**3GPP TSG-RAN WG3 Meeting #114b-e *R3-221261***

**E-meeting, 17-26 January 2022**

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| --- |
| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **38.423** | **CR** | **0732** | **rev** | **1** | **Current version:** | 16.8.0 |  |
|  |
| *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:***  | Supporting UE Power Saving Enhancements |
|  |  |
| ***Source to WG:*** | Huawei, Nokia, Nokia Shanghai Bell |
| ***Source to TSG:*** | R3 |
|  |  |
| ***Work item code:*** | NR\_UE\_pow\_sav\_enh |  | ***Date:*** | 2022-01-17 |
|  |  |  |  |  |
| ***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 canbe 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:*** | The power saving WID is agreed in RP-212630 with the following objective related to RAN3. * *Study and specify paging enhancement(s) to reduce unnecessary UE paging receptions, subject to no impact to legacy UEs [RAN2, RAN1, RAN3]*

This CR contains the protocol changes to support UE power saving.  |
|  |  |
| ***Summary of change:*** | Include the PEIPS assistance information in the XnAP Paging message |
|  |  |
| ***Consequences if not approved:*** | Enhanced power saving feature is not supported.  |
|  |  |
| ***Clauses affected:*** | 8.2.5.2, 9.1.1.7, 9.2.3.x, 9.3.4, 9.3.5, 9.3.7 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS 38.413 CR 0725 TS 38.473 CR 0855.TS 38.410 CR 0037 |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** | This CR is conditional to pending decision in RAN2 whethe the paging subgrouping feature is restricted to last serving cell or not. |
|  |  |
| ***This CR's revision history:*** | Rev0: R3-220676Rev1: R3-221261 Update the IE name, and Asn.1.  |

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| **Change Begins** |

## 3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

5QI 5G QoS Identifier

AMF Access and Mobility Management Function

CAG Closed Access Group

CGI Cell Global Identifier

CHO Conditional Handover

CP Control Plane

DAPS Dual Active Protocol Stack

DL Downlink

EN-DC E-UTRA-NR Dual Connectivity

E-RAB E-UTRAN Radio Access Bearer

GUAMI Globally Unique AMF Identifier

IAB Integrated Access and Backhaul

IMEISV International Mobile station Equipment Identity and Software Version number

MCG Master Cell Group

M-NG-RAN node Master NG-RAN node

NGAP NG Application Protocol

NID Network Identifier

NPN Non-Public Network

NSSAI Network Slice Selection Assistance Information

PEIPS Paging Early Indication with Paging Subgrouping

PNI-NPN Public Network Integrated Non-Public Network RANAC RAN Area Code

RSN Redundancy Sequence Number

SCG Secondary Cell Group

SCTP Stream Control Transmission Protocol

SNPN Stand-alone Non-Public Network

S-NG-RAN node Secondary NG-RAN node

S-NSSAI Single Network Slice Selection Assistance Information

SUL Supplementary Uplink

TAC Tracking Area Code

TAI Tracking Area Identity

UL Uplink

UPF User Plane Function

V2X Vehicle-to-Everything

**<Unchanged Text Omitted>**

### 8.2.5 RAN Paging

#### 8.2.5.1 General

The purpose of the RAN Paging procedure is to enable the NG-RAN node1 to request paging of a UE in the NG-RAN node2.

The procedure uses non UE-associated signalling.

#### 8.2.5.2 Successful operation



Figure 8.2.5.2-1: RAN Paging: successful operation

The RAN Paging procedure is triggered by the NG-RAN node1 by sending the RAN PAGING message to the NG-RAN node2,in which the necessary information e.g. UE RAN Paging Identity should be provided.

If the *Paging Priority* IE is included in the RAN PAGING message, the NG-RAN node2 may use it to prioritize paging.

If the *Assistance Data for RAN Paging* IE is included in the RAN PAGING message, the NG-RAN node2 may use it according to TS 38.300 [9].

If the *UE Radio Capability for Paging* IE is included in the RAN PAGING message, the NG-RAN node2 may use it to apply specific paging schemes.

If the *Extended UE Identity Index Value* IE is included in the RAN PAGING message, the NG-RAN node2 may use it according to TS 36.304 [34]. When available, NG-RAN node1 may include the *Extended UE Identity Index Value* IE in the RAN PAGING message towards an ng-eNB (e.g. NG-RAN node2).

When available, the NG-RAN node1 shall include the *Paging eDRX Information* IE in the RAN PAGING message towards the NG-RAN node2. If the *Paging eDRX Information* IE is included in the RAN PAGING message, the NG-RAN node2 shall, if supported, use it according to TS 36.304 [34].

When available, the NG-RAN node1 shall include the *UE Specific DRX* IE in the RAN PAGING message towards the NG-RAN node2. If the *UE specific DRX* IE is included in the RAN PAGING message, the NG-RAN node2 shall, if supported, use it according to TS 36.304 [34].

If the *PEIPS Assistance Information* IE is included in the RAN PAGING message, the NG-RAN node2 shall, if supported, use it as defined in TS 23.501 [7] and TS 38.300 [90].

Editor’s Note: The inclusion of the PEI Assistance Information is to be finally confirmed in RAN2.

**<Unchanged Text Omitted>**

#### 9.1.1.7 RAN PAGING

This message is sent by the NG-RAN node1 to NG-RAN node2 to page a UE.

Direction: NG-RAN node1 → NG-RAN node2.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.3.1 |  | YES | reject |
| CHOICE *UE Identity Index Value* | M |  |  |  | YES | reject |
| *>Length-10* |  |  |  |  |  |  |
| >>Index Length-10 | M |  | BIT STRING (SIZE(10)) | Coded as specified in TS 38.304 [33] and TS 36.304 [34]. | – |  |
| UE RAN Paging Identity | M |  | 9.2.3.43 |  | YES | ignore |
| Paging DRX | M |  | 9.2.3.66 | Includes the RAN paging cycle as defined in TS 36.304 [34] and 38.304 [33]. | YES | ignore |
| RAN Paging Area | M |  | 9.2.3.38 |  | YES | reject |
| Paging Priority | O |  | 9.2.3.44 |  | YES | ignore |
| Assistance Data for RAN Paging | O |  | 9.2.3.41 |  | YES | ignore |
| UE Radio Capability for Paging | O |  | 9.2.3.91 |  | YES | ignore |
| Extended UE Identity Index Value | O |  | 9.2.3.141 | Coded as specified in TS 36.304 [34]. | YES | ignore |
| Paging eDRX Information | O |  | 9.2.3.142 |  | YES | ignore |
| UE specific DRX | O |  | 9.2.3.143 | Includes the UE specific paging cycle as defined in TS 36.304 [34] and 38.304 [33]. | YES | Ignore |
| PEIPS Assistance Information | O |  | 9.2.3.x |  | YES | ignore |

Editor’s Note: The inclusion of the PEI Assistance Information is to be confirmed in RAN2.

**<Unchanged Text Omitted>**

9.2.3.x PEIPS Assistance Information

This IE provides the information related to CN paging subgrouping for a particular UE, as specified in TS 38.304 [33].

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** |
| CN Subgroup ID | M |  | INTEGER (0..7,…) |  |

### 9.3.4 PDU Definitions

-- ASN1START

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- PDU definitions for XnAP.

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

 SNTriggered,

 SCGIndicator,

 UESpecificDRX,

 PEIPSassistanceInformation

**<Unchanged Text Omitted>**

 id-SCGIndicator,

 id-UESpecificDRX,

 id-PDUSessionExpectedUEActivityBehaviour,

 id-PEIPSassistanceInformation,

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- RAN PAGING

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RANPaging ::= SEQUENCE {

 protocolIEs ProtocolIE-Container {{RANPaging-IEs}},

 ...

}

RANPaging-IEs XNAP-PROTOCOL-IES ::= {

 { ID id-UEIdentityIndexValue CRITICALITY reject TYPE UEIdentityIndexValue PRESENCE mandatory}|

 { ID id-UERANPagingIdentity CRITICALITY ignore TYPE UERANPagingIdentity PRESENCE mandatory}|

 { ID id-PagingDRX CRITICALITY ignore TYPE PagingDRX PRESENCE mandatory}|

 { ID id-RANPagingArea CRITICALITY reject TYPE RANPagingArea PRESENCE mandatory}|

 { ID id-PagingPriority CRITICALITY ignore TYPE PagingPriority PRESENCE optional }|

 { ID id-AssistanceDataForRANPaging CRITICALITY ignore TYPE AssistanceDataForRANPaging PRESENCE optional }|

 { ID id-UERadioCapabilityForPaging CRITICALITY ignore TYPE UERadioCapabilityForPaging PRESENCE optional }|

 { ID id-ExtendedUEIdentityIndexValue CRITICALITY ignore TYPE ExtendedUEIdentityIndexValue PRESENCE optional }|

 { ID id-PagingeDRXInformation CRITICALITY ignore TYPE PagingeDRXInformation PRESENCE optional }|

 { ID id-UESpecificDRX CRITICALITY ignore TYPE UESpecificDRX PRESENCE optional }|

 { ID id-PEIPSassistanceInformation CRITICALITY ignore TYPE PEIPSassistanceInformation PRESENCE optional },

 ...

}

**<Unchanged Text Omitted>**

### 9.3.5 Information Element definitions

-- ASN1START

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Information Element Definitions

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

**<Unchanged Text Omitted>**

CHOinformation-Ack-ExtIEs XNAP-PROTOCOL-EXTENSION ::={

 ...

}

CHO-Probability ::= INTEGER (1..100)

CNsubgroupID ::= INTEGER (0..7, ...)

ConfiguredTACIndication ::= ENUMERATED {

 true,

 ...

}

**<Unchanged Text Omitted>**

PedestrianUE ::= ENUMERATED {

 authorized,

 not-authorized,

 ...

}

PER-Scalar ::= INTEGER (0..9, ...)

PER-Exponent ::= INTEGER (0..9, ...)

PEIPSassistanceInformation ::= SEQUENCE {

 cNsubgroupID CNsubgroupID,

 iE-Extensions ProtocolExtensionContainer { {PEIPSassistanceInformation-ExtIEs} } OPTIONAL,

 ...

}

PEIPSassistanceInformation-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {

 ...

}

PacketLossRate ::= INTEGER (0..1000, ...)

PagingDRX ::= ENUMERATED {

 v32,

 v64,

 v128,

 v256,

 ... ,

 v512,

 v1024

 }

**<Unchanged Text Omitted>**

### 9.3.7 Constant definitions

-- ASN1START

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Constant definitions

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

**<Unchanged Text Omitted>**

id-QoS-Mapping-Information ProtocolIE-ID ::= 250

id-AdditionLocationInformation ProtocolIE-ID ::= 251

id-dataForwardingInfoFromTargetE-UTRANnode ProtocolIE-ID ::= 252

id-PEIPSassistanceInformation ProtocolIE-ID ::= aaa

**<Unchanged Text Omitted>**

|  |
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| **Change Ends** |