**3GPP TSG-RAN3 Meeting #123R3-240849**

**Athens, Greece, 26th Feb – 1st Mar 2024**

Agenda Item: 9.1.11.1

Source: Ericsson (moderator)

Title: Summary of Offline Discussion for CB: # 16\_R18Redcap

Document for: Discussion

# Introduction

**CB: # 16\_R18Redcap**

**- How to modify the Paging Policy Differentiation IE in the RAN PAGING REQUEST message by adding a list of PDU sessions and QoS flows?**

**- MT Communication Handling procedure? Paging enhancements? HO restriction? Reply LS to SA2 in R3-240026?**

(moderator – E///)

Summary of offline disc R3-240849

# For the Chair’s Notes

Agree R3-240989

Agree R3-240990

Agree R3-240848

Endorse R3-240991

Merge R3-240199

**To be captured as rapporteur change:**

* R3-240544 be captured by XnAP and equivalent change by NGAP rapporteurs.

**To be continued:**

* Addition of PDU session IDs info from RAN to AMF.
* RedCap Rx branches and HD FDD indication over F1 Paging
* RAT restrictions in LTE

# Discussion

## PPD

NGAP CR:

It is proposed to modify the PPD as proposed in R3-240572 (Ericsson, QC, Huawei, Xiaomi, CATT):

1. Addition of PDU Session list
	1. PDU session ID
	2. QoS flow List
		1. QFI
		2. ARP
		3. PPI
		4. 5QI
		5. DL Data Size

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| Figure 4.8.2.2b-1: Network Triggered Connection Resume for UE in RRC\_INACTIVE with CN based MT communication handling1a. When downlink data is received and the SMF/UPF is requested to perform buffering as specified in clause 4.8.1.1a, the UPF/SMF checks with AMF for the possibility of data delivery, similar to step 2 of clause 4.24.2 with the following differences:- The UPF provides the DL data size information of the QoS Flow when sending Data Notification to SMF if the UPF has received instruction from SMF.- In the Namf\_MT\_EnableUEReachability the SMF may also send the following parameters the PPI, the ARP and the 5QI, DL data size, and/or QFI for the QoS Flow of the PDU Session which triggered the request for paging policy differentiation as defined in clause 5.4.3.2 of TS 23.501 [2].[…]2. When the AMF determines that the UE is reachable, the AMF sends an N2 DL Data Notification message to NG-RAN with the request for the UE's RRC connection to be resumed. The AMF may include the following per QoS Flow parameter(s) the PPI, the ARP and the 5QI, DL data size and/or QFI for the QoS Flow(s) of the PDU Session in the N2 DL Data Notification message to trigger and enable RAN paging. If the AMF receives MT signalling (i.e. via Namf\_Communication\_N1N2MessageTransfer) in step 1a, AMF includes DL Signalling indication in the N2 RAN Paging Request message.3. NG-RAN performs RAN paging towards the UE considering the parameters provided by the AMF. Based on the DL data size for QoS Flow(s), if it’s provided, the NG-RAN determines whether to set the MT-SDT flag as defined in TS 38.300 [9]).4. When the UE receives RAN paging, it initiates the UE triggered Connection Resume procedure and NG-RAN notifies CN as specified in clause 4.8.2.2 including the N2 Notification in step 3b.5. The UPF triggers downlink data delivery if there is any. The AMF sends downlink NAS messages if there is any. |

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| 9.3.3.63 Paging Policy Differentiation This IE provides paging policy differentiation information for a UE in RRC\_INACTIVE state.

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| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** |
| **PDU Session for Paging List** |  | ***1*** |  |  |
| **>PDU Session for Paging Item** |  | ***1..<maxnoofPDUSessions>*** |  |  |
| >>PDU Session ID | O |  | 9.3.1.50 |  |
| **>>Paging Policy Differentiation List** |  | *1* |  |  |
| **>>>Paging Policy Differentiation Item** |  | *1..<maxnoofQoSFlows>* |  |  |
| >>>>QoS Flow Identifier | O |  | 9.3.1.51 |  |
| >>>>Paging Policy Indicator | O |  | INTEGER(0..7, …) | Used for paging policy differentiation as specified in TS 23.501 [9]). |
| >>>>Allocation and Retention Priority | O |  | 9.3.1.19 |  |
| >>>>5QI | O |  | INTEGER (0..255, …) | Indicates the 5QI associated with the PDU session |
| >>>>DL Data Size | O |  | INTEGER (0..96000, …) | Unit: Byte. |

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| **Range bound** | **Explanation** |
| maxnoofPDUSessions | Maximum no. of PDU sessions allowed towards one UE. Value is 256. |
| maxnoofQoSFlows | Maximum no. of QoS flows allowed within one PDU session. Value is 64.  |

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Proposal 1: Agree to revise the PPD IE per PDU session, by including the DL data size per QoS flow (Ericsson et al. CR, merge with ZTE paper, CT, NSB)

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Stage 2 CR:

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| 9.2.2 Mobility in RRC\_INACTIVE9.2.2.1 Overview[…]Upon receiving the RAN Paging Request message from the AMF while the UE is in RRC\_INACTIVE with eDRX beyond 10.24 seconds, the last serving gNB may page in its cells comprised in the RNA and may send XnAP RAN Paging to neighbour gNB(s) if the RNA includes cells of neighbour gNB(s), in order to trigger the UE to resume connection in RRC\_CONNECTED state. or in RRC\_INACTIVE state for DL SDT, based on the DL Data Size if included in the NGAP RAN Paging Request message. |
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Proposal 2: Agree the stage 2 TS 38.300 CR to capture RRC\_INACTIVE DL SDT paging (R3-240106Nokia et al. + co-signers, ZTE, CT, etc. everyone)

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## eRedCap indication

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| [R3-240311](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_123%5CDocs%5CR3-240311.zip) | eRedCap UE access control (Huawei, Ericsson, ZTE, Qualcomm Incorporated, Xiaomi) | CR1073r, TS 38.413 v18.0.0, Rel-18, Cat. F* Update the procedure text rather than adding new procedure text
* Add Nok, CT, CATT as co-source

Rev in R3-240848 |

eRedCap = extra Reduced Capability

Proposal 3: Agree revision R3-240848 (Huawei et al.)

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## Other issues

3.3.1) R3-240574: Correction of MT Communication Handling procedure (Ericsson, Huawei)

* Addition of PDU session IDs info from RAN to AMF.

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| [R3-240574](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_123%5CDocs%5CR3-240574.zip) | Correction of MT Communication Handling procedure (Ericsson, Huawei) | CR1102r, TS 38.413 v18.0.0, Rel-18, Cat. FNok, ZTE: AMF should know which PDU session are active or non-activeCATT: Not essential |

Moderator: do not agree, PDU session ID is included in all NGAP messages where AMF is required to contact SMF.

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| 9.2.2.16 UE CONTEXT SUSPEND REQUESTThis message is sent by the NG-RAN node to request the AMF to suspend the UE context and the related PDU session contexts.Direction: NG-RAN node → AMF

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| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M |  | 9.3.1.1 |  | YES | reject |
| AMF UE NGAP ID | M |  | 9.3.3.1 |  | YES | reject |
| RAN UE NGAP ID | M |  | 9.3.3.2 |  | YES | reject |
| Information on Recommended Cells and RAN Nodes for Paging | O |  | 9.3.1.100 |  | YES | ignore |
| Paging Assistance Data for CE Capable UE  | O |  | 9.3.1.141 |  | YES | ignore |
| **PDU Session Resource Suspend List** |  | *0..1* |  |  | YES | reject |
| **>PDU Session Resource Suspend Item** |  | *1..<maxnoofPDUSessions>* |  |  | - |  |
| >>PDU Session ID | M |  | 9.3.1.50 |  | - |  |
| >>UE Context Suspend Request Transfer | M |  | Containing the *UE Context Suspend Request Transfer* IE specified in subclause 9.3.4.26. |  | - |  |

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| **Range bound** | **Explanation** |
| maxnoofPDUSessions | Maximum no. of PDU sessions allowed towards one UE. Value is 256. |

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| 9.2.2.19 UE CONTEXT RESUME REQUESTThis message is sent by the NG-RAN node to request the AMF to resume the UE-associated logical NG-connection and UE context.Direction: NG-RAN node → AMF

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| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.3.1.1 |  | YES | reject |
| AMF UE NGAP ID | M |  | 9.3.3.1 |  | YES | reject |
| RAN UE NGAP ID | M |  | 9.3.3.2 |  | YES | reject |
| RRC Resume Cause | M |  | RRC Establishment Cause9.3.1.111 |  | YES | ignore |
| **PDU Session Resource Resume List** |  | *0..1*  |  |  | YES | reject |
| **>PDU Session Resource Resume Item** |  | *1..<maxnoofPDUSessions>* |  |  | - |  |
| >>PDU Session ID | M |  | 9.3.1.50 |  | - |  |
| >>UE Context Resume Request Transfer | M |  | OCTET STRING | Containing the *UE Context Resume Request Transfer* IE specified in subclause 9.3.4.24  | - |  |
| **PDU Session Resource Failed to Resume List** |  | *0..1* |  |  | YES | reject |
| **>PDU Session Resource Failed to Resume Item** |  | *1..<maxnoofPDUSessions>* |  |  | - |  |
| >>PDU Session ID | M |  | 9.3.1.50 |  | - |  |
| >>Cause | M |  | 9.3.1.2 |  | - |  |
| Suspend Request Indication | O |  | 9.3.1.158 |  | YES | ignore |
| Information on Recommended Cells and RAN Nodes for Paging | O |  | 9.3.1.100 |  | YES | ignore |
| Paging Assistance Data for CE Capable UE  | O |  | 9.3.1.141 |  | YES | ignore |

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| Range bound | Explanation |
| maxnoofPDUSessions | Maximum no. of PDU sessions allowed towards one UE. Value is 256. |

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Proposal 4: Since the NG-RAN should be able to tell AMF which PDU sessions have corresponding PDU session resources established in the NG-RAN, the NG-RAN can include “a list of PDU Session IDs” in the MT Communication Handling Request message to instruct the AMF that the user plane connections for these PDU sessions are to be “Suspended” “Resumed” since the UE enters RRC Inactive with long eDRX, so that the AMF can trigger UpdateSmContext correspondingly.

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3.3.2) R3-240085: RedCap Rx branches and HD FDD indication over F1 Paging (Qualcomm Incorporated, Ericsson)

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| [R3-240085](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_123%5CDocs%5CR3-240085.zip) | RedCap Rx branches and HD FDD indication over F1 Paging (Qualcomm Incorporated, Ericsson) | CR1297r, TS 38.473 v17.7.0, Rel-17, Cat. FHW, Nok: Not convinced on the enhancement, try to understand the benefitsE///, ZTE: Support the CRR17 or R18? |

Motivations explained for paging optimization in the cells which supports HD FDD bands or 1/2 Rx. PDCCH aggregation and paging boosting for 1RX UE, etc.

Moreover alignment between F1 and RRC is needed:

RRC:

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| UERadioPagingInformation-v1700-IEs ::= SEQUENCE { ue-RadioPagingInfo-r17                OCTET STRING (CONTAINING UE-RadioPagingInfo-r17) OPTIONAL, inactiveStatePO-Determination-r17     ENUMERATED {supported} OPTIONAL, numberOfRxRedCap-r17                  ENUMERATED {one, two} OPTIONAL, halfDuplexFDD-TypeA-RedCap-r17         SEQUENCE (SIZE (1..maxBands)) OF FreqBandIndicatorNR OPTIONAL, nonCriticalExtension UERadioPagingInformation-v1800-IEs OPTIONAL } |

F1AP:

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| 9.3.1.270 UE Paging CapabilityThis IE provides the UE Paging Capability information needed for paging.

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| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| INACTIVE State PO-Determination | O |  | ENUMERATED(supported,…) | Corresponds to the *inactiveStatePO-Determination* contained in the *UERadioPagingInformation* IE defined in TS 38.331 [8]. | - | - |
| RedCap Indication | O |  | ENUMERATED(true,…) | Indicates that the paged UE is a Redcap UE or an eRedCap UE. | YES | Ignore |

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Proposal 5: To be continued…

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3.3.3) R3-240425, Correction to 36.413 for Handover Restriction List (R18) (CATT)

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| [R3-240425](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_123%5CDocs%5CR3-240425.zip) | Correction to 36.413 for Handover Restriction List (R18) (CATT) | CR1928r, TS 36.413 v18.0.0, Rel-18, Cat. F |

VDF: thinks it is needed

Proposal: …To be continued

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3.3.4) procedural text correction

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| [R3-240197](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_123%5CDocs%5CR3-240197.zip) | Correction on MT COMMUNICATION HANDLING REQUEST in TS38.413 (ZTE) | CR1063r, TS 38.413 v18.0.0, Rel-18, Cat. F |

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| The NG-RAN node initiates the procedure by sending the MT COMMUNICATION HANDLING REQUEST message to the AMF.If the *5GC Action* IE within the MT COMMUNICATION HANDLING REQUEST message is set to "HLCom Activate", the AMF shall activate MT communication handling as specified in TS 23.501 [9] and take into account the *NR Paging Long eDRX Information for RRC INACTIVE* IE when applying MT communication handling as specified in TS 38.304 [12] and TS 23.502 [10].If the *5GC Action* IE within the MT COMMUNICATION HANDLING REQUEST message is set to "HLCom Deactivate", the AMF shall deactivate MT communication handling as specified in TS 23.501 [9]. |

Proposal 6: already captured by NGAP rapporteur

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| [R3-240312](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_123%5CDocs%5CR3-240312.zip) | UL SDT for MT communication handling (Huawei, ZTE, Ericsson) | draftCR |

Proposal 7: Looks ok, agree to be endorsed

Remove note and place new text together with previous step description

Update figure as needed

Add co-signers: Nokia, NSB,

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| [R3-240544](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_123%5CDocs%5CR3-240544.zip) | Correction of NR Paging Long eDRX Cycle for RRC INACTIVE (Huawei) | CR1185r, TS 38.423 v18.0.0, Rel-18, Cat. F |

Proposal 8: Looks ok, suggest to be captured in XnAP and NGAP rapporteur.

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