performance assurance MnS should have a capability to notify the authorized consumer about handover improvement which is the result of a resolved PCI collision or PCI confusion problem for NR cells.

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| **Next change** |

##### 6.4.2.1.2 PCI re-configuration

| Use case stage | Evolution/Specification | <<Uses>>Related use |
| --- | --- | --- |
| **Goal**  | To automatically re-configure the PCIs of NR cells, due to the PCI collision or PCI confusion problems. |  |
| **Actors and Roles** | C-SON to support PCI re-configuration. |  |
| **Telecom resources** | * gNB;
* The producer of provisioning MnS
* The producer of fault supervision MnS
 |  |
| **Assumptions** | N/A |  |
| **Pre-conditions** | * 5G NR cells are in operation.
* The C-SON function has been in operation, and enabled.
 |  |
| **Begins when**  | The C-SON function requests the producer of performance assurance MnS to collect handover performance related measurements reported by NG-RAN. |  |
| **Step 1 (M)** | Based on the measurements above, the C-SON function requests the producer of trace MnS to collect Radio Link Failure traces from UEs in cells where PCI collision or PCI confusion is suspected. |  |
| **Step 2 (M)** | The C-SON function analyses the PCI related information and detects that NR cells have experienced PCI conflict or confusion issues. |  |
|  |  |  |
| **Step 3 (M)** | The C-SON function determines the new PCI value(s) and requests the producer of provisioning MnS to re-configure the PCI value for the NR cell(s) experienced PCI conflict or confusion issues. |  |
| **Step 4 (M)** | The producer of provisioning MnS notifies the C-SON function about the resolution of PCI collision or PCI confusion problems for NR cell(s).  |  |
| **Step 5 (M)** | The C-SON function requests the producer of performance assurance MnS to collect handover performance related measurements reported by NG-RAN in order to assess whether the PCI collision or confusion was corrected. |  |
| **Ends when**  | All the steps identified above are successfully completed. |  |
| **Exceptions** | One of the steps identified above fails. |  |
| **Post-conditions** | The PCI value of a NR cell has been selected. |  |
| **Traceability**  | **REQ-CPCI-CONFIG-FUN-1, REQ-CPCI-CONFIG-FUN-2, REQ-CPCI-CONFIG-FUN-3, REQ-CPCI-CONFIG-FUN-X, REQ-CPCI-CONFIG-FUN-Y** |  |

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| **Next change** |

#### 7.2.1.1 MnS component type A

Table 7.2.1.1-1: PCI type A

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| --- | --- |
| MnS Component Type A | Note |
| Operations and notifications defined in clause 11.1.1 of TS 28.532 [3]:- createMOI operation- getMOIAttributes operation--- modifyMOIAttributes operation- - deleteMOI operation- - notifyMOIAttributeValueChanges operation- notifyMOICreation- notifyMOIDeletion- notifyMOIChanges | It is supported by Provisioning MnS for NF, as defined in 28.531 [11]. |
| Operations and notifications defined in clause 11.5.1 of TS 28.532 [3]:- establishStreamingConnection operation- terminateStreamingConnection operation- reportStreamData operation- addStream operation - deleteStream operation - getConnectionInfo operation - getStreamInfo operation |  |
| Operations defined in clauses 11.3.1.1.1 and 11.6.1 in TS 28.532 [3] and clause 6.2.3 of TS 28.550 [12]:- notifyFileReady operation- notifyFilePreparationError notification- subscribe operation- unsubscribe operation- istAvailableFiles operation | It is supported by Performance Assurance MnS for NFs, as defined in 28.550 [12]. |

#### 7.2.1.2 MnS Component Type B definition

##### 7.2.1.2.1 Control information

The parameter is used to control the C-SON PCI configuration function.

Table 7.2.1.2.1-1: PCI control

| Control parameter | Definition | Legal Values |
| --- | --- | --- |
| PCI configuration control | This attribute allows authorized consumer to enable/disable the C-SON PCI configuration functionality. | disable, enable |

##### 7.2.1.2.2 Parameters to be updated

The table below lists the parameter related to the C-SON PCI configuration function.

Table 7.2.1.2.2-1: PCI update

| **Updated parameters** | **Definition** | **Legal Values** |
| --- | --- | --- |
| NR PCI | This parameter contains the PCI of the NR cell. | Integer |

#### 7.2.1.3 MnS Component Type C definition

##### 7.2.1.3.1 Notifications information

The table below lists the notifications related to PCI configuration are generated from the NR cells.

Table 7.2.1.3.1-1: PCI notification

|  |  |  |
| --- | --- | --- |
| Notification information | Description | Note |
| PCI collision notification | The collision notification is used to indicate two neighbouring cells are using the same PCIs. |  |
| PCI Confusion notification | The confusion notification is used to indicate that a serving cell has 2 neighbouring cells that are using the same PCI value. |  |

##### 7.2.1.3.2 Performance measurements

Performance measurements related to the PCI configuration are collected from the NR cells.

Table 7.2.1.3.2-1. PCI related performance measurements

|  |  |  |
| --- | --- | --- |
| Performance measurements | Description | Note |
| PCI of candidate cells | The measurement contains cumulative counter with subcounters that is identified by the PCI value(s) of the candidate cells, and is derived from *MeasResultListNR* (see clause 6.3.2 in TS 38.331 [9]) where it contains PCI in *PhysCellId*, and RSRP/RSRQ in *MeasQuantityResults* of candidate cells. It is generated when the RSRP received from the candidate cells exceeds certain thresholds.  |  |
| Excessive Radio Link Failure | The measurements can be used to discover cells with excessive Radio Link Failures (see TS 28.552 [5] clauses 5.1.1.6.1.8, 5.1.1.6.1.9, 5.1.1.6.2.1 and 5.1.1.6.2.2) |  |

##### 7.2.1.3.x Trace Reporting

Trace information related to the PCI configuration are collected from NR cells.

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| Trace Report | Description | Note |
| RLF messages  | Radio Link Failure messages are generated by UEs experiencing Radio Link Failures caused by PCI collision and PCI confusion (see TS 32.423 [Y] clause 4.30 and TS 38.423 [X] clause 8.4.7) |  |

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| **End of changes** |