**3GPP TSG-WG2 Meeting #110-e *draft-R2-2005821***

**Online, 1 June, 2020 – 12 June, 2020**

|  |
| --- |
| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
|  |
|  | **36.331** | **CR** | **4298** | **rev** | **1** | **Current version:** | **15.9.0** |  |
|  |
| *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)*.* |
|  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network | **X** | Core Network |  |

|  |
| --- |
|  |
| ***Title:***  | Relaxed serving cell measurement for UEs using WUS |
|  |  |
| ***Source to WG:*** | Qualcomm Technologies Int |
| ***Source to TSG:*** | R2  |
|  |  |
| ***Work item code:*** | LTE\_eMTC4-Core |  | ***Date:*** | 2020-05-21 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** | Rel-15 |
|  | *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:*** | Relaxed serving cell measurement when using WUS was discussed in Rel-15 but was not. This feature has no UE capability indication and is linked to support for WUS. A Release 15 UE supporting WUS can also make use of this power saving feature provided network broadcasts *numDRX-CyclesRelaxed* and the UE meets the conditions specified for relaxed serving cell measurement by RAN4 in TS 36.133.In RAN2-109bis-e meeting, it was agreed that early implementation of relaxed serving cell measurement by Rel-15 UEs when configured with WUS is permitted, therefore, Rel-15 specification can be updated. |
|  |  |
| ***Summary of change:*** | A new field *WUS-Config-v15a0* is added in the IE *RadioResourceConfigCommonSIB*. |
|  |  |
| ***Consequences if not approved:*** | Rel-15 UE cannot take benefit of relaxed serving cell measurement when using WUS. |
|  |  |
| ***Clauses affected:*** | 6.3.2 |
|  |  |
|  | **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:*** | Rel-16 Cat. A aspects of this CR is included in R2-2004634. |
|  |  |
| ***This CR's revision history:*** |  |

|  |
| --- |
| First change |

### 6.3.2 Radio resource control information elements

<skipped>

#### – *RadioResourceConfigCommon*

The IE *RadioResourceConfigCommonSIB* and IE *RadioResourceConfigCommon* are used to specify common radio resource configurations in the system information and in the mobility control information, respectively, e.g., the random access parameters and the static physical layer parameters.

*RadioResourceConfigCommon* information element

-- ASN1START

RadioResourceConfigCommonSIB ::= SEQUENCE {

 rach-ConfigCommon RACH-ConfigCommon,

 bcch-Config BCCH-Config,

 pcch-Config PCCH-Config,

 prach-Config PRACH-ConfigSIB,

 pdsch-ConfigCommon PDSCH-ConfigCommon,

 pusch-ConfigCommon PUSCH-ConfigCommon,

 pucch-ConfigCommon PUCCH-ConfigCommon,

 soundingRS-UL-ConfigCommon SoundingRS-UL-ConfigCommon,

 uplinkPowerControlCommon UplinkPowerControlCommon,

 ul-CyclicPrefixLength UL-CyclicPrefixLength,

 ...,

 [[ uplinkPowerControlCommon-v1020 UplinkPowerControlCommon-v1020 OPTIONAL -- Need OR

 ]],

 [[ rach-ConfigCommon-v1250 RACH-ConfigCommon-v1250 OPTIONAL -- Need OR

 ]],

 [[ pusch-ConfigCommon-v1270 PUSCH-ConfigCommon-v1270 OPTIONAL -- Need OR

 ]],

 [[ bcch-Config-v1310 BCCH-Config-v1310 OPTIONAL, -- Need OR

 pcch-Config-v1310 PCCH-Config-v1310 OPTIONAL, -- Need OR

 freqHoppingParameters-r13 FreqHoppingParameters-r13 OPTIONAL, -- Need OR

 pdsch-ConfigCommon-v1310 PDSCH-ConfigCommon-v1310 OPTIONAL, -- Need OR

 pusch-ConfigCommon-v1310 PUSCH-ConfigCommon-v1310 OPTIONAL, -- Need OR

 prach-ConfigCommon-v1310 PRACH-ConfigSIB-v1310 OPTIONAL, -- Need OR

 pucch-ConfigCommon-v1310 PUCCH-ConfigCommon-v1310 OPTIONAL -- Need OR

 ]],

 [[ highSpeedConfig-r14 HighSpeedConfig-r14 OPTIONAL, -- Need OR

 prach-Config-v1430 PRACH-Config-v1430 OPTIONAL, -- Need OR

 pucch-ConfigCommon-v1430 PUCCH-ConfigCommon-v1430 OPTIONAL -- Need OR

 ]],

 [[ prach-Config-v1530 PRACH-ConfigSIB-v1530 OPTIONAL, -- Cond EDT

 ce-RSS-Config-r15 RSS-Config-r15 OPTIONAL, -- Need OR

 wus-Config-r15 WUS-Config-r15 OPTIONAL, -- Need OR

 highSpeedConfig-v1530 HighSpeedConfig-v1530 OPTIONAL -- Need OR

 ]],

 [[ uplinkPowerControlCommon-v1540 UplinkPowerControlCommon-v1530 OPTIONAL -- Need OR

 ]],

 [[ wus-Config-v1560 WUS-Config-v1560 OPTIONAL -- Need OR

 ]],

 [[ wus-Config-v15a0 WUS-Config-v15a0 OPTIONAL -- Need OR

 ]]

}

RadioResourceConfigCommon ::= SEQUENCE {

 rach-ConfigCommon RACH-ConfigCommon OPTIONAL, -- Need ON

 prach-Config PRACH-Config,

 pdsch-ConfigCommon PDSCH-ConfigCommon OPTIONAL, -- Need ON

 pusch-ConfigCommon PUSCH-ConfigCommon,

 phich-Config PHICH-Config OPTIONAL, -- Need ON

 pucch-ConfigCommon PUCCH-ConfigCommon OPTIONAL, -- Need ON

 soundingRS-UL-ConfigCommon SoundingRS-UL-ConfigCommon OPTIONAL, -- Need ON

 uplinkPowerControlCommon UplinkPowerControlCommon OPTIONAL, -- Need ON

 antennaInfoCommon AntennaInfoCommon OPTIONAL, -- Need ON

 p-Max P-Max OPTIONAL, -- Need OP

 tdd-Config TDD-Config OPTIONAL, -- Cond TDD

 ul-CyclicPrefixLength UL-CyclicPrefixLength,

 ...,

 [[ uplinkPowerControlCommon-v1020 UplinkPowerControlCommon-v1020 OPTIONAL -- Need ON

 ]],

 [[ tdd-Config-v1130 TDD-Config-v1130 OPTIONAL -- Cond TDD3

 ]],

 [[ pusch-ConfigCommon-v1270 PUSCH-ConfigCommon-v1270 OPTIONAL -- Need OR

 ]],

 [[

 prach-Config-v1310 PRACH-Config-v1310 OPTIONAL, -- Need ON

 freqHoppingParameters-r13 FreqHoppingParameters-r13 OPTIONAL, -- Need ON

 pdsch-ConfigCommon-v1310 PDSCH-ConfigCommon-v1310 OPTIONAL, -- Need ON

 pucch-ConfigCommon-v1310 PUCCH-ConfigCommon-v1310 OPTIONAL, -- Need ON

 pusch-ConfigCommon-v1310 PUSCH-ConfigCommon-v1310 OPTIONAL, -- Need ON

 uplinkPowerControlCommon-v1310 UplinkPowerControlCommon-v1310 OPTIONAL -- Need ON

 ]],

 [[ highSpeedConfig-r14 HighSpeedConfig-r14 OPTIONAL, -- Need OR

 prach-Config-v1430 PRACH-Config-v1430 OPTIONAL, -- Need OR

 pucch-ConfigCommon-v1430 PUCCH-ConfigCommon-v1430 OPTIONAL, -- Need OR

 tdd-Config-v1430 TDD-Config-v1430 OPTIONAL -- Cond TDD3

 ]],

 [[

 tdd-Config-v1450 TDD-Config-v1450 OPTIONAL -- Cond TDD3

 ]],

 [[ uplinkPowerControlCommon-v1530 UplinkPowerControlCommon-v1530 OPTIONAL, -- Need ON

 highSpeedConfig-v1530 HighSpeedConfig-v1530 OPTIONAL -- Need OR

 ]]

}

RadioResourceConfigCommonPSCell-r12 ::= SEQUENCE {

 basicFields-r12 RadioResourceConfigCommonSCell-r10,

 pucch-ConfigCommon-r12 PUCCH-ConfigCommon,

 rach-ConfigCommon-r12 RACH-ConfigCommon,

 uplinkPowerControlCommonPSCell-r12 UplinkPowerControlCommonPSCell-r12,

 ...,

 [[ uplinkPowerControlCommonPSCell-v1310

 UplinkPowerControlCommon-v1310 OPTIONAL -- Need ON

 ]],

 [[ uplinkPowerControlCommonPSCell-v1530

 UplinkPowerControlCommon-v1530 OPTIONAL -- Need ON

 ]]

}

RadioResourceConfigCommonPSCell-v12f0 ::= SEQUENCE {

 basicFields-v12f0 RadioResourceConfigCommonSCell-v10l0

}

RadioResourceConfigCommonPSCell-v1440 ::= SEQUENCE {

 basicFields-v1440 RadioResourceConfigCommonSCell-v1440

}

RadioResourceConfigCommonSCell-r10 ::= SEQUENCE {

 -- DL configuration as well as configuration applicable for DL and UL

 nonUL-Configuration-r10 SEQUENCE {

 -- 1: Cell characteristics

 dl-Bandwidth-r10 ENUMERATED {n6, n15, n25, n50, n75, n100},

 -- 2: Physical configuration, general

 antennaInfoCommon-r10 AntennaInfoCommon,

 mbsfn-SubframeConfigList-r10 MBSFN-SubframeConfigList OPTIONAL, -- Need OR

 -- 3: Physical configuration, control

 phich-Config-r10 PHICH-Config,

 -- 4: Physical configuration, physical channels

 pdsch-ConfigCommon-r10 PDSCH-ConfigCommon,

 tdd-Config-r10 TDD-Config OPTIONAL -- Cond TDDSCell

 },

 -- UL configuration

 ul-Configuration-r10 SEQUENCE {

 ul-FreqInfo-r10 SEQUENCE {

 ul-CarrierFreq-r10 ARFCN-ValueEUTRA OPTIONAL, -- Need OP

 ul-Bandwidth-r10 ENUMERATED {n6, n15,

 n25, n50, n75, n100} OPTIONAL, -- Need OP

 additionalSpectrumEmissionSCell-r10 AdditionalSpectrumEmission

 },

 p-Max-r10 P-Max OPTIONAL, -- Need OP

 uplinkPowerControlCommonSCell-r10 UplinkPowerControlCommonSCell-r10,

 -- A special version of IE UplinkPowerControlCommon may be introduced

 -- 3: Physical configuration, control

 soundingRS-UL-ConfigCommon-r10 SoundingRS-UL-ConfigCommon,

 ul-CyclicPrefixLength-r10 UL-CyclicPrefixLength,

 -- 4: Physical configuration, physical channels

 prach-ConfigSCell-r10 PRACH-ConfigSCell-r10 OPTIONAL, -- Cond TDD-OR-NoR11

 pusch-ConfigCommon-r10 PUSCH-ConfigCommon

 } OPTIONAL, -- Need OR

 ...,

 [[ ul-CarrierFreq-v1090 ARFCN-ValueEUTRA-v9e0 OPTIONAL -- Need OP

 ]],

 [[ rach-ConfigCommonSCell-r11 RACH-ConfigCommonSCell-r11 OPTIONAL, -- Cond ULSCell

 prach-ConfigSCell-r11 PRACH-Config OPTIONAL, -- Cond UL

 tdd-Config-v1130 TDD-Config-v1130 OPTIONAL, -- Cond TDD2

 uplinkPowerControlCommonSCell-v1130

 UplinkPowerControlCommonSCell-v1130 OPTIONAL -- Cond UL

 ]],

 [[ pusch-ConfigCommon-v1270 PUSCH-ConfigCommon-v1270 OPTIONAL -- Need OR

 ]],

 [[ pucch-ConfigCommon-r13 PUCCH-ConfigCommon OPTIONAL, -- Cond UL

 uplinkPowerControlCommonSCell-v1310

 UplinkPowerControlCommonSCell-v1310 OPTIONAL -- Cond UL

 ]],

 [[ highSpeedConfigSCell-r14 HighSpeedConfigSCell-r14 OPTIONAL, -- Need OR

 prach-Config-v1430 PRACH-Config-v1430 OPTIONAL, -- Cond UL

 ul-Configuration-r14 SEQUENCE {

 ul-FreqInfo-r14 SEQUENCE {

 ul-CarrierFreq-r14 ARFCN-ValueEUTRA-r9 OPTIONAL, -- Need OP

 ul-Bandwidth-r14 ENUMERATED {n6, n15,

 n25, n50, n75, n100} OPTIONAL, -- Need OP

 additionalSpectrumEmissionSCell-r14 AdditionalSpectrumEmission

 },

 p-Max-r14 P-Max OPTIONAL, -- Need OP

 soundingRS-UL-ConfigCommon-r14 SoundingRS-UL-ConfigCommon,

 ul-CyclicPrefixLength-r14 UL-CyclicPrefixLength,

 prach-ConfigSCell-r14 PRACH-ConfigSCell-r10 OPTIONAL, -- Cond TDD-OR-NoR11

 uplinkPowerControlCommonPUSCH-LessCell-v1430

 UplinkPowerControlCommonPUSCH-LessCell-v1430 OPTIONAL -- Need OR

} OPTIONAL, -- Cond ULSRS

 harq-ReferenceConfig-r14 ENUMERATED {sa2,sa4,sa5} OPTIONAL, -- Need OR

 soundingRS-FlexibleTiming-r14 ENUMERATED {true} OPTIONAL -- Need OR

 ]],

 [[ mbsfn-SubframeConfigList-v1430 MBSFN-SubframeConfigList-v1430 OPTIONAL -- Need ON

 ]],

 [[ uplinkPowerControlCommonSCell-v1530 UplinkPowerControlCommon-v1530 OPTIONAL -- Need ON

 ]]

}

RadioResourceConfigCommonSCell-v10l0 ::= SEQUENCE {

 -- UL configuration

 ul-Configuration-v10l0 SEQUENCE {

 additionalSpectrumEmissionSCell-v10l0 AdditionalSpectrumEmission-v10l0

 }

}

RadioResourceConfigCommonSCell-v1440 ::= SEQUENCE {

 ul-Configuration-v1440 SEQUENCE {

 ul-FreqInfo-v1440 SEQUENCE {

 additionalSpectrumEmissionSCell-v1440 AdditionalSpectrumEmission-v10l0

 }

 }

}

BCCH-Config ::= SEQUENCE {

 modificationPeriodCoeff ENUMERATED {n2, n4, n8, n16}

}

BCCH-Config-v1310 ::= SEQUENCE {

 modificationPeriodCoeff-v1310 ENUMERATED {n64}

}

FreqHoppingParameters-r13 ::= SEQUENCE {

 dummy ENUMERATED {nb2, nb4} OPTIONAL,

 dummy2 CHOICE {

 interval-FDD-r13 ENUMERATED {int1, int2, int4, int8},

 interval-TDD-r13 ENUMERATED {int1, int5, int10, int20}

 } OPTIONAL,

 dummy3 CHOICE {

 interval-FDD-r13 ENUMERATED {int2, int4, int8, int16},

 interval-TDD-r13 ENUMERATED { int5, int10, int20, int40}

 } OPTIONAL,

 interval-ULHoppingConfigCommonModeA-r13 CHOICE {

 interval-FDD-r13 ENUMERATED {int1, int2, int4, int8},

 interval-TDD-r13 ENUMERATED {int1, int5, int10, int20}

 } OPTIONAL, -- Cond MP-A

 interval-ULHoppingConfigCommonModeB-r13 CHOICE {

 interval-FDD-r13 ENUMERATED {int2, int4, int8, int16},

 interval-TDD-r13 ENUMERATED { int5, int10, int20, int40}

 } OPTIONAL, -- Cond MP-B

 dummy4 INTEGER (1..maxAvailNarrowBands-r13) OPTIONAL

}

PCCH-Config ::= SEQUENCE {

 defaultPagingCycle ENUMERATED {

 rf32, rf64, rf128, rf256},

 nB ENUMERATED {

 fourT, twoT, oneT, halfT, quarterT, oneEighthT,

 oneSixteenthT, oneThirtySecondT}

}

PCCH-Config-v1310 ::= SEQUENCE {

 paging-narrowBands-r13 INTEGER (1..maxAvailNarrowBands-r13),

 mpdcch-NumRepetition-Paging-r13 ENUMERATED {r1, r2, r4, r8, r16, r32, r64, r128, r256},

 nB-v1310 ENUMERATED {one64thT, one128thT, one256thT}

 OPTIONAL -- Need OR

}

UL-CyclicPrefixLength ::= ENUMERATED {len1, len2}

HighSpeedConfig-r14 ::= SEQUENCE {

 highSpeedEnhancedMeasFlag-r14 ENUMERATED {true} OPTIONAL, -- Need OR

 highSpeedEnhancedDemodulationFlag-r14 ENUMERATED {true} OPTIONAL -- Need OR

}

HighSpeedConfig-v1530 ::= SEQUENCE {

 highSpeedMeasGapCE-ModeA-r15 ENUMERATED {true}

}

HighSpeedConfigSCell-r14 ::= SEQUENCE {

 highSpeedEnhancedDemodulationFlag-r14 ENUMERATED {true} OPTIONAL -- Need OR

}

-- ASN1STOP

|  |
| --- |
| Next change |

#### *– WUS-Config*

The IE *WUS-Config* is used to specify the WUS configuration. For the UEs supporting WUS, E-UTRAN uses WUS to indicate that the UE shall attempt to receive paging in that cell, see TS 36.304 [4].

***WUS-Config* information element**

-- ASN1START

WUS-Config-r15 ::= SEQUENCE {

 maxDurationFactor-r15 ENUMERATED {one32th, one16th, one8th, one4th},

 numPOs-r15 ENUMERATED {n1, n2, n4, spare1} DEFAULT n1,

 freqLocation-r15 ENUMERATED {n0, n2, n4, spare1},

 timeOffsetDRX-r15 ENUMERATED {ms40, ms80, ms160, ms240},

 timeOffset-eDRX-Short-r15 ENUMERATED {ms40, ms80, ms160, ms240},

 timeOffset-eDRX-Long-r15 ENUMERATED {ms1000, ms2000} OPTIONAL -- Need OP

}

WUS-Config-v1560 ::= SEQUENCE {

 powerBoost-r15 ENUMERATED {dB0, dB1dot8, dB3, dB4dot8}

}

WUS-Config-v15a0 ::= SEQUENCE {

 numDRX-CyclesRelaxed-r15 ENUMERATED {n1, n2, n4, n8}

}

-- ASN1STOP

| *WUS-Config* field descriptions |
| --- |
| ***freqLocation***Frequency location of WUS within paging narrowband for BL UEs and UEs in CE. Value *n0* corresponds to WUS in the 1st and 2nd PRB, value *n2* represents the 3rd and 4th PRB, and value *n4* represents the 5th and 6th PRB. |
| ***maxDurationFactor***Maximum WUS duration, expressed as a ratio of Rmax associated with Type 1-CSS, see TS 36.211 [21]. Value *one32th* corresponds to Rmax \* 1/32, value *one16th* corresponds to Rmax \* 1/16 and so on.The value $L\_{MWUS\_{max}} $in TS 36.213 [23] considered by the UE is : maxDuration = Max (signalled value \* Rmax, 1) where Rmax is the value of *mpdcch-NumRepetitionPaging* for the carrier. |
| ***numDRX-CyclesRelaxed***Maximum number of consecutive DRX cycles during which the UE can use WUS for synchronisation and skip serving cell measurements, see TS 36.133 [16]. Value n1 corresponds to 1 DRX cycle, value n2 corresponds to 2 DRX cycles and so on. |
| ***numPOs***Number of consecutive Paging Occasions (PO) mapped to one WUS, applicable to UEs configured to use extended DRX, see TS 36.304 [4]. Value *n1* corresponds to 1 PO, value *n2* corresponds to 2 POs and so on.  |
| ***powerBoost***Power offset of WUS relative to CRS in dB, see TS 36.213 [23] clause 5.2. Value *db0* corresponds to 0dB, value *db1dot8* corresponds to 1.8dB, and so on. |
| ***timeOffsetDRX***Minimum time gap in milliseconds from the end of the configured maximum WUS duration to the first associated PO, see TS 36.211 [21]. Value *ms40* corresponds to 40 ms, value *ms80* corresponds to 80 ms and so on. |
| ***timeOffset-eDRX-Short***When eDRX is used, the short non-zero gap in milliseconds from the end of the configured maximum WUS duration to the associated PO, see TS 36.211 [21]. Value *ms40* corresponds to 40 ms, value *ms80* corresponds to 80 ms and so on.E-UTRAN configures *timeOffset-eDRX-Short* to a value longer than or equal to *timeOffsetDRX*. |
| ***timeOffset-eDRX-Long***When eDRX is used, the long non-zero gap in milliseconds from the end of the configured maximum WUS duration to the associated PO, see TS 36.211 [21]. Value *ms1000* corresponds to 1000 ms and value *ms2000* corresponds to 2000 ms.If the field is absent, UE uses *timeOffset-eDRX-Short* for monitoring WUS. |

|  |
| --- |
| End of change |