3GPP TSG-RAN WG3 Meeting #113-e R3-213653

**Online, 16 - 27 August 2021**

**Agenda item: 22.2.2**

**Source:**  **Qualcomm Incorporated, Huawei, Lenovo, Motorola Mobility**

**Title:** (**TP to TS 38.473 BL CR) Multicast Group Paging**

**Document for: Other**

# **1 Introduction**

As discussed in [1], the following proposals are achieved:

Proposal 1: Introduce MBS Session List in PDU Session Level, and each MBS Session item should:

* includes MBS Session ID;
* includes list of MBS QoS Flow information (includes MBS QoS Flow ID, MBS QoS profile, and the mapped unicast QoS Flow ID);
* supports to add/modify/release MBS QoS flows;
* includes MBS Service Area Information.

Proposal 2: Use the accepted MBS QFI in the *PDU Session Resource Modify Response Transfer* IE to indicate the support of MBS by the gNB.

Proposal 3: Introduce non UE associated class1 NGAP: Session activation/deactivation procedures for Multicast Session Management.

Proposal 4: Introduce NGAP: GROUP PAGING message to support group paging from CN to RAN. And the NGAP: GROUP PAGING message includes:

* MBS Session ID
* TAI List
* Service Area

**Proposal 5: Introduce non UE associated Class 2 F1AP: Group Paging procedure to support group paging from gNB-CU to gNB-DU. And the F1AP: GROUP PAGINGE message includes:**

* **MBS Session ID**
* **Paging Cell List**

Proposal 6: Introduce a non-UE associated class1 NGAP: Multicast Distribution Setup procedure, triggered by the gNB:

* in case the gNB decides or is configured to use unicast transport for multicast distribution sessions, it includes the DL GTP-U tunnel info in the Multicast Distribution Setup Request.
* in case the DL GTP-U tunnel info is not included in the Multicast Distribution Setup Request, the core network shall provide IP multicast DL tunnel info to the gNB, to enable IP multicast transport.

Proposal 7: Introduce a non-UE associated Class1 E1AP procedure, e.g. named as Multicast Distribution Setup procedure, triggered by the gNB-CU-UP:

* in case the gNB-CU-UP decides or is configured to use unicast transport for multicast distribution sessions, it includes the DL GTP-U tunnel info in the Multicast Distribution Response Request.
* in case the DL GTP-U tunnel info is not included in the Multicast Distribution Setup Request, the cgNB-CU-CP shall provide IP multicast DL tunnel info to the gNB-CU-UP, to enable IP multicast transport.

In this paper, we provide the text proposal to BL CR of TS 38.473 in Section 3.

# **2 Reference**

1. R3-213555 Consideration on Multicast Session Management Huawei, CBN, China Unicom, Lenovo, Motorola Mobility, Qualcomm Incorporated, China Telecom
2. R3-213556 (TP to TS 38.410 BL CR) Multicast Session Management Huawei, CBN, China Unicom, Lenovo, Motorola Mobility, Qualcomm Incorporated, China Telecom
3. R3-213557 (TP to TS 38.413 BL CR) Multicast Session Management Huawei, Lenovo, Motorola Mobility, Qualcomm Incorporated
4. R3-213746 (TP to TS 38.460 BL CR) Support of Multicast Distribution Setup and Release Lenovo, Motorola Mobility, Huawei, Qualcomm Incorporated
5. R3-213747 (TP to TS 38.463 BL CR) Support of Multicast Distribution Setup and Release Lenovo, Motorola Mobility, Huawei, Qualcomm Incorporated

# **3 Text Proposal**

***-----------------Start of the Changes-------------------***

## 8.1 List of F1AP Elementary procedures

In the following tables, all EPs are divided into Class 1 and Class 2 EPs (see subclause 3.1 for explanation of the different classes):

Table 1: Class 1 procedures

|  |  |  |  |
| --- | --- | --- | --- |
| Elementary Procedure | Initiating Message | Successful Outcome | Unsuccessful Outcome |
| Response message | Response message |
| Reset | RESET | RESET ACKNOWLEDGE |  |
| F1 Setup | F1 SETUP REQUEST | F1 SETUP RESPONSE | F1 SETUP FAILURE |
| gNB-DU Configuration Update | GNB-DU CONFIGURATION UPDATE | GNB-DU CONFIGURATION UPDATE ACKNOWLEDGE | GNB-DU CONFIGURATION UPDATE FAILURE |
| gNB-CU Configuration Update | GNB-CU CONFIGURATION UPDATE | GNB-CU CONFIGURATION UPDATE ACKNOWLEDGE | GNB-CU CONFIGURATION UPDATE FAILURE |
| UE Context Setup | UE CONTEXT SETUP REQUEST | UE CONTEXT SETUP RESPONSE | UE CONTEXT SETUP FAILURE |
| UE Context Release (gNB-CU initiated) | UE CONTEXT RELEASE COMMAND | UE CONTEXT RELEASE COMPLETE |  |
| UE Context Modification (gNB-CU initiated) | UE CONTEXT MODIFICATION REQUEST | UE CONTEXT MODIFICATION RESPONSE | UE CONTEXT MODIFICATION FAILURE |
| UE Context Modification Required (gNB-DU initiated) | UE CONTEXT MODIFICATION REQUIRED | UE CONTEXT MODIFICATION CONFIRM | UE CONTEXT MODIFICATION REFUSE |
| Write-Replace Warning  | WRITE-REPLACE WARNING REQUEST | WRITE-REPLACE WARNING RESPONSE |  |
| PWS Cancel | PWS CANCEL REQUEST | PWS CANCEL RESPONSE |  |
| gNB-DU Resource Coordination | GNB-DU RESOURCE COORDINATION REQUEST | GNB-DU RESOURCE COORDINATION RESPONSE |  |
| F1 Removal | F1 REMOVAL REQUEST | F1 REMOVAL RESPONSE | F1 REMOVAL FAILURE |
| BAP Mapping Configuration | BAP MAPPING CONFIGURATION  | BAP MAPPING CONFIGURATION ACKNOWLEDGE | BAP MAPPING CONFIGURATION FAILURE |
| GNB-DU Resource Configuration | GNB-DU RESOURCE CONFIGURATION | GNB-DU RESOURCE CONFIGURATION ACKNOWLEDGE | GNB-DU RESOURCE CONFIGURATION FAILURE |
| IAB TNL Address Allocation | IAB TNL ADDRESS REQUEST | IAB TNL ADDRESS RESPONSE | IAB TNL ADDRESS FAILURE |
| IAB UP Configuration Update | IAB UP CONFIGURATION UPDATE REQUEST | IAB UP CONFIGURATION UPDATE RESPONSE | IAB UP CONFIGURATION UPDATE FAILURE |
| Resource Status Reporting Initiation | RESOURCE STATUS REQUEST | RESOURCE STATUS RESPONSE | RESOURCE STATUS FAILURE |
| Positioning Measurement | POSITIONING MEASUREMENT REQUEST | POSITIONING MEASUREMENT RESPONSE | POSITIONING MEASUREMENT FAILURE |
| Positioning Information Exchange | POSITIONING INFORMATION REQUEST | POSITIONING INFORMATION RESPONSE | POSITIONING INFORMATION FAILURE |
| TRP Information Exchange | TRP INFORMATION REQUEST | TRP INFORMATION RESPONSE | TRP INFORMATION FAILURE |
| Positioning Activation | POSITIONING ACTIVATION REQUEST | POSITIONING ACTIVATION RESPONSE | POSITIONING ACTIVATION FAILURE |
| E-CID Measurement Initiation | E-CID MEASUREMENT INITIATION REQUEST | E-CID MEASUREMENT INITIATION RESPONSE | E-CID MEASUREMENT INITIATION FAILURE |

Table 2: Class 2 procedures

|  |  |
| --- | --- |
| Elementary Procedure | Message |
| Error Indication | ERROR INDICATION |
| UE Context Release Request (gNB-DU initiated) | UE CONTEXT RELEASE REQUEST |
| Initial UL RRC Message Transfer | INITIAL UL RRC MESSAGE TRANSFER |
| DL RRC Message Transfer | DL RRC MESSAGE TRANSFER |
| UL RRC Message Transfer | UL RRC MESSAGE TRANSFER |
| UE Inactivity Notification  | UE INACTIVITY NOTIFICATION |
| System Information Delivery | SYSTEM INFORMATION DELIVERY COMMAND |
| Paging | PAGING |
| Notify | NOTIFY |
| PWS Restart Indication | PWS RESTART INDICATION |
| PWS Failure Indication | PWS FAILURE INDICATION |
| gNB-DU Status Indication | GNB-DU STATUS INDICATION |
| RRC Delivery Report | RRC DELIVERY REPORT |
| Network Access Rate Reduction | NETWORK ACCESS RATE REDUCTION |
| Trace Start | TRACE START |
| Deactivate Trace | DEACTIVATE TRACE |
| DU-CU Radio Information Transfer | DU-CU RADIO INFORMATION TRANSFER |
| CU-DU Radio Information Transfer | CU-DU RADIO INFORMATION TRANSFER |
| Resource Status Reporting | RESOURCE STATUS UPDATE |
| Access And Mobility Indication | ACCESS AND MOBILITY INDICATION |
| Reference Time Information Reporting Control | REFERENCE TIME INFORMATION REPORTING CONTROL |
| Reference Time Information Report | REFERENCE TIME INFORMATION REPORT |
| Access Success | ACCESS SUCCESS |
| Cell Traffic Trace | CELL TRAFFIC TRACE |
| Positioning Assistance Information Control | POSITIONING ASSISTANCE INFORMATION CONTROL |
| Positioning Assistance Information Feedback | POSITIONING ASSISTANCE INFORMATION FEEDBACK |
| Positioning Measurement Report | POSITIONING MEASUREMENT REPORT |
| Positioning Measurement Abort | POSITIONING MEASUREMENT ABORT |
| Positioning Measurement Failure Indication | POSITIONING MEASUREMENT FAILURE INDICATION |
| Positioning Measurement Update | POSITIONING MEASUREMENT UPDATE |
| Positioning Deactivation | POSITIONING DEACTIVATION |
| E-CID Measurement Failure Indication | E-CID MEASUREMENT FAILURE INDICATION |
| E-CID Measurement Report | E-CID MEASUREMENT REPORT |
| E-CID Measurement Termination | E-CID MEASUREMENT TERMINATION COMMAND |
| Positioning Information Update | POSITIONING INFORMATION UPDATE |
| Multicast Group Paging | MULTICAST GROUP PAGING |

***-----------------Next Changes-------------------***

## 8.x NR MBS Procedures

### 8.x.1 Multicast Group Paging

#### 8.x.1.1 General

The purpose of the Multicast Group Paging procedure is to provide the paging information to enable the gNB-DU to page UEs joined the Multicast MBS session. The procedure uses non-UE associated signalling.

#### 8.x.1.2 Successful Operation



Figure 8.x.1.2-1: Multicast Group Paging procedure. Successful operation.

The gNB-CU initiates the procedure by sending a MULTICAT GROUP PAGING message.

At the reception of the MULTICAT GROUP PAGING message, the gNB-DU shall perform paging of the UEs in cells which belong to cells as indicated in the *Paging Cell List* IE.

#### 8.x.1.3 Abnormal Conditions

Not applicable.

***-----------------Next Changes-------------------***

#### 9.2.y.1 Multicast GROUP PAGING

This message is sent by the gNB-CU and is used to request the gNB-DU to page UEs.

Direction: gNB-CU → gNB-DU

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.3.1.1 |  | YES | ignore |
| MBS Session ID | M |  | FFS |  | YES | reject |
| Further IEs FFS |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofPagingCells | Maximum no. of paging cells, the maximum value is 512.  |