**3GPP TSG-RAN WG3 Meeting # 129bis *R3-257287***

**Prague, Czech Republic, 13 – 17 October, 2025**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.300** | **CR** | **draftCR** | **rev** | **-** | **Current version:** | **17.14.0** |  |
|  | | | | | | | | |
| *For* ***[HELP](http://www.3gpp.org/3G_Specs/CRs.htm" \l "_blank)*** *on using this form: comprehensive instructions can be found at  <http://www.3gpp.org/Change-Requests>.* | | | | | | | | |
|  | | | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network | **X** | Core Network | **X** |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***Title:*** | Correction on Paging Loss issue | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson, Nokia, Jio Platforms, Huawei, ZTE, CATT, NTT Docomo | | | | | | | | | |
| ***Source to TSG:*** | R3 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_newRAT-Core, TEI17 | | | | |  | ***Date:*** | | | 2025-10-13 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***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-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | RAN3 has agreed a solution during RAN3#129bis meeting in TS 38.413 to prevent or minimize paging loss based on gNB using the UE Radio Access Capabilities to check that the UE Radio Capability for Paging (received in the same NGAP message) contains the full information on paging related features. If the gNB detects an omission, the gNB updates the UE Radio Capability for Paging Information and uploads it to the AMF. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Add the description in section 9.2.5 to describe the solution that can help avoid the paging loss issue. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The paging may be lost when the UE moves from a gNB which does not support forwarding the proper radio paging capability to the AMF. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 9.2.5 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR … CR … | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR … CR … | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

<<<<<<<<<<<<<<<<<<<< Start of Change >>>>>>>>>>>>>>>>>>>>

9.2.5 Paging

Paging allows the network to reach UEs in RRC\_IDLE and in RRC\_INACTIVE state through *Paging* messages, and to notify UEs in RRC\_IDLE, RRC\_INACTIVE and RRC\_CONNECTED state of system information change (see clause 7.3.3) and ETWS/CMAS indications (see clause 16.4) through *Short Messages*. Both *Paging* messages and *Short Messages* are addressed with P-RNTI on PDCCH, but while the former is sent on PCCH, the latter is sent over PDCCH directly (see clause 6.5 of TS 38.331 [12]).

While in RRC\_IDLE the UE monitors the paging channels for CN-initiated paging. While in RRC\_INACTIVE with no ongoing SDT procedure (see clause 18.0) the UE monitors paging channels for RAN-initiated paging and CN-initiated paging. A UE need not monitor paging channels continuously though; Paging DRX is defined where the UE in RRC\_IDLE or RRC\_INACTIVE is only required to monitor paging channels during one Paging Occasion (PO) per DRX cycle (see TS 38.304 [10]). The Paging DRX cycles are configured by the network:

1) For CN-initiated paging, a default cycle is broadcast in system information;

2) For CN-initiated paging, a UE specific cycle can be configured via NAS signalling;

3) For RAN-initiated paging, a UE-specific cycle is configured via RRC signalling;

- The UE uses the shortest of the DRX cycles applicable i.e. a UE in RRC\_IDLE uses the shortest of the first two cycles above, while a UE in RRC\_INACTIVE uses the shortest of the three.

The POs of a UE for CN-initiated and RAN-initiated paging are based on the same UE ID, resulting in overlapping POs for both. The number of different POs in a DRX cycle is configurable via system information and a network may distribute UEs to those POs based on their IDs.

While in RRC\_CONNECTED and while in RRC\_INACTIVE with ongoing SDT procedure, the UE monitors the paging channels in any PO signalled in system information for SI change indication and PWS notification. In case of BA, a UE in RRC\_CONNECTED only monitors paging channels on the active BWP with common search space configured.

For operation with shared spectrum channel access, a UE can be configured for an additional number of PDCCH monitoring occasions in its PO to monitor for paging. However, when the UE detects a PDCCH transmission within the UE's PO addressed with P-RNTI, the UE is not required to monitor the subsequent PDCCH monitoring occasions within this PO.

If Paging Cause is included in the Paging message, a UE in RRC\_IDLE or RRC\_INACTIVE state may use the Paging Cause as per TS 23.501[3].

**Paging optimization for UEs in CM\_IDLE**: at UE context release, the NG-RAN node may provide the AMF with a list of recommended cells and NG-RAN nodes as assistance info for subsequent paging. The AMF may also provide Paging Attempt Information consisting of a Paging Attempt Count and the Intended Number of Paging Attempts and may include the Next Paging Area Scope. If Paging Attempt Information is included in the Paging message, each paged NG-RAN node receives the same information during a paging attempt. The Paging Attempt Count shall be increased by one at each new paging attempt. The Next Paging Area Scope, when present, indicates whether the AMF plans to modify the paging area currently selected at next paging attempt. If the UE has changed its state to CM CONNECTED the Paging Attempt Count is reset.

**Paging optimization for UEs in RRC\_INACTIVE**: at RAN Paging, the serving NG-RAN node provides RAN Paging area information. The serving NG-RAN node may also provide RAN Paging attempt information. Each paged NG-RAN node receives the same RAN Paging attempt information during a paging attempt with the following content: Paging Attempt Count, the intended number of paging attempts and the Next Paging Area Scope. The Paging Attempt Count shall be increased by one at each new paging attempt. The Next Paging Area Scope, when present, indicates whether the serving NG\_RAN node plans to modify the RAN Paging Area currently selected at next paging attempt. If the UE leaves RRC\_INACTIVE state the Paging Attempt Count is reset.

**UE power saving for paging monitoring:** in order to reduce UE power consumption due to false paging alarms, the group of UEs monitoring the same PO can be further divided into multiple subgroups. With subgrouping, a UE shall monitor PDCCH in its PO for paging if the subgroup to which the UE belongs is paged as indicated via associated PEI. If a UE cannot find its subgroup ID with the PEI configurations in a cell or if the UE is unable to monitor the associated PEI occasion corresponding to its PO, it shall monitor the paging in its PO.

These subgroups have the following characteristics:

- They are formed based on either CN controlled subgrouping or UE ID based subgrouping;

- If CN controlled subgroup ID is not provided from AMF, UE ID based subgrouping is used if supported by the UE and network;

- The RRC state (RRC\_IDLE or RRC\_INACTIVE state) does not impact which subgroup the UE belongs to;

- Subgrouping support for a cell is broadcast in the system information as one of the following: Only CN controlled subgrouping supported, only UE ID based subgrouping supported, or both CN controlled subgrouping and UE ID based subgrouping supported;

- Total number of subgroups allowed in a cell is up to 8 and represents the sum of CN controlled and UE ID based subgrouping configured by the network;

- A UE configured with CN controlled subgroup ID applies CN controlled subgroup ID if the cell supports CN controlled subgrouping; otherwise, it derives UE ID based subgroup ID if the cell supports only UE ID based subgrouping.

PEI associated with subgroups has the following characteristics:

- If the PEI is supported by the UE, it shall at least support UE ID based subgrouping method;

- PEI monitoring can be limited via system information to the last used cell (i.e., the cell in which the UE most recently received *RRCRelease* without indicating that the last used cell for PEI shall not be updated);

- A PEI-capable UE shall store its last used cell information;

- gNBs supporting the PEI monitoring to the last used cell function provide the UE's last used cell information to the AMF in the NG-AP UE Context Release Complete message for PEI capable UEs, as described in TS 38.413 [26];

- UE that expects MBS group notification shall ignore the PEI and shall monitor paging in its PO.

**CN controlled subgrouping:** For CN controlled subgrouping, AMF is responsible for assigning subgroup ID to the UE. The total number of subgroups for CN controlled subgrouping which can be configured, e.g. by OAM is up to 8. It is assumed that CN controlled subgrouping support is homogeneous within an RNA.

The following figure describes the procedure for CN controlled subgrouping:

****

**Figure 9.2.5-1: Procedure for CN controlled subgrouping**

1. The UE indicates its support of CN controlled subgrouping via NAS signalling.

2. If the UE supports CN controlled subgrouping, the AMF determines the subgroup ID assignment for the UE.

3. The AMF sends subgroup ID to the UE via NAS signalling.

4. The AMF informs the gNB about the CN assigned subgroup ID for paging the UE in RRC\_IDLE/ RRC\_INACTIVE state.

5. When the paging message for the UE is received from the CN or is generated by the gNB, the gNB determines the PO and the associated PEI occasion for the UE.

6. Before the UE is paged in the PO, the gNB transmits the associated PEI and indicates the corresponding CN controlled subgroup of the UE that is to be paged in the PEI.

**UE ID based subgrouping:** For UE ID based subgrouping, the gNB and UE can determine the subgroup ID based on the UE ID and the total number of subgroups for UE ID based subgrouping in the cell. The total number of subgroups for UE ID based subgrouping is decided by the gNB for each cell and can be different in different cells. The following figure describes the procedure for UE ID based subgrouping:

****

**Figure 9.2.5-2: Procedure for UE ID based subgrouping**

1. The gNB determines the total number of subgroups for UE ID based subgrouping in a cell.

2. The gNB broadcasts the total number of subgroups for UE ID based subgrouping in a cell.

3. UE determines its subgroup in a cell.

4. When paging message for the PEI capable UE is received from the CN at the gNB or is generated by the gNB, the gNB determines the PO and the associated PEI occasion for the UE.

5. Before the UE is paged in the PO, the gNB transmits the associated PEI and indicates the corresponding subgroup derived based on UE ID of the UE that is paged in the PEI.

Paging to the UE may be lost in case gNB does not support forwarding the appropriate radio paging capability to the AMF. The gNB verifies that the UE Radio Capability for Paging received from the AMF in the INITIAL CONTEXT SETUP REQUEST message contains all the paging related information for all NG-RAN RAT(s) which the UE supports based on the UE Radio Capability, and indicates it to AMF if necessary, as described in TS 38.413 [26].