**3GPP TSG-RAN WG2 meeting#112-e *draft\_R2-2010909***

**Online, 2nd - 13th November 2020**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
|  |
|  | **36.331** | **CR** | **4480** | **rev** | **1** | **Current version:** | **16.2.1** |  |
|  |
| *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 |  | Core Network |  |

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| ***Title:***  | Clarification on the reference (N)RSRP for the first TA validation for PUR |
|  |  |
| ***Source to WG:*** | Huawei, HiSilicon  |
| ***Source to TSG:*** | R2 |
|  |  |
| ***Work item code:*** | NB\_IOTenh3-Core, LTE\_eMTC5-Core |  | ***Date:*** | 2020-11-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 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-12 (Release 12)**Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)* |
|  |   |
| ***Reason for change:*** | In section 5.3.3.19, it is specified that the UE validates the TA by checking the serving cell (N)RSRP variation since the last TA validation. However, it is not specified what is the reference value for the first TA validation.  |
|  |  |
| ***Summary of change:*** | Clarify that the (N)RSRP value of the serving cell at the time of the reception of the PUR configuration including the field *pur-RSRP-ChangeThreshold/ pur-NRSRP-ChangeThreshold* is used as the reference for the first TA validation.**Impact Analysis**Impacted functionality:Transmission using PURInter-operability: The CR only impacts the UE, no inter-operability issue is foreseen. |
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| ***Consequences if not approved:*** | The reference (N)RSRP for the first TA validation is not specified. |
|  |  |
| ***Clauses affected:*** | 6.3.2, 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:*** |  |

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| First change |

### 6.3.2 Radio resource control information elements

#### – *PUR-Config*

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

*PUR-Config* information element

-- ASN1START

PUR-Config-r16 ::= SEQUENCE {

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

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

 pur-StartTimeParameters-r16 SEQUENCE {

 periodicityAndOffset-r16 PUR-PeriodicityAndOffset-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-RNTI-r16 C-RNTI OPTIONAL, -- Need ON

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

 pur-RSRP-ChangeThreshold-r16 SetupRelease {PUR-RSRP-ChangeThreshold-r16} OPTIONAL, -- Need ON

 pur-ResponseWindowTimer-r16 ENUMERATED {sf240, sf480, sf960, sf1920, sf3840, sf5760, sf7680, sf10240} OPTIONAL, -- Need ON

 pur-MPDCCH-Config-r16 PUR-MPDCCH-Config-r16 OPTIONAL, -- Need ON

 pur-PDSCH-FreqHopping-r16 BOOLEAN,

 pur-PUCCH-Config-r16 PUR-PUCCH-Config-r16 OPTIONAL, -- Need ON

 pur-PUSCH-Config-r16 PUR-PUSCH-Config-r16 OPTIONAL, -- Need ON

 ...

}

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

 mpdcch-FreqHopping-r16 BOOLEAN,

 mpdcch-Narrowband-r16 INTEGER (1..maxAvailNarrowBands-r13),

 mpdcch-PRB-PairsConfig-r16 SEQUENCE{

 numberPRB-Pairs-r16 ENUMERATED {n2, n4, n6, spare1},

 resourceBlockAssignment-r16 BIT STRING (SIZE(4))

 },

 mpdcch-NumRepetition-r16 ENUMERATED {r1, r2, r4, r8, r16, r32, r64, r128, r256},

 mpdcch-StartSF-UESS-r16 CHOICE {

 fdd ENUMERATED {v1, v1dot5, v2, v2dot5, v4, v5, v8, v10},

 tdd ENUMERATED {v1, v2, v4, v5, v8, v10, v20, spare1}

 },

 mpdcch-Offset-PUR-SS-r16 ENUMERATED {zero, oneEighth, oneQuarter,

 threeEighth, oneHalf, fiveEighth,

 threeQuarter, sevenEighth}

}

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

 n1PUCCH-AN-r16 INTEGER (0..2047) OPTIONAL, -- Need ON

 pucch-NumRepetitionCE-Format1-r16 ENUMERATED {n1, n2, n4, n8} OPTIONAL -- Need ON

}

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

 pur-GrantInfo-r16 CHOICE {

 ce-ModeA SEQUENCE {

 numRUs-r16 BIT STRING (SIZE(2)),

 prb-AllocationInfo-r16 BIT STRING (SIZE(10)),

 mcs-r16 BIT STRING (SIZE(4)),

 numRepetitions-r16 BIT STRING (SIZE(3))

 },

 ce-ModeB SEQUENCE {

 subPRB-Allocation-r16 BOOLEAN,

 numRUs-r16 BOOLEAN,

 prb-AllocationInfo-r16 BIT STRING (SIZE(8)),

 mcs-r16 BIT STRING (SIZE(4)),

 numRepetitions-r16 BIT STRING (SIZE(3))

 }

 } OPTIONAL, -- Need ON

 pur-PUSCH-FreqHopping-r16 BOOLEAN,

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

 alpha-r16 Alpha-r12,

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

 pusch-NB-MaxTBS-r16 BOOLEAN,

 locationCE-ModeB-r16 INTEGER (0..5) OPTIONAL -- Cond SubPRB

}

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

 increaseThresh-r16 RSRP-ChangeThresh-r16,

 decreaseThresh-r16 RSRP-ChangeThresh-r16 OPTIONAL --Need OP

}

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

-- ASN1STOP

|  |
| --- |
| *PUR-Config* field descriptions |
| ***alpha***Parameter: *αc*(3). See TS 36.213 [23], clause 5.1.1.1.  |
| ***hsfn-LSB-Info***Indicates the LSB of the H-SFN corresponding to the last subframe of the first transmission of *RRCConnectionRelease* message containing *pur-Config*. |
| ***locationCE-ModeB***PRB location within the narrowband when PUSCH sub-PRB resource allocation is enabled for PUR grant in CE mode B. |
| ***mpdcch-FreqHopping***Frequency hopping activation/deactivation for MPDCCH. See TS 36.213 [23]. |
| ***mpdcch-Narrowband***Indicates the index of a narrowband on which the UE monitors for MPDCCH, see TS 36.213 [23], clause 9.1.5. Field values (1..*maxAvailNarrowBands-r13*) correspond to narrowband indices (0..*maxAvailNarrowBands-r13*-1) as specified in TS 36.211 [21]. |
| ***mpdcch-NumRepetition***Maximum number of repetitions levels for UE-SS for MPDCCH, see TS 36.213 [23]. |
| ***mpdcch-Offset-PUR-SS***Starting subframes configuration of the MPDCCH search space for PUR, see TS 36.213 [23]. |
| ***mpdcch-PRB-PairsConfig***Indicates the configuration of physical resource-block pairs used for MPDCCH. See TS 36.213 [23]. *mpdcch-PRB-Pairs* indicates the number of PRB pairs. Value n2 corresponds to 2 PRB pairs; n4 corresponds to 4 PRB pairs and so on. *resourceBlockAssignment*indicates the index to a specific combination of PRB pair for MPDCCH set. See TS 36.213 [23], clause 9.1.4.4. |
| ***mpdcch-StartSF-UESS***Starting subframe configuration for an MPDCCH PUR search space, see TS 36.213 [23]. Value v1 corresponds to 1, value v1dot5 corresponds to 1.5, and so on. |
| ***n1PUCCH-AN***Indicates UE-specific PUCCH AN resource offset, see TS 36.213 [23], clause 10.1. |
| ***p0-UE-PUSCH***Parameter: P0\_UE\_PUSCH,c (3). See TS 36.213 [23], clause 5.1.1.1, unit dB. |
| ***pucch-NumRepetitionCE-Format1***Number of PUCCH repetitions for PUCCH format 1/1a, see TS 36.211 [21] and TS 36.213 [23]. When *pur-GrantInfo* is set to *ce-ModeA*, value n1 corresponds to 1 repetition, value n2 corresponds to 2 repetitions, and so on. When *pur-GrantInfo* is set to *ce-ModeB*, actual value corresponds to 4 \* indicated value. |
| ***pusch-CyclicShift***Parameter: $n\_{cs,λ}.$See TS 36.211 [21] clause 5.5.2.1.1. Value n0 corresponds to 0 and n6 corresponds to 6. |
| ***pusch-NB-MaxTBS***Activation of 2984 bits maximum PUSCH TBS in 1.4 MHz in CE mode A, see TS 36.212 [22] and TS 36.213 [23]. |
| ***pur-GrantInfo***Indicates UL grant for transmission using PUR. Field set to *ce-ModeA* indicates the PUR grant is for CE Mode A and the field set to *ce-ModeB* indicates the PUR grant is for CE Mode B. *numRUs* indicates DCI field for PUSCH number of resource units, see TS 36.213 [23] clause 8.1.6. *prbAllocationInfo* indicates DCI field for PUSCH resource block assignment, see TS 36.212 [22], clause 5.3.3.1.10 (CE Mode A) and clause 5.3.3.1.11 (CE Mode B). *mcs* indicates DCI field for PUSCH modulation and coding scheme, see TS 36.213 [23] clause 8.6. *numRepetitions* indicates DCI field for PUSCH repetition number, see TS 36.213 [23] clause 8.0.For CE Mode A, *numRUs* set to '00' indicates use of full-PRB resource allocation, otherwise sub-PRB resource allocation as defined in TS 36.213 [23], clause 8.1.6. For CE Mode B, *subPRB-Allocation* indicates whether sub-PRB resource allocation is used. |
| ***pur-ImplicitReleaseAfter***Number of consecutive PUR occasions that can be skipped before implicit release, as specified in 5.3.3.20. Value *n2* corresponds to 2 PUR occasions, value *n4* corresponds to 4 PUR occasions and so on.  |
| ***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-PDSCH-FreqHopping***Frequency hopping activation/deactivation for PDSCH. See TS 36.213 [23]. |
| ***pur-PeriodicityAndOffset***Indicates the periodicity for the PUR occasions and time offset until the first PUR occasion. |
| ***pur-PUSCH-FreqHopping***Frequency hopping activation/deactivation for PUSCH. See TS 36.213 [23]. |
| ***pur-ResponseWindowTimer***PUR MPDCCH search space window duration. See TS 36.321 [6] and TS 36.213 [23]. Value in subframes. Value *sf240* corresponds to 240 subframes, value *sf480* corresponds to 480 subframes and so on. |
| ***pur-RSRP-ChangeThreshold***Indicates the threshold(s) of change in serving cell RSRP in dB for TA validation. Value dB4 corresponds to 4 dB, value dB6 corresponds to 6 dB and so on. When *pur-RSRP-ChangeThreshold* is set to *setup*, if *decreaseThresh* is absent the value of *increaseThresh* is also used for *decreaseThresh*. The RSRP of the serving cell at the time the field is received is used as the reference for the first TA validation, see clause 5.3.3.19. |
| ***pur-TimeAlignmentTimer***Indicates the idle mode TA timer in seconds for TA validation. Actual value = indicated value \* PUR periodicity. |

| Conditional presence | Explanation |
| --- | --- |
| *SubPRB* | This field is optionally present, need ON, if *subPRB-Allocation* is set to TRUE; otherwise the field is not present and UE shall delete any existing value for this field. |

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| Next change |

#### 6.7.3.2 NB-IoT Radio resource control information elements

#### – *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

 ...

}

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 |
| --- |
| ***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: $n\_{cs}$. 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*.The NRSRP of the serving cell at the time the field is received is used as the reference for the first TA validation, see clause 5.3.3.19. |
| ***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. |