**3GPP** **TSG SA WG5 Meeting 138-e TDoc S5-214366rev1**

**electronic meeting, online, 23 - 31 August 2021**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **28.313** | **CR** | **0017** | **rev** | **2** | **Current version:** | **17.1.0** |  |
|  | | | | | | | | |
| *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:*** | | | 2021-08-13 |
|  |  | | | |  | |  | | |  |
| ***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 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:*** | | 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. | | | | | | | | |
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| ***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:*** | | S5-212306 | | | | | | | | |

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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 is in operation, is enabled, and subscribed PM measurements are recieved. |  |
| **Begins when** | The C-SON function requests the producer of performance assurance MnS to collect handover performance related measurements reported by NG-RAN. C-SON finds a potential PCI confusion and/or collision based on received PM data. |  |
| **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 if NR cells have experienced PCI conflict or confusion issues. If no PCI collision or confusion is found, go to step 5. |  |
| **Step 3 (M)** | When the C-SON function detects PCI collision and/or confusion it determines the new PCI value(s) and requests the producer of provisioning MnS to re-configure the PCI value for the NR cell(s) which 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) and goes back to step 2. |  |
| **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. The C-SON function turns off the collection of RLF data. |  |
| **Ends when** | All the steps identified above are successfully completed. Step 5 is done. |  |
| **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

|  |  |
| --- | --- |
| 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 |
| 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. Some lf these messages are caused by PCI collision or 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** |