**3GPP TSG-2 Meeting #R2-2203445**

**, Revision of R2-2202048**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **1** | **CR** | **draft** | **rev** | **-** | **Current version:** | **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:*** | Capturing RRC impacts for RAT dependent Positioning | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** |  | | | | | | | | | |
| ***Source to TSG:*** | R2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_pos\_enh-Core | | | | |  | ***Date:*** | | | 14 |
|  |  | | | |  | |  | | |  |
| ***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 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:*** | | Capture the below agreements from RAN2#116bis-e in RRC specification   |  | | --- | | Agreements:  Proposal 1 (modified) To support UL positioning in RRC\_INACTIVE, reuse SDT TA timer mechanism (with a separate timer with similar function) for TA validation.  Proposal 2 To support UL positioning in RRC\_INACTIVE, reuse RSRP change based solution for TA validation  Proposal 3 The SRSp configuration is considered as invalid if TA is not valid.  Proposal 4 When cell reselection is performed and UE initiates RRC resume procedure to the cell which is different from the cell in which the SRSp is configured, the TA timer configuration for SRS should be released.  Proposal 5 (modified) The SRSp configuration is released when the UE sends RRCResumeRequest to a cell other than the cell where it is released to RRC\_INACTIVE state.  Proposal 6 BWP info together with the SRS-PosResourceSet IE is included in RRCRelease message for SRS configuration in RRC\_INACTIVE.  Proposal 7 RAN2 confirms RAN1 agreement that UE may be configured to transmit UL SRS for Positioning where the following parameters are additionally configured for the transmission of the SRS for Positioning during the RRC\_INACTIVE state: frequency location and bandwidth, SCS, CP length.  Proposal 8 Add the restriction on AP SRS in the field description of resourceType “The aperiodic is not applicable for the UE in RRC\_INACTIVE.”.  FFS if the TA timer configuration is invalidated upon any cell reselection. | | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | * TA Validation Procedure has been added * RRC Resume Procedure has been updated * ASN.1 changes has been added | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | RRC Inactive Positioning may not be supported. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.X, 5.3.12, 5.3.13, 6.2.2, 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:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

*Beginning of Changes*

##### 5.X Timing alignment validation for SRS for Positioning transmission in RRC Inactive

The UE shall:

1> if *srs-timeAlignmentTimer* is configured and *srs-TimeAlignmentTimer* is running;

2> if *RSRP-ChangeThreshold* is configured and the following conditions are fulfilled:

3> if the serving cell RSRP has not increased by more than *changeThresh* compared to the stored serving cell reference RSRP value; and

3> if the serving cell RSRP has not decreased by more than *changeThresh* compared to the stored serving cell reference RSRP value;

4> consider the Timing Advance value for SRS for Positioning transmission to be valid;

2> else:

3> consider the SRS for positioning configuration in RRC Inactive state to be invalid.

Editor’s Note: can be updated to align with SDT TA Validation Procedure

*Next Change*

### 5.3.8 RRC connection release

#### 5.3.8.1 General



Figure 5.3.8.1-1: RRC connection release, successful

The purpose of this procedure is:

- to release the RRC connection, which includes the release of the established radio bearers, BH RLC channels as well as all radio resources; or

- to suspend the RRC connection only if SRB2 and at least one DRB or, for IAB, SRB2, are setup, which includes the suspension of the established radio bearers.

#### 5.3.8.2 Initiation

The network initiates the RRC connection release procedure to transit a UE in RRC\_CONNECTED to RRC\_IDLE; or to transit a UE in RRC\_CONNECTED to RRC\_INACTIVE only if SRB2 and at least one DRB or, for IAB, SRB2, is setup in RRC\_CONNECTED; or to transit a UE in RRC\_INACTIVE back to RRC\_INACTIVE when the UE tries to resume; or to transit a UE in RRC\_INACTIVE to RRC\_IDLE when the UE tries to resume. The procedure can also be used to release and redirect a UE to another frequency.

#### 5.3.8.3 Reception of the *RRCRelease* by the UE

The UE shall:

1> delay the following actions defined in this sub-clause 60 ms from the moment the *RRCRelease* message was received or optionally when lower layers indicate that the receipt of the *RRCRelease* message has been successfully acknowledged, whichever is earlier;

1> stop timer T380, if running;

1> stop timer T320, if running;

1> if timer T316 is running;

2> stop timer T316;

2> clear the information included in *VarRLF-Report,* if any;

1> stop timer T350, if running;

1> if theAS security is not activated:

2> ignore any field included in *RRCRelease* message except *waitTime*;

2> perform the actions upon going to RRC\_IDLE as specified in 5.3.11 with the release cause 'other' upon which the procedure ends;

1> if the *RRCRelease* message includes *redirectedCarrierInfo* indicating redirection to *eutra*:

2> if *cnType* is included:

3> after the cell selection, indicate the available CN Type(s) and the received *cnType* to upper layers;

NOTE 1: Handling the case if the E-UTRA cell selected after the redirection does not support the core network type specified by the *cnType,* is up to UE implementation.

2> if *voiceFallbackIndication* is included:

3> consider the RRC connection release was for EPS fallback for IMS voice (see TS 23.502 [43]);

1> if the *RRCRelease* message includes the *cellReselectionPriorities*:

2> store the cell reselection priority information provided by the *cellReselectionPriorities*;

2> if the *t320* is included:

3> start timer T320, with the timer value set according to the value of *t320*;

1> else:

2> apply the cell reselection priority information broadcast in the system information;

1> if *deprioritisationReq* is included and the UE supports RRC connection release with deprioritisation:

2> start or restart timer T325 with the timer value set to the *deprioritisationTimer* signalled;

2> store the *deprioritisationReq* until T325 expiry;

NOTE 1a: The UE stores the deprioritisation request irrespective of any cell reselection absolute priority assignments (by dedicated or common signalling) and regardless of RRC connections in NR or other RATs unless specified otherwise.

1> if the *RRCRelease* includes the *measIdleConfig*:

2> if T331 is running:

3> stop timer T331;

3> perform the actions as specified in 5.7.8.3;

2> if the *measIdleConfig* is set to *setup*:

3> store the received *measIdleDuration* in *VarMeasIdleConfig*;

3> start timer T331 with the value set to *measIdleDuration*;

3> if the *measIdleConfig* contains *measIdleCarrierListNR*:

4> store the received *measIdleCarrierListNR* in *VarMeasIdleConfig*;

3> if the *measIdleConfig* contains *measIdleCarrierListEUTRA*:

4> store the received *measIdleCarrierListEUTRA* in *VarMeasIdleConfig*;

3> if the *measIdleConfig* contains *validityAreaList*:

4> store the received *validityAreaList* in *VarMeasIdleConfig*;

1> if the *RRCRelease* includes *suspendConfig*:

2> apply the received *suspendConfig*;

Editor’s Note: FFS if any change is needed for RRC Release

2> remove all the entries within *VarConditionalReconfig*, if any;

2> for each *measId*, if the associated *reportConfig* has a *reportType* set to *condTriggerConfig*:

3> for the associated *reportConfigId*:

4> remove the entry with the matching *reportConfigId* from the *reportConfigList* within the *VarMeasConfig*;

3> if the associated *measObjectId* is only associated to a *reportConfig* with *reportType* set to *condTriggerConfig*:

4> remove the entry with the matching *measObjectId* from the *measObjectList* within the *VarMeasConfig*;

3> remove the entry with the matching *measId* from the *measIdList* within the *VarMeasConfig*;

2> reset MAC and release the default MAC Cell Group configuration, if any;

2> re-establish RLC entities for SRB1;

2> if the *RRCRelease* message with *suspendConfig* was received in response to an *RRCResumeRequest* or an *RRCResumeRequest1*:

3> stop the timer T319 if running;

3> in the stored UE Inactive AS context:

4> replace the KgNB and KRRCint keys with the current KgNB and KRRCint keys;

4> replace the C-RNTI with the C-RNTI used in the cell (see TS 38.321 [3]) the UE has received the *RRCRelease* message;

4> replace the *cellIdentity* with the *cellIdentity* of the cell the UE has received the *RRCRelease* message;

4> replace the physical cell identitywith the physical cell identity of the cell the UE has received the *RRCRelease* message;

2> else:

3> store in the UE Inactive AS Context the current KgNB and KRRCint keys, the ROHC state, the stored QoS flow to DRB mapping rules, the C-RNTI used in the source PCell, the *cellIdentity* and the physical cell identity of the source PCell, the *spCellConfigCommon* within *ReconfigurationWithSync* of the NR PSCell (if configured) and all other parameters configured except for:

- parameters within *ReconfigurationWithSync* of the PCell;

- parameters within *ReconfigurationWithSync* of the NR PSCell, if configured;

- parameters within *MobilityControlInfoSCG* of the E-UTRA PSCell, if configured;

- *servingCellConfigCommonSIB*;

NOTE 2: NR sidelink communication related configurations and logged measurement configuration are not stored as UE Inactive AS Context, when UE enters RRC\_INACTIVE.

2> suspend all SRB(s) and DRB(s), except SRB0;

2> indicate PDCP suspend to lower layers of all DRBs;

2> if the *t380* is included:

3> start timer T380, with the timer value set to *t380*;

2> if the *RRCRelease* message is including the *waitTime*:

3> start timer T302 with the value set to the *waitTime*;

3> inform upper layers that access barring is applicable for all access categories except categories '0' and '2';

2> if T390 is running:

3> stop timer T390 for all access categories;

3> perform the actions as specified in 5.3.14.4;

2> indicate the suspension of the RRC connection to upper layers;

2> enter RRC\_INACTIVE and perform cell selection as specified in TS 38.304 [20];

1> else

2> perform the actions upon going to RRC\_IDLE as specified in 5.3.11, with the release cause 'other'.

*Next Change*

### 5.3.12 UE actions upon PUCCH/SRS release request

Upon receiving a PUCCH release request from lower layers, for all bandwidth parts of an indicated serving cell the UE shall:

1> release PUCCH-CSI-Resources configured in *CSI-ReportConfig*;

1> release *SchedulingRequestResourceConfig* instances configured in *PUCCH-Config*.

Upon receiving an SRS release request from lower layers, for all bandwidth parts of an indicated serving cell the UE shall:

1> release *SRS-Resource* instances configured in *SRS-Config*.

Upon receiving a positioning SRS configuration for RRC\_INACTIVE release request from lower layers, the UE shall:

1> release the configured *srs-PosRRC-InactiveConfig*.

*Next Change*

### 5.3.13 RRC connection resume

#### 5.3.13.1 General



Figure 5.3.13.1-1: RRC connection resume, successful



Figure 5.3.13.1-2: RRC connection resume fallback to RRC connection establishment, successful



Figure 5.3.13.1-3: RRC connection resume followed by network release, successful



Figure 5.3.13.1-4: RRC connection resume followed by network suspend, successful



Figure 5.3.13.1-5: RRC connection resume, network reject

The purpose of this procedure is to resume a suspended RRC connection, including resuming SRB(s) and DRB(s) or perform an RNA update.

#### 5.3.13.1a Conditions for resuming RRC Connection for NR sidelink communication/V2X sidelink communication

For NR sidelink communication an RRC connection is resumed only in the following cases:

1> if configured by upper layers to transmit NR sidelink communication and related data is available for transmission:

2> if the frequency on which the UE is configured to transmit NR sidelink communication is included in *sl-FreqInfoList* within *SIB12* provided by the cell on which the UE camps; and if the valid version of *SIB12* does not include *sl-TxPoolSelectedNormal* for the concerned frequency;

For V2X sidelink communication an RRC connection resume is initiated only when the conditions specified for V2X sidelink communication in subclause 5.3.3.1a of TS 36.331 [10] are met.

NOTE: Upper layers initiate an RRC connection resume. The interaction with NAS is left to UE implementation.

#### 5.3.13.2 Initiation

The UE initiates the procedure when upper layers or AS (when responding to RAN paging, upon triggering RNA updates while the UE is in RRC\_INACTIVE, or for NR sidelink communication/V2X sidelink communication as specified in sub-clause 5.3.13.1a) requests the resume of a suspended RRC connection.

The UE shall ensure having valid and up to date essential system information as specified in clause 5.2.2.2 before initiating this procedure.

Upon initiation of the procedure, the UE shall:

1> if the resumption of the RRC connection is triggered by response to NG-RAN paging:

2> select '0' as the Access Category;

2> perform the unified access control procedure as specified in 5.3.14 using the selected Access Category and one or more Access Identities provided by upper layers;

3> if the access attempt is barred, the procedure ends;

1> else if the resumption of the RRC connection is triggered by upper layers:

2> if the upper layers provide an Access Category and one or more Access Identities:

3> perform the unified access control procedure as specified in 5.3.14 using the Access Category and Access Identities provided by upper layers;

4> if the access attempt is barred, the procedure ends;

2> if the resumption occurs after release with redirect with *mpsPriorityIndication*:

3> set the resumeCause to mps-PriorityAccess;

2> else:

3> set the *resumeCause* in accordance with the information received from upper layers;

1> else if the resumption of the RRC connection is triggered due to an RNA update as specified in 5.3.13.8:

2> if an emergency service is ongoing:

NOTE: How the RRC layer in the UE is aware of an ongoing emergency service is up to UE implementation.

3> select '2' as the Access Category;

3> set the *resumeCause* to *emergency*;

2> else:

3> select '8' as the Access Category;

2> perform the unified access control procedure as specified in 5.3.14 using the selected Access Category and one or more Access Identities to be applied as specified in TS 24.501 [23];

3> if the access attempt is barred:

4> set the variable *pendingRNA-Update* to *true*;

4> the procedure ends;

1> if the UE is in NE-DC or NR-DC:

2> if the UE does not support maintaining SCG configuration upon connection resumption:

3> release the MR-DC related configurations (i.e., as specified in 5.3.5.10) from the UE Inactive AS context, if stored;

1> if the UE does not support maintaining the MCG SCell configurations upon connection resumption:

2> release the MCG SCell(s) from the UE Inactive AS context, if stored;

1> if the UE performs connection resumption in a different cell than the cell where *srs-PosRRC-InactiveConfig* was configured;

2> stop the *srs-timeAlignmentTimer*, if running;

2> release the configured *srs-PosRRC-InactiveConfig*;

Editor’s Note: FFS if the TA timer configuration is invalidated upon any cell reselection.

1> apply the default L1 parameter values as specified in corresponding physical layer specifications, except for the parameters for which values are provided in *SIB1*;

1> apply the default SRB1 configuration as specified in 9.2.1;

1> apply the default MAC Cell Group configuration as specified in 9.2.2;

1> release *delayBudgetReportingConfig* from the UE Inactive AS context, if stored;

1> stop timer T342, if running;

1> release *overheatingAssistanceConfig* from the UE Inactive AS context, if stored;

1> stop timer T345, if running;

1> release *idc-AssistanceConfig* from the UE Inactive AS context, if stored;

1> release *drx-PreferenceConfig* for all configured cell groups from the UE Inactive AS context, if stored;

1> stop all instances of timer T346a, if running;

1> release *maxBW-PreferenceConfig* for all configured cell groups from the UE Inactive AS context, if stored;

1> stop all instances of timer T346b, if running;

1> release *maxCC-PreferenceConfig* for all configured cell groups from the UE Inactive AS context, if stored;

1> stop all instances of timer T346c, if running;

1> release *maxMIMO-LayerPreferenceConfig* for all configured cell groups from the UE Inactive AS context, if stored;

1> stop all instances of timer T346d, if running;

1> release *minSchedulingOffsetPreferenceConfig* for all configured cell groups from the UE Inactive AS context, if stored;

1> stop all instances of timer T346e, if running;

1> release *releasePreferenceConfig* from the UE Inactive AS context, if stored;

1> release *wlanNameList* from the UE Inactive AS context, if stored;

1> release *btNameList* from the UE Inactive AS context, if stored;

1> release *sensorNameList* from the UE Inactive AS context, if stored;

1> release *obtainCommonLocation* from the UE Inactive AS context, if stored;

1> stop timer T346f, if running;

1> release *referenceTimePreferenceReporting* from the UE Inactive AS context, if stored;

1> release *sl-AssistanceConfigNR* from the UE Inactive AS context, if stored;

1> apply the CCCH configuration as specified in 9.1.1.2;

1> apply the *timeAlignmentTimerCommon* included in *SIB1*;

1> start timer T319;

1> set the variable *pendingRNA-Update* to *false*;

1> initiate transmission of the *RRCResumeRequest* message or *RRCResumeRequest1* in accordance with 5.3.13.3.

*Next Change*

6.2.2 Message definitions

– *CounterCheck*

The *CounterCheck* message is used by the network to indicate the current COUNT MSB values associated to each DRB and to request the UE to compare these to its COUNT MSB values and to report the comparison results to the network.

***<Skip unmodified changes>***

– *RRCRelease*

The *RRCRelease* message is used to command the release of an RRC connection or the suspension of the RRC connection.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: Network to UE

***RRCRelease* message**

-- ASN1START

-- TAG-RRCRELEASE-START

RRCRelease ::= SEQUENCE {

rrc-TransactionIdentifier RRC-TransactionIdentifier,

criticalExtensions CHOICE {

rrcRelease RRCRelease-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

RRCRelease-IEs ::= SEQUENCE {

redirectedCarrierInfo RedirectedCarrierInfo OPTIONAL, -- Need N

cellReselectionPriorities CellReselectionPriorities OPTIONAL, -- Need R

suspendConfig SuspendConfig OPTIONAL, -- Need R

deprioritisationReq SEQUENCE {

deprioritisationType ENUMERATED {frequency, nr},

deprioritisationTimer ENUMERATED {min5, min10, min15, min30}

} OPTIONAL, -- Need N

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension RRCRelease-v1540-IEs OPTIONAL

}

RRCRelease-v1540-IEs ::= SEQUENCE {

waitTime RejectWaitTime OPTIONAL, -- Need N

nonCriticalExtension RRCRelease-v1610-IEs OPTIONAL

}

RRCRelease-v1610-IEs ::= SEQUENCE {

voiceFallbackIndication-r16 ENUMERATED {true} OPTIONAL, -- Need N

measIdleConfig-r16 SetupRelease {MeasIdleConfigDedicated-r16} OPTIONAL, -- Need M

nonCriticalExtension RRCRelease-v1650-IEs OPTIONAL

}

RRCRelease-v1650-IEs ::= SEQUENCE {

mpsPriorityIndication-r16 ENUMERATED {true} OPTIONAL, -- Cond Redirection2

nonCriticalExtension SEQUENCE {} OPTIONAL

}

RedirectedCarrierInfo ::= CHOICE {

nr CarrierInfoNR,

eutra RedirectedCarrierInfo-EUTRA,

...

}

RedirectedCarrierInfo-EUTRA ::= SEQUENCE {

eutraFrequency ARFCN-ValueEUTRA,

cnType ENUMERATED {epc,fiveGC} OPTIONAL -- Need N

}

CarrierInfoNR ::= SEQUENCE {

carrierFreq ARFCN-ValueNR,

ssbSubcarrierSpacing SubcarrierSpacing,

smtc SSB-MTC OPTIONAL, -- Need S

...

}

SuspendConfig ::= SEQUENCE {

fullI-RNTI I-RNTI-Value,

shortI-RNTI ShortI-RNTI-Value,

ran-PagingCycle PagingCycle,

ran-NotificationAreaInfo RAN-NotificationAreaInfo OPTIONAL, -- Need M

t380 PeriodicRNAU-TimerValue OPTIONAL, -- Need R

nextHopChainingCount NextHopChainingCount,

...,

[[

srs-PosRRC-InactiveConfig-r17 SRS-PosRRC-InactiveConfig-r17 OPTIONAL -- Need N ]]

}

PeriodicRNAU-TimerValue ::= ENUMERATED { min5, min10, min20, min30, min60, min120, min360, min720}

CellReselectionPriorities ::= SEQUENCE {

freqPriorityListEUTRA FreqPriorityListEUTRA OPTIONAL, -- Need M

freqPriorityListNR FreqPriorityListNR OPTIONAL, -- Need M

t320 ENUMERATED {min5, min10, min20, min30, min60, min120, min180, spare1} OPTIONAL, -- Need R

...

}

PagingCycle ::= ENUMERATED {rf32, rf64, rf128, rf256}

FreqPriorityListEUTRA ::= SEQUENCE (SIZE (1..maxFreq)) OF FreqPriorityEUTRA

FreqPriorityListNR ::= SEQUENCE (SIZE (1..maxFreq)) OF FreqPriorityNR

FreqPriorityEUTRA ::= SEQUENCE {

carrierFreq ARFCN-ValueEUTRA,

cellReselectionPriority CellReselectionPriority,

cellReselectionSubPriority CellReselectionSubPriority OPTIONAL -- Need R

}

FreqPriorityNR ::= SEQUENCE {

carrierFreq ARFCN-ValueNR,

cellReselectionPriority CellReselectionPriority,

cellReselectionSubPriority CellReselectionSubPriority OPTIONAL -- Need R

}

RAN-NotificationAreaInfo ::= CHOICE {

cellList PLMN-RAN-AreaCellList,

ran-AreaConfigList PLMN-RAN-AreaConfigList,

...

}

PLMN-RAN-AreaCellList ::= SEQUENCE (SIZE (1.. maxPLMNIdentities)) OF PLMN-RAN-AreaCell

PLMN-RAN-AreaCell ::= SEQUENCE {

plmn-Identity PLMN-Identity OPTIONAL, -- Need S

ran-AreaCells SEQUENCE (SIZE (1..32)) OF CellIdentity

}

PLMN-RAN-AreaConfigList ::= SEQUENCE (SIZE (1..maxPLMNIdentities)) OF PLMN-RAN-AreaConfig

PLMN-RAN-AreaConfig ::= SEQUENCE {

plmn-Identity PLMN-Identity OPTIONAL, -- Need S

ran-Area SEQUENCE (SIZE (1..16)) OF RAN-AreaConfig

}

RAN-AreaConfig ::= SEQUENCE {

trackingAreaCode TrackingAreaCode,

ran-AreaCodeList SEQUENCE (SIZE (1..32)) OF RAN-AreaCode OPTIONAL -- Need R

}

SRS-PosRRC-InactiveConfig-r17 ::= SEQUENCE {

srs-Config-r17 SetupRelease {SRS-Config} OPTIONAL, -- Need M

bwp-r17 BWP OPTIONAL, -- Need S

srs-TimeAlignmentTimer-r17 ENUMERARED {FFS align with SDT} OPTIONAL, -- Need R

changeThresh-r17 RSRP-ChangeThresh-r17, OPTIONAL -- Need R

}

RSRP-ChangeThresh-r17 ::= ENUMERATED {dB4, dB6, dB8, dB10, dB14, dB18, dB22, dB26, dB30, dB34, spare6, spare5, spare4, spare3, spare2, spare1}

Editor’s Note: To be updated to align with SDT

Editor’s Note: To Check whether BWP IE loactionAndBandwidth field to be used or separate fields along with offsetToPointA is to be used.

Editor’s Note: Check the need codes and whether instead of SRS-Config; SRSPosResourceSet And SRSPosResource are to be used.

-- TAG-RRCRELEASE-STOP

-- ASN1STOP

|  |
| --- |
| ***RRCRelease-IEs* field descriptions** |
| ***cnType***  Indicate that the UE is redirected to EPC or 5GC. |
| ***deprioritisationReq***  Indicates whether the current frequency or RAT is to be de-prioritised. |
| ***deprioritisationTimer***  Indicates the period for which either the current carrier frequency or NR is deprioritised. Value *minN* corresponds to N minutes. |
| ***measIdleConfig***  Indicates measurement configuration to be stored and used by the UE while in RRC\_IDLE or RRC\_INACTIVE. |
| ***mpsPriorityIndication***  Indicates the UE can set the establishment cause to mps-PriorityAccess for a new connection to a new RAT following a redirect to NR. If the target RAT is E-UTRA, see TS 36.331 [10]. The gNB sets the indication only for UEs authorized to receive MPS treatment as indicated by ARP and/or QoS characteristics at the gNB, and it is applicable only for this instance of release with redirection to carrier/RAT included in the *redirectedCarrierInfo* field in the *RRCRelease* message. |
| ***srs-PosRRCInactiveConfig***  SRS for positioning confifuration during RRC Inactive State. |
| ***suspendConfig***  Indicates configuration for the RRC\_INACTIVE state. The network does not configure *suspendConfig* when the network redirect the UE to an inter-RAT carrier frequency or if the UE is configured with a DAPS bearer. |
| ***redirectedCarrierInfo***  Indicates a carrier frequency (downlink for FDD) and is used to redirect the UE to an NR or an inter-RAT carrier frequency, by means of cell selection at transition to RRC\_IDLE or RRC\_INACTIVE as specified in TS 38.304 [20]. Based on UE capability, the network may include *redirectedCarrierInfo* in *RRCRelease* message with *suspendConfig* if this message is sent in response to an *RRCResumeRequest* or an *RRCResumeRequest1* which is triggered by the NAS layer (see 5.3.1.4 in TS 24.501 [23]). |
| ***voiceFallbackIndication***  Indicates the RRC release is triggered by EPS fallback for IMS voice as specified in TS 23.502 [43]. |

|  |
| --- |
| ***CarrierInfoNR* field descriptions** |
| ***carrierFreq***  Indicates the redirected NR frequency. |
| ***ssbSubcarrierSpacing***  Subcarrier spacing of SSB in the redirected SSB frequency. Only the values 15 kHz or 30 kHz (FR1), and 120 kHz or 240 kHz (FR2) are applicable. |
| ***smtc***  The SSB periodicity/offset/duration configuration for the redirected SSB frequency. It is based on timing reference of PCell. If the field is absent, the UE uses the SMTC configured in the measObjectNR having the same SSB frequency and subcarrier spacing. |

|  |
| --- |
| ***RAN-NotificationAreaInfo* field descriptions** |
| ***cellList***  A list of cells configured as RAN area. |
| ***ran-AreaConfigList***  A list of RAN area codes or RA code(s) as RAN area. |

|  |
| --- |
| ***PLMN-RAN-AreaConfig* field descriptions** |
| ***plmn-Identity***  PLMN Identity to which the cells in *ran-Area* belong. If the field is absent the UE not in SNPN access mode uses the ID of the registered PLMN. This field is not included for UE in SNPN access mode (for UE in SNPN access mode the *ran-Area* always belongs to the registered SNPN). |
| ***ran-AreaCodeList***  The total number of RAN-AreaCodes of all PLMNs does not exceed 32. |
| ***ran-Area***  Indicates whether TA code(s) or RAN area code(s) are used for the RAN notification area. The network uses only TA code(s) or both TA code(s) and RAN area code(s) to configure a UE. The total number of TACs across all PLMNs does not exceed 16. |

|  |
| --- |
| ***PLMN-RAN-AreaCell* field descriptions** |
| ***plmn-Identity***  PLMN Identity to which the cells in *ran-AreaCells* belong. If the field is absent the UE not in SNPN access mode uses the ID of the registered PLMN. This field is not included for UE in SNPN access mode (for UE in SNPN access mode the *ran-AreaCells* always belongs to the registered SNPN). |
| ***ran-AreaCells***  The total number of cells of all PLMNs does not exceed 32. |

|  |
| --- |
| ***SuspendConfig* field descriptions** |
| ***ran-NotificationAreaInfo***  Network ensures that the UE in RRC\_INACTIVE always has a valid *ran-NotificationAreaInfo*. |
| ***ran-PagingCycle***  Refers to the UE specific cycle for RAN-initiated paging. Value *rf32* corresponds to 32 radio frames, value *rf64* corresponds to 64 radio frames and so on. |
| ***t380***  Refers to the timer that triggers the periodic RNAU procedure in UE. Value *min5* corresponds to 5 minutes, value *min10* corresponds to 10 minutes and so on. |

|  |
| --- |
| ***SRS-PosRRC-InactiveConfig* field descriptions** |
| ***bwp***  BWP configuration for SRS for Positioning during the RRC\_Inactive state. If the field is absent UE is configured with an SRS for Positioning associated with the initial UL BWP and transmitted, during the RRC\_INACTIVE state, inside the initial UL BWP with the same CP and SCS as configured for initial UL BWP. |
| ***srs-TimeAlignmnetTimer***  TA timer for SRS for positioning transmission during RRC Inactive State.  Editor’s Note: Range to be taken from SDT |

|  |  |
| --- | --- |
| **Conditional Presence** | **Explanation** |
| *Redirection2* | The field is optionally present, Need R, if *redirectedCarrierInfo* is included; otherwise the field is not present. |

*Next Change*

### 6.3.2 Radio resource control information elements

#### – *AdditionalSpectrumEmission*

The IE *AdditionalSpectrumEmission* is used to indicate emission requirements to be fulfilled by the UE (see TS 38.101-1 [15], clause 6.2.3, and TS 38.101-2 [39], clause 6.2.3).

*AdditionalSpectrumEmission* information element

***<Skip unmodified changes>***

– *SRS-Config*

The IE *SRS-Config* is used to configure sounding reference signal transmissions. The configuration defines a list of SRS-Resources, a list of SRS-PosResources, a list of SRS-PosResourceSets and a list of SRS-ResourceSets. Each resource set defines a set of SRS-Resources or SRS-PosResources. The network triggers the transmission of the set of SRS-Resources or SRS-PosResources 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-RequestDCI-1-2-r16 INTEGER (1..2) OPTIONAL, -- Need S

srs-RequestDCI-0-2-r16 INTEGER (1..2) OPTIONAL, -- Need S

srs-ResourceSetToAddModListDCI-0-2-r16 SEQUENCE (SIZE(1..maxNrofSRS-ResourceSets)) OF SRS-ResourceSet OPTIONAL, -- Need N

srs-ResourceSetToReleaseListDCI-0-2-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-r16 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, SRS-PosResource* 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).  If the IE *srs-ResourceId-Ext* is present, the IE *srs-ResourceId* in *spatialRelationInfoPos* represents the index from 0 to 63. Otherwise the IE *srs-ResourceId* in *spatialRelationInfoPos* represents the index from 0 to 31. |
| ***srs-RequestDCI-0-2***  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-RequestDCI-0-2* 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-RequestDCI-1-2***  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-ResourceSetToAddModListDCI-0-2***  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-ResourceSetToReleaseListDCI-0-2***  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). |

|  |
| --- |
| ***SRS-ResourceSet, SRS-PosResourceSet* 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). 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). |
| ***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. The aperiodic SRS is not applicable for the UE in RRC\_INACTIVE |
| ***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, srs-PosResourceIdList***  The IDs of the SRS-Resources/SRS-PosResource used in this *SRS-ResourceSet/SRS-PosResourceSet*. If this *SRS-ResourceSet/SRS-PosResourceSet* is configured with usage set to codebook, the *srs-ResourceIdList/srs-PosResourceIdList* contains at most 2 entries. If this *SRS-ResourceSet/SRS-PosResourceSet* is configured with *usage* set to *nonCodebook*, the *srs-ResourceIdList/srs-PosResourceIdList* contains at most 4 entries. |
| ***srs-ResourceSetId, srs-PosResourceSetId***  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 (see TS 37.355 [49]) and DL-PRS Resource Set. |

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| ***SSB-Configuration* field descriptions** |
| ***halfFrameIndex***  Indicates whether SSB is in the first half or the second half of the frame.Value zero indicates the first half and value 1 indicates the second half. |
| ***integerSubframeOffset***  Indicates the subframe boundary offset of the cell in which SSB is transmited. |
| ***sfn0-Offset***  Indiactes the time offset of the SFN0 slot 0 for the cell with respect to SFN0 slot 0 of serving cell. |
| ***sfn-Offset***  Specifies the SFN offset between the cell in which SSB is transmited and serving cell. The offset corresponds to the number of full radio frames counted from the beginning of a radio frame #0 of serving cell to the beginning of the closest subsequent radio frame #0 of the cell in which SSB is transmitted. |
| ***sfn-SSB-Offset***  Indicates the SFN offset of the transmitted SSB relative to the start of the SSB period. Value 0 indicates that the SSB is transmitted in the first system frame, value 1 indicates that SSB is transmitted in the second system frame and so on. The network configures this field according to the field *ssb-Periodicity* such that the indicated system frame does not exceed the configured SSB periodicity. |
| ***ssb-Freq***  Indicates the frequency of the SSB. |
| ***ssb-PBCH-BlockPower***  Average EPRE of the resources elements that carry secondary synchronization signals in dBm that the NW used for SSB transmission, see TS 38.213 [13], clause 7. |
| ***ssb-Periodicity***  Indicates the periodicity of the SSB. If the field is absent, the UE applies the value ms5. (see TS 38.213 [13], clause 4.1) |
| ***ssbSubcarrierSpacing***  Subcarrier spacing of SSB. Only the values 15 kHz or 30 kHz (FR1), and 120 kHz or 240 kHz (FR2) are applicable. |

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| **Conditional Presence** | **Explanation** |
| *Setup* | This field is mandatory present upon configuration of *SRS-ResourceSet* or *SRS-Resource* and optionally present, Need M, otherwise. |
| *NonCodebook* | This field is optionally present, Need M, in case of non-codebook based transmission, otherwise the field is absent. |
| *Pathloss* | The field is mandatory present if the IE *SSB-InfoNcell* is included in *pathlossReferenceRS-Pos*; otherwise it is optionally present, Need R |

*End Of Changes*