**3GPP TSG-SA5 Meeting #133e *S5-206316rev1***

**e-meeting 12th – 21st October 2020** *Revision of S5-206052, S5-206078*

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  |  | **CR** |  | **rev** | **2** | **Current version:** |  |  |
|  | | | | | | | | |
| *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:*** | Correct Distributed PCI optimization | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson, Intel | | | | | | | | | |
| ***Source to TSG:*** | S5 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | eSON\_5G | | | | |  | ***Date:*** | | | 2020-10-03 |
|  |  | | | |  | |  | | |  |
| ***Category:*** |  |  | | | | | ***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-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | The Use Case and Management Services descriptions for D-SON PCI optimization do not confirm to RAN3 agreements.  The PCI reconfiguration is controlled by the CU, as evident from TS 38.473 clause 9.2.1.10, Information Element *NR PCI* | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Correct Use Case and Management Services descriptions for D-SON PCI optimization | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Misalignment with this specification and Stage 2 and Stage 3 in TS 28.541. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 6.1.1.4, 6.4.1.4.1, 6.4.1.4.2, 6.4.1.4.X (new), 7.1.3.3.1, 7.1.3.3.1 (new), 8.2.3.1, 8.2.3.2, 8.2.3.X (new). | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | |  | | |
| ***affected:*** | |  | **X** | Test specifications | | | |  | | |
| ***(show related CRs)*** | | **X** |  | O&M Specifications | | | | CR 0385, CR 0386 | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | S5-205141 | | | | | | | | |

**First change**

#### 6.1.1.4 PCI configuration and re-configuration

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

**REQ-DPCI-CONFIG-FUN-2** producer of provisioning MnS should have a capability allowing an authorized consumer to enable or disable the PCI configuration function.

**REQ-DPCI-CONFIG-FUN-3** producer of provisioning MnS should have a capability to notify the authorized consumer with the PCI value(s) being selected for NR cell(s).

**REQ-DPCI-CONFIG-FUN-4** producer of provisioning MnS should have a capability to notify the authorized consumer about the resolution of PCI collision or PCI confusion problems for NR cells.

**REQ-DPCI-CONFIG-FUN-5** producer of provisioning MnS should have a capability allowing an authorized consumer to configure or re-configure the PCI list at the PCI configuration function.

**REQ-DPCI-CONFIG-FUN-6** producer of fault supervision MnS should have a capability to generate or clear the alarm to PCI configuration function failure.

**Next change**

##### 6.4.1.4.1 Initial PCI configuration

| Use case stage | Evolution/Specification | <<Uses>> Related use |
| --- | --- | --- |
| **Goal** | To automatically configure the initial PCI for a NR cell, from a list of PCIs. |  |
| **Actors and Roles** | D-SON management function to support initial PCI list configuration. |  |
| **Telecom resources** | * gNB; * The producer of provisioning MnS |  |
| **Assumptions** | N/A |  |
| **Pre-conditions** | * The NR cells is not yet in operation. * No PCI list has been assigned to the NR cell. |  |
| **Begins when** | The D-SON management function decides to configure the PCI list for a NR cell. |  |
| **Step 1 (M)** | The D-SON management function requests the producer of provisioning MnS to configure the PCI list for a cell to the PCI configuration function. |  |
| **Step 2 (M)** | The D-SON management function requests the producer of provisioning MnS to enable the PCI configuration function at NR cell(s). |  |
| **Step 3 (M)** | When the cell is about to start operating, the PCI configuration function selects a PCI value from the list of PCI values and provides that to the NR cell. |  |
| **Step 4 (M)** | The producer of provisioning MnS notifies the consumer with the PCI value being assigned for the NR cell. |  |
| **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 configured. |  |
| **Traceability** | **REQ-DPCI-CONFIG-FUN-1, REQ-DPCI-CONFIG-FUN-2, REQ-DPCI-CONFIG-FUN-3, REQ-DPCI-CONFIG-FUN-5** |  |

##### 6.4.1.4.2 PCI re-configuration failure mitigation

| Use case stage | Evolution/Specification | <<Uses>> Related use |
| --- | --- | --- |
| **Goal** | To automatically re-configure the PCI list of an NR cell, due to the failure of PCI configuration function to resolve PCI collision or PCI confusion problems. |  |
| **Actors and Roles** | D-SON management function to support PCI re-configuration. |  |
| **Telecom resources** | * gNB; * The producer of provisioning MnS * The producer of fault supervision MnS |  |
| **Assumptions** | N/A |  |
| **Pre-conditions** | * A NR cell has been assigned a PCI value. * The PCI configuration function is in operation and enabled. |  |
| **Begins when** | The PCI configuration function has detected the PCI problem of a PCI collision or a PCI confusion for an NR cell. |  |
| **Step 1 (M)** | The D-SON management function receives an alarm from the producer of fault supervision MnS indicating the PCI configuration function failed to resolve PCI collision or PCI confusion problems for an NR cell(s). |  |
| **Step 2 (M)** | The D-SON management function requests the producer of provisioning MnS to re-configure the PCI list at the PCI configuration function. |  |
| **Step 3 (M)** | The PCI configuration function selects PCI value(s) from the PCI list. |  |
| **Step 4 (M)** | The producer of provisioning MnS notifies the consumer about the new PCI value of the NR cell. |  |
| **Step 5 (M)** | The D-SON management function receives a clear alarm notification from the producer of fault supervision MnS indicating the PCI configuration function has resolved the PCI issues. |  |
| **Ends when** | All the steps identified above are successfully completed. |  |
| **Exceptions** | One of the steps identified above fails. |  |
| **Post-conditions** | The PCI collision or PCI confusion have been resolved. |  |
| **Traceability** | **REQ-DPCI-CONFIG-FUN-3, REQ-DPCI-CONFIG-FUN-4, REQ-DPCI-CONFIG-FUN-5, REQ-DPCI-CONFIG-FUN-6** |  |

##### 6.4.1.4.X PCI re-configuration

| Use case stage | Evolution/Specification | <<Uses>> Related use |
| --- | --- | --- |
| **Goal** | To automatically re-configure the PCI of an NR cell, PCI collision or PCI confusion problems. |  |
| **Actors and Roles** | D-SON management function to support PCI re-configuration. |  |
| **Telecom resources** | * gNB; * The producer of provisioning MnS * The producer of fault supervision MnS |  |
| **Assumptions** | N/A |  |
| **Pre-conditions** | * A NR cell has been assigned a PCI value. * The PCI configuration function is in operation and enabled. |  |
| **Begins when** | The PCI configuration function has detected a PCI collision or a PCI confusion for an NR cell. |  |
| **Step 1 (M)** | The PCI configuration function selects a PCI values from the PCI list, and configures the cell with the new PCI value. |  |
| **Step 2 (M)** | The producer of provisioning MnS notifies the consumer about the new PCI value of the NR cell. |  |
| **Ends when** | All the steps identified above are successfully completed. |  |
| **Exceptions** | One of the steps identified above fails. |  |
| **Post-conditions** | The PCI collision or PCI confusion have been resolved. |  |
| **Traceability** | **REQ-DPCI-CONFIG-FUN-3, REQ-DPCI-CONFIG-FUN-4** |  |

**Next change**

#### 7.1.3.3 MnS Component Type C definition

##### 7.1.3.3.1 Notification information

The table below lists the notifications related to D-SON PCI configuration.

Table 7.1.3.3.1-1: PCI notifications

|  |  |  |
| --- | --- | --- |
| Notifications | Description | Note |
| PCI change notification | When the PCI configuration function changes the PCI of a cell, this change is notified using a notifyMOIAttributeValueChanges notification. See attribute nRPCI in TS 28.541 [13]. |  |

##### 7.1.3.3.2 Alarm notification information

The table below lists the alarm notifications related to D-SON PCI configuration.

Table 7.1.3.3.2-1: PCI alarm notifications

|  |  |  |
| --- | --- | --- |
| Alarm notifications | Description | Note |
| PCI configuration function failure | This alarm notification indicates that the PCI configuration function has failed to resolve PCI collision or PCI confusion problems. |  |

**Next change**

### 8.2.3 PCI configuration

#### 8.2.3.1 Initial PCI configuration

Figure 8.2.3.1-1 depicts a procedure that describes how D-SON management function can manage the PCI configuration (D-SON) function to assign the initial PCI values to an NR cell.



Figure 8.2.3.1-1: Initial PCI configuration procedure

1. The D-SON management function consumes the MnS of NF provisioning with *modifyMOIAttributes* operation to configure the PCI list for an NR cell.

1.a The producer of provisioning MnS sets the PCI list at the PCI configuration (D-SON) function. (NOTE)

2. The D-SON management function consumes the MnS of NF provisioning with *modifyMOIAttributes* operation to enable the PCI configuration function for NR cell(s) if it is not enabled.

2.a The MnS of provisioning enables the PCI configuration (D-SON) function (NOTE).

3. The PCI configuration (D-SON) function selects PCI value(s) from the PCI list.

4. The PCI configuration (D-SON) function reports the PCI value(s) being assigned to the MnS of NF provisioning.

5. The MnS of NF provisioning sends a notification *notifyMOIAttributeValueChange* to D-SON management function to indicate the PCI value(s) being assigned to NR cell(s).

NOTE: The interface between MnS of NF provisioning and PCI configuration (D-SON) function is not subject to standardization.

#### 8.2.3.2 PCI re-configuration failure mitigation

Figure 8.2.3.2-1 depicts a procedure that describes how D-SON management function can re-configure the PCI list for the NR cell, when the PCI configuration function is not able to mitigate a PCI collision or PCI confusion problem.



Figure 8.2.3.2-1: PCI re-configuration failure mitigation procedure

1. The PCI configuration (D-SON) function reports to the producer of fault supervision MnS that PCI configuration function failed to mitigate the PCI collision or PCI confusion problem (NOTE).

2. The producer of fault supervision MnS sends a notification *notifyNewAlarm* to D-SON management function to report the PCI configuration function failure.

3. The D-SON management function consumes the MnS of NF provisioning with *modifyMOIAttributes* operation to re-configure the PCI list for NR cell(s).

3.a The MnS of NF provisioning re-configures the PCI list for NR cell(s) (NOTE).

4. The PCI configuration (D-SON) function selects PCI value(s) from the updated PCI list.

5. The PCI configuration (D-SON) function reports the PCI value(s) being assigned to the MnS of NF provisioning.

3. The Producer of provisioning MnS sends a notification *notifyMOIAttributeValueChange* to the D-SON management function to indicate the new PCI value being assigned to NR cell.

7. The PCI configuration (D-SON) function notifies MnS of fault supervision that the PCI configuration function has been restored (NOTE).

8. The producer of fault supervision MnS sends a notification *notifyClearedAlarm* to D-SON management function to report that the PCI configuration function has been restored.

NOTE: The interface between Producer of provisioning MnS and PCI configuration (D-SON) function is not subject to standardization.

#### 8.2.3.X PCI re-configuration

Figure 8.2.3.X-1 depicts a procedure that describes how the PCI configuration function, when detecting a PCI collision or confusion, re-configures the PCI of the cell based on the PCI list and notifies the D-SON management consumer.

**D-SON management consumer**

**Producer of provisioning MnS**

3. *notifyMOIAttributeChange*   
 to indicate new PCI value

**PCI configuration function**

2. Indicate that attribute is changed.

1. Detect and correct PCI collision or confusion

Figure 8.2.3.X-1: PCI re-configuration procedure

1. The PCI configuration (D-SON) function detects and corrects the PCI collision or PCI confusion problem for a NR cell.

2. The PCI configuration (D-SON) function indicates the attribute change to the Producer of provisioning MnS. (NOTE)

3. The Producer of provisioning MnS sends a notification *notifyMOIAttributeValueChange* to the D-SON management function to indicate the new PCI value having been assigned to NR cell.

NOTE: The interface between Producer of provisioning MnS and PCI configuration (D-SON) function is not subject to standardization.

**End of changes**