**3GPP TSG-RAN Meeting #111 R2-200xxxx**

**Electronic meeting, 17th – 28th August 2020 Revision of R2-2006942**

|  |
| --- |
| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
|  |
|  | **38.331** | **CR** | **1757** | **rev** | **1** | **Current version:** | **16.1.0** |  |
|  |
| *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:***  | Minor corrections and update for RRC Positioning |
|  |  |
| ***Source to WG:*** | Ericsson |
| ***Source to TSG:*** | R2 |
|  |  |
| ***Work item code:*** | NR\_Pos-Core |  | ***Date:*** | 2020-08-27 |
|  |  |  |  |  |
| ***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:*** | * Abbreviations are missing and aligning the terminologies DL PRS to DL-PRS similar to LPP specification.
* a reference to LPP has been added for field description dl-PRS-ID.
* Field nr-CarrierFreq is defined but it wasn’t used and thus removed
* RRC field name need to be aligned to LPP name. dl-PRS-ARFCN-PointA to dl-PRS-PointA

 **Impact analysis**Impacted 5G architecture options:NR SA, NR-DC, NE-DC Impacted functionality:Miscellaneous minor corrections to NR Positioning. Inter-operability:If the network is implemented according to the CR and the UE is not, there will not be inter-operability problems.If the UE is implemented according to the CR and the network is not, there will not be inter-operability problems.  |
|  |  |
| ***Summary of change:*** | Abbreviations, references are added and terminologies are aligned. Unused field description is removed. |
|  |  |
| ***Consequences if not approved:*** | It would be difficult to read and search the specifications |
|  |  |
| ***Clauses affected:*** | 3.2, 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:*** | The CR has been updated based upon R2-2007547  |
|  |  |
| ***This CR's revision history:*** |  |

*Beginning Of Change*

## 3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 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 TR 21.905 [1].

5GC 5G Core Network

ACK Acknowledgement

AM Acknowledged Mode

ARQ Automatic Repeat Request

AS Access Stratum

ASN.1 Abstract Syntax Notation One

BAP Backhaul Adaptation Protocol

BCD Binary Coded Decimal

BH Backhaul

BLER Block Error Rate

BWP Bandwidth Part

CA Carrier Aggregation

CAG Closed Access Group

CAG-ID Closed Access Group Identifier

CAPC Channel Access Priority Class

CBR Channel Busy Ratio

CCCH Common Control Channel

CG Cell Group

CHO Conditional Handover

CLI Cross Link Interference

CMAS Commercial Mobile Alert Service

CP Control Plane

CPC Conditional PSCell Change

C-RNTI Cell RNTI

CSI Channel State Information

DAPS Dual Active Protocol Stack

DC Dual Connectivity

DCCH Dedicated Control Channel

DCI Downlink Control Information

DCP DCI with CRC scrambled by PS-RNTI

DFN Direct Frame Number

DL Downlink

DL-PRS Downlink Positioning Reference Signals

DL-SCH Downlink Shared Channel

DM-RS Demodulation Reference Signal

DRB (user) Data Radio Bearer

DRX Discontinuous Reception

DTCH Dedicated Traffic Channel

EN-DC E-UTRA NR Dual Connectivity with E-UTRA connected to EPC

EPC Evolved Packet Core

EPS Evolved Packet System

ETWS Earthquake and Tsunami Warning System

E-UTRA Evolved Universal Terrestrial Radio Access

E-UTRA/5GC E-UTRA connected to 5GC

E-UTRA/EPC E-UTRA connected to EPC

E-UTRAN Evolved Universal Terrestrial Radio Access Network

FDD Frequency Division Duplex

FFS For Further Study

GERAN GSM/EDGE Radio Access Network

GNSS Global Navigation Satellite System

GSM Global System for Mobile Communications

HARQ Hybrid Automatic Repeat Request

HRNN Human Readable Network Name

IAB Integrated Access and Backhaul

IAB-DU IAB-node DU

IAB-MT IAB Mobile Termination

IDC In-Device Coexistence

IE Information element

IMSI International Mobile Subscriber Identity

kB Kilobyte (1000 bytes)

L1 Layer 1

L2 Layer 2

L3 Layer 3

LBT Listen Before Talk

MAC Medium Access Control

MCG Master Cell Group

MDT Minimization of Drive Tests

MIB Master Information Block

MR-DC Multi-Radio Dual Connectivity

N/A Not Applicable

NE-DC NR E-UTRA Dual Connectivity

(NG)EN-DC E-UTRA NR Dual Connectivity (covering E-UTRA connected to EPC or 5GC)

NGEN-DC E-UTRA NR Dual Connectivity with E-UTRA connected to 5GC

NID Network Identifier

NPN Non-Public Network

NR-DC NR-NR Dual Connectivity

NR/5GC NR connected to 5GC

PCell Primary Cell

PDCP Packet Data Convergence Protocol

PDU Protocol Data Unit

PLMN Public Land Mobile Network

PNI-NPN Public Network Integrated Non-Public Network

posSIB Positioning SIB

PRS Positioning Reference Signals

PSCell Primary SCG Cell

PWS Public Warning System

QoS Quality of Service

RAN Radio Access Network

RAT Radio Access Technology

RLC Radio Link Control

RMTC RSSI Measurement Timing Configuration

RNA RAN-based Notification Area

RNTI Radio Network Temporary Identifier

ROHC Robust Header Compression

RPLMN Registered Public Land Mobile Network

RRC Radio Resource Control

RS Reference Signal

SBAS Satellite Based Augmentation System

SCell Secondary Cell

SCG Secondary Cell Group

SCS Subcarrier Spacing

SFN System Frame Number

SFTD SFN and Frame Timing Difference

SI System Information

SIB System Information Block

SL Sidelink

SLSS Sidelink Synchronisation Signal

SNPN Stand-alone Non-Public Network

SpCell Special Cell

SRB Signalling Radio Bearer

SRS Sounding Reference Signal

SSB Synchronization Signal Block

TAG Timing Advance Group

TDD Time Division Duplex

TM Transparent Mode

UE User Equipment

UL Uplink

UM Unacknowledged Mode

UP User Plane

In the ASN.1, lower case may be used for some (parts) of the above abbreviations e.g. c-RNTI.

*Next Change*

### 6.3.2 Radio resource control information elements

– *AdditionalSpectrumEmission*

*<Skip Unmodified Changes>*

– *LocationMeasurementInfo*

The IE *LocationMeasurementInfo* defines the information sent by the UE to the network to assist with the configuration of measurement gaps for location related measurements.

***LocationMeasurementInfo* information element**

-- ASN1START

-- TAG-LOCATIONMEASUREMENTINFO-START

LocationMeasurementInfo ::= CHOICE {

 eutra-RSTD EUTRA-RSTD-InfoList,

 ...,

 eutra-FineTimingDetection NULL,

 nr-PRS-Measurement-r16 NR-PRS-MeasurementInfoList-r16

}

EUTRA-RSTD-InfoList ::= SEQUENCE (SIZE (1..maxInterRAT-RSTD-Freq)) OF EUTRA-RSTD-Info

EUTRA-RSTD-Info ::= SEQUENCE {

 carrierFreq ARFCN-ValueEUTRA,

 measPRS-Offset INTEGER (0..39),

 ...

}

NR-PRS-MeasurementInfoList-r16 ::= SEQUENCE (SIZE (1..maxFreqLayers)) OF NR-PRS-MeasurementInfo-r16

NR-PRS-MeasurementInfo-r16 ::= SEQUENCE {

 dl-PRS-PointA-r16 ARFCN-ValueNR,

 nr-MeasPRS-RepetitionAndOffset-r16 CHOICE {

 ms20-r16 INTEGER (0..19),

 ms40-r16 INTEGER (0..39),

 ms80-r16 INTEGER (0..79),

 ms160-r16 INTEGER (0..159),

 ...

 },

 nr-MeasPRS-length-r16 ENUMERATED {ms1dot5, ms3, ms3dot5, ms4, ms5dot5, ms6, spare2, spare1},

 ...

}

-- TAG-LOCATIONMEASUREMENTINFO-STOP

-- ASN1STOP

| *LocationMeasurementInfo* field descriptions |
| --- |
| ***carrierFreq***The EARFCN value of the carrier received from upper layers for which the UE needs to perform the inter-RAT RSTD measurements. |
| ***measPRS-Offset***Indicates the requested gap offset for performing RSTD measurements towards E-UTRA. It is the smallest subframe offset from the beginning of subframe 0 of SFN=0 of the serving cell of the requested gap for measuring PRS positioning occasions in the carrier frequency *carrierFreq* for which the UE needs to perform the inter-RAT RSTD measurements. The PRS positioning occasion information is received from upper layers. The value of *measPRS-Offset* is obtained by mapping the starting subframe of the PRS positioning occasion in the measured cell onto the corresponding subframe in the serving cell and is calculated as the serving cell's number of subframes from SFN=0 mod 40.The UE shall take into account any additional time required by the UE to start PRS measurements on the other carrier when it does this mapping for determining the *measPRS-Offset*.NOTE: Figure 6.2.2-1 in TS 36.331[10] illustrates the *measPRS-Offset* field. |
| ***dl-PRS-PointA***The ARFCN value of the carrier received from upper layers for which the UE needs to perform the NR DL-PRS measurements. |
| ***nr-MeasPRS-RepetitionAndOffset***Indicates the gap periodicity in ms and offset in number of subframes of the requested measurement gap for performing NR DL-PRS measurements. |
| ***nr-MeasPRS-length***Indicates measurement gap length in ms of the requested measurement gap for performing NR DL-PRS measurements. |
|  |

*<Skip Unmodified Changes>*

– *SRS-Config*

The IE *SRS-Config* is used to configure sounding reference signal transmissions or to configure sounding reference signal measurements for CLI. The configuration defines a list of SRS-Resources and a list of SRS-ResourceSets. Each resource set defines a set of SRS-Resources. The network triggers the transmission of the set of SRS-Resources using a configured aperiodicSRS-ResourceTrigger (L1 DCI).

***SRS-Config* information element**

-- ASN1START

-- TAG-SRS-CONFIG-START

SRS-Config ::= SEQUENCE {

 srs-ResourceSetToReleaseList SEQUENCE (SIZE(1..maxNrofSRS-ResourceSets)) OF SRS-ResourceSetId OPTIONAL, -- Need N

 srs-ResourceSetToAddModList SEQUENCE (SIZE(1..maxNrofSRS-ResourceSets)) OF SRS-ResourceSet OPTIONAL, -- Need N

 srs-ResourceToReleaseList SEQUENCE (SIZE(1..maxNrofSRS-Resources)) OF SRS-ResourceId OPTIONAL, -- Need N

 srs-ResourceToAddModList SEQUENCE (SIZE(1..maxNrofSRS-Resources)) OF SRS-Resource OPTIONAL, -- Need N

 tpc-Accumulation ENUMERATED {disabled} OPTIONAL, -- Need S

 ...,

 [[

 srs-RequestForDCI-Format1-2-r16 INTEGER (1..2) OPTIONAL, -- Need S

 srs-RequestForDCI-Format0-2-r16 INTEGER (1..2) OPTIONAL, -- Need S

 srs-ResourceSetToAddModListForDCI-Format0-2-r16 SEQUENCE (SIZE(1..maxNrofSRS-ResourceSets)) OF SRS-ResourceSet OPTIONAL, -- Need N

 srs-ResourceSetToReleaseListForDCI-Format0-2-r16 SEQUENCE (SIZE(1..maxNrofSRS-ResourceSets)) OF SRS-ResourceSetId OPTIONAL,-- Need N

 srs-PosResourceSetToReleaseList-r16 SEQUENCE (SIZE(1..maxNrofSRS-PosResourceSets-r16)) OF SRS-PosResourceSetId-r16

 OPTIONAL, -- Need N

 srs-PosResourceSetToAddModList-r16 SEQUENCE (SIZE(1..maxNrofSRS-PosResourceSets-r16)) OF SRS-PosResourceSet-r16 OPTIONAL,-- Need N

 srs-PosResourceToReleaseList-r16 SEQUENCE (SIZE(1..maxNrofSRS-PosResources-r16)) OF SRS-PosResourceId-r16 OPTIONAL,-- Need N

 srs-PosResourceToAddModList-r16 SEQUENCE (SIZE(1..maxNrofSRS-PosResources-r16)) OF SRS-PosResource-r16 OPTIONAL -- Need N

 ]]

}

SRS-ResourceSet ::= SEQUENCE {

 srs-ResourceSetId SRS-ResourceSetId,

 srs-ResourceIdList SEQUENCE (SIZE(1..maxNrofSRS-ResourcesPerSet)) OF SRS-ResourceId OPTIONAL, -- Cond Setup

 resourceType CHOICE {

 aperiodic SEQUENCE {

 aperiodicSRS-ResourceTrigger INTEGER (1..maxNrofSRS-TriggerStates-1),

 csi-RS NZP-CSI-RS-ResourceId OPTIONAL, -- Cond NonCodebook

 slotOffset INTEGER (1..32) OPTIONAL, -- Need S

 ...,

 [[

 aperiodicSRS-ResourceTriggerList SEQUENCE (SIZE(1..maxNrofSRS-TriggerStates-2))

 OF INTEGER (1..maxNrofSRS-TriggerStates-1) OPTIONAL -- Need M

 ]]

 },

 semi-persistent SEQUENCE {

 associatedCSI-RS NZP-CSI-RS-ResourceId OPTIONAL, -- Cond NonCodebook

 ...

 },

 periodic SEQUENCE {

 associatedCSI-RS NZP-CSI-RS-ResourceId OPTIONAL, -- Cond NonCodebook

 ...

 }

 },

 usage ENUMERATED {beamManagement, codebook, nonCodebook, antennaSwitching},

 alpha Alpha OPTIONAL, -- Need S

 p0 INTEGER (-202..24) OPTIONAL, -- Cond Setup

 pathlossReferenceRS PathlossReferenceRS-Config OPTIONAL, -- Need M

 srs-PowerControlAdjustmentStates ENUMERATED { sameAsFci2, separateClosedLoop} OPTIONAL, -- Need S

 ...,

 [[

 pathlossReferenceRSList-r16 SetupRelease { PathlossReferenceRSList-r16} OPTIONAL -- Need M

 ]]

}

PathlossReferenceRS-Config ::= CHOICE {

 ssb-Index SSB-Index,

 csi-RS-Index NZP-CSI-RS-ResourceId

}

PathlossReferenceRSList-r16 ::= SEQUENCE (SIZE (1..maxNrofSRS-PathlossReferenceRS-r16)) OF PathlossReferenceRS-r16

PathlossReferenceRS-r16 ::= SEQUENCE {

 srs-PathlossReferenceRS-Id-r16 SRS-PathlossReferenceRS-Id-r16,

 pathlossReferenceRS-r16 PathlossReferenceRS-Config

}

SRS-PathlossReferenceRS-Id-r16 ::= INTEGER (0..maxNrofSRS-PathlossReferenceRS-1-r16)

SRS-PosResourceSet-r16 ::= SEQUENCE {

 srs-PosResourceSetId-r16 SRS-PosResourceSetId-r16,

 srs-PosResourceIdList-r16 SEQUENCE (SIZE(1..maxNrofSRS-ResourcesPerSet)) OF SRS-PosResourceId-r16

 OPTIONAL, -- Cond Setup

 resourceType-r16 CHOICE {

 aperiodic-r16 SEQUENCE {

 aperiodicSRS-ResourceTriggerList-r16 SEQUENCE (SIZE(1..maxNrofSRS-TriggerStates-1))

 OF INTEGER (1..maxNrofSRS-TriggerStates-1) OPTIONAL, -- Need M

 ...

 },

 semi-persistent-r16 SEQUENCE {

 ...

 },

 periodic-r16 SEQUENCE {

 ...

 }

 },

 alpha-r16 Alpha OPTIONAL, -- Need S

 p0-r16 INTEGER (-202..24) OPTIONAL, -- Cond Setup

 pathlossReferenceRS-Pos-r16 CHOICE {

 ssb-IndexServing-r16 SSB-Index,

 ssb-Ncell-r16 SSB-InfoNcell-r16,

 dl-PRS-r16 DL-PRS-Info-r16

 } OPTIONAL, -- Need M

 ...

}

SRS-ResourceSetId ::= INTEGER (0..maxNrofSRS-ResourceSets-1)

SRS-PosResourceSetId-r16 ::= INTEGER (0..maxNrofSRS-PosResourceSets-1-r16)

SRS-Resource ::= SEQUENCE {

 srs-ResourceId SRS-ResourceId,

 nrofSRS-Ports ENUMERATED {port1, ports2, ports4},

 ptrs-PortIndex ENUMERATED {n0, n1 } OPTIONAL, -- Need R

 transmissionComb CHOICE {

 n2 SEQUENCE {

 combOffset-n2 INTEGER (0..1),

 cyclicShift-n2 INTEGER (0..7)

 },

 n4 SEQUENCE {

 combOffset-n4 INTEGER (0..3),

 cyclicShift-n4 INTEGER (0..11)

 }

 },

 resourceMapping SEQUENCE {

 startPosition INTEGER (0..5),

 nrofSymbols ENUMERATED {n1, n2, n4},

 repetitionFactor ENUMERATED {n1, n2, n4}

 },

 freqDomainPosition INTEGER (0..67),

 freqDomainShift INTEGER (0..268),

 freqHopping SEQUENCE {

 c-SRS INTEGER (0..63),

 b-SRS INTEGER (0..3),

 b-hop INTEGER (0..3)

 },

 groupOrSequenceHopping ENUMERATED { neither, groupHopping, sequenceHopping },

 resourceType CHOICE {

 aperiodic SEQUENCE {

 ...

 },

 semi-persistent SEQUENCE {

 periodicityAndOffset-sp SRS-PeriodicityAndOffset,

 ...

 },

 periodic SEQUENCE {

 periodicityAndOffset-p SRS-PeriodicityAndOffset,

 ...

 }

 },

 sequenceId INTEGER (0..1023),

 spatialRelationInfo SRS-SpatialRelationInfo OPTIONAL, -- Need R

 ...,

 [[

 resourceMapping-r16 SEQUENCE {

 startPosition-r16 INTEGER (0..13),

 nrofSymbols-r16 ENUMERATED {n1, n2, n4},

 repetitionFactor-r16 ENUMERATED {n1, n2, n4}

 } OPTIONAL -- Need R

 ]]

}

SRS-PosResource-r16::= SEQUENCE {

 srs-PosResourceId-r16 SRS-PosResourceId-r16,

 transmissionComb-r16 CHOICE {

 n2-r16 SEQUENCE {

 combOffset-n2-r16 INTEGER (0..1),

 cyclicShift-n2-r16 INTEGER (0..7)

 },

 n4-r16 SEQUENCE {

 combOffset-n4-16 INTEGER (0..3),

 cyclicShift-n4-r16 INTEGER (0..11)

 },

 n8-r16 SEQUENCE {

 combOffset-n8-r16 INTEGER (0..7),

 cyclicShift-n8-r16 INTEGER (0..5)

 },

 ...

 },

 resourceMapping-r16 SEQUENCE {

 startPosition-r16 INTEGER (0..13),

 nrofSymbols-r16 ENUMERATED {n1, n2, n4, n8, n12}

 },

 freqDomainShift-r16 INTEGER (0..268),

 freqHopping-r16 SEQUENCE {

 c-SRS-r16 INTEGER (0..63),

 ...

 },

 groupOrSequenceHopping-r16 ENUMERATED { neither, groupHopping, sequenceHopping },

 resourceType-r16 CHOICE {

 aperiodic-r16 SEQUENCE {

 slotOffset-r16 INTEGER (1..32) OPTIONAL, -- Need S

 ...

 },

 semi-persistent-r16 SEQUENCE {

 periodicityAndOffset-sp-r16 SRS-PeriodicityAndOffset-r16,

 ...

 },

 periodic-r16 SEQUENCE {

 periodicityAndOffset-p-r16 SRS-PeriodicityAndOffset-r16,

 ...

 }

 },

 sequenceId-r16 INTEGER (0..65535),

 spatialRelationInfoPos-r16 SRS-SpatialRelationInfoPos-r16 OPTIONAL, -- Need R

 ...

}

SRS-SpatialRelationInfo ::= SEQUENCE {

 servingCellId ServCellIndex OPTIONAL, -- Need S

 referenceSignal CHOICE {

 ssb-Index SSB-Index,

 csi-RS-Index NZP-CSI-RS-ResourceId,

 srs SEQUENCE {

 resourceId SRS-ResourceId,

 uplinkBWP BWP-Id

 }

 }

}

SRS-SpatialRelationInfoPos-r16 ::= CHOICE {

 servingRS-r16 SEQUENCE {

 servingCellId ServCellIndex OPTIONAL, -- Need S

 referenceSignal-r16 CHOICE {

 ssb-IndexServing-r16 SSB-Index,

 csi-RS-IndexServing-r16 NZP-CSI-RS-ResourceId,

 srs-SpatialRelation-r16 SEQUENCE {

 resourceSelection-r16 CHOICE {

 srs-ResourceId-r16 SRS-ResourceId,

 srs-PosResourceId-r16 SRS-PosResourceId-r16

 },

 uplinkBWP-r16 BWP-Id

 }

 }

 },

 ssb-Ncell-r16 SSB-InfoNcell-r16,

 dl-PRS-r16 DL-PRS-Info-r16

}

SSB-Configuration-r16 ::= SEQUENCE {

 ssb-Freq-r16 ARFCN-ValueNR,

 halfFrameIndex-r16 ENUMERATED {zero, one},

 ssbSubcarrierSpacing-r16 SubcarrierSpacing,

 ssb-Periodicity-r16 ENUMERATED { ms5, ms10, ms20, ms40, ms80, ms160, spare2,spare1 } OPTIONAL, -- Need S

 sfn0-Offset-r16 SEQUENCE {

 sfn-Offset-r16 INTEGER (0..1023),

 integerSubframeOffset-r16 INTEGER (0..9) OPTIONAL -- Need R

 } OPTIONAL, -- Need R

 sfn-SSB-Offset-r16 INTEGER (0..15),

 ss-PBCH-BlockPower-r16 INTEGER (-60..50) OPTIONAL -- Cond Pathloss

}

SSB-InfoNcell-r16 ::= SEQUENCE {

 physicalCellId-r16 PhysCellId,

 ssb-IndexNcell-r16 SSB-Index OPTIONAL, -- Need S

 ssb-Configuration-r16 SSB-Configuration-r16 OPTIONAL -- Need S

}

DL-PRS-Info-r16 ::= SEQUENCE {

 dl-PRS-ID-r16 INTEGER (0..255),

 dl-PRS-ResourceSetId-r16 INTEGER (0..7),

 dl-PRS-ResourceId-r16 INTEGER (0..63) OPTIONAL -- Need S

}

SRS-ResourceId ::= INTEGER (0..maxNrofSRS-Resources-1)

SRS-PosResourceId-r16 ::= INTEGER (0..maxNrofSRS-PosResources-1-r16)

SRS-PeriodicityAndOffset ::= CHOICE {

 sl1 NULL,

 sl2 INTEGER(0..1),

 sl4 INTEGER(0..3),

 sl5 INTEGER(0..4),

 sl8 INTEGER(0..7),

 sl10 INTEGER(0..9),

 sl16 INTEGER(0..15),

 sl20 INTEGER(0..19),

 sl32 INTEGER(0..31),

 sl40 INTEGER(0..39),

 sl64 INTEGER(0..63),

 sl80 INTEGER(0..79),

 sl160 INTEGER(0..159),

 sl320 INTEGER(0..319),

 sl640 INTEGER(0..639),

 sl1280 INTEGER(0..1279),

 sl2560 INTEGER(0..2559)

}

SRS-PeriodicityAndOffset-r16 ::= CHOICE {

 sl1 NULL,

 sl2 INTEGER(0..1),

 sl4 INTEGER(0..3),

 sl5 INTEGER(0..4),

 sl8 INTEGER(0..7),

 sl10 INTEGER(0..9),

 sl16 INTEGER(0..15),

 sl20 INTEGER(0..19),

 sl32 INTEGER(0..31),

 sl40 INTEGER(0..39),

 sl64 INTEGER(0..63),

 sl80 INTEGER(0..79),

 sl160 INTEGER(0..159),

 sl320 INTEGER(0..319),

 sl640 INTEGER(0..639),

 sl1280 INTEGER(0..1279),

 sl2560 INTEGER(0..2559),

 sl5120 INTEGER(0..5119),

 sl10240 INTEGER(0..10239),

 sl40960 INTEGER(0..40959),

 sl81920 INTEGER(0..81919),

 ...

}

-- TAG-SRS-CONFIG-STOP

-- ASN1STOP

|  |
| --- |
| ***SRS-Config* field descriptions** |
| ***tpc-Accumulation***If the field is absent, UE applies TPC commands via accumulation. If disabled, UE applies the TPC command without accumulation (this applies to SRS when a separate closed loop is configured for SRS) (see TS 38.213 [13], clause 7.3). |

|  |
| --- |
| *SRS-Resource* field descriptions |
| ***cyclicShift-n2***Cyclic shift configuration (see TS 38.214 [19], clause 6.2.1). |
| ***cyclicShift-n4***Cyclic shift configuration (see TS 38.214 [19], clause 6.2.1). |
| ***freqHopping***Includes parameters capturing SRS frequency hopping (see TS 38.214 [19], clause 6.2.1). For CLI SRS-RSRP measurement, the network always configures this field such that *b-hop* > *b-SRS*. |
| ***groupOrSequenceHopping***Parameter(s) for configuring group or sequence hopping (see TS 38.211 [16], clause 6.4.1.4.2). For CLI SRS-RSRP measurement, the network always configures this parameter to 'neither'. |
| ***nrofSRS-Ports***Number of ports. For CLI SRS-RSRP measurement, the network always configures this parameter to 'port1'. |
| ***periodicityAndOffset-p***Periodicity and slot offset for this SRS resource. All values are in "number of slots". Value *sl1* corresponds to a periodicity of 1 slot, value *sl2* corresponds to a periodicity of 2 slots, and so on. For each periodicity the corresponding offset is given in number of slots. For periodicity *sl1* the offset is 0 slots (see TS 38.214 [19], clause 6.2.1). For CLI SRS-RSRP measurement, *sl1280* and *sl2560* cannot be configured. |
| ***periodicityAndOffset-sp***Periodicity and slot offset for this SRS resource. All values are in "number of slots". Value *sl1* corresponds to a periodicity of 1 slot, value *sl2* corresponds to a periodicity of 2 slots, and so on. For each periodicity the corresponding offset is given in number of slots. For periodicity *sl1* the offset is 0 slots (see TS 38.214 [19], clause 6.2.1). |
| ***ptrs-PortIndex***The PTRS port index for this SRS resource for non-codebook based UL MIMO. This is only applicable when the corresponding *PTRS-UplinkConfig* is set to CP-OFDM. The *ptrs-PortIndex* configured here must be smaller than the *maxNrofPorts* configured in the *PTRS-UplinkConfig* (see TS 38.214 [19], clause 6.2.3.1). This parameter is not applicable to CLI SRS-RSRP measurement. |
| ***resourceMapping***OFDM symbol location of the SRS resource within a slot including *nrofSymbols* (number of OFDM symbols), *startPosition* (value 0 refers to the last symbol, value 1 refers to the second last symbol, and so on) and *repetitionFactor* (see TS 38.214 [19], clause 6.2.1 and TS 38.211 [16], clause 6.4.1.4). The configured SRS resource does not exceed the slot boundary. If *resourceMapping-r16* is signalled, UE shall ignore the *resourceMapping* (without suffix). For CLI SRS-RSRP measurement, the network always configures *nrofSymbols* and *repetitionFactor* to 'n1'. |
| ***resourceType***Periodicity and offset for semi-persistent and periodic SRS resource (see TS 38.214 [19], clause 6.2.1). For CLI SRS-RSRP measurement, only 'periodic' is applicable for *resourceType*. |
| ***sequenceId***Sequence ID used to initialize pseudo random group and sequence hopping (see TS 38.214 [19], clause 6.2.1). |
| ***servingCellId***The serving Cell ID of the source SSB, CSI-RS, or SRS for the spatial relation of the target SRS resource. If this field is absent the SSB, the CSI-RS, or the SRS is from the same serving cell where the SRS is configured. |
| ***spatialRelationInfo***Configuration of the spatial relation between a reference RS and the target SRS. Reference RS can be SSB/CSI-RS/SRS (see TS 38.214 [19], clause 6.2.1). This parameter is not applicable to CLI SRS-RSRP measurement. |
| ***spatialRelationInfoPos***Configuration of the spatial relation between a reference RS and the target SRS. Reference RS can be SSB/CSI-RS/SRS/DL-PRS (see TS 38.214 [19], clause 6.2.1). |
| ***srs-RequestForDCI-Format0-2***Indicate the number of bits for "SRS request"in DCI format 0\_2. When the field is absent, then the value of 0 bit for "SRS request" in DCI format 0\_2 is applied. If the parameter *srs-RequestForDCI-Format0-2* is configured to value 1, 1 bit is used to indicate one of the first two rows of Table 7.3.1.1.2-24 in TS 38.212 [17] for triggered aperiodic SRS resource set. If the value 2 is configured, 2 bits are used to indicate one of the rows of Table 7.3.1.1.2-24 in TS 38.212 [17]. When UE is configured with *supplementaryUplink*, an extra bit (the first bit of the SRS request field) is used for the non-SUL/SUL indication. |
| ***srs-RequestForDCI-Format1-2***Indicate the number of bits for "SRS request" in DCI format 1\_2. When the field is absent, then the value of 0 bit for "SRS request" in DCI format 1\_2 is applied. When the UE is configured with *supplementaryUplink*, an extra bit (the first bit of the SRS request field) is used for the non-SUL/SUL indication (see TS 38.214 [19], clause 6.1.1.2). |
| ***srs-ResourceSetToAddModListForDCI-Format0-2***List of SRS resource set to be added or modified for DCI format 0\_2 (see TS 38.212 [17], clause 7.3.1). |
| ***srs-ResourceSetToReleaseListForDCI-Format0-2***List of SRS resource set to be released for DCI format 0\_2 (see TS 38.212 [17], clause 7.3.1). |
| ***transmissionComb***Comb value (2 or 4 or 8) and comb offset (0..combValue-1) (see TS 38.214 [19], clause 6.2.1). |

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| *SRS-ResourceSet* field descriptions |
| ***alpha***alpha value for SRS power control (see TS 38.213 [13], clause 7.3). When the field is absent the UE applies the value 1. |
| ***aperiodicSRS-ResourceTriggerList***An additional list of DCI "code points" upon which the UE shall transmit SRS according to this SRS resource set configuration (see TS 38.214 [19], clause 6.1.1.2). When the field is not included during a reconfiguration of *SRS-ResourceSet* of *resourceType* set to *aperiodic*, UE maintains this value based on the Need M; that is, this list is not considered as an extension of *aperiodicSRS-ResourceTrigger* for purpose of applying the general rule for extended list in clause 6.1.3. |
| ***aperiodicSRS-ResourceTrigger***The DCI "code point" upon which the UE shall transmit SRS according to this SRS resource set configuration (see TS 38.214 [19], clause 6.1.1.2). |
| ***associatedCSI-RS***ID of CSI-RS resource associated with this SRS resource set in non-codebook based operation (see TS 38.214 [19], clause 6.1.1.2). |
| ***csi-RS***ID of CSI-RS resource associated with this SRS resource set. (see TS 38.214 [19], clause 6.1.1.2). |
| ***csi-RS-IndexServingcell***Indicates CSI-RS index belonging to a serving cell |
| ***p0***P0 value for SRS power control. The value is in dBm. Only even values (step size 2) are allowed (see TS 38.213 [13], clause 7.3). |
| ***pathlossReferenceRS***A reference signal (e.g. a CSI-RS config or a SS block) to be used for SRS path loss estimation (see TS 38.213 [13], clause 7.3). |
| ***pathlossReferenceRS-Pos***A reference signal (e.g. a SS block or a DL-PRS config) to be used for SRS path loss estimation (see TS 38.213 [13], clause 7.3). |
| ***pathlossReferenceRSList***Multiple candidate pathloss reference RS(s) for SRS power control, where one candidate RS can be mapped to SRS Resource Set via MAC CE (clause 6.1.3.27 in TS 38.321 [3]). The network can only configure this field if *pathlossReferenceRS* is not configured in the same *SRS-ResourceSet*. |
| ***resourceSelection***Indicates whether the configured SRS spatial relation resource is a *SRS-Resource* or *SRS-PosResource*. |
| ***resourceType***Time domain behavior of SRS resource configuration, see TS 38.214 [19], clause 6.2.1. The network configures SRS resources in the same resource set with the same time domain behavior on periodic, aperiodic and semi-persistent SRS. |
| ***slotOffset***An offset in number of slots between the triggering DCI and the actual transmission of this *SRS-ResourceSet*. If the field is absent the UE applies no offset (value 0). |
| ***srs-PowerControlAdjustmentStates***Indicates whether hsrs,c(i) = fc(i,1) or hsrs,c(i) = fc(i,2) (if twoPUSCH-PC-AdjustmentStates are configured) or separate close loop is configured for SRS. This parameter is applicable only for Uls on which UE also transmits PUSCH. If absent or release, the UE applies the value sameAs-Fci1 (see TS 38.213 [13], clause 7.3). |
| ***srs-ResourceIdList***The IDs of the SRS-Resources used in this *SRS-ResourceSet*. If this *SRS-ResourceSet* is configured with usage set to codebook, the *srs-ResourceIdList* contains at most 2 entries. If this *SRS-ResourceSet* is configured with *usage* set to *nonCodebook*, the *srs-ResourceIdList* contains at most 4 entries. |
| ***srs-ResourceSetId***The ID of this resource set. It is unique in the context of the BWP in which the parent *SRS-Config* is defined. |
| ***ssb-IndexSevingcell***Indicates SSB index belonging to a serving cell |
| ***ssb-NCell***This field indicates a SSB configuration from neighboring cell |
| ***usage***Indicates if the SRS resource set is used for beam management, codebook based or non-codebook based transmission or antenna switching. See TS 38.214 [19], clause 6.2.1. Reconfiguration between codebook based and non-codebook based transmission is not supported. |
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| *SSB-InfoNCell* field descriptions |
| ***physicalCellId***This field specifies the physical cell ID of the neighbour cell for which SSB configuration is provided. |
| ***ssb-IndexNcell***This field specifies the index of the SSB for a neighbour cell. See TS 38.213 [13]. If this field is absent, the UE determines the *ssb-IndexNcell* of the *physicalCellId*based on its SSB measurement from the cell. |
| ***ssb-Configuration***This field specifies the full configuration of the SSB. If this field is absent, the UE obtains the configuration for the SSB from *nr-SSB-Config* received as part of DL-PRS assistance data in LPP*,* see TS 37.355 [49], by looking up the corresponding SSB configuration using the field *physicalCellId*. |

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| *DL-PRS-Info* field descriptions |
| ***dl-PRS-ID***This field specifies the UE specific TRP ID (see TS 37.355 [49]) for which PRS configuration is provided.  |
| ***dl-PRS-ResourceSetId***This field specifies the PRS-ResourceSet ID of a PRS resourceSet. |
| ***dl-PRS-ResourceId***This field specifies the PRS-Resource ID of a PRS resource. If this field is absent, the UE determines the *dl-PRS-ResourceID* based on its PRS measurement from the TRP and DL-PRS Resource Set. |

*Next Change*