**3GPP TSG-RAN2 Meeting #114-e *R2-210xxxx***

**Online, 19th May 2021 - 27th May 2021**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **36.331** | **CR** | **4679** | **rev** | **-** | **Current version:** | **16.4.0** |  |
|  | | | | | | | | |
| *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 | **x** | Radio Access Network | **x** | Core Network |  |

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|  | | | | | | | | | | |
| ***Title:*** | Add *ack-NACK-NumRepetitions* for *PUR-Config-NB* | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | ZTE Corporation, Sanechips | | | | | | | | | |
| ***Source to TSG:*** | R2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NB\_IOTenh3-Core | | | | |  | ***Date:*** | | | 2021-05-xx |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-16 |
|  | *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-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | For NB-IoT UE in RRC\_CONNECTED state, *ack-NACK-NumRepetitions* configured in *NPUSCH-ConfigDedicated-NB-r13* would be used. And it describes that if this field is absent and no value was configured via dedicated signalling, the value used for reception of Msg4 is used.  But in *PUR-Config-NB*, *ack-NACK-NumRepetitions* is not included, and the value used for reception of Msg4 is not suitable for PUR. The reason is, *ack-NACK-NumRepetitions-Msg4* is configured per CEL. UE cannot determine which CEL’s value can be used for PUR procedure. Then UE cannot decide the HARQ ack-NACK repetition number to be used for PUR. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Introduce *ack-NACK-NumRepetitions* into *PUR-Config-NB*.  **Impact Analysis**  Impacted functionality:  The changes only impacts NB-IoT PUR procedure.  Inter-operability:  If the UE is implemented according to this CR and the network is not, there is no inter-operability issue.  If the network is implemented according to the CR and the UE is not, the UE may follow existing process that is unclear.  Backward compatibiliy:  No backward compatibility issue is identified (?). | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | UE cannot decide the HARQ ack-NACK repetition number to be used for PUR. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 6.7.3.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 the change>**

6.7.3.2 NB-IoT Radio resource control information elements

//Skip the unrelated part//

– *PUR-Config-NB*

The IE *PUR-Config-NB* is used to specify PUR configuration.

*PUR-Config-NB* information element

-- ASN1START

PUR-Config-NB-r16 ::= SEQUENCE {

pur-ConfigID-r16 PUR-ConfigID-NB-r16 OPTIONAL, --Need OR

pur-TimeAlignmentTimer-r16 INTEGER (1..8) OPTIONAL, --Need OR

pur-NRSRP-ChangeThreshold-r16 SetupRelease {PUR-NRSRP-ChangeThreshold-r16}

OPTIONAL, --Need ON

pur-ImplicitReleaseAfter-r16 ENUMERATED {n2, n4, n8, spare} OPTIONAL, --Need OR

pur-RNTI-r16 C-RNTI OPTIONAL, --Need ON

pur-ResponseWindowTimer-r16 ENUMERATED {pp1, pp2, pp3, pp4, pp8, pp16, pp32, pp64}

OPTIONAL, --Need ON

pur-StartTimeParameters-r16 SEQUENCE {

periodicityAndOffset-r16 PUR-PeriodicityAndOffset-NB-r16,

startSFN-r16 INTEGER (0..1023),

startSubframe-r16 INTEGER (0..9),

hsfn-LSB-Info-r16 BIT STRING (SIZE(1))

} OPTIONAL, --Need ON

pur-NumOccasions-r16 ENUMERATED {one, infinite},

pur-PhysicalConfig-r16 SEQUENCE {

carrierConfig-r16 CarrierConfigDedicated-NB-r13,

npusch-NumRUsIndex-r16 INTEGER (0..7),

npusch-NumRepetitionsIndex-r16 INTEGER (0..7),

npusch-SubCarrierSetIndex-r16 CHOICE {

khz15 INTEGER (0..18),

khz3dot75 INTEGER (0..47)

},

npusch-MCS-r16 CHOICE {

singleTone INTEGER (0..10),

multiTone INTEGER (0..13)

},

p0-UE-NPUSCH-r16 INTEGER (-8..7),

alpha-r16 ENUMERATED {al0, al04, al05, al06,

al07, al08, al09, al1},

npusch-CyclicShift-r16 ENUMERATED {n0, n6},

npdcch-Config-r16 NPDCCH-ConfigDedicated-NB-r13

} OPTIONAL, -- Need ON

...,

[[ack-NACK-NumRepetitions-v16xy ACK-NACK-NumRepetitions-NB-r13 OPTIONAL -- Need ON

]]

}

PUR-NRSRP-ChangeThreshold-r16 ::= SEQUENCE {

increaseThresh-r16 NRSRP-ChangeThresh-NB-r16,

decreaseThresh-r16 NRSRP-ChangeThresh-NB-r16 OPTIONAL --Need OP

}

NRSRP-ChangeThresh-NB-r16 ::= ENUMERATED {dB4, dB6, dB8, dB10, dB14, dB18, dB22, dB26, dB30, dB34, spare6, spare5, spare4, spare3, spare2, spare1}

-- ASN1STOP

| *PUR-Config-NB* field descriptions |
| --- |
| ***ack-NACK-NumRepetitions***  Number of repetitions for the ACK NACK resource unit carrying HARQ response to NPDSCH, see TS 36.213 [23], clause 16.4.2. If this field is absent and no value was configured via pur-Config, the latest used ack-NACK-NumRepetitions value is used. |
| ***alpha***  Parameter: *αc*(3). See TS 36.213 [23], clause 16.2.1.1.1. |
| ***carrierConfig***  Carrier used for PUR. |
| ***hsfn-LSB-Info***  LSB of the H-SFN corresponding to the last subframe of the first transmission of *RRCConnectionRelease* message containing *pur-Config*. |
| ***npdcch-Config***  NPDCCH configuration for PUR. |
| ***npusch-CyclicShift***  Parameter: . See TS 36.211 [21], clause 10.1.4.1.2. Value *n0* corresponds to value 0 and value *n6* corresponds to value 6. |
| ***npusch-MCS***  Index to tables specified in TS 36.213 [23], Table 16.5.1.2-1 and Table 16.5.1.2-2 for single tone and multi tone respectively, that defines modulation and TBS index for NPUSCH for PUR. |
| ***npusch-NumRepetitionsIndex***  Index to a table specified in TS 36.213 [23], Table 16.5.1.1-3, that defines number of repetitions for NPUSCH for PUR. |
| ***npusch-NumRUsIndex***  Index to a table specified in TS 36.213 [23], Table 16.5.1.1-2, that defines number of resource units for NPUSCH for PUR. |
| ***npusch-SubCarrierSetIndex***  For NPUSCH transmission with subcarrier spacing 3.75 kHz, indicates the subcarrier used for PUR specified in TS 36.213 [23].  For NPUSCH transmission with subcarrier spacing 15 kHz, index to a table specified in TS 36.213 [23], Table 16.5.1.1-1, that defines the set of subcarriers for NPUSCH for PUR. |
| ***p0-UE-NPUSCH***  Parameter: . See TS 36.213 [23], clause 16.2.1.1.1, unit dB. |
| ***pur-ImplicitReleaseAfter***  Number of consecutive PUR occasions that can be skipped before implicit release of PUR configuration. Value *n2* corresponds to 2 PUR occasions, value *n4* corresponds to 4 PUR occasions, and so on. |
| ***pur-NRSRP-ChangeThreshold***  Threshold(s) of change in serving cell NRSRP in dB for TA validation. Value *dB4* corresponds to 4 dB, value *dB6* corresponds to 6 dB, and so on. When *pur-NRSRP-ChangeThreshold* is set to *setup*, if *decreaseThrsh* is absent the value of *increaseThresh* is also used for *decreaseThresh*. |
| ***pur-NumOccasions***  Number of PUR occasions. Value *one* corresponds to 1 PUR occasion, and value *infinite* corresponds to an infinite number of PUR occasions. |
| ***pur-PeriodicityAndOffset***  Indicates the periodicity for the PUR occasions and time offset until the first PUR occasion. |
| ***pur-ResponseWindowTimer***  Duration of the PUR response window in TS 36.321 [6]. Value in PDCCH periods. Value *pp2* corresponds to 2 PDDCH periods, *pp3* corresponds to 3 PDCCH periods, and so on.  The value considered by the UE is: *pur-ResponseWindowSize* = Min (signaled value x PDCCH period, 10.24s). |
| ***pur-TimeAlignmentTimer***  Value of the time alignment timer for PUR. Value in number of periodicity of PUR. |

**<End of the change>**