**3GPP TSG-RAN WG2 Meeting #109-e *R2-2001761***

**Electronic meeting, 24 February – 6 March, 2020**

|  |
| --- |
| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
|  |
|  | **36.331** | **CR** | **4234** | **rev** |  **-** | **Current version:** | **15.8.0** |  |
|  |
| *For* [***HELP***](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 |  |

|  |
| --- |
|  |
| ***Title:***  | Introduction of NR Mobility enhancements  |
|  |  |
| ***Source to WG:*** | Ericsson, CATT |
| ***Source to TSG:*** | R2 |
|  |  |
| ***Work item code:*** | NR\_Mob\_enh-Core |  | ***Date:*** | 2020-03-09 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***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:*** | Introduction of Conditional intra-SN PSCell Change and T312 for NR PSCell. |
|  |  |
| ***Summary of change:*** | Description that conditional PSCell change is supported added in 4.4 and 6.2.2. Support for early RLF declaration in (NG)EN-DC, i.e. T312 in NR PSCell added in 6.2.2.  |
|  |  |
| ***Consequences if not approved:*** | Conditional intra-SN PSCell Change and T312 for NR PSCell will not be supported in the specifications. |
|  |  |
| ***Clauses affected:*** | 4.4, 6.2.2 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** | **X** |  |  Other core specifications  | TS 38.306 CR xxxx |
| ***affected:*** |  | **X** |  Test specifications | TS 38.331 CR 1478 |
| ***(show related CRs)*** |  | **X** |  O&M Specifications |  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

Beginning of changes

## 4.4 Functions

The RRC protocol includes the following main functions:

- Broadcast of system information:

- Including NAS common information;

- Information applicable for UEs in RRC\_IDLE, e.g. cell (re-)selection parameters, neighbouring cell information and information (also) applicable for UEs in RRC\_CONNECTED, e.g. common channel configuration information;

- Including ETWS notification, CMAS notification (not applicable for NB-IoT);

- Including positioning assistance data.

- RRC connection control:

- Paging;

- Establishment/ modification/ suspension / resumption / release of RRC connection, including e.g. assignment/ modification of UE identity (C-RNTI), establishment/ modification/ suspension/ resumption/ release of SRB1, SRB1bis, SRB2 and SRB4, access class barring;

- Initial security activation, i.e. initial configuration of AS integrity protection (SRBs) and AS ciphering (SRBs, DRBs);

- For RNs, configuration of AS integrity protection for DRBs;

- RRC connection mobility including e.g. intra-frequency and inter-frequency handover, associated security handling, i.e. key/ algorithm change, specification of RRC context information transferred between network nodes;

NOTE 1: In NB-IoT, only key change (but no re-keying) at RRC Connection Resumption and RRC context information transfer are applicable.

- Establishment/ modification/ release of RBs carrying user data (DRBs);

- Radio configuration control including e.g. assignment/ modification of ARQ configuration, HARQ configuration, DRX configuration;

- For RNs, RN-specific radio configuration control for the radio interface between RN and E-UTRAN;

- In case of CA, cell management including e.g. change of PCell, addition/ modification/ release of SCell(s) and addition/modification/release of STAG(s);

- In case of DC, cell management including e.g. change of PSCell, addition/ modification/ release of SCG cell(s) and addition/modification/release of SCG TAG(s).

- In case of (NG)EN-DC, transparent transfer of NR RRC messages (e.g. DL: reconfiguration messages used to add or modify the NR SCG configuration or to (re-)configure measurements; configure conditional PSCell change; UL: measurement reports and reconfiguration complete messages) and of configurations of radio bearers using NR PDCP.

- QoS control including assignment/ modification of semi-persistent scheduling (SPS) configuration information for DL and UL, assignment/ modification of parameters for UL rate control in the UE, i.e. allocation of a priority and a prioritised bit rate (PBR) for each RB (not applicable for NB-IoT);

- Recovery from radio link failure;

- In case of LWA, RCLWI and LWIP, WLAN mobility set management including e.g. addition/ modification/ release of WLAN(s) from the WLAN mobility set;

- Inter-RAT mobility including e.g. security activation, transfer of RRC context information (not applicable for NB-IoT);

- Measurement configuration and reporting (not applicable for NB-IoT):

- Establishment/ modification/ release of measurements (e.g. intra-frequency, inter-frequency and inter- RAT measurements);

- Setup and release of measurement gaps;

- Measurement reporting;

- Other functions including e.g. transfer of dedicated NAS information and non-3GPP dedicated information, transfer of UE radio access capability information, support for E-UTRAN sharing (multiple PLMN identities);

- Generic protocol error handling;

- Support of self-configuration and self-optimisation (not applicable for NB-IoT);

- Support of measurement logging and reporting for network performance optimisation, as specified in TS 37.320 [60] (not applicable for NB-IoT);

NOTE 2: Random access is specified entirely in the MAC including initial transmission power estimation.

Next change

FFS: How to capture sending of an NR *RRCReconfigurationComplete* message to an LTE MN upon execution of CPC when only SRB1 is configured.

Next change

### 6.2.2 Message definitions

<----------------------------------------------------*Unmodified parts omitted*---------------------------------------------------------->

#### – *SCGFailureInformationNR*

The *SCGFailureInformationNR* message is used to provide information regarding NR SCG failures detected by the UE.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E‑UTRAN

*SCGFailureInformationNR message*

-- ASN1START

SCGFailureInformationNR-r15 ::= SEQUENCE {

 criticalExtensions CHOICE {

 c1 CHOICE {

 scgFailureInformationNR-r15 SCGFailureInformationNR-r15-IEs,

 spare3 NULL, spare2 NULL, spare1 NULL

 },

 criticalExtensionsFuture SEQUENCE {}

 }

}

SCGFailureInformationNR-r15-IEs ::= SEQUENCE {

 failureReportSCG-NR-r15 FailureReportSCG-NR-r15 OPTIONAL,

 nonCriticalExtension SEQUENCE {} OPTIONAL

}

FailureReportSCG-NR-r15 ::= SEQUENCE {

 failureType-r15 ENUMERATED {

 t310-Expiry, randomAccessProblem,

 rlc-MaxNumRetx,

 synchReconfigFailureSCG, scg-reconfigFailure,

 srb3-IntegrityFailure, t312-Expiry-r16, spare1},

 measResultFreqListNR-r15 MeasResultFreqListFailNR-r15 OPTIONAL,

 measResultSCG-r15 OCTET STRING OPTIONAL,

 ...

}

MeasResultFreqListFailNR-r15 ::= SEQUENCE (SIZE (1..maxFreqNR-r15)) OF MeasResultFreqFailNR-r15

MeasResultFreqFailNR-r15 ::= SEQUENCE {

 carrierFreq-r15 ARFCN-ValueNR-r15,

 measResultCellList-r15 MeasResultCellListNR-r15 OPTIONAL,

 ...

}

-- ASN1STOP

| *SCGFailureInformationNR* field descriptions |
| --- |
| ***measResultFreqListNR***The field contains available results of measurements on NR frequencies the UE is configured to measure by *measConfig*. |
| ***measResultSCG***Includes the NR *MeasResultSCG-Failure* IE as specified in TS 38.331 [82]. The field contains available results of measurements on NR frequencies the UE is configured to measure by the NR RRCConfiguration message. |

<----------------------------------------------------*Unmodified parts omitted*---------------------------------------------------------->

#### – *RRCConnectionReconfiguration*

The *RRCConnectionReconfiguration* message is the command to modify an RRC connection. It may convey information for measurement configuration, mobility control, radio resource configuration (including RBs, MAC main configuration and physical channel configuration) including any associated dedicated NAS information and security configuration.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: E‑UTRAN to UE

*RRCConnectionReconfiguration message*

-- ASN1START

RRCConnectionReconfiguration ::= SEQUENCE {

 rrc-TransactionIdentifier RRC-TransactionIdentifier,

 criticalExtensions CHOICE {

 c1 CHOICE{

 rrcConnectionReconfiguration-r8 RRCConnectionReconfiguration-r8-IEs,

 spare7 NULL,

 spare6 NULL, spare5 NULL, spare4 NULL,

 spare3 NULL, spare2 NULL, spare1 NULL

 },

 criticalExtensionsFuture SEQUENCE {}

 }

}

RRCConnectionReconfiguration-r8-IEs ::= SEQUENCE {

 measConfig MeasConfig OPTIONAL, -- Need ON

 mobilityControlInfo MobilityControlInfo OPTIONAL, -- Cond HO

 dedicatedInfoNASList SEQUENCE (SIZE(1..maxDRB)) OF

 DedicatedInfoNAS OPTIONAL, -- Cond nonHO

 radioResourceConfigDedicated RadioResourceConfigDedicated OPTIONAL, -- Cond HO-toEUTRA

 securityConfigHO SecurityConfigHO OPTIONAL, -- Cond HO-toEPC

 nonCriticalExtension RRCConnectionReconfiguration-v890-IEs OPTIONAL

}

RRCConnectionReconfiguration-v890-IEs ::= SEQUENCE {

 lateNonCriticalExtension OCTET STRING (CONTAINING RRCConnectionReconfiguration-v8m0-IEs) OPTIONAL,

 nonCriticalExtension RRCConnectionReconfiguration-v920-IEs OPTIONAL

}

-- Late non-critical extensions:

RRCConnectionReconfiguration-v8m0-IEs ::= SEQUENCE {

 -- Following field is only for pre REL-10 late non-critical extensions

 lateNonCriticalExtension OCTET STRING OPTIONAL,

 nonCriticalExtension RRCConnectionReconfiguration-v10i0-IEs OPTIONAL

}

RRCConnectionReconfiguration-v10i0-IEs ::= SEQUENCE {

 antennaInfoDedicatedPCell-v10i0 AntennaInfoDedicated-v10i0 OPTIONAL, -- Need ON

 nonCriticalExtension RRCConnectionReconfiguration-v10l0-IEs OPTIONAL

}

RRCConnectionReconfiguration-v10l0-IEs ::= SEQUENCE {

 mobilityControlInfo-v10l0 MobilityControlInfo-v10l0 OPTIONAL,

 sCellToAddModList-v10l0 SCellToAddModList-v10l0 OPTIONAL, -- Need ON

 -- Following field is only for late non-critical extensions from REL-10 to REL-11

 lateNonCriticalExtension OCTET STRING OPTIONAL,

 nonCriticalExtension RRCConnectionReconfiguration-v12f0-IEs OPTIONAL

}

RRCConnectionReconfiguration-v12f0-IEs ::= SEQUENCE {

 scg-Configuration-v12f0 SCG-Configuration-v12f0 OPTIONAL, -- Cond nonFullConfig

 -- Following field is only for late non-critical extensions from REL-12

 lateNonCriticalExtension OCTET STRING OPTIONAL,

 nonCriticalExtension RRCConnectionReconfiguration-v1370-IEs OPTIONAL

}

RRCConnectionReconfiguration-v1370-IEs ::= SEQUENCE {

 radioResourceConfigDedicated-v1370 RadioResourceConfigDedicated-v1370 OPTIONAL, -- Need ON

 sCellToAddModListExt-v1370 SCellToAddModListExt-v1370 OPTIONAL, -- Need ON

 nonCriticalExtension RRCConnectionReconfiguration-v13c0-IEs OPTIONAL

}

RRCConnectionReconfiguration-v13c0-IEs ::= SEQUENCE {

 radioResourceConfigDedicated-v13c0 RadioResourceConfigDedicated-v13c0 OPTIONAL, -- Need ON

 sCellToAddModList-v13c0 SCellToAddModList-v13c0 OPTIONAL, -- Need ON

 sCellToAddModListExt-v13c0 SCellToAddModListExt-v13c0 OPTIONAL, -- Need ON

 scg-Configuration-v13c0 SCG-Configuration-v13c0 OPTIONAL, -- Need ON

 -- Following field is only for late non-critical extensions from REL-13 onwards

 nonCriticalExtension SEQUENCE {} OPTIONAL

}

-- Regular non-critical extensions:

RRCConnectionReconfiguration-v920-IEs ::= SEQUENCE {

 otherConfig-r9 OtherConfig-r9 OPTIONAL, -- Need ON

 fullConfig-r9 ENUMERATED {true} OPTIONAL, -- Cond HO-Reestab

 nonCriticalExtension RRCConnectionReconfiguration-v1020-IEs OPTIONAL

}

RRCConnectionReconfiguration-v1020-IEs ::= SEQUENCE {

 sCellToReleaseList-r10 SCellToReleaseList-r10 OPTIONAL, -- Need ON

 sCellToAddModList-r10 SCellToAddModList-r10 OPTIONAL, -- Need ON

 nonCriticalExtension RRCConnectionReconfiguration-v1130-IEs OPTIONAL

}

RRCConnectionReconfiguration-v1130-IEs ::= SEQUENCE {

 systemInformationBlockType1Dedicated-r11 OCTET STRING (CONTAINING SystemInformationBlockType1) OPTIONAL, -- Need ON

 nonCriticalExtension RRCConnectionReconfiguration-v1250-IEs OPTIONAL

}

RRCConnectionReconfiguration-v1250-IEs ::= SEQUENCE {

 wlan-OffloadInfo-r12 CHOICE {

 release NULL,

 setup SEQUENCE {

 wlan-OffloadConfigDedicated-r12 WLAN-OffloadConfig-r12,

 t350-r12 ENUMERATED {min5, min10, min20, min30, min60,

 min120, min180, spare1} OPTIONAL -- Need OR

 }

 } OPTIONAL, -- Need ON

 scg-Configuration-r12 SCG-Configuration-r12 OPTIONAL, -- Cond nonFullConfig

 sl-SyncTxControl-r12 SL-SyncTxControl-r12 OPTIONAL, -- Need ON

 sl-DiscConfig-r12 SL-DiscConfig-r12 OPTIONAL, -- Need ON

 sl-CommConfig-r12 SL-CommConfig-r12 OPTIONAL, -- Need ON

 nonCriticalExtension RRCConnectionReconfiguration-v1310-IEs OPTIONAL

}

RRCConnectionReconfiguration-v1310-IEs ::= SEQUENCE {

 sCellToReleaseListExt-r13 SCellToReleaseListExt-r13 OPTIONAL, -- Need ON

 sCellToAddModListExt-r13 SCellToAddModListExt-r13 OPTIONAL, -- Need ON

 lwa-Configuration-r13 LWA-Configuration-r13 OPTIONAL, -- Need ON

 lwip-Configuration-r13 LWIP-Configuration-r13 OPTIONAL, -- Need ON

 rclwi-Configuration-r13 RCLWI-Configuration-r13 OPTIONAL, -- Need ON

 nonCriticalExtension RRCConnectionReconfiguration-v1430-IEs OPTIONAL

}

RRCConnectionReconfiguration-v1430-IEs ::= SEQUENCE {

 sl-V2X-ConfigDedicated-r14 SL-V2X-ConfigDedicated-r14 OPTIONAL, -- Need ON

 sCellToAddModListExt-v1430 SCellToAddModListExt-v1430 OPTIONAL, -- Need ON

 perCC-GapIndicationRequest-r14 ENUMERATED{true} OPTIONAL, -- Need ON

 systemInformationBlockType2Dedicated-r14 OCTET STRING (CONTAINING SystemInformationBlockType2) OPTIONAL, -- Cond nonHO

 nonCriticalExtension RRCConnectionReconfiguration-v1510-IEs OPTIONAL

}

RRCConnectionReconfiguration-v1510-IEs ::= SEQUENCE {

 nr-Config-r15 CHOICE {

 release NULL,

 setup SEQUENCE {

 endc-ReleaseAndAdd-r15 BOOLEAN,

 nr-SecondaryCellGroupConfig-r15 OCTET STRING OPTIONAL, -- Need ON

 p-MaxEUTRA-r15 P-Max OPTIONAL -- Need ON

 }

 } OPTIONAL, -- Need ON

 sk-Counter-r15 INTEGER (0.. 65535) OPTIONAL, -- Need ON

 nr-RadioBearerConfig1-r15 OCTET STRING OPTIONAL, -- Need ON

 nr-RadioBearerConfig2-r15 OCTET STRING OPTIONAL, -- Need ON

 tdm-PatternConfig-r15 TDM-PatternConfig-r15 OPTIONAL, -- Cond FDD-PCell

 nonCriticalExtension RRCConnectionReconfiguration-v1530-IEs OPTIONAL

}

RRCConnectionReconfiguration-v1530-IEs ::= SEQUENCE {

 securityConfigHO-v1530 SecurityConfigHO-v1530 OPTIONAL, -- Cond HO-5GC

 sCellGroupToReleaseList-r15 SCellGroupToReleaseList-r15 OPTIONAL, -- Need ON

 sCellGroupToAddModList-r15 SCellGroupToAddModList-r15 OPTIONAL, -- Need ON

 dedicatedInfoNASList-r15 SEQUENCE (SIZE(1..maxDRB-r15)) OF

 DedicatedInfoNAS OPTIONAL, -- Cond nonHO

 p-MaxUE-FR1-r15 P-Max OPTIONAL, -- Need OR

 smtc-r15 MTC-SSB-NR-r15 OPTIONAL, -- Need OP

 nonCriticalExtension SEQUENCE {} OPTIONAL

}

SL-SyncTxControl-r12 ::= SEQUENCE {

 networkControlledSyncTx-r12 ENUMERATED {on, off} OPTIONAL -- Need OP

}

PSCellToAddMod-r12 ::= SEQUENCE {

 sCellIndex-r12 SCellIndex-r10,

 cellIdentification-r12 SEQUENCE {

 physCellId-r12 PhysCellId,

 dl-CarrierFreq-r12 ARFCN-ValueEUTRA-r9

 } OPTIONAL, -- Cond SCellAdd

 radioResourceConfigCommonPSCell-r12 RadioResourceConfigCommonPSCell-r12 OPTIONAL, -- Cond SCellAdd

 radioResourceConfigDedicatedPSCell-r12 RadioResourceConfigDedicatedPSCell-r12 OPTIONAL, -- Cond SCellAdd2

 ...,

 [[ antennaInfoDedicatedPSCell-v1280 AntennaInfoDedicated-v10i0 OPTIONAL -- Need ON

 ]],

 [[ sCellIndex-r13 SCellIndex-r13 OPTIONAL -- Need ON

 ]],

 [[ radioResourceConfigDedicatedPSCell-v1370 RadioResourceConfigDedicatedPSCell-v1370 OPTIONAL -- Need ON

 ]],

 [[ radioResourceConfigDedicatedPSCell-v13c0 RadioResourceConfigDedicatedPSCell-v13c0 OPTIONAL -- Need ON

 ]]

}

PSCellToAddMod-v12f0 ::= SEQUENCE {

 radioResourceConfigCommonPSCell-r12 RadioResourceConfigCommonPSCell-v12f0 OPTIONAL

}

PSCellToAddMod-v1440 ::= SEQUENCE {

 radioResourceConfigCommonPSCell-r14 RadioResourceConfigCommonPSCell-v1440 OPTIONAL

}

PowerCoordinationInfo-r12 ::= SEQUENCE {

 p-MeNB-r12 INTEGER (1..16),

 p-SeNB-r12 INTEGER (1..16),

 powerControlMode-r12 INTEGER (1..2)

}

SCellToAddModList-r10 ::= SEQUENCE (SIZE (1..maxSCell-r10)) OF SCellToAddMod-r10

SCellToAddModList-v10l0 ::= SEQUENCE (SIZE (1..maxSCell-r10)) OF SCellToAddMod-v10l0

SCellToAddModList-v13c0 ::= SEQUENCE (SIZE (1..maxSCell-r10)) OF SCellToAddMod-v13c0

SCellToAddModListExt-r13 ::= SEQUENCE (SIZE (1..maxSCell-r13)) OF SCellToAddModExt-r13

SCellToAddModListExt-v1370 ::= SEQUENCE (SIZE (1..maxSCell-r13)) OF SCellToAddModExt-v1370

SCellToAddModListExt-v13c0 ::= SEQUENCE (SIZE (1..maxSCell-r13)) OF SCellToAddMod-v13c0

SCellToAddModListExt-v1430 ::= SEQUENCE (SIZE (1..maxSCell-r13)) OF SCellToAddModExt-v1430

SCellGroupToAddModList-r15 ::= SEQUENCE (SIZE (1..maxSCellGroups-r15)) OF SCellGroupToAddMod-r15

SCellToAddMod-r10 ::= SEQUENCE {

 sCellIndex-r10 SCellIndex-r10,

 cellIdentification-r10 SEQUENCE {

 physCellId-r10 PhysCellId,

 dl-CarrierFreq-r10 ARFCN-ValueEUTRA

 } OPTIONAL, -- Cond SCellAdd

 radioResourceConfigCommonSCell-r10 RadioResourceConfigCommonSCell-r10 OPTIONAL, -- Cond SCellAdd

 radioResourceConfigDedicatedSCell-r10 RadioResourceConfigDedicatedSCell-r10 OPTIONAL, -- Cond SCellAdd2

 ...,

 [[ dl-CarrierFreq-v1090 ARFCN-ValueEUTRA-v9e0 OPTIONAL -- Cond EARFCN-max

 ]],

 [[ antennaInfoDedicatedSCell-v10i0 AntennaInfoDedicated-v10i0 OPTIONAL -- Need ON

 ]],

 [[ srs-SwitchFromServCellIndex-r14 INTEGER (0.. 31) OPTIONAL -- Need ON

 ]],

 [[ sCellState-r15 ENUMERATED {activated, dormant} OPTIONAL -- Need ON

 ]]

}

SCellToAddMod-v10l0 ::= SEQUENCE {

 radioResourceConfigCommonSCell-v10l0 RadioResourceConfigCommonSCell-v10l0 OPTIONAL

}

SCellToAddMod-v13c0 ::= SEQUENCE {

 radioResourceConfigDedicatedSCell-v13c0 RadioResourceConfigDedicatedSCell-v13c0 OPTIONAL

}

SCellToAddModExt-r13 ::= SEQUENCE {

 sCellIndex-r13 SCellIndex-r13,

 cellIdentification-r13 SEQUENCE {

 physCellId-r13 PhysCellId,

 dl-CarrierFreq-r13 ARFCN-ValueEUTRA-r9

 } OPTIONAL, -- Cond SCellAdd

 radioResourceConfigCommonSCell-r13 RadioResourceConfigCommonSCell-r10 OPTIONAL, -- Cond SCellAdd

 radioResourceConfigDedicatedSCell-r13 RadioResourceConfigDedicatedSCell-r10 OPTIONAL, -- Cond SCellAdd2

 antennaInfoDedicatedSCell-r13 AntennaInfoDedicated-v10i0 OPTIONAL -- Need ON

}

SCellToAddModExt-v1370 ::= SEQUENCE {

 radioResourceConfigCommonSCell-v1370 RadioResourceConfigCommonSCell-v10l0 OPTIONAL

}

SCellToAddModExt-v1430 ::= SEQUENCE {

 srs-SwitchFromServCellIndex-r14 INTEGER (0.. 31) OPTIONAL, -- Need ON

 ...,

 [[ sCellState-r15 ENUMERATED {activated, dormant} OPTIONAL -- Need ON

 ]]

}

SCellGroupToAddMod-r15 ::= SEQUENCE {

 sCellGroupIndex-r15 SCellGroupIndex-r15,

 sCellConfigCommon-r15 SCellConfigCommon-r15 OPTIONAL, -- Need ON

 sCellToReleaseList-r15 SCellToReleaseListExt-r13 OPTIONAL, -- Need ON

 sCellToAddModList-r15 SCellToAddModListExt-r13 OPTIONAL -- Need ON

}

SCellToReleaseList-r10 ::= SEQUENCE (SIZE (1..maxSCell-r10)) OF SCellIndex-r10

SCellToReleaseListExt-r13 ::= SEQUENCE (SIZE (1..maxSCell-r13)) OF SCellIndex-r13

SCellGroupToReleaseList-r15 ::= SEQUENCE (SIZE (1..maxSCellGroups-r15)) OF SCellGroupIndex-r15

SCellGroupIndex-r15 ::= INTEGER (1..maxSCellGroups-r15)

SCellConfigCommon-r15 ::= SEQUENCE {

 radioResourceConfigCommonSCell-r15 RadioResourceConfigCommonSCell-r10 OPTIONAL, -- Need ON

 radioResourceConfigDedicatedSCell-r15 RadioResourceConfigDedicatedSCell-r10 OPTIONAL,-- Need ON

 antennaInfoDedicatedSCell-r15 AntennaInfoDedicated-v10i0 OPTIONAL -- Need ON

}

SCG-Configuration-r12 ::= CHOICE {

 release NULL,

 setup SEQUENCE {

 scg-ConfigPartMCG-r12 SEQUENCE {

 scg-Counter-r12 INTEGER (0.. 65535) OPTIONAL, -- Need ON

 powerCoordinationInfo-r12 PowerCoordinationInfo-r12 OPTIONAL, -- Need ON

 ...

 } OPTIONAL, -- Need ON

 scg-ConfigPartSCG-r12 SCG-ConfigPartSCG-r12 OPTIONAL -- Need ON

 }

}

SCG-Configuration-v12f0 ::= CHOICE {

 release NULL,

 setup SEQUENCE {

 scg-ConfigPartSCG-v12f0 SCG-ConfigPartSCG-v12f0 OPTIONAL -- Need ON

 }

}

SCG-Configuration-v13c0 ::= CHOICE {

 release NULL,

 setup SEQUENCE {

 scg-ConfigPartSCG-v13c0 SCG-ConfigPartSCG-v13c0 OPTIONAL -- Need ON

 }

}

SCG-ConfigPartSCG-r12 ::= SEQUENCE {

 radioResourceConfigDedicatedSCG-r12 RadioResourceConfigDedicatedSCG-r12 OPTIONAL, -- Need ON

 sCellToReleaseListSCG-r12 SCellToReleaseList-r10 OPTIONAL, -- Need ON

 pSCellToAddMod-r12 PSCellToAddMod-r12 OPTIONAL, -- Need ON

 sCellToAddModListSCG-r12 SCellToAddModList-r10 OPTIONAL, -- Need ON

 mobilityControlInfoSCG-r12 MobilityControlInfoSCG-r12 OPTIONAL, -- Need ON

 ...,

 [[

 sCellToReleaseListSCG-Ext-r13 SCellToReleaseListExt-r13 OPTIONAL, -- Need ON

 sCellToAddModListSCG-Ext-r13 SCellToAddModListExt-r13 OPTIONAL -- Need ON

 ]],

 [[

 sCellToAddModListSCG-Ext-v1370 SCellToAddModListExt-v1370 OPTIONAL -- Need ON

 ]],

 [[

 pSCellToAddMod-v1440 PSCellToAddMod-v1440 OPTIONAL -- Need ON

 ]],

 [[ sCellGroupToReleaseListSCG-r15 SCellGroupToReleaseList-r15 OPTIONAL, -- Need ON

 sCellGroupToAddModListSCG-r15 SCellGroupToAddModList-r15 OPTIONAL -- Need ON

 ]],

 [[ -- NE-DC addition for setup/ modification and release SN configured measurements

 measConfigSN-r15 MeasConfig OPTIONAL, -- Need ON

 -- NE-DC additions concerning DRBs/ SRBs are within RadioResourceConfigDedicatedSCG

 tdm-PatternConfigNE-DC-r15 TDM-PatternConfig-r15 OPTIONAL -- Cond FDD-PSCell

 ]],

 [[ p-MaxEUTRA-r15 P-Max OPTIONAL -- Need ON

 ]]

}

SCG-ConfigPartSCG-v12f0 ::= SEQUENCE {

 pSCellToAddMod-v12f0 PSCellToAddMod-v12f0 OPTIONAL, -- Need ON

 sCellToAddModListSCG-v12f0 SCellToAddModList-v10l0 OPTIONAL -- Need ON

}

SCG-ConfigPartSCG-v13c0 ::= SEQUENCE {

 sCellToAddModListSCG-v13c0 SCellToAddModList-v13c0 OPTIONAL, -- Need ON

 sCellToAddModListSCG-Ext-v13c0 SCellToAddModListExt-v13c0 OPTIONAL -- Need ON

}

SecurityConfigHO ::= SEQUENCE {

 handoverType CHOICE {

 intraLTE SEQUENCE {

 securityAlgorithmConfig SecurityAlgorithmConfig OPTIONAL, -- Cond fullConfig

 keyChangeIndicator BOOLEAN,

 nextHopChainingCount NextHopChainingCount

 },

 interRAT SEQUENCE {

 securityAlgorithmConfig SecurityAlgorithmConfig,

 nas-SecurityParamToEUTRA OCTET STRING (SIZE(6))

 }

 },

 ...

}

SecurityConfigHO-v1530 ::= SEQUENCE {

 handoverType-v1530 CHOICE {

 intra5GC-r15 SEQUENCE {

 securityAlgorithmConfig-r15 SecurityAlgorithmConfig OPTIONAL, -- Cond HO-toEUTRA

 keyChangeIndicator-r15 BOOLEAN,

 nextHopChainingCount-r15 NextHopChainingCount,

 nas-Container-r15 OCTET STRING OPTIONAL -- Need ON

 },

 fivegc-ToEPC-r15 SEQUENCE {

 securityAlgorithmConfig-r15 SecurityAlgorithmConfig,

 nextHopChainingCount-r15 NextHopChainingCount

 },

 epc-To5GC-r15 SEQUENCE {

 securityAlgorithmConfig-r15 SecurityAlgorithmConfig,

 nas-Container-r15 OCTET STRING

 }

 },

 ...

}

TDM-PatternConfig-r15 ::= CHOICE {

 release NULL,

 setup SEQUENCE {

 subframeAssignment-r15 SubframeAssignment-r15,

 harq-Offset-r15 INTEGER (0.. 9)

 }

}

-- ASN1STOP

| *RRCConnectionReconfiguration* field descriptions |
| --- |
| ***dedicatedInfoNASList***This field is used to transfer UE specific NAS layer information between the network and the UE. The RRC layer is transparent for each PDU in the list. If *dedicatedInfoNASList-r15* is present, UE shall ignore the *dedicatedInfoNASList* (without suffix). |
| ***endc-ReleaseAndAdd***A one-shot field indicating whether the UE simultaneously releases and adds all the NR SCG related configuration within *nr-Config*, i.e. the configuration set by the NR *RRCReconfiguration* message (e.g. *secondaryCellGroup, SRB3* and *measConfig)*. |
| ***fullConfig***Indicates the full configuration option is applicable for the RRC Connection Reconfiguration message for intra-system intra-RAT handover. For inter-RAT handover from NR to E-UTRA, *fullConfig* indicates whether or not delta signalling of SDAP/PDCP from source RAT is applicable. This field is absent when the *RRCConnectionReconfiguration* message is generated by the E-UTRA SCG. |
| ***harq-Offset***Indicates a HARQ subframe offset that is applied to the subframes designated as UL in the associated subrame assignment, see TS 36.213 [23]. |
| ***keyChangeIndicator***If UE is connected to EPC, true is used only in an intra-cell handover when a KeNB key is derived from a KASME key taken into use through the latest successful NAS SMC procedure, as described in TS 33.401 [32] for KeNB re-keying. false is used in an intra-LTE handover when the new KeNB key is obtained from the current KeNB key or from the NH as described in TS 33.401 [32].If UE is connected to 5GC, with keyChangeIndicator-r15, true is used in an intra-cell handover when a KeNB key is derived from a KAMF key taken into use through the latest successful NAS SMC procedure, as described in TS 33.501 [86] for KeNB re-keying.False is used for intra-system handover when the new KeNB key is obtained from the current KeNB key or from the NH as described in TS 33.501 [86]. True is also used in NG based handover procedure with KAMF change, when a KeNB key is derived from the new KAMF key as described in TS 33.501 [86]. |
| ***lwa-Configuration***This field is used to provide parameters for LWA configuration. E-UTRAN does not simultaneously configure LWA with DC, LWIP or RCLWI for a UE. |
| ***lwip-Configuration***This field is used to provide parameters for LWIP configuration. E-UTRAN does not simultaneously configure LWIP with DC, LWA or RCLWI for a UE. |
| ***measConfig***Measurements that E-UTRAN may configure when the UE is not configured with NE-DC. |
| ***measConfigSN***Measurements that E-UTRAN may configure when the UE is configured with NE-DC and for which reports are carried within an NR RRC message. |
| ***nas-Container***This field is used to transfer UE specific NAS layer information between the network and the UE. The RRC layer is transparent for this field, although, if included, it affects activation of AS- security after handover within E-UTRA/5GC. The content is defined in TS 24.501 [95]. In case of NG based handover, the content of nas-Container is. the Intra N1 mode NAS transparent container IE. In case of inter-system handover to from 5GS to EPS, the content of NAS-Container is. the S1 mode to N1 mode NAS transparent container IE. |
| ***nas-securityParamToEUTRA***This field is used to transfer UE specific NAS layer information between the network and the UE. The RRC layer is transparent for this field, although, if included, it affects activation of AS- security after inter-RAT handover to E-UTRA/EPC or inter-system handover to E-UTRA/EPC. The content is defined in TS 24.301 [35]. This field is not used for handover from 5GC. |
| ***networkControlledSyncTx***This field indicates whether the UE shall transmit synchronisation information (i.e. become synchronisation source). Value *On* indicates the UE to transmit synchronisation information while value *Off* indicates the UE to not transmit such information. |
| ***nextHopChainingCount***Parameter NCC: See TS 33.401 [32] if UE is connected to EPC, else see 33.501 [86] if UE is connected to 5GC. |
| ***nr-Config***Includes the NR related configurations. This field is used to configure (NG)EN-DC configuration, possibly in conjunction with fields *sk-Counter* and *nr-RadioBearerConfig1/ 2*. NOTE 1. |
| ***nr-RadioBearerConfig1, nr-RadioBearerConfig2***Includes the NR *RadioBearerConfig* IE as specified in TS 38.331 [82]. The field includes the configuration of RBs configured with NR PDCP. |
| ***nr-SecondaryCellGroupConfig***Includes the NR *RRCReconfiguration* message as specified in TS 38.331 [82]. In this version of the specification, the NR RRC message only includes fields *secondaryCellGroup, conditionalReconfiguration* and/ or *measConfig*. If *nr-SecondaryCellGroupConfig* is configured, the network always includes this field upon MN handover to initiate an NR SCG reconfiguration with sync and key change. |
| ***perCC-GapIndicationRequest***Indicates that UE shall include *perCC-GapIndicationList* and *numFreqEffective* in the *RRCConnectionReconfigurationComplete* message. *numFreqEffectiveReduced* may also be included if frequencies are configured for reduced measurement performance. |
| ***p-MaxEUTRA***Indicates the maximum power available for LTE. |
| ***p-MaxUE-FR1***The maximum total transmit power to be used by the UE across all serving cells in frequency range 1 (FR1) across all cell groups. The maximum transmit power that the UE may use may be additionally limited on cell- or cell-group level. The field is optionally present, if (NG)EN-DC (nr-Config-r15) has been configured. It is absent otherwise. |
| ***p-MeNB***Indicates the guaranteed power for the MeNB, as specified in TS 36.213 [23]. The value N corresponds to N-1 in TS 36.213 [23]. |
| ***powerControlMode***Indicates the power control mode used in DC. Value 1 corresponds to DC power control mode 1 and value 2 indicates DC power control mode 2, as specified in TS 36.213 [23]. |
| ***p-SeNB***Indicates the guaranteed power for the SeNB as specified in TS 36.213 [23], Table 5.1.4.2-1. The value N corresponds to N-1 in TS 36.213 [23]. |
| ***rclwi-Configuration***WLAN traffic steering command as specified in 5.6.16.2. E-UTRAN does not simultaneously configure RCLWI with DC, LWA or LWIP for a UE. |
| ***sCellConfigCommon***Indicates the common configuration for the SCell group. |
| ***sCellGroupIndex***Indicates the identity of SCell groups for which a common configuration is provided. |
| ***sCellIndex***The *sCellIndex* is unique within the scope of the UE. In case of DC, an SCG cell can not use the same value as used for an MCG cell. For *pSCellToAddMod*, if *sCellIndex-r13* is present the UE shall ignore *sCellIndex-r12.* |
| ***sCellGroupToAddModList, sCellGroupToAddModListSCG***Indicates the SCell group to be added or modified. E-UTRAN only configures at most 4 SCell groups per UE over all cell groups. SCell groups can only be configured for LTE SCells, and all SCells in an SCell group must belong to the same cell group. |
| ***sCellGroupToReleaseList***Indicates the SCell group to be released. |
| ***sCellState***A one-shot field that indicates whether the SCell shall be considered to be in activated or dormant state upon SCell configuration. |
| ***sCellToAddModList, sCellToAddModListExt***Indicates the SCell to be added or modified. E-UTRAN uses field *sCellToAddModList-r10* to add or modify SCells (with *sCellIndex-r10*) for a UE that does not support carrier aggregation with more than 5 component carriers. If E-UTRAN includes *sCellToAddModListExt-v1430* it includes the same number of entries, and listed in the same order, as in *sCellToAddModListExt-r13*. If E-UTRAN includes *sCellToAddModList-v10l0* it includes the same number of entries, and listed in the same order, as in *sCellToAddModList-r10*. If E-UTRAN includes *sCellToAddModListExt-v1370* it includes the same number of entries, and listed in the same order, as in *sCellToAddModListExt-r13*. If E-UTRAN includes *sCellToAddModListExt-v13c0* it includes the same number of entries, and listed in the same order, as in *sCellToAddModListExt-r13.* |
| ***sCellToAddModListSCG, sCellToAddModListSCG-Ext***Indicates the SCG cell to be added or modified. The field is used for SCG cells other than the PSCell (which is added/ modified by field *pSCellToAddMod*). E-UTRAN uses field *sCellToAddModListSCG-r12* to add or modify SCells (with *sCellIndex-r10*) for a UE that does not support carrier aggregation with more than 5 component carriers. If E-UTRAN includes *sCellToAddModListSCG-v10l0* it includes the same number of entries, and listed in the same order, as in *sCellToAddModListSCG-r12*. If E-UTRAN includes *sCellToAddModListSCG-Ext-v1370* it includes the same number of entries, and listed in the same order, as in *sCellToAddModListSCG-Ext-r13*. If E-UTRAN includes *sCellToAddModListSCG-Ext-v13c0* it includes the same number of entries, and listed in the same order, as in *sCellToAddModListSCG-Ext-r13.* |
| ***sCellToReleaseList, sCellToReleaseListExt***Indicates the SCell to be released. E-UTRAN uses field *sCellToReleaseList-r10* to release SCells for a UE that does not support carrier aggregation with more than 5 component carriers. |
| ***sCellToReleaseListSCG, sCellToReleaseListSCG-Ext***Indicates the SCG cell to be released. The field is also used to release the PSCell e.g. upon change of PSCell, upon system information change for the PSCell. E-UTRAN uses field *sCellToReleaseListSCG-r12* to release SCells for a UE that does not support carrier aggregation with more than 5 component carriers. |
| ***scg-Configuration***Covers the SCG configuration as used in case of DC and NE-DC. When the UE is configured with NE-DC, E-UTRAN neither applies value release nor configures *scg-ConfigPartMCG*. |
| ***scg-Counter***A counter used upon initial configuration of SCG security as well as upon refresh of S-KeNB. E-UTRAN includes the field upon SCG change when one or more SCG DRBs are configured. Otherwise E-UTRAN does not include the field. |
| ***securityConfigHO***This field contains the parameters required to update the security keys at handover. If E-UTRAN includes the *securityConfigHO* (i.e., without suffix), the choice *intraLTE* is used for handover within E-UTRA/EPC while the choice *interRAT* is used for handover from GERAN or UTRAN to E-UTRA/EPC. If E-UTRAN includes the *securityConfigHO-v1530* (i.e., with suffix), the choice *intra5GC* is used for handover from NR or E-UTRA/5GC to E-UTRA/5GC while the choice *fivegc-ToEPC* is used for inter-system handover from NR or E-UTRA/5GC to E-UTRA/EPC and the choice *epc-To5GC* is used for inter-system handover from E-UTRA/EPC to E-UTRA/5GC. |
| ***sk-Counter***A one-shot counter used upon initial configuration of S-KgNB as well as upon refresh of S-KgNB. E-UTRAN always provides this field either upon initial configuration of an NR SCG, or upon configuration of the first (SN terminated) RB using S-KgNB, whichever happens first. |
| ***sl-V2X-ConfigDedicated***Indicates sidelink configuration for non-P2X related V2X sidelink communication as well as P2X related V2X sidelink communication. |
| ***smtc***The SSB periodicity/offset/duration configuration of target cell for NR PSCell addition and SN change. It is based on timing reference of EUTRA PCell. NOTE 2.If the field is absent, the UE uses the SMTC in the *measObjectNR* having the same SSB frequency and subcarrier spacing, as configured before the reception of the RRC message. |
| ***srs-SwitchFromServCellIndex***Indicates the serving cell whose UL transmission may be interrupted during SRS transmission on a PUSCH-less cell. During SRS transmission on a PUSCH-less cell, the UE may temporarily suspend the UL transmission on a serving cell with PUSCH in the same CG to allow the PUSCH-less cell to transmit SRS. The PUSCH-less cell is always a TDD cell but the serving cell with PUSCH may be either a FDD or TDD cell. |
| ***subframeAssignment***Indicates DL/UL subframe configuration where sa0 points to Configuration 0, sa1 to Configuration 1 etc. as specified in TS 36.211 [21], table 4.2-2. |
| ***systemInformationBlockType1Dedicated***This field is used to transfer *SystemInformationBlockType1* or *SystemInformationBlockType1-BR* to the UE. |
| ***systemInformationBlockType2Dedicated***This field is used to transfer BR version of *SystemInformationBlockType2* to BL UEs or UEs in CE or *SystemInformationBlockType2* to non-BL UEs. |
| ***t350***Timer T350 as described in clause 7.3. Value *minN* corresponds to N minutes. |
| ***tdm-PatternConfig***UL/DL reference configuration indicating the time during which a UE configured with (NG)EN-DC is allowed to transmit. This field is used when power control or IMD issues require single UL transmission as specified in TS 38.101-3 [101] and TS 38.213 [88]. |
| ***tdm-PatternConfigNE-DC***UL/DL reference configuration indicating the time during which a UE configured with NE-DC is allowed to transmit. This field is used when power control or IMD issues require single UL transmission as specified in TS 38.101-3 [101] and TS 38.213 [88]. |

| Conditional presence | Explanation |
| --- | --- |
| *EARFCN-max* | The field is mandatory present if *dl-CarrierFreq-r10* is included and set to *maxEARFCN*. Otherwise the field is not present. |
| *FDD-PCell* | This field is optionally present, need ON, for a FDD PCell if there is no SCell with configured uplink. Otherwise, the field is not present. |
| *FDD-PSCell* | This field is optionally present, need ON, for a FDD PSCell if there is no SCell with configured uplink. Otherwise, the field is not present. |
| *fullConfig* | This field is mandatory present for handover within E-UTRA when the *fullConfig* is included; otherwise it is optionally present, Need OP.  |
| *HO* | The field is mandatory present in case of handover within E-UTRA or to E-UTRA; otherwise the field is not present. |
| *HO-Reestab* | The field is mandatory present in case of inter-system handover within E-UTRA or handover from NR to E-UTRA/EPC; it is optionally present, need ON, in case of intra-system handover within E-UTRA or upon the first reconfiguration after RRC connection re-establishment; or for intra-system handover from NR to E-UTRA, otherwise the field is not present. |
| *HO-5GC* | The field is mandatory present in case of handover within E-UTRA/5GC, handover to E-UTRA/5GC, handover from NR to E-UTRA/EPC, or handover from E-UTRA/5GC to E-UTRA/EPC, otherwise the field is not present. |
| *HO-toEPC* | The field is mandatory present in case of handover within E-UTRA/EPC or to E-UTRA/EPC, except handover from NR or E-UTRA/5GC, otherwise the field is not present.  |
| *HO-toEUTRA* | The field is mandatory present in case of handover to E-UTRA or for reconfigurations when *fullConfig* is included; otherwise the field is optionally present, need ON. |
| *nonFullConfig* | The field is not present when the *fullConfig* is included or in case of handover to E-UTRA; otherwise it is optional present, need ON. |
| *nonHO* | The field is not present in case of handover within E-UTRA or to E-UTRA; otherwise it is optional present, need ON. |
| *SCellAdd* | The field is mandatory present upon SCell addition; otherwise it is not present. |
| *SCellAdd2* | The field is mandatory present upon SCell addition; otherwise it is optionally present, need ON. |

NOTE 1: Fields *sk-Counter* and *nr-RadioBearerConfig1/ 2* are placed outside *nr-Config*, as these may be configured while the UE is not configured with (NG)EN-DC.

NOTE 2: It is not specified whether the timing reference for the SMTC configuration is the source EUTRA PCell or the target EUTRA PCell in case the NR PSCell addition or SN change takes place simultaneously with handover. As a consequence, explicit SMTC configuration is only supported when the source EUTRA PCell and the target EUTRA PCell of the handover are SFN/subframe-synchronized.

End of changes