**3GPP TSG-RAN2 Meeting #116 electronic *R2-21XXXX***

**Online, 1 - 12 November, 2021**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **36.331** | **CR** | **-** | **rev** | **-** | **Current version:** | **16.6.0** |  |
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| *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 | **X** | Radio Access Network | **X** | Core Network |  |

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| ***Title:***  | Introduction of Rel-17 paging with service indication for MUSIM |
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| ***Source to WG:*** | Huawei, HiSilicon |
| ***Source to TSG:*** | RAN2 |
|  |  |
| ***Work item code:*** | LTE\_NR\_MUSIM-Core |  | ***Date:*** | 2021-11-01 |
|  |  |  |  |  |
| ***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)* |
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| ***Reason for change:*** | Following the “[Post115-e][236][MUSIM] Paging with service indication” phase 1, the following were proposed:**Proposal 1: Introduce paging cause by using the ”nonCriticalExtension” in the Paging record.****Proposal 2: No need to study solution proposals based on extending legacy Paging record.****Proposal 3: FFS if B.1 (parallel list with 1 paging cause value “voice”) or B.2 (parallel list with 2 paging cause values “voice, other”) is the preferred ASN.1 coding approach.****Proposal 4: The solution proposal to introduce paging cause in NR will be used for LTE.****Proposal 5: No need to send an LS to SA2 asking to consider a NAS solution to introduce paging cause in LTE.****Proposal 6: For paging reception in RRC\_IDLE, UE forwards the paging cause to NAS. It’s up to NAS whether to accept or reject the paging.****Proposal 7: For the AS-NAS interaction for paging reception in RRC\_INACTIVE, FFS Option 2 or Option 3 (i.e. up to UE implementation) is the preferred solution.****Proposal 8: The AS-NAS interaction principles for NR are applied to LTE.****Proposal 9: Introduction of paging cause impacts 38.331 and 36.331 specs; FFS if it impacts stage 2 specs (38.300 and 36.300)**Relevant LTE proposals from the above should be added to the RRC spec. |
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| ***Summary of change:*** | In Section 5.3.2.3,* For paging reception in RRC\_IDLE, *pagingCause* (if present) will be forwarded to upper layers;
* For paging reception in RRC\_INACTIVE, Editor note was added as there was no consensus on what solutions proposal to use for AS-NAS interaction;

In Section 6.2.2,* ASN.1 code was added to introduce paging cause;
* Editor note was added as there was no consensus on the number of pagingcause values.

**Impact Analysis**Impacted 5G architecture options:Impacted functionality:Inter-operability: |
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| ***Consequences if not approved:*** | R17 MUSIM paging with service indication is not supported |
|  |  |
| ***Clauses affected:*** | A.B.CX.Y.Z |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  |  |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  |  |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  |  |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

*START OF CHANGE*

#### 5.3.2.3 Reception of the *Paging* message by the UE

Upon receiving the *Paging* message, the UE shall:

1> if in RRC\_IDLE, for each of the *PagingRecord*, if any, included in the *Paging* message:

2> if the *ue-Identity* included in the *PagingRecord* matches one of the UE identities allocated by upper layers:

3> forward the *ue-Identity, accessType* (if present), *pagingCause* (if present) and, except for NB-IoT, the *cn-Domain* to the upper layers;

3> store *mt-EDT*, if present;

1> if in RRC\_INACTIVE, for each of the *PagingRecord*, if any, included in the *Paging* message:

2> if the *ue-Identity* included in the *PagingRecord* matches the stored *fullI-RNTI*:

3> if UE is configured with one or more access identities equal to 1, 2 or 11-15 applicable in the selected PLMN:

4> initiate RRC connection resume procedure in 5.3.3.2 with cause value set to 'highProrityAccess';

3> else:

4> initiate the RRC connection resumption procedure according to 5.3.3.2 with cause value set to 'mt-access';

Editor’s note: For RAN paging reception in RRC\_INACTIVE for Multi-SIM UEs, whether RRC informs the upper layers an indication about the RAN paging and the RRC layer resumes the RRC connection based on a request from the upper layer OR it’s up to UE implementation needs to be discussed.

2> else if the *ue-Identity* included in the *PagingRecord* matches one of the UE identities allocated by upper layers:

3> forward the *ue-Identity, accessType* (if present), *pagingCause* (if present) and the *cn-Domain* to the upper layers;

 3> perform the actions upon leaving RRC\_INACTIVE as specified in 5.3.12, with release cause 'other';

*START OF CHANGE*

***Paging* message**

-- ASN1START

Paging ::= SEQUENCE {

 pagingRecordList PagingRecordList OPTIONAL, -- Need ON

 systemInfoModification ENUMERATED {true} OPTIONAL, -- Need ON

 etws-Indication ENUMERATED {true} OPTIONAL, -- Need ON

 nonCriticalExtension Paging-v890-IEs OPTIONAL

}

Paging-v890-IEs ::= SEQUENCE {

 lateNonCriticalExtension OCTET STRING OPTIONAL,

 nonCriticalExtension Paging-v920-IEs OPTIONAL

}

Paging-v920-IEs ::= SEQUENCE {

 cmas-Indication-r9 ENUMERATED {true} OPTIONAL, -- Need ON

 nonCriticalExtension Paging-v1130-IEs OPTIONAL

}

Paging-v1130-IEs ::= SEQUENCE {

 eab-ParamModification-r11 ENUMERATED {true} OPTIONAL, -- Need ON

 nonCriticalExtension Paging-v1310-IEs OPTIONAL

}

Paging-v1310-IEs ::= SEQUENCE {

 redistributionIndication-r13 ENUMERATED {true} OPTIONAL, -- Need ON

 systemInfoModification-eDRX-r13 ENUMERATED {true} OPTIONAL, -- Need ON

 nonCriticalExtension Paging-v1530-IEs OPTIONAL

}

Paging-v1530-IEs ::= SEQUENCE {

 accessType ENUMERATED {non3GPP} OPTIONAL, -- Need ON

 nonCriticalExtension Paging-v1610-IEs OPTIONAL

}

Paging-v1610-IEs ::= SEQUENCE {

 pagingRecordList-v1610 PagingRecordList-v1610 OPTIONAL, -- Need ON

 uac-ParamModification-r16 ENUMERATED {true} OPTIONAL, -- Need ON

 nonCriticalExtension Paging-v17xy-IEs OPTIONAL

}

Paging-v17xy-IEs ::= SEQUENCE {

pagingRecordList-v17xt PagingRecordList-v17xy OPTIONAL, -- Need ON

nonCriticalExtension SEQUENCE {} OPTIONAL

}

PagingRecordList ::= SEQUENCE (SIZE (1..maxPageRec)) OF PagingRecord

PagingRecordList-v1610 ::= SEQUENCE (SIZE (1..maxPageRec)) OF PagingRecord-v1610

PagingRecordList-v17xy ::= SEQUENCE (SIZE (1..maxPageRec)) OF PagingRecord-v17xy

PagingRecord ::= SEQUENCE {

 ue-Identity PagingUE-Identity,

 cn-Domain ENUMERATED {ps, cs},

 ...

}

PagingRecord-v1610 ::= SEQUENCE {

 accessType-r16 ENUMERATED {non3GPP} OPTIONAL, -- Need ON

 mt-EDT-r16 ENUMERATED {true} OPTIONAL -- Need ON

}

PagingRecord-v17xy ::= SEQUENCE {

pagingCause-r17 ENUMERATED {FFS} OPTIONAL -- Need ON

}

PagingUE-Identity ::= CHOICE {

 s-TMSI S-TMSI,

 imsi IMSI,

 ...,

 ng-5G-S-TMSI-r15 NG-5G-S-TMSI-r15,

 fullI-RNTI-r15 I-RNTI-r15

}

IMSI ::= SEQUENCE (SIZE (6..21)) OF IMSI-Digit

IMSI-Digit ::= INTEGER (0..9)

-- ASN1STOP

Editor’s note: Whether to have one cause value or two cause values for “pagingCause-r17” needs to be discussed.

| ***Paging* field descriptions** |
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| ***accessType***It indicates whether Paging is originated due to the PDU sessions from the non-3GPP access when E-UTRA is connected to 5GC. E-UTRAN does not include both *accessType* (i.e., without suffix) and *accessType-r16* in a single paging message. |
| ***cmas-Indication***If present: indication of a CMAS notification. |
| ***cn-Domain***Indicates the origin of paging. |
| ***eab-ParamModification***If present: indication of an EAB parameters (SIB14) modification. |
| ***etws-Indication***If present: indication of an ETWS primary notification and/ or ETWS secondary notification. |
| ***imsi***The International Mobile Subscriber Identity, a globally unique permanent subscriber identity, see TS 23.003 [27]. The first element contains the first IMSI digit, the second element contains the second IMSI digit and so on. |
| ***mt-EDT***Indication of mobile terminating EDT. |
| ***pagingRecordList***If E-UTRAN includes *pagingRecordList-v1610*,it includes the same number of entries, and listed in the same order, as in *pagingRecordList* (i.e. without suffix). |
| ***redistributionIndication***If present: indication to trigger E-UTRAN inter-frequency redistribution procedure as specified in TS 36.304 [4], clause 5.2.4.10. |
| ***systemInfoModification***If present: indication of a BCCH modification other than SIB10, SIB11, SIB12 and SIB14. This indication does not apply to UEs using eDRX cycle longer than the BCCH modification period. |
| ***systemInfoModification-eDRX***If present: indication of a BCCH modification other than SIB10, SIB11, SIB12 and SIB14. This indication applies only to UEs using eDRX cycle longer than the BCCH modification period. |
| ***uac-ParamModification***If present: indication of UAC parameters (SIB25) modification. |
| ***ue-Identity***Provides the NAS identity of the UE that is being paged. The IMSI is not applicable for E-UTRA/5GC. |
| ***pagingCause***Indicates whether the Paging message is originated for voice. Applicable to Multi-SIM UEs. |

END OF CHANGE