# 6 Protocol data units, formats and parameters (ASN.1)

## 6.3 RRC information elements

### 6.3.2 Radio resource control information elements

#### – *CSI-AperiodicTriggerStateList*

The *CSI-AperiodicTriggerStateList* IE is used to configure the UE with a list of aperiodic trigger states. Each codepoint of the DCI field "CSI request" is associated with one trigger state (see TS 38.321 [3], clause 6.1.3.13). Upon reception of the value associated with a trigger state, the UE will perform measurement of CSI-RS, CSI-IM and/or SSB (reference signals) and aperiodic reporting on L1 according to all entries in the *associatedReportConfigInfoList* for that trigger state.

*CSI-AperiodicTriggerStateList* information element

-- ASN1START

-- TAG-CSI-APERIODICTRIGGERSTATELIST-START

CSI-AperiodicTriggerStateList ::= SEQUENCE (SIZE (1..maxNrOfCSI-AperiodicTriggers)) OF CSI-AperiodicTriggerState

CSI-AperiodicTriggerState ::= SEQUENCE {

 associatedReportConfigInfoList SEQUENCE (SIZE(1..maxNrofReportConfigPerAperiodicTrigger)) OF CSI-AssociatedReportConfigInfo,

 ...

}

CSI-AssociatedReportConfigInfo ::= SEQUENCE {

 reportConfigId CSI-ReportConfigId,

 resourcesForChannel CHOICE {

 nzp-CSI-RS SEQUENCE {

 resourceSet INTEGER (1..maxNrofNZP-CSI-RS-ResourceSetsPerConfig),

 qcl-info SEQUENCE (SIZE(1..maxNrofAP-CSI-RS-ResourcesPerSet)) OF TCI-StateId

 OPTIONAL -- Cond Aperiodic

 },

 csi-SSB-ResourceSet INTEGER (1..maxNrofCSI-SSB-ResourceSetsPerConfig)

 },

 csi-IM-ResourcesForInterference INTEGER(1..maxNrofCSI-IM-ResourceSetsPerConfig) OPTIONAL, -- Cond CSI-IM-ForInterference

 nzp-CSI-RS-ResourcesForInterference INTEGER (1..maxNrofNZP-CSI-RS-ResourceSetsPerConfig) OPTIONAL, -- Cond NZP-CSI-RS-ForInterference

 ...

}

-- TAG-CSI-APERIODICTRIGGERSTATELIST-STOP

-- ASN1STOP

|  |
| --- |
| *CSI-AssociatedReportConfigInfo* field descriptions |
| ***csi-IM-ResourcesForInterference****CSI-IM-ResourceSet* for interference measurement. Entry number in csi-IM-ResourceSetList in the CSI-ResourceConfig indicated by *csi-IM-ResourcesForInterference* in the *CSI-ReportConfig* indicated by *reportConfigId* above (value 1 corresponds to the first entry, value 2 to the second entry, and so on). The indicated *CSI-IM-ResourceSet* should have exactly the same number of resources like the *NZP-CSI-RS-ResourceSet* indicated in *resourceSet* within *nzp-CSI-RS*. |
| ***csi-SSB-ResourceSet***CSI-SSB-ResourceSet for channel measurements. Entry number in *csi-SSB-ResourceSetList* in the *CSI-ResourceConfig* indicated by *resourcesForChannelMeasurement* in the *CSI-ReportConfig* indicated by *reportConfigId* above (value 1 corresponds to the first entry, value 2 to the second entry, and so on). |
| ***nzp-CSI-RS-ResourcesForInterference****NZP-CSI-RS-ResourceSet* for interference measurement. Entry number in *nzp-CSI-RS-ResourceSetList* in the *CSI-ResourceConfig* indicated by *nzp-CSI-RS-ResourcesForInterference* in the *CSI-ReportConfig* indicated by *reportConfigId* above (value 1 corresponds to the first entry, value 2 to the second entry, and so on).  |
| ***qcl-info***List of references to TCI-States for providing the QCL source and QCL type for each *NZP-CSI-RS-Resource* listed in *nzp-CSI-RS-Resources* of the *NZP-CSI-RS-ResourceSet* indicated by *resourceSet* within *nzp-CSI-RS*. Each *TCI-StateId* refers to the *TCI-State* which has this value for *tci-StateId* and is defined in *tci-StatesToAddModList* in the *PDSCH-Config* included in the *BWP-Downlink* corresponding to the serving cell and to the DL BWP to which the *resourcesForChannelMeasuremen*t (in the *CSI-ReportConfig* indicated by *reportConfigId* above) belong to. First entry in *qcl-info* corresponds to first entry in *nzp-CSI-RS-Resources* of that *NZP-CSI-RS-ResourceSet*, second entry in *qcl-info* corresponds to second entry in *nzp-CSI-RS-Resources*, and so on (see TS 38.214 [19], clause 5.2.1.5.1) |
| ***reportConfigId***The *reportConfigId* of one of the *CSI-ReportConfigToAddMod* configured in *CSI-MeasConfig* |
| ***resourceSet****NZP-CSI-RS-ResourceSet* for channel measurements. Entry number in *nzp-CSI-RS-ResourceSetList* in the *CSI-ResourceConfig* indicated by *resourcesForChannelMeasurement* in the *CSI-ReportConfig* indicated by r*eportConfigId* above (value 1 corresponds to the first entry, value 2 to thesecond entry, and so on). |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *Aperiodic* | The field is mandatory present if the *NZP-CSI-RS-Resources* in the associated *resourceSet* have the resourceType aperiodic. The field is absent otherwise. |
| *CSI-IM-ForInterference* | This field is mandatory present if the *CSI-ReportConfig* identified by *reportConfigId* is configured with *csi-IM-ResourcesForInterference*; otherwise it is absent. |
| *NZP-CSI-RS-ForInterference* | This field is mandatory present if the *CSI-ReportConfig* identified by *reportConfigId* is configured with *nzp-CSI-RS-ResourcesForInterference*; otherwise it is absent. |

#### – *TRS-AperiodicTriggerStateList*

The *TRS-AperiodicTriggerStateList* IE is used to configure the UE with a list of aperiodic trigger states of TRS for SCell activation.

*TRS-AperiodicTriggerStateList* information element

TRS-AperiodicTriggerStateList ::= SEQUENCE (SIZE (1..maxNrOfTRS-AperiodicTriggers)) OF CSI-AperiodicTriggerStateList

#### – *CSI-MeasConfig*

The IE *CSI-MeasConfig* is used to configure CSI-RS (reference signals) belonging to the serving cell in which *CSI-MeasConfig* is included, channel state information reports to be transmitted on PUCCH on the serving cell in which *CSI-MeasConfig* is included and channel state information reports on PUSCH triggered by DCI received on the serving cell in which *CSI-MeasConfig* is included. See also TS 38.214 [19], clause 5.2.

*CSI-MeasConfig* information element

-- ASN1START

-- TAG-CSI-MEASCONFIG-START

CSI-MeasConfig ::= SEQUENCE {

 nzp-CSI-RS-ResourceToAddModList SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-Resources)) OF NZP-CSI-RS-Resource OPTIONAL, -- Need N

 nzp-CSI-RS-ResourceToReleaseList SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-Resources)) OF NZP-CSI-RS-ResourceId OPTIONAL, -- Need N

 nzp-CSI-RS-ResourceSetToAddModList SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-ResourceSets)) OF NZP-CSI-RS-ResourceSet

 OPTIONAL, -- Need N

 nzp-CSI-RS-ResourceSetToReleaseList SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-ResourceSets)) OF NZP-CSI-RS-ResourceSetId

 OPTIONAL, -- Need N

 csi-IM-ResourceToAddModList SEQUENCE (SIZE (1..maxNrofCSI-IM-Resources)) OF CSI-IM-Resource OPTIONAL, -- Need N

 csi-IM-ResourceToReleaseList SEQUENCE (SIZE (1..maxNrofCSI-IM-Resources)) OF CSI-IM-ResourceId OPTIONAL, -- Need N

 csi-IM-ResourceSetToAddModList SEQUENCE (SIZE (1..maxNrofCSI-IM-ResourceSets)) OF CSI-IM-ResourceSet OPTIONAL, -- Need N

 csi-IM-ResourceSetToReleaseList SEQUENCE (SIZE (1..maxNrofCSI-IM-ResourceSets)) OF CSI-IM-ResourceSetId OPTIONAL, -- Need N

 csi-SSB-ResourceSetToAddModList SEQUENCE (SIZE (1..maxNrofCSI-SSB-ResourceSets)) OF CSI-SSB-ResourceSet OPTIONAL, -- Need N

 csi-SSB-ResourceSetToReleaseList SEQUENCE (SIZE (1..maxNrofCSI-SSB-ResourceSets)) OF CSI-SSB-ResourceSetId OPTIONAL, -- Need N

 csi-ResourceConfigToAddModList SEQUENCE (SIZE (1..maxNrofCSI-ResourceConfigurations)) OF CSI-ResourceConfig

 OPTIONAL, -- Need N

 csi-ResourceConfigToReleaseList SEQUENCE (SIZE (1..maxNrofCSI-ResourceConfigurations)) OF CSI-ResourceConfigId

 OPTIONAL, -- Need N

 csi-ReportConfigToAddModList SEQUENCE (SIZE (1..maxNrofCSI-ReportConfigurations)) OF CSI-ReportConfig OPTIONAL, -- Need N

 csi-ReportConfigToReleaseList SEQUENCE (SIZE (1..maxNrofCSI-ReportConfigurations)) OF CSI-ReportConfigId

 OPTIONAL, -- Need N

 reportTriggerSize INTEGER (0..6) OPTIONAL, -- Need M

 aperiodicTriggerStateList SetupRelease { CSI-AperiodicTriggerStateList } OPTIONAL, -- Need M

 aperiodicTRS-TriggerStateList SetupRelease { TRS-AperiodicTriggerStateList } OPTIONAL, -- Need M

 semiPersistentOnPUSCH-TriggerStateList SetupRelease { CSI-SemiPersistentOnPUSCH-TriggerStateList } OPTIONAL, -- Need M

 ...,

 [[

 reportTriggerSizeDCI-0-2-r16 INTEGER (0..6) OPTIONAL -- Need R

 ]]

}

-- TAG-CSI-MEASCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *CSI-MeasConfig* field descriptions |
| ***aperiodicTriggerStateList***Contains trigger states for dynamically selecting one or more aperiodic and semi-persistent reporting configurations and/or triggering one or more aperiodic CSI-RS resource sets for channel and/or interference measurement (see TS 38.214 [19], clause 5.2.1). |
| ***aperiodicTRS-TriggerStateList***Contains trigger states for triggering one or more aperiodic TRS resource sets for SCell activation. In the case of two bursts in TRS for one SCell, each *CSI-AperiodicTriggerState* contains, for this Scell, two separate resourceSets each with a different *aperiodicTriggeringOffset*. |
| ***csi-IM-ResourceSetToAddModList***Pool of *CSI-IM-ResourceSet* which can be referred to from *CSI-ResourceConfig* or from MAC CEs. |
| ***csi-IM-ResourceToAddModList***Pool of *CSI-IM-Resource* which can be referred to from *CSI-IM-ResourceSet*. |
| ***csi-ReportConfigToAddModList***Configured CSI report settings as specified in TS 38.214 [19] clause 5.2.1.1. |
| ***csi-ResourceConfigToAddModList***Configured CSI resource settings as specified in TS 38.214 [19] clause 5.2.1.2. |
| ***csi-SSB-ResourceSetToAddModList***Pool of CSI-SSB-ResourceSet which can be referred to from *CSI-ResourceConfig*. |
| ***nzp-CSI-RS-ResourceSetToAddModList***Pool of *NZP-CSI-RS-ResourceSet* which can be referred to from *CSI-ResourceConfig* or from MAC CEs. |
| ***nzp-CSI-RS-ResourceToAddModList***Pool of *NZP-CSI-RS-Resource* which can be referred to from *NZP-CSI-RS-ResourceSet*. |
| ***reportTriggerSize, reportTriggerSizeDCI-0-2***Size of CSI request field in DCI (bits) (see TS 38.214 [19], clause 5.2.1.5.1). The field *reportTriggerSize* applies to DCI format 0\_1 and the field *reportTriggerSizeDCI-0-2* applies to DCI format 0\_2 (see TS 38.214 [19], clause 5.2.1.5.1). |