**3GPP TSG-RAN WG2 Meeting #131 R2-250xxxx**

Bengaluru, India, Auguest 25th – 29th, 2025

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **38.331** | **CR** | **Draft** | **rev** | **-** | **Current version:** | **18.5.0** |  |
|  | | | | | | | | |
| *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 |  |

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| ***Title:*** | Introduction of Service Continuity for MH Sidelink Relay in 38.331 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | CATT | | | | | | | | | |
| ***Source to TSG:*** | R2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_SL\_relay\_multihop | | | | |  | ***Date:*** | | | 2025-06-06 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-19 |
|  | *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-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Introduction of Rel-19 SL relay service continuity | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | 1. Add definition on UE for SL Relay multihop communication; 2. Add the procedure on path switch for scenario A,B,C and D in SL Relay multihop communication; 3. Enhance the measurement for scenario A,B,C and D in SL Relay multihop communication. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Rel-19 SL relay service continuity can’t be supported. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 3.1, 5.3.5.5.2, 6.3.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **X** |  | Other core specifications | | | | TS 38.300 CR xxxx | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

## 3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [1].

**2Rx XR UE:** Two antenna port XR UE as specified in TS 38.101-1 [15].

**A2X communication:** A communication to support A2X services leveraging PC5 reference points, as defined in TS 23.256 [76]. A2X services are realized by various types of A2X applications, e.g., BRID or DAA.

**Additional sidelink RLC bearer:** If the sidelink PDCP entity is associated with two sidelink RLC entities, the additional sidelink RLC bearer is the RLC bearer configured by *sl-RLC-BearerToAddModListSizeExt* in *sl-ConfigDedicatedNR*, or *sl-RLC-BearerConfigListSizeExt* in *SIB12* or in *SidelinkPreconfigNR*.

**Aerial UE:** UE performingAerial UE communication, as defined in TS 38.300 [2], clause 16.18 and TS 23.256 [76].

**AM MRB:** An MRB associated with at least an AM RLC bearer for PTP transmission.

**BH RLC channel:** An RLC channel between two nodes, which is used to transport backhaul packets.

**Broadcast MRB:** A radio bearer configured for MBS broadcast delivery.

**CEIL:** Mathematical function used to 'round up' i.e. to the nearest integer having a higher or equal value.

**Child UE:** A U2N Relay UE’s next hop in downstream direction for serving a U2N Remote UE in U2N Relay communication. Child UE can be the U2N Remote UE or a U2N Relay UE.

**DAPS bearer:** a bearer whose radio protocols are located in both the source gNB and the target gNB during DAPS handover to use both source gNB and target gNB resources.

**Data Burst:** A set of multiple PDUs generated and sent by the application in a short period of time, as defined in TS 23.501 [32].

**Dedicated signalling:** Signalling sent on DCCH logical channel between the network and a single UE.

**Dormant BWP:** The dormant BWP is one of downlink BWPs configured by the network via dedicated RRC signalling. In the dormant BWP, the UE stops monitoring PDCCH on/for the SCell, but continues performing CSI measurements, Automatic Gain Control (AGC) and beam management, if configured. For each serving cell other than the SpCell or PUCCH SCell, the network may configure one BWP as a dormant BWP.

**Earth-fixed cell:** An NTN cell fixed with respect to a certain geographic area on Earth. It can be provisioned by beam(s) continuously covering the same geographical area (e.g., the case of GSO satellites).

**Earth-moving cell:** An NTN cell moving on the ground. It can be provisioned by beam(s) whose coverage area slides over the Earth's surface (e.g., the case of NGSO satellites generating fixed or non-steerable beams).

**eRedCap UE:** A UE with enhanced reduced capabilities as specified in clause 4.2.22.1 in TS 38.306 [26].

**Field:** The individual contents of an information element are referred to as fields.

**First U2N Relay UE**: an Intermediate U2N Relay UE having both PC5 connection to a parent UE and PC5 connection to a U2N Remote UE for serving the U2N Remote UE in case of multi-hop L2 U2N Relay communication.

**FLOOR:** Mathematical function used to 'round down' i.e. to the nearest integer having a lower or equal value.

**Frequency Selection Area ID:** An identity used for broadcast MBS session to guide the frequency selection of the UE as defined in TS 23.247 [67].

**Global cell identity:** An identity to uniquely identifying an NR cell. It is consisted of *cellIdentity* and *plmn-Identity* of the first *PLMN-Identity* in *plmn-IdentityList* in SIB1.

**Information element:** A structural element containing single or multiple fields is referred as information element.

**Intermediate U2N Relay UE**: a U2N Relay UE having both PC5 connection to a parent UE and PC5 connection to a child UE or a U2N Remote UE for serving the U2N Remote UE in case of multi-hop L2 U2N Relay communication.

**Last U2N Relay UE**: a U2N Relay UE having both Uu connection to the network and PC5 connection to a child UE for serving a U2N Remote UE in case of L2 U2N Relay communication.

Editor’s note: FFS whether the term ‘Last U2N Relay UE’ can also cover single-hop U2N Relay UE, if needed, i.e. single-hop U2N Relay UE can be also called ‘Last U2N Relay UE’ in Rel-19 specifications.

**Candidate configuration:** A configuration part of an *RRCReconfiguration* message associated with a candidate cell, e.g., for LTM or subsequent CPAC. A candidate configuration can be a complete candidate configuration or a delta configuration relatively to a reference configuration.

**Reference configuration:** A configuration provided by the network to the UE that is common, within the same cell group, to a group of configured non-complete candidate configurations.

**MBS Radio Bearer:** A radio bearer that is configured for MBS delivery.

**Mobile IAB-MT**: mobile IAB-node function that terminates the Uu interface to the parent node using the procedures and behaviours specified for UEs unless stated otherwise. The mobile IAB-MT uses the same procedures and behaviours specified for the IAB-MT, unless explicitly stated otherwise.

**Mobile IAB-node**: RAN node that supports NR access links to UEs and an NR backhaul link to a parent node, and that can conduct physical mobility across the RAN area. The mobile IAB-node function used in 38-series of 3GPP Specifications corresponds to the MBSR function defined in TS 23.501 [32]. The mobile IAB-node uses the same procedures and behaviours specified for the IAB-node, unless explicitly stated otherwise.

**Multicast/Broadcast Service:** A point-to-multipoint service as defined in TS 23.247 [67].

**Multicast MRB:** A radio bearer configured for MBS multicast delivery.

**MUSIM gap:** Period that the UE may use to perform MUSIM operations.

**Multi-path:** Mode of operation of a UE in RRC\_CONNECTED configured with one direct path on which the UE connects to gNB using NR Uu, and one indirect path on which the UE connects to the same gNB via another UE using PC5 unicast link or Non-3GPP Connection.

**MP remote UE:** A UE configured with Multi-path. When the connectivity of indirect path is PC5 unicast link, the MP remote UE is acting as a L2 U2N Remote UE. When the connectivity of indirect path is Non-3GPP Connection, the MP remote UE is acting as a N3C remote UE.

**MP relay UE:** A UE that provides connectivity of indirect path to a MP remote UE. When the connectivity is PC5 unicast link, the MP relay UE is acting as a L2 U2N Relay UE. When the connectivity is Non-3GPP Connection, the MP relay UE is acting as a N3C relay UE.

**NCSG:** Network controlled small gap as defined in TS 38.133 [14].

**NPN-only Cell**: A cell that is only available for normal service for NPNs' subscriber. An NPN-capable UE determines that a cell is NPN-only Cell by detecting that the *cellReservedForOtherUse* IE is set to true while the *npn-IdentityInfoList* IE is present in *CellAccessRelatedInfo*.

**N3C indirect path:** In Multi-path, the indirect path using Non-3GPP Connection between remote UE and relay UE.

**NR sidelink communication**: AS functionality enabling at least V2X Communication as defined in TS 23.287 [55] and/or A2X Communication as defined in TS 23.256 [76] and/or ProSe Communication (including ProSe UE-to-Network Relay, non-Relay communication, and ProSe UE-to-UE Relay Communication including UE-to-UE Relay communication with integrated discovery) as defined in TS 23.304 [65] between two or more nearby UEs, using NR technology but not traversing any network node.

**NR sidelink discovery**: AS functionality enabling ProSe non-Relay Discovery, ProSe UE-to-Network Relay discovery and ProSe UE-to-UE Relay discovery for Proximity based Services as defined in TS 23.304 [65] between two or more nearby UEs, using NR technology but not traversing any network node.

**NR sidelink positioning:** AS functionality which determines geographical or relative location and possibly velocity of a target UE or ranging via PC5 interface using SL-PRS transmission and reception as defined in TS 38.305 [73] and TS 38.355 [77].

**Parent UE:** A U2N Remote UE or U2N Relay UE’s next hop U2N Relay UE in upstream direction for serving the U2N Remote UE in U2N Relay communication.

**PNI-NPN identity:** an identifier of a PNI-NPN comprising of a PLMN ID and a CAG-ID combination.

**Primary Cell**: The MCG cell, operating on the primary frequency, in which the UE either performs the initial connection establishment procedure or initiates the connection re-establishment procedure.

**PC5 Relay RLC channel**: An RLC channel between L2 U2N Remote UE and L2 U2N Relay UE, between L2 U2N Relay UEs (in case of multi-hop L2 U2N relay communication), or between L2 U2U Remote UE and L2 U2U Relay UE, which is used to transport packets over PC5 for L2 UE-to-Network relay or L2 UE-to-UE relay.

**PDU Set**: one or more PDUs carrying the payload of one unit of information generated at the application level (e.g. frame(s) or video slice(s) for XR Services), as defined in TS 23.501 [32].

**Primary SCG Cell**: For dual connectivity operation, the SCG cell in which the UE performs random access when performing the Reconfiguration with Sync procedure.

**Primary Timing Advance Group**: Timing Advance Group containing the SpCell.

**PUCCH SCell:** An SCell configured with PUCCH by *PUCCH-Config*.

**PUSCH-Less SCell:** An SCell configured without PUSCH.

**Quasi-Earth-fixed cell**: An NTN cell fixed with respect to a certain geographic area on Earth during a certain time duration. It can be provisioned by beam(s) covering one geographic area for a limited period and a different geographic area during another period (e.g., the case of NGSO satellites generating steerable beams).

**RedCap UE:** A UE with reduced capabilities as specified in clause 4.2.21.1 in TS 38.306 [26].

**RLC bearer configuration:** The lower layer part of the radio bearer configuration comprising the RLC and logical channel configurations.

**Secondary Cell**: For a UE configured with CA, a cell providing additional radio resources on top of Special Cell.

**Secondary Cell Group**: For a UE configured with dual connectivity, the subset of serving cells comprising of the PSCell and zero or more secondary cells.

**Serving Cell**: For a UE in RRC\_CONNECTED not configured with CA/DC there is only one serving cell comprising of the primary cell. For a UE in RRC\_CONNECTED configured with CA/ DC the term 'serving cells' is used to denote the set of cells comprising of the Special Cell(s) and all secondary cells.

**Small Data Transmission**: A procedure used for transmission of data and/or signalling over allowed radio bearers in RRC\_INACTIVE state (i.e. without the UE transitioning to RRC\_CONNECTED state). The SDT procedure is considered to be ongoing once the conditions for initating SDT as specified in clause 5.3.13.1b are fulfilled until the SDT procedure is completed either successfully or unsuccessfully as specified in clause 18.0 in TS 38.300 [2].

**SNPN identity:** an identifier of an SNPN comprising of a PLMN ID and an NID combination.

**SL indirect path:** In Multi-path, the indirect path using PC5 unicast link between remote UE and relay UE.

**Special Cell:** For Dual Connectivity operation the term Special Cell refers to the PCell of the MCG or the PSCell of the SCG, otherwise the term Special Cell refers to the PCell.

**Split DRB:** In MR-DC, a DRB that supports transmission via MCG and SCG, as well as duplication of PDCP PDUs as defined in TS 37.340 [41]; or in MP, a DRB that supports transmission via direct path and indirect path, as well as duplication of PDCP PDUs.

**Split SRB**: In MR-DC, an SRB that supports transmission via MCG and SCG as well as duplication of RRC PDUs as defined in TS 37.340 [41]; or in MP, a SRB that supports transmission via direct path and indirect path, as well as duplication of PDCP PDUs.

**SSB Frequency**: Frequency referring to the position of resource element RE=#0 (subcarrier #0) of resource block RB#10 of the SS block.

**U2N Relay UE**: A UE that provides functionality to support connectivity to the network for U2N Remote UE(s). Up to three L2 U2N Relay UEs (i.e. one Last U2N Relay and up to two Intermediate U2N Relays including one First U2N Relay) can be configured for serving a L2 U2N Remote UE in multi-hop L2 U2N Relay communication in this release.

**U2N Remote UE**: A UE that communicates with the network via one or more U2N Relay UEs on an indirect path.

**U2U Relay UE:** A UE that provides functionality to support connectivity between two U2U Remote UEs .

**U2U Remote UE:** A UE that communicates with other UEs via a U2U Relay UE.

**UE-to-Network Relay communication:** A mode of communication in which a UE communicates with the network through an indirect path involving only one U2N Relay UE for single-hop L2 U2N Relay communication or multiple L2 U2N Relay UEs for multi-hop L2 U2N Relay communication.

**UE-to-Network Relay discovery:** A mode of NR sidelink discovery in which a UE discovers other UEs for U2N Relay communication.

**Uu Relay RLC channel**: An RLC channel between L2 U2N Relay UE and gNB, which is used to transport packets over Uu for L2 UE-to-Network relay or for indirect path in case of MP**.**

**UE Inactive AS Context**: UE Inactive AS Context is stored when the connection is suspended and restored when the connection is resumed. It includes information as defined in clause 5.3.8.3.

**V2X sidelink communication**: AS functionality enabling V2X Communication as defined in TS 23.285 [56], between nearby UEs, using E-UTRA technology but not traversing any network node.

## 4.2 Architecture

### 4.2.1 UE states and state transitions including inter RAT

A UE is either in RRC\_CONNECTED state or in RRC\_INACTIVE state when an RRC connection has been established. If this is not the case, i.e. no RRC connection is established, the UE is in RRC\_IDLE state. The RRC states can further be characterised as follows:

**- RRC\_IDLE**:

- A UE specific DRX may be configured by upper layers;

- At lower layers, the UE may be configured with a DRX for PTM transmission of MBS broadcast;

- UE controlled mobility based on network configuration;

- The UE:

- Monitors Short Messages transmitted with P-RNTI over DCI (see clause 6.5);

- Monitors a Paging channel for CN paging using 5G-S-TMSI, except if the UE is acting as a L2 U2N Remote UE;

- If configured by upper layers for MBS multicast reception, monitors a Paging channel for CN paging using TMGI;

- Performs neighbouring cell measurements and cell (re-)selection;

- Performs measurements on L2 U2N Relay UEs and relay (re-)selection;

- Acquires system information and can send SI request (if configured);

- Performs logging of available measurements together with location and time for logged measurement configured UEs;

- Performs idle/inactive measurements for idle/inactive measurement configured UEs;

- If configured by upper layers for MBS broadcast reception, acquires MCCH change notification and MBS broadcast control information and data.

**- RRC\_INACTIVE**:

- A UE specific DRX may be configured by upper layers or by RRC layer;

- At lower layers, the UE may be configured with a DRX for PTM transmission of MBS broadcast and/or a DRX for PTM transmission of MBS multicast;

- UE controlled mobility based on network configuration;

- The UE stores the UE Inactive AS context;

- A RAN-based notification area is configured by RRC layer;

- Transfer of unicast data and/or signalling to/from UE over radio bearers configured for SDT.

- The UE:

- Monitors Short Messages transmitted with P-RNTI over DCI (see clause 6.5);

- While T319a is running, monitors control channels associated with the shared data channel to determine if data is scheduled for it;

- While SDT procedure is ongoing and T319a is not running, if CG-SDT is selected and if extended CG-SDT periodicity is configured (i.e. *cg-SDT-PeriodicityExt* is configured), monitors a Paging channel for CN paging using 5G-S-TMSI and RAN paging using fullI-RNTI except if the UE is acting as a L2 U2N Remote UE;

- While SDT procedure is not ongoing, monitors a Paging channel for CN paging using 5G-S-TMSI and RAN paging using fullI-RNTI, except if the UE is acting as a L2 U2N Remote UE;

- If configured by upper layers for MBS multicast reception, while SDT procedure is not ongoing, monitors a Paging channel for paging using TMGI;

- Performs neighbouring cell measurements and cell (re-)selection;

- Performs measurements on L2 U2N Relay UEs and relay (re-)selection;

- Performs RAN-based notification area updates periodically and when moving outside the configured RAN-based notification area;

- Acquires system information and, while SDT procedure is not ongoing, can send SI request (if configured);

- While SDT procedure is not ongoing, performs logging of available measurements together with location and time for logged measurement configured UEs;

- While SDT procedure is not ongoing, performs idle/inactive measurements for idle/inactive measurement configured UEs;

- If configured by upper layers for MBS broadcast reception, acquires MCCH change notification and MBS broadcast control information and data;

- If configured for MBS multicast reception in RRC\_INACTIVE, acquires multicast MCCH change notification and MBS multicast control information and data;

- Transmits SRS for Positioning.

**- RRC\_CONNECTED:**

- The UE stores the AS context;

- Transfer of unicast data to/from UE;

- Transfer of MBS multicast data to UE;

- At lower layers, the UE may be configured with a UE specific DRX;

- At lower layers, the UE may be configured with a DRX for PTM transmission of MBS broadcast and/or a DRX for MBS multicast;

- At lower layers, the UE may be configured with a cell specific cell DTX/DRX;

- For UEs supporting CA, use of one or more SCells, aggregated with the SpCell, for increased bandwidth;

- For UEs supporting DC, use of one SCG, aggregated with the MCG, for increased bandwidth;

- Network controlled mobility within NR, to/from E-UTRA, and to UTRA-FDD;

- Network controlled mobility (path switch) between a serving cell and a L2 U2N Relay UE, or vice versa, or between a source L2 U2N Relay UE and a target L2 U2N Relay UE;

- Network controlled MP operation.

- The UE:

- Monitors Short Messages transmitted with P-RNTI over DCI (see clause 6.5), if configured;

- Monitors control channels associated with the shared data channel to determine if data is scheduled for it;

- Provides channel quality and feedback information;

- Performs neighbouring cell and/or L2 U2N relay measurements and measurement reporting;

- Acquires system information;

- Performs immediate MDT measurement together with available location reporting;

- If configured by upper layers for MBS broadcast reception, acquires MCCH change notification and MBS broadcast control information and data.

Figure 4.2.1-1 illustrates an overview of UE RRC state machine and state transitions in NR. A UE has only one RRC state in NR at one time.



Figure 4.2.1-1: UE state machine and state transitions in NR

Figure 4.2.1-2 illustrates an overview of UE state machine and state transitions in NR as well as the mobility procedures supported between NR/5GC, E-UTRA/EPC and E-UTRA/5GC.



Figure 4.2.1-2: UE state machine and state transitions between NR/5GC, E-UTRA/EPC and E-UTRA/5GC

Figure 4.2.1-3 illustrates the mobility procedure supported between NR/5GC and UTRA-FDD.



Figure 4.2.1-3: Mobility procedure supported between NR/5GC and UTRA-FDD

##### 5.3.5.5.2 Reconfiguration with sync

The UE shall perform the following actions to execute a reconfiguration with sync.

1> if the AS security is not activated, 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> stop timer T430 if running;

1> if no DAPS bearer is configured:

2> stop timer T310 for the corresponding SpCell, if running;

1> if this procedure is executed for the MCG:

2> if timer T316 is running;

3> stop timer T316;

3> if the UE supports RLF-Report for fast MCG recovery procedure as specified in TS 38.306 [26]:

4> set the *elapsedTimeT316* in the *VarRLF-Report* to the value of the elapsed time of the timer T316;

4> set the *pSCellId* in the *VarRLF-Report* to the global cell identity of the PSCell, if available, otherwise to the physical cell identity and carrier frequency of the PSCell;

3> else:

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

2> resume MCG transmission, if suspended.

1> stop timer T312 for the corresponding SpCell, if running;

1> if *sl-PathSwitchConfig* is included:

2> apply the value of the *newUE-Identity* as the C-RNTI;

2> if *sl-IndirectPathMaintain* is not included in *reconfigurationWithSync*:

3> if the UE is L2 U2N remote UE at source side:

4> indicate to upper layer to trigger PC5 unicast link release with the source L2 U2N Relay UE;

3> consider the target L2 U2N Relay UE to be the one indicated by the *targetRelayUE-Identity* in the *sl-PathSwitchConfig*;

3> start timer T420 for the corresponding target L2 U2N Relay UE with the timer value set to *t420*, as included in the *sl-PathSwitchConfig*;

3> indicate to upper layer (to trigger the PC5 unicast link establishment) with the target L2 U2N Relay UE indicated by the *targetRelayUE-Identity*;

3> apply the default configuration of SL-RLC1 as defined in 9.2.4 for SRB1;

2> else:

3> consider the connected L2 U2N Relay UE on the indirect path as the target L2 U2N relay UE, and maintain the PC5 connection with the L2 U2N Relay UE;

1> else (*sl-PathSwitchConfig* is not included):

2> if this procedure is executed for the MCG or if this procedure is executed for an SCG not indicated as deactivated in the E-UTRA or NR RRC message in which the *RRCReconfiguration* message is embedded:

3> start timer T304 for the corresponding SpCell with the timer value set to *t304*, as included in the *reconfigurationWithSync*;

2> if the *frequencyInfoDL* is included:

3> consider the target SpCell to be one on the SSB frequency indicated by the *frequencyInfoDL* with a physical cell identity indicated by the *physCellId*;

2> else:

3> consider the target SpCell to be one on the SSB frequency of the source SpCell with a physical cell identity indicated by the *physCellId*;

2> if this procedure is performed due to an LTM cell switch execution:

3> start synchronising to the DL of the indicated LTM candidate cell, if no DL synchronization for the indicated LTM candidate cell has been already acquired;

2> else:

3> start synchronising to the DL of the target SpCell;

2> apply the specified BCCH configuration defined in 9.1.1.1 for the target SpCell;

2> acquire the *MIB* of the target SpCell, which is scheduled as specified in TS 38.213 [13];

2> if *NTN-Config* is configured for the target cell:

3> start timer T430 with the timer value set to *ntn-UlSyncValidityDuration* from the subframe indicated by *epochTime*, according to the target cell *NTN-Config*;

NOTE 1: The UE should perform the reconfiguration with sync as soon as possible following the reception of the RRC message triggering the reconfiguration with sync, which could be before confirming successful reception (HARQ and ARQ) of this message.

NOTE 2: The UE may omit reading the *MIB* if the UE already has the required timing information, or the timing information is not needed for random access, or if not needed for RACH-less initial UL transmission.

NOTE 2a: A UE with DAPS bearer does not monitor for system information updates in the source PCell.

2> If any DAPS bearer is configured:

3> create a MAC entity for the target cell group with the same configuration as the MAC entity for the source cell group;

3> for each DAPS bearer:

4> establish an RLC entity or entities for the target cell group, with the same configurations as for the source cell group;

4> establish the logical channel for the target cell group, with the same configurations as for the source cell group;

NOTE 2b: In order to understand if a DAPS bearer is configured, the UE needs to check the presence of the field *daps-Config* within the *RadioBearerConfig* IE received in *radioBearerConfig* or *radioBearerConfig2*.

3> for each SRB:

4> establish an RLC entity for the target cell group, with the same configurations as for the source cell group;

4> establish the logical channel for the target cell group, with the same configurations as for the source cell group;

3> suspend SRBs for the source cell group;

NOTE 3: Void

3> apply the value of the *newUE-Identity* as the C-RNTI in the target cell group;

3> configure lower layers for the target SpCell in accordance with the received s*pCellConfigCommon*;

3> configure lower layers for the target SpCell in accordance with any additional fields, not covered in the previous, if included in the received *reconfigurationWithSync.*

2> else:

3> reset the MAC entity of this cell group;

3> consider the SCell(s) of this cell group, if configured, that are not included in the *SCellToAddModList* in the *RRCReconfiguration* message, to be in deactivated state;

3> apply the value of the *newUE-Identity* as the C-RNTI for this cell group;

3> configure lower layers in accordance with the received s*pCellConfigCommon*;

3> if *rach-LessHO* is included:

4> configure lower layers in accordance with *rach-LessHO* for the target SpCell;

3> configure lower layers in accordance with any additional fields, not covered in the previous, if included in the received *reconfigurationWithSync.*

2> if the UE is acting as L2 U2N Remote UE at the source side:

3> if the *sl-IndirectPathMaintain* is not included in *reconfigurationWithSync*:

4> indicate upper layer to trigger PC5 unicast link release.

Upon L2 U2N Relay UE receiving *reconfigurationWithSync*, it either indicates to upper layers (to trigger PC5 unicast link release with Child UE(s)) or sends *NotificationMessageSidelink* message to the connected L2 U2N Remote UE(s) or Child UE(s) in accordance with 5.8.9.10.

NOTE 4: The MP direct path release is realized by direct-to-indirect path switch procedure (i.e. *sl-PathSwitchConfig* and *sl-indirectPathMaintain* included in *RRCReconfiguration* message), where MP is configured in source side.

## 5.5 Measurements

### 5.5.1 Introduction

The network may configure an RRC\_CONNECTED UE to perform measurements. The network may configure the UE to report them in accordance with the measurement configuration or perform conditional reconfiguration evaluation in accordance with the conditional reconfiguration. The measurement configuration is provided by means of dedicated signalling i.e. using the *RRCReconfiguration* or *RRCResume.*

The network may configure the UE to perform the following types of measurements:

- NR measurements;

- Inter-RAT measurements of E-UTRA frequencies;

- Inter-RAT measurements of UTRA-FDD frequencies;

- NR sidelink measurements of L2 U2N Relay UEs.

The network may configure the UE to report the following measurement information based on SS/PBCH block(s):

- Measurement results per SS/PBCH block;

- Measurement results per cell based on SS/PBCH block(s);

- SS/PBCH block(s) indexes.

The network may configure the UE to report the following measurement information based on CSI-RS resources:

- Measurement results per CSI-RS resource;

- Measurement results per cell based on CSI-RS resource(s);

- CSI-RS resource measurement identifiers.

The network may configure the UE to perform the following types of measurements for NR sidelink and V2X sidelink:

- CBR measurements.

The network may configure the UE to report the following CLI measurement information based on SRS resources:

- Measurement results per SRS resource;

- SRS resource(s) indexes.

The network may configure the UE to report the following CLI measurement information based on CLI-RSSI resources:

- Measurement results per CLI-RSSI resource;

- CLI-RSSI resource(s) indexes.

The network may configure the UE to report the following Rx-Tx time difference measurement information based on CSI-RS for tracking or PRS:

- UE Rx-Tx time difference measurement result.

The measurement configuration includes the following parameters:

**1. Measurement objects:** A list of objects on which the UE shall perform the measurements.

- For intra-frequency and inter-frequency measurements a measurement object indicates the frequency/time location and subcarrier spacing of reference signals to be measured. Associated with this measurement object, the network may configure a list of cell specific offsets, a list of 'exclude-listed' cells and a list of 'allow-listed' cells. Exclude-listed cells are not applicable in event evaluation or measurement reporting. Allow-listed cells are the only ones applicable in event evaluation or measurement reporting.

- The *measObjectId* of the MO which corresponds to each serving cell is indicated by *servingCellMO* within the serving cell configuration.

- For inter-RAT E-UTRA measurements a measurement object is a single E-UTRA carrier frequency. Associated with this E-UTRA carrier frequency, the network can configure a list of cell specific offsets and a list of 'exclude-listed' cells. Exclude-listed cells are not applicable in event evaluation or measurement reporting.

- For inter-RAT UTRA-FDD measurements a measurement object is a set of cells on a single UTRA-FDD carrier frequency.

- For NR sidelink measurements of L2 U2N Relay UEs, a measurement object is a single NR sidelink frequency to be measured.

- For CBR measurement of NR sidelink communication, a measurement object is a set of transmission resource pool(s) on a single carrier frequency for NR sidelink communication.

- For CBR measurement of NR sidelink discovery, a measurement object is a set of discovery dedicated resource pool(s) or transmission resource pool(s) also used for NR sidelink discovery on a single carrier frequency for NR sidelink discovery.

- For CBR measurement of NR sidelink positioning, a measurement object is a set of positioning dedicated resource pool(s) or transmission resource pool(s) also used for NR sidelink positioning on a single carrier frequency for NR sidelink positioning.

- For CLI measurements a measurement object indicates the frequency/time location of SRS resources and/or CLI-RSSI resources, and subcarrier spacing of SRS resources to be measured.

**2. Reporting configurations:** A list of reporting configurations where there can be one or multiple reporting configurations per measurement object. Each measurement reporting configuration consists of the following:

- Reporting criterion: The criterion that triggers the UE to send a measurement report. This can either be periodical or a single event description.

- RS type: The RS that the UE uses for beam and cell measurement results (SS/PBCH block or CSI-RS).

- Reporting format: The quantities per cell and per beam that the UE includes in the measurement report (e.g. RSRP) and other associated information such as the maximum number of cells and the maximum number beams per cell to report.

In case of conditional reconfiguration, each configuration consists of the following:

- Execution criteria: The criteria the UE uses for conditional reconfiguration execution.

- RS type: The RS that the UE uses for obtaining beam and cell measurement results (SS/PBCH block-based or CSI-RS-based), used for evaluating conditional reconfiguration execution condition.

**3. Measurement identities:** For measurement reporting, a list of measurement identities where each measurement identity links one measurement object with one reporting configuration. By configuring multiple measurement identities, it is possible to link more than one measurement object to the same reporting configuration, as well as to link more than one reporting configuration to the same measurement object. The measurement identity is also included in the measurement report that triggered the reporting, serving as a reference to the network. For conditional reconfiguration triggering, one measurement identity links to exactly one conditional reconfiguration trigger configuration. And up to 2 measurement identities can be linked to one conditional reconfiguration execution condition.

**4. Quantity configurations:** The quantity configuration defines the measurement filtering configuration used for all event evaluation and related reporting, and for periodical reporting of that measurement. For NR measurements, the network may configure up to 2 quantity configurations with a reference in the NR measurement object to the configuration that is to be used. In each configuration, different filter coefficients can be configured for different measurement quantities, for different RS types, and for measurements per cell and per beam.

**5. Measurement gaps:** Periods that the UE may use to perform measurements.

**6. Effective measurement window:** Periods that the UE may use to perform inter RAT measurements.

A UE in RRC\_CONNECTED maintains a measurement object list, a reporting configuration list, and a measurement identities list according to signalling and procedures in this specification. The measurement object list possibly includes NR measurement object(s), CLI measurement object(s), inter-RAT objects, and L2 U2N Relay objects. Similarly, the reporting configuration list includes NR, inter-RAT, and L2 U2N Relay reporting configurations. Any measurement object can be linked to any reporting configuration of the same RAT type. Some reporting configurations may not be linked to a measurement object. Likewise, some measurement objects may not be linked to a reporting configuration.

The measurement procedures distinguish the following types of cells:

1. The NR serving cell(s) – these are the SpCell and one or more SCells.

2. Listed cells – these are cells listed within the measurement object(s).

3. Detected cells – these are cells that are not listed within the measurement object(s) but are detected by the UE on the SSB frequency(ies) and subcarrier spacing(s) indicated by the measurement object(s).

For NR measurement object(s), the UE measures and reports on the serving cell(s)/serving Relay UE (for L2 U2N Remote UE), listed cells and/or detected cells. For inter-RAT measurements object(s) of E-UTRA, the UE measures and reports on listed cells and detected cells and, for RSSI and channel occupancy measurements, the UE measures and reports on the configured resources on the indicated frequency. For inter-RAT measurements object(s) of UTRA-FDD, the UE measures and reports on listed cells. For CLI measurement object(s), the UE measures and reports on configured measurement resources (i.e. SRS resources and/or CLI-RSSI resources). For L2 U2N Relay object(s), the UE measures and reports on the serving NR cell(s), as well as the discovered L2 U2N Relay UEs.

Whenever the procedural specification, other than contained in clause 5.5.2, refers to a field it concerns a field included in the *VarMeasConfig* unless explicitly stated otherwise i.e. only the measurement configuration procedure covers the direct UE action related to the received *measConfig*.

In NR-DC, the UE may receive two independent *measConfig*:

- a *measConfig*, associated with MCG, that is included in the *RRCReconfiguration* message received via SRB1; and

- a *measConfig*, associated with SCG, that is included in the *RRCReconfiguration* message received via SRB3, or, alternatively, included within a *RRCReconfiguration* message embedded in a *RRCReconfiguration* message received via SRB1.

In this case, the UE maintains two independent *VarMeasConfig* and *VarMeasReportList*, one associated with each *measConfig*, and independently performs all the procedures in clause 5.5 for each *measConfig* and the associated *VarMeasConfig* and *VarMeasReportList*, unless explicitly stated otherwise.

The configurations related to CBR measurements are only included in the *measConfig* associated with MCG.

The configurations related to Rx-Tx time difference measurement are only included in the *measConfig* associated with MCG.

### 5.5.3 Performing measurements

#### 5.5.3.1 General

An RRC\_CONNECTED UE shall derive cell measurement results by measuring one or multiple beams associated per cell as configured by the network, as described in 5.5.3.3. For all cell measurement results, except for RSSI, and CLI measurement results in RRC\_CONNECTED, the UE applies the layer 3 filtering as specified in 5.5.3.2, before using the measured results for evaluation of reporting criteria, measurement reporting or the criteria to trigger conditional reconfiguration execution. For cell measurements, the network can configure RSRP, RSRQ, SINR, RSCP or EcN0 as trigger quantity. For CLI measurements, the network can configure SRS-RSRP or CLI-RSSI as trigger quantity. For cell and beam measurements, reporting quantities can be any combination of quantities (i.e. only RSRP; only RSRQ; only SINR; RSRP and RSRQ; RSRP and SINR; RSRQ and SINR; RSRP, RSRQ and SINR; only RSCP; only EcN0; RSCP and EcN0), irrespective of the trigger quantity, and for CLI measurements, reporting quantities can be either SRS-RSRP or CLI-RSSI. For conditional reconfiguration execution, the network can configure up to 2 quantities, both using same RS type. The UE does not apply the layer 3 filtering as specified in 5.5.3.2 to derive the CBR measurements. The UE does not apply the layer 3 filtering as specified in 5.5.3.2 to derive the Rx-Tx time difference measurements. The UE does not apply the layer 3 filtering as specified in 5.5.3.2 to derive the altitude measurements.

The network may also configure the UE to report measurement information per beam (which can either be measurement results per beam with respective beam identifier(s) or only beam identifier(s)), derived as described in 5.5.3.3a. If beam measurement information is configured to be included in measurement reports, the UE applies the layer 3 beam filtering as specified in 5.5.3.2. On the other hand, the exact L1 filtering of beam measurements used to derive cell measurement results is implementation dependent.

The UE shall:

1> whenever the UE has a *measConfig*, perform RSRP and RSRQ measurements for each serving cell for which *servingCellMO* is configured as follows:

2> if the *reportConfig* associated with at least one *measId* included in the *measIdList* within *VarMeasConfig* contains an *rsType* set to *ssb* and *ssb-ConfigMobility* is configured in the *measObject* indicated by the *servingCellMO*:

3> if the *reportConfig* contains a *reportQuantityRS-Indexes* and *maxNrofRS-IndexesToReport*:

4> derive layer 3 filtered RSRP and RSRQ per beam for the serving cell based on SS/PBCH block, as described in 5.5.3.3a;

3> derive serving cell measurement results based on SS/PBCH block, as described in 5.5.3.3;

2> if the *reportConfig* associated with at least one *measId* included in the *measIdList* within *VarMeasConfig* contains an *rsType* set to *csi-rs* and *CSI-RS-ResourceConfigMobility* is configured in the *measObject* indicated by the *servingCellMO*:

3> if the *reportConfig* contains a *reportQuantityRS-Indexes* and *maxNrofRS-IndexesToReport*:

4> derive layer 3 filtered RSRP and RSRQ per beam for the serving cell based on CSI-RS, as described in 5.5.3.3a;

3> derive serving cell measurement results based on CSI-RS, as described in 5.5.3.3;

1> for each serving cell for which *servingCellMO* is configured, if the *reportConfig* associated with at least one *measId* included in the *measIdList* within *VarMeasConfig* contains SINR as trigger quantity and/or reporting quantity:

2> if the *reportConfig* contains *rsType* set to *ssb* and *ssb-ConfigMobility* is configured in the *servingCellMO*:

3> if the *reportConfig*contains a *reportQuantityRS-Indexes* and *maxNrofRS-IndexesToReport*:

4> derive layer 3 filtered SINR per beam for the serving cell based on SS/PBCH block, as described in 5.5.3.3a;

3> derive serving cell SINR based on SS/PBCH block, as described in 5.5.3.3;

2> if the *reportConfig* contains *rsType* set to *csi-rs* and *CSI-RS-ResourceConfigMobility* is configured in the *servingCellMO*:

3> if the *reportConfig*contains a *reportQuantityRS-Indexes* and *maxNrofRS-IndexesToReport*:

4> derive layer 3 filtered SINR per beam for the serving cell based on CSI-RS, as described in 5.5.3.3a;

3> derive serving cell SINR based on CSI-RS, as described in 5.5.3.3;

1> for each *measId* included in the *measIdList* within *VarMeasConfig*:

2> if the *reportType* for the associated *reportConfig* is set to *reportCGI* and timer T321 is running:

3> if *useAutonomousGaps* is configured for the associated *reportConfig*:

4> perform the corresponding measurements on the frequency and RAT indicated in the associated *measObject* using autonomous gaps as necessary;

3> else:

4> perform the corresponding measurements on the frequency and RAT indicated in the associated *measObject* using available idle periods;

3> if the cell indicated by *reportCGI* field for the associated *measObject* is an NR cell and that indicated cell is broadcasting *SIB1* (see TS 38.213 [13], clause 13):

4> try to acquire *SIB1* in the concerned cell;

3> if the cell indicated by *reportCGI* field is an E-UTRA cell:

4> try to acquire *SystemInformationBlockType1* in the concerned cell;

2> if the *ul-DelayValueConfig* is configured for the associated *reportConfig*:

3> ignore the *measObject;*

3> for each of the configured DRBs*,* configure the PDCP layer to perform corresponding average UL PDCP packet delay measurement per DRB;

2> if the *ul-ExcessDelayConfig* is configured for the associated *reportConfig*:

3> ignore the *measObject;*

3> for each of the configured DRBs*,* configure the PDCP layer to perform corresponding UL PDCP Excess Packet Delay delay measurement according to the configured threshold per DRB;

2> if the *reportType* for the associated *reportConfig* is *periodical*, *eventTriggered*; or

2> if the *reportType* for the associated *reportConfig* is *condTriggerConfig,* the *measId* is within the MCG *VarMeasConfig* and is indicated in the *condExecutionCond* or in the *condExecutionCondPSCell* associated to a *condReconfigId* in the MCG *VarConditionalReconfig* (for CHO, CPA, MN-initiated inter-SN CPC, or subsequent CPAC in NR-DC); or

2> if the *reportType* for the associated *reportConfig* is *condTriggerConfig*, the *measId* is within the SCG *VarMeasConfig* and is indicated in the *condExecutionCond* associated to a *condReconfigId* in the SCG *VarConditionalReconfig* (for intra-SN CPC or subsequent CPAC); or

2> if the *reportType* for the associated *reportConfig* is *condTriggerConfig*, the *measId* is within the SCG *VarMeasConfig* and is indicated in the *condExecutionCondSCG* associated to a *condReconfigId* in the MCG *VarConditionalReconfig* (for SN-initiated inter-SN CPC or subsequent CPAC in NR-DC); or

2> if the *reportType* for the associated *reportConfig* is *condTriggerConfig*, the *measId* is within the SCG *VarMeasConfig* and is indicated in the *triggerConditionSN* associated to a *condReconfigurationId* in *VarConditionalReconfiguration* as specified in TS 36.331 [10] (for SN-initiated inter-SN CPC in EN-DC):

3> if a measurement gap configuration is setup, or

3> if the UE does not require measurement gaps to perform the concerned measurements:

4> if *s-MeasureConfig* is not configured, or

4> if *s-MeasureConfig* is set to *ssb-RSRP* and the NR SpCell RSRP based on SS/PBCH block, after layer 3 filtering, is lower than *ssb-RSRP,* or

4> if *s-MeasureConfig* is set to *csi-RSRP* and the NR SpCell RSRP based on CSI-RS, after layer 3 filtering, is lower than *csi-RSRP*:

5> if the *measObject* is associated to NR and the *rsType* is set to *csi-rs*:

6> if reportQuantityRS-Indexes and maxNrofRS-IndexesToReport for the associated reportConfig are configured:

7> derive layer 3 filtered beam measurements only based on CSI-RS for each measurement quantity indicated in *reportQuantityRS-Indexes*, as described in 5.5.3.3a;

6> derive cell measurement results based on CSI-RS for the trigger quantity and each measurement quantity indicated in *reportQuantityCell* using parameters from the associated *measObject*, as described in 5.5.3.3;

5> if the *measObject* is associated to NR and the *rsType* is set to *ssb*:

6> if reportQuantityRS-Indexes and maxNrofRS-IndexesToReport for the associated reportConfig are configured:

7> derive layer 3 beam measurements only based on SS/PBCH block for each measurement quantity indicated in *reportQuantityRS-Indexes*, as described in 5.5.3.3a;

6> derive cell measurement results based on SS/PBCH block for the trigger quantity and each measurement quantity indicated in *reportQuantityCell* using parameters from the associated *measObject*, as described in 5.5.3.3;

5> if the *measObject* is associated to E-UTRA:

6> perform the corresponding measurements associated to neighbouring cells on the frequencies indicated in the concerned *measObject*, as described in 5.5.3.2;

5> if the measObject is associated to UTRA-FDD:

6> perform the corresponding measurements associated to neighbouring cells on the frequencies indicated in the concerned *measObject*, as described in 5.5.3.2;

5> if the measObject is associated to L2 U2N Relay UE:

6> perform the corresponding measurements associated to candidate Relay UEs on the frequencies indicated in the concerned *measObject*, as described in 5.5.3.4;

4> if the *measRSSI-ReportConfig* is configured in the associated *reportConfig*:

5> perform the RSSI and channel occupancy measurements on the frequency configured by *rmtc-Frequency* in the associated *measObject*;

NOTE 0: The network avoids configuring UEs supporting only CHO and/or Rel-16 CPC with measurements not referred to by any execution condition.

2> if the *reportType* for the associated *reportConfig* is set to *reportSFTD* and the *numberOfReportsSent* as defined within the *VarMeasReportList* for this *measId* is less than one:

3> if the *reportSFTD-Meas* is set to *true:*

4> if the *measObject* is associated to E-UTRA:

5> perform SFTD measurements between the PCell and the E-UTRA PSCell;

5> if the *reportRSRP* is set to *true*;

6> perform RSRP measurements for the E-UTRA PSCell;

4> else if the *measObject* is associated to NR:

5> perform SFTD measurements between the PCell and the NR PSCell;

5> if the *reportRSRP* is set to *true*;

6> perform RSRP measurements for the NR PSCell based on SSB;

3> else if the *reportSFTD-NeighMeas* is included*:*

4> if the *measObject* is associated to NR:

5> if the *drx-SFTD-NeighMeas* is included:

6> perform SFTD measurements between the PCell and the NR neighbouring cell(s) detected based on parameters in the associated *measObject* using available idle periods;

5> else:

6> perform SFTD measurements between the PCell and the NR neighbouring cell(s) detected based on parameters in the associated *measObject*;

5> if the *reportRSRP* is set to *true*:

6> perform RSRP measurements based on SSB for the NR neighbouring cell(s) detected based on parameters in the associated *measObject*;

2> if the *reportType* for the associated *reportConfig* is *cli-Periodical* or *cli-EventTriggered*:

3> perform the corresponding measurements associated to CLI measurement resources indicated in the concerned *measObjectCLI*;

2> perform the evaluation of reporting criteria as specified in 5.5.4, except if *reportConfig* is *condTriggerConfig*.

NOTE 1: The evaluation of conditional reconfiguration execution criteria is specified in 5.3.5.13.

The UE acting as a L2 U2N Remote UE whenever configured with *measConfig* shall:

1. perform the corresponding measurements associated to the serving L2 U2N Relay UE, as described in 5.5.3.4;

The UE capable of Rx-Tx time difference measurement when configured with *measObjectRxTxDiff* shall:

1> perform the corresponding Rx-Tx time difference measurements associated with downlink reference signals indicated in the concerned *measObjectRxTxDiff*.

The UE capable of CBR measurement when configured to transmit NR sidelink communication/discovery/positioning shall:

1> If the frequency used for NR sidelink communication/discovery/positioning is included in *sl-FreqInfoToAddModList*/*sl-FreqInfoToAddModListExt* in *sl-ConfigDedicatedNR* within *RRCReconfiguration* message or includedin *sl-ConfigCommonNR* within *SIB12* orincludedin *sl-PosConfigCommonNR* within *SIB23*:

2> if the UE is in RRC\_IDLE or in RRC\_INACTIVE:

3> if configured with NR sidelink communication and the cell chosen for NR sidelink communication provides *SIB12* which includes *sl-TxPoolSelectedNormal* or *sl-TxPoolExceptional* forthe concerned frequency; or

3> if configured with NR sidelink discovery and the cell chosen for NR sidelink discovery provides *SIB12* which includes *sl-TxPoolSelectedNormal* or *sl-TxPoolExceptional* but does not include *sl-DiscTxPoolSelected* forthe concerned frequency:

4> perform CBR measurement on pool(s) in *sl-TxPoolSelectedNormal* or *sl-TxPoolExceptional* for the concerned frequency in *SIB12*;

3> if configured with NR sidelink discovery and the cell chosen for NR sidelink discovery provides *SIB12* which includes *sl-DiscTxPoolSelected* forthe concerned frequency:

4> perform CBR measurement on pools in *sl-DiscTxPoolSelected* and *sl-TxPoolExceptional* for the concerned frequency in *SIB12*;

3> if configured with NR sidelink positioning and the cell chosen for NR sidelink positioning provides *SIB23* which includes *sl-PRS-TxPoolSelectedNormal* or *sl-PRS-TxPoolExceptional* forthe concerned frequency, or provides *SIB12* which includes *sl-TxPoolSelectedNormal*, *sl-TxPoolExceptional*:

4> perform CBR measurement on pool(s) in *sl-PRS-TxPoolSelectedNormal*, *sl-PRS-TxPoolExceptional, sl-TxPoolSelectedNormal* or *sl-TxPoolExceptional* for the concerned frequency;

2> if the UE is in RRC\_CONNECTED:

3> if *tx-PoolMeasToAddModList* is included in *VarMeasConfig*:

4> perform CBR measurements on each transmission resource pool indicated in the *tx-PoolMeasToAddModList*;

3> if *sl-DiscTxPoolSelected*, *sl-TxPoolSelectedNormal*, *sl-TxPoolScheduling,* *sl-TxPoolExceptional*, *sl-PRS-TxPoolSelectedNormal*, *sl-PRS-TxPoolScheduling or sl-PRS-TxPoolExceptional* is included in *sl-ConfigDedicatedNR* for the concerned frequency within *RRCReconfiguration*:

4> perform CBR measurement on pool(s) in *sl-DiscTxPoolSelected*, *sl-TxPoolSelectedNormal*, *sl-TxPoolScheduling,* *sl-TxPoolExceptional*, *sl-PRS-TxPoolSelectedNormal*, *sl-PRS-TxPoolScheduling and sl-PRS-TxPoolExceptional* if included in *sl-ConfigDedicatedNR* for the concerned frequency within *RRCReconfiguration*;

3> else:

4> if configured with NR sidelink communication and the cell chosen for NR sidelink communication provides *SIB12* which includes *sl-TxPoolSelectedNormal* or *sl-TxPoolExceptional* forthe concerned frequency; or

4> if configured with NR sidelink discovery and the cell chosen for NR sidelink discovery provides *SIB12* which includes *sl-TxPoolSelectedNormal* or *sl-TxPoolExceptional* but does not provide *sl-DiscTxPoolSelected* forthe concerned frequency:

5> perform CBR measurement on pool(s) in *sl-TxPoolSelectedNormal* or *sl-TxPoolExceptional* for the concerned frequency in *SIB12*;

4> if configured with NR sidelink discovery and the cell chosen for NR sidelink discovery provides *SIB12* which includes *sl-DiscTxPoolSelected* forthe concerned frequency:

5> perform CBR measurement on pools in *sl-DiscTxPoolSelected* and *sl-TxPoolExceptional* for the concerned frequency in *SIB12*;

4> if configured with NR sidelink positioning and the cell chosen for NR sidelink positioning provides *SIB23* which includes *sl-PRS-TxPoolSelectedNormal* or *sl-PRS-TxPoolExceptional,* or provides *SIB12* which includes *sl-TxPoolSelectedNormal*, *sl-TxPoolExceptional* forthe concerned frequency:

5> perform CBR measurement on pool(s) in *sl-TxPoolSelectedNormal*, *sl-TxPoolExceptional*, *sl-PRS-TxPoolSelectedNormal* or *sl-PRS-TxPoolExceptional* for the concerned frequency;

1> else:

2> if configured with NR sidelink communication and *sl-TxPoolSelectedNormal* is included in *SidelinkPreconfigNR* for the concerned frequency; or

2> if configured with NR sidelink discovery and *sl-TxPoolSelectedNormal* is included in *SidelinkPreconfigNR* but *sl-DiscTxPoolSelected* is not included in *SidelinkPreconfigNR* for the concerned frequency:

3> perform CBR measurement on pool(s) in *sl-TxPoolSelectedNormal* in *SidelinkPreconfigNR* for the concerned frequency.

2> if configured with NR sidelink discovery and *sl-DiscTxPoolSelected* is included in *SidelinkPreconfigNR* for the concerned frequency:

3> perform CBR measurement on pools in *sl-DiscTxPoolSelected* if included in *SidelinkPreconfigNR*.

2> if configured with NR sidelink positioning and *sl-TxPoolSelectedNormal* or *sl-PRS-TxPoolSelectedNormal* is included in *SL-PreconfigurationNR* for the concerned frequency:

3> perform CBR measurement on pool(s) in *sl-TxPoolSelectedNormal* or *sl-PRS-TxPoolSelectedNormal* in *SidelinkPreconfigNR* for the concerned frequency.

NOTE 2: In case the configurations for NR sidelink communication and CBR measurement are acquired via the E-UTRA, configurations for NR sidelink communication in *SIB12*, *sl-ConfigDedicatedNR* within *RRCReconfiguration* used in this clause are provided by the configurations in *SystemInformationBlockType28*, *sl-ConfigDedicatedForNR* within *RRCConnectionReconfiguration* as specified in TS 36.331[10], respectively.

NOTE 3: If a UE that is configured by upper layers to transmit V2X sidelink communication is configured by NR with transmission resource pool(s) and the measurement objects concerning V2X sidelink communication (i.e. by *sl-ConfigDedicatedEUTRA-Info*), it shall perform CBR measurement as specified in clause 5.5.3 of TS 36.331 [10], based on the transmission resource pool(s) and the measurement object(s) concerning V2X sidelink communication configured by NR.

NOTE 4: For V2X sidelink communication, each of the CBR measurement results is associated with a resource pool, as indicated by the *poolReportId* (see TS 36.331 [10]), that refers to a pool as included in *sl-ConfigDedicatedEUTRA-Info* or *SIB13*.

#### 5.5.3.2 Layer 3 filtering

The UE shall:

1> for each cell measurement quantity, each beam measurement quantity, each sidelink measurement quantity as needed in clause 5.8.10, for each CLI measurement quantity that the UE performs measurements according to 5.5.3.1, for each L2 U2N Relay UE measurement quantity according to 5.5.3.4, for evaluating the selected or detected NR sidelink U2N Relay UEs according to 5.8.15.3, for evaluating the SyncRef UE according to 5.8.5 and 5.8.6, for evaluating the NR sidelink U2U Relay/Remote UE threshold conditions according to 5.8.16.2 and 5.8.17.2, for evaluating the conditions for selection and reselection of NR sidelink U2U Relay UE according to 5.8.17.3, and for evaluating the detected NR sidelink U2U Relay UEs according to 5.8.17.4:

2> filter the measured result, before using for evaluation of reporting criteria, for measurement reporting, for U2N/U2U Relay (re)selection evaluation or for evaluating the SyncRef UE, by the following formula:

***F*n = (1 – *a*)\**F*n-1 + *a*\**M*n**

where

***Mn*** is the latest received measurement result from the physical layer;

***Fn*** is the updated filtered measurement result, that is used for evaluation of reporting criteria, for measurement reporting, for U2N/U2U Relay (re)selection evaluation or for evaluating the SyncRef UE;

***Fn-1*** is the old filtered measurement result, where ***F0*** is set to ***M1*** when the first measurement result from the physical layer is received; and for *MeasObjectNR*, ***a*** = 1/2(***ki***/4), where ***ki*** is the *filterCoefficient* for the corresponding measurement quantity of the i:th *QuantityConfigNR* in *quantityConfigNR-List*, and *i* is indicated by *quantityConfigIndex* in *MeasObjectNR*; for other measurements, ***a*** = 1/2(***k***/4), where ***k*** is the *filterCoefficient* for the corresponding measurement quantity received by the *quantityConfig*; for UTRA-FDD, a = 1/2(k/4), where k is the filterCoefficient for the corresponding measurement quantity received by *quantityConfigUTRA-FDD* in the *QuantityConfig*;

2> adapt the filter such that the time characteristics of the filter are preserved at different input rates, observing that the *filterCoefficient k* assumes a sample rate equal to X ms; The value of X is equivalent to one intra-frequency L1 measurement period as defined in TS 38.133 [14] assuming non-DRX operation, and depends on frequency range.

NOTE 1: If ***k*** is set to 0, no layer 3 filtering is applicable.

NOTE 2: The filtering is performed in the same domain as used for evaluation of reporting criteria, for measurement reporting, for U2N/U2U Relay (re)selection evaluation or for evaluating the SyncRef UE, i.e., logarithmic filtering for logarithmic measurements.

NOTE 3: The filter input rate is implementation dependent, to fulfil the performance requirements set in TS 38.133 [14]. For further details about the physical layer measurements, see TS 38.133 [14].

NOTE 4: For CLI-RSSI measurement, it is up to UE implementation whether to reset filtering upon BWP switch.

NOTE 5: For SSB measurements when multiple altitude range-based *ssb-ToMeasure* are configured, it is up to UE implementation whether to reset filtering upon entering a different altitude range.

NOTE 6: Upon satellite switch with resynchronization, it is up to UE implementation to reset filtering for the serving cell.

### 5.5.4 Measurement report triggering

#### 5.5.4.1 General

If AS security has been activated successfully, the UE shall:

1> for each *measId* included in the *measIdList* within *VarMeasConfig*:

2> if the corresponding *reportConfig* includes a *reportType* set to *eventTriggered* or *periodical*:

3> if the corresponding *measObject* concerns NR:

4> if the corresponding *reportConfig* includes *measRSSI-ReportConfig*:

5> consider the resource indicated by the *rmtc-Config* on the associated frequency to be applicable;

4> if the *eventA1* or *eventA2* is configured in the corresponding *reportConfig*:

5> consider only the serving cell to be applicable;

4> if the *eventA3* or *eventA5* or *eventA3H1* or *eventA3H2* or *eventA5H1* or *eventA5H2* is configured in the corresponding *reportConfig*:

5> if a serving cell is associated with a *measObjectNR* and neighbours are associated with another *measObjectNR*, consider any serving cell associated with the other *measObjectNR* to be a neighbouring cell as well;

4> if the *eventX2* is configured in the corresponding *reportConfig*:

5> consider only the serving L2 U2N Relay UE to be applicable;

4> if corresponding *reportConfig* includes *reportType* set to *periodical*; or

4> for measurement events other than *eventA1,* *eventA2, eventD1*, *eventD2*, *eventX2*, *eventH1* or *eventH2*:

5> if *useAllowedCellList* is set to *true*:

6> consider any neighbouring cell detected based on parameters in the associated *measObjectNR* to be applicable when the concerned cell is included in the *allowedCellsToAddModList* defined within the *VarMeasConfig* for this *measId*;

5> else:

6> consider any neighbouring cell detected based on parameters in the associated *measObjectNR* to be applicable when the concerned cell is not included in the *excludedCellsToAddModList* defined within the *VarMeasConfig* for this *measId*;

3> else if the corresponding *measObject* concerns E-UTRA:

4> if *eventB1* or *eventB2* is configured in the corresponding *reportConfig*:

5> consider a serving cell, if any, on the associated E-UTRA frequency as neighbour cell;

4> consider any neighbouring cell detected on the associated frequency to be applicable when the concerned cell is not included in the *excludedCellsToAddModListEUTRAN* defined within the *VarMeasConfig* for this *measId*;

3> else if the corresponding *measObject* concerns UTRA-FDD:

4> if *eventB1-UTRA-FDD* or *eventB2-UTRA-FDD* is configured in the corresponding *reportConfig*; or

4> if corresponding *reportConfig* includes *reportType* set to *periodical*:

5> consider a neighbouring cell on the associated frequency to be applicable when the concerned cell is included in the *cellsToAddModList* defined within the *VarMeasConfig* for this *measId*;

3> else if the corresponding *measObject* concerns L2 U2N Relay UE:

4> if *eventY1-Relay* or *eventY2-Relay* or *eventZ1-Relay* is configured in the corresponding *reportConfig*; or

4> if corresponding *reportConfig* includes *reportType* set to *periodical*:

5> consider any L2 U2N Relay UE fulfilling upper layer criteria detected on the associated frequency to be applicable for this *measId*;

2> else if the corresponding *reportConfig* includes a *reportType* set to *reportCGI*:

3> consider the cell detected on the associated *measObject* which has a physical cell identity matching the value of the *cellForWhichToReportCGI* included in the corresponding *reportConfig* within the *VarMeasConfig* to be applicable;

2> else if the corresponding *reportConfig* includes a *reportType* set to *reportSFTD*:

3> if the corresponding *measObject* concerns NR:

4> if the *reportSFTD-Meas* is set to *true*:

5> consider the NR PSCell to be applicable;

4> else if the *reportSFTD-NeighMeas* is included:

5> if *cellsForWhichToReportSFTD* is configured in the corresponding *reportConfig*:

6> consider any NR neighbouring cell detected on the associated *measObjectNR* which has a physical cell identity that is included in the *cellsForWhichToReportSFTD* to be applicable;

5> else:

6> consider up to 3 strongest NR neighbouring cells detected based on parameters in the associated *measObjectNR* to be applicable when the concerned cells are not included in the *excludedCellsToAddModList* defined within the *VarMeasConfig* for this *measId*;

3> else if the corresponding *measObject* concerns E-UTRA:

4> if the *reportSFTD-Meas* is set to *true*:

5> consider the E-UTRA PSCell to be applicable;

2> else if the corresponding *reportConfig* includes a *reportType* set to *cli-Periodical or cli-EventTriggered*:

3> consider all CLI measurement resources included in the corresponding *measObject* to be applicable;

2> else if the corresponding *reportConfig* includes a *reportType* set to *rxTxPeriodical*:

3> consider all Rx-Tx time difference measurement resources included in the corresponding *measObject* to be applicable;

2> if the corresponding *reportConfig* concerns the reporting for NR sidelink communication/discovery (i.e. *reportConfigNR-SL*):

3> consider the transmission resource pools indicated by the *tx-PoolMeasToAddModList* defined within the *VarMeasConfig* for this *measId* to be applicable;

2> if the *reportType* is set to *eventTriggered*, and if the corresponding *reportConfig* does not include *numberOfTriggeringCells*, and if the entry condition applicable for this event, i.e. the event corresponding with the *eventId* of the corresponding *reportConfig* within *VarMeasConfig*, is fulfilled for one or more applicable cells for all measurements after layer 3 filtering taken during *timeToTrigger* defined for this event within the *VarMeasConfig*, while the *VarMeasReportList* does not include a measurement reporting entry for this *measId* (a first cell triggers the event):

3> include a measurement reporting entry within the *VarMeasReportList* for this *measId*;

3> set the *numberOfReportsSent* defined within the *VarMeasReportList* for this *measId* to 0;

3> include the concerned cell(s) in the *cellsTriggeredList* defined within the *VarMeasReportList* for this *measId*;

3> if *useT312* is set to *true* in *reportConfig* for this event:

4> if T310 for the corresponding SpCell is running; and

4> if T312 is not running for corresponding SpCell:

5> start timer T312 for the corresponding SpCell with the value of T312 configured in the corresponding *measObjectNR*;

3> initiate the measurement reporting procedure, as specified in 5.5.5;

2> else if the *reportType* is set to *eventTriggered*, and if the corresponding *reportConfig* does not include *numberOfTriggeringCells*,and if the entry condition applicable for this event, i.e. the event corresponding with the *eventId* of the corresponding *reportConfig* within *VarMeasConfig*, is fulfilled for one or more applicable cells not included in the *cellsTriggeredList* for all measurements after layer 3 filtering taken during *timeToTrigger* defined for this event within the *VarMeasConfig* (a subsequent cell triggers the event):

3> set the *numberOfReportsSent* defined within the *VarMeasReportList* for this *measId* to 0;

3> include the concerned cell(s) in the *cellsTriggeredList* defined within the *VarMeasReportList* for this *measId*;

3> if *useT312* is set to *true* in *reportConfig* for this event:

4> if T310 for the corresponding SpCell is running; and

4> if T312 is not running for corresponding SpCell:

5> start timer T312 for the corresponding SpCell with the value of T312 configured in the corresponding *measObjectNR*;

3> initiate the measurement reporting procedure, as specified in 5.5.5;

2> if the *reportType* is set to *eventTriggered*, and if the corresponding *reportConfig* includes *numberOfTriggeringCells*, and if the entry condition applicable for this event, i.e. the event corresponding with the *eventId* of the corresponding *reportConfig* within *VarMeasConfig*, is fulfilled for one or more applicable cells for all measurements after layer 3 filtering taken during *timeToTrigger* defined for this event within the *VarMeasConfig*:

3> if the *VarMeasReportList* does not include a measurement reporting entry for this *measId* (a first cell triggers the event):

4> include a measurement reporting entry within the *VarMeasReportList* for this *measId*;

3> if the number of cell(s) in the *cellsTriggeredList* is larger than or equal to *numberOfTriggeringCells*:

4> include the concerned cell(s) in the *cellsTriggeredList* defined within the *VarMeasReportList* for this *measId*;

3> else:

4> include the concerned cell(s) in the *cellsTriggeredList* defined within the *VarMeasReportList* for this *measId*;

4> if the number of cell(s) in the *cellsTriggeredList* is larger than or equal to *numberOfTriggeringCells*:

5> set the *numberOfReportsSent* defined within the *VarMeasReportList* for this *measId* to 0;

5> initiate the measurement reporting procedure, as specified in 5.5.5;

2> if the *reportType* is set to *eventTriggered* and if the leaving condition applicable for this event is fulfilled for one or more of the cells included in the *cellsTriggeredList* defined within the *VarMeasReportList* for this *measId* for all measurements after layer 3 filtering taken during *timeToTrigger* defined within the *VarMeasConfig* for this event:

3> if *enteringLeavingReport* is configured for the corresponding reporting configuration:

4> store the concerned cell(s) in the *cellsMetLeavingCond* defined within the *VarMeasReportList* for this *measId*;

3> remove the concerned cell(s) in the *cellsTriggeredList* defined within the *VarMeasReportList* for this *measId*;

3> if *reportOnLeave* is set to *true* for the corresponding reporting configuration:

4> if the corresponding *reportConfig* does not include *numberOfTriggeringCells*; or

4> if the corresponding *reportConfig* includes *numberOfTriggeringCells* and a measurement report was previously sent to the network for at least one of the concerned cell(s):

5> initiate the measurement reporting procedure, as specified in 5.5.5;

3> remove all the concerned cell(s) from *cellsMetLeavingCond* defined within the *VarMeasReportList* for this *measId*, if any;

3> if the *cellsTriggeredList* defined within the *VarMeasReportList* for this *measId* is empty:

4> remove the measurement reporting entry within the *VarMeasReportList* for this *measId*;

4> stop the periodical reporting timer for this *measId*, if running;

2> if the *reportType* is set to *eventTriggered* and if the entry condition applicable for this event, i.e. the event corresponding with the *eventId* of the corresponding *reportConfig* within *VarMeasConfig*, is fulfilled for one or more applicable L2 U2N Relay UEs for all measurements after layer 3 filtering taken during *timeToTrigger* defined for this event within the *VarMeasConfig*, while the *VarMeasReportList* does not include a measurement reporting entry for this *measId* (a first L2 U2N Relay UE triggers the event):

3> include a measurement reporting entry within the *VarMeasReportList* for this *measId*;

3> set the *numberOfReportsSent* defined within the *VarMeasReportList* for this *measId* to 0;

3> include the concerned L2 U2N Relay UE(s) in the *relaysTriggeredList* defined within the *VarMeasReportList* for this *measId*;

3> initiate the measurement reporting procedure, as specified in 5.5.5;

2> else if the *reportType* is set to *eventTriggered* and if the entry condition applicable for this event, i.e. the event corresponding with the *eventId* of the corresponding *reportConfig* within *VarMeasConfig*, is fulfilled for one or more applicable L2 U2N Relay UEs not included in the *relaysTriggeredList* for all measurements after layer 3 filtering taken during *timeToTrigger* defined for this event within the *VarMeasConfig* (a subsequent L2 U2N Relay UE triggers the event):

3> set the *numberOfReportsSent* defined within the *VarMeasReportList* for this *measId* to 0;

3> include the concerned L2 U2N Relay UE(s) in the *relaysTriggeredList* defined within the *VarMeasReportList* for this *measId*;

3> initiate the measurement reporting procedure, as specified in 5.5.5;

2> else if the *reportType* is set to *eventTriggered* and if the leaving condition applicable for this event is fulfilled for one or more of the L2 U2N Relay UEs included in the *relaysTriggeredList* defined within the *VarMeasReportList* for this *measId* for all measurements after layer 3 filtering taken during *timeToTrigger* defined within the *VarMeasConfig* for this event:

3> remove the concerned L2 U2N Relay UE(s) in the *relaysTriggeredList* defined within the *VarMeasReportList* for this *measId*;

3> if *reportOnLeave* is set to *true* for the corresponding reporting configuration:

4> initiate the measurement reporting procedure, as specified in 5.5.5;

3> if the *relaysTriggeredList* defined within the *VarMeasReportList* for this *measId* is empty:

4> remove the measurement reporting entry within the *VarMeasReportList* for this *measId*;

4> stop the periodical reporting timer for this *measId*, if running;

2> else if the *reportType* is set to *eventTriggered* and if the entry condition applicable for this event, i.e. the event corresponding with the *eventId* of the corresponding *reportConfig* within *VarMeasConfig*, is fulfilled for one or more applicable transmission resource pools for all measurements taken during *timeToTrigger* defined for this event within the *VarMeasConfig*, while the *VarMeasReportList* does not include an measurement reporting entry for this *measId* (a first transmission resource pool triggers the event):

3> include a measurement reporting entry within the *VarMeasReportList* for this *measId*;

3> set the *numberOfReportsSent* defined within the *VarMeasReportList* for this *measId* to 0;

3> include the concerned transmission resource pool(s) in the *poolsTriggeredList* defined within the *VarMeasReportList* for this *measId*;

3> initiate the measurement reporting procedure, as specified in 5.5.5;

2> else if the *reportType* is set to *eventTriggered* and if the entry condition applicable for this event, i.e. the event corresponding with the *eventId* of the corresponding *reportConfig* within *VarMeasConfig*, is fulfilled for one or more applicable transmission resource pools not included in the *poolsTriggeredList* for all measurements taken during *timeToTrigger* defined for this event within the *VarMeasConfig* (a subsequent transmission resource pool triggers the event):

3> set the *numberOfReportsSent* defined within the *VarMeasReportList* for this *measId* to 0;

3> include the concerned transmission resource pool(s) in the *poolsTriggeredList* defined within the *VarMeasReportList* for this *measId*;

3> initiate the measurement reporting procedure, as specified in 5.5.5;

2> if the *reportType* is set to *eventTriggered* and if the leaving condition applicable for this event is fulfilled for one or more applicable transmission resource pools included in the *poolsTriggeredList* defined within the *VarMeasReportList* for this *measId* for all measurements taken during *timeToTrigger* defined within the *VarMeasConfig* for this event:

3> remove the concerned transmission resource pool(s) in the *poolsTriggeredList* defined within the *VarMeasReportList* for this *measId*;

3> if the *poolsTriggeredList* defined within the *VarMeasReportList* for this *measId* is empty:

4> remove the measurement reporting entry within the *VarMeasReportList* for this *measId*;

4> stop the periodical reporting timer for this *measId*, if running

2> else if the *reportType* is set to *eventTriggered* and if the *eventId* is set to *eventD1* or *eventD2* or *eventH1* or *eventH2* and if the entering condition applicable for this event, i.e. the event corresponding with the *eventId* of the corresponding *reportConfig* within *VarMeasConfig*, is fulfilled during *timeToTrigger* defined for this event within the *VarMeasConfig*, while the *VarMeasReportList* does not include a measurement reporting entry for this *measId*:

3> include a measurement reporting entry within the *VarMeasReportList* for this *measId*;

3> set the *numberOfReportsSent* defined within the *VarMeasReportList* for this *measId* to 0;

3> initiate the measurement reporting procedure, as specified in 5.5.5;

2> else if the *reportType* is set to *eventTriggered* and if the *eventId* is set to *eventD1* or *eventD2* or *eventH1* or *eventH2* and if the leaving condition applicable for this event is fulfilled for the associated *VarMeasReport* within the *VarMeasReportList* for this *measId* during *timeToTrigger* defined within the *VarMeasConfig* for this event:

3> if *reportOnLeave* is set to *true* for the corresponding reporting configuration:

4> initiate the measurement reporting procedure, as specified in 5.5.5;

3> remove the measurement reporting entry within the *VarMeasReportList* for this *measId*;

3> stop the periodical reporting timer for this *measId*, if running;

NOTE 1: Void.

2> if *reportType* is set to *periodical* and if a (first) measurement result is available:

3> include a measurement reporting entry within the *VarMeasReportList* for this *measId*;

3> set the *numberOfReportsSent* defined within the *VarMeasReportList* for this *measId* to 0;

3> if the corresponding *reportConfig* includes *measRSSI-ReportConfig*:

4> initiate the measurement reporting procedure as specified in 5.5.5 immediately when RSSI sample values are reported by the physical layer after the first L1 measurement duration;

3> else if the corresponding *reportConfig* includes the *ul-DelayValueConfig*:

4> initiate the measurement reporting procedure, as specified in 5.5.5, immediately after a first measurement result is provided from lower layers of the associated DRB identity;

3> else if the corresponding *reportConfig* includes the *ul-ExcessDelayConfig*:

4> initiate the measurement reporting procedure, as specified in 5.5.5, immediately after a first measurement result is provided from lower layers of the associated DRB identity(ies) according to the configured threshold per DRB identity(ies);

3> else if the *reportAmount* exceeds 1:

4> initiate the measurement reporting procedure, as specified in 5.5.5, immediately after the quantity to be reported becomes available for the NR SpCell or for the serving L2 U2N Relay UE (if the UE is a L2 U2N Remote UE);

3> else (i.e. the *reportAmount* is equal to 1):

4> initiate the measurement reporting procedure, as specified in 5.5.5, immediately after the quantity to be reported becomes available for the NR SpCell and for the strongest cell among the applicable cells, or for the NR SpCell and for the strongest L2 U2N Relay UEs among the applicable L2 U2N Relay UEs; or initiate the measurement reporting procedure, as specified in 5.5.5, immediately after the quantity to be reported becomes available for the serving L2 U2N Relay UE and for the strongest cell among the applicable cells, or for the serving L2 U2N Relay UE and for the strongest L2 U2N Relay UEs among the applicable L2 U2N Relay UEs (if the UE is a L2 U2N Remote UE);

2> if, in case the corresponding *reportConfig* concerns the reporting for NR sidelink communication/discovery, *reportType* is set to *periodical* and if a (first) measurement result is available:

3> include a measurement reporting entry within the *VarMeasReportList* for this *measId*;

3> set the *numberOfReportsSent* defined within the *VarMeasReportList* for this *measId* to 0;

3> initiate the measurement reporting procedure, as specified in 5.5.5, immediately after the quantity to be reported becomes available for the NR SpCell and CBR measurement results become available;

2> if the *reportType* is set to *cli-EventTriggered* and if the entry condition applicable for this event, i.e. the event corresponding with the *eventId* of the corresponding *reportConfig* within *VarMeasConfig*, is fulfilled for one or more applicable CLI measurement resources for all measurements after layer 3 filtering taken during *timeToTrigger* defined for this event within the *VarMeasConfig*, while the *VarMeasReportList* does not include a measurement reporting entry for this *measId* (a first CLI measurement resource triggers the event):

3> include a measurement reporting entry within the *VarMeasReportList* for this *measId*;

3> set the *numberOfReportsSent* defined within the *VarMeasReportList* for this *measId* to 0;

3> include the concerned CLI measurement resource(s) in the *cli-TriggeredList* defined within the *VarMeasReportList* for this *measId*;

3> initiate the measurement reporting procedure, as specified in 5.5.5;

2> else if the *reportType* is set to *cli-EventTriggered* and if the entry condition applicable for this event, i.e. the event corresponding with the *eventId* of the corresponding *reportConfig* within *VarMeasConfig*, is fulfilled for one or more CLI measurement resources not included in the *cli-TriggeredList* for all measurements after layer 3 filtering taken during *timeToTrigger* defined for this event within the *VarMeasConfig* (a subsequent CLI measurement resource triggers the event):

3> set the *numberOfReportsSent* defined within the *VarMeasReportList* for this *measId* to 0;

3> include the concerned CLI measurement resource(s) in the *cli-TriggeredList* defined within the *VarMeasReportList* for this *measId*;

3> initiate the measurement reporting procedure, as specified in 5.5.5;

2> if the *reportType* is set to *cli-EventTriggered* and if the leaving condition applicable for this event is fulfilled for one or more of the CLI measurement resources included in the *cli-TriggeredList* defined within the *VarMeasReportList* for this *measId* for all measurements after layer 3 filtering taken during *timeToTrigger* defined within the *VarMeasConfig* for this event:

3> remove the concerned CLI measurement resource(s) in the *cli-TriggeredList* defined within the *VarMeasReportList* for this *measId*;

3> if *reportOnLeave* is set to *true* for the corresponding reporting configuration:

4> initiate the measurement reporting procedure, as specified in 5.5.5;

3> if the *cli-TriggeredList* defined within the *VarMeasReportList* for this *measId* is empty:

4> remove the measurement reporting entry within the *VarMeasReportList* for this *measId*;

4> stop the periodical reporting timer for this measId, if running;

2> if *reportType* is set to *cli-Periodical* and if a (first) measurement result is available:

3> include a measurement reporting entry within the *VarMeasReportList* for this *measId*;

3> set the *numberOfReportsSent* defined within the *VarMeasReportList* for this *measId* to 0;

3> initiate the measurement reporting procedure, as specified in 5.5.5, immediately after the quantity to be reported becomes available for at least one CLI measurement resource;

2> if *reportType* is set to *rxTxPeriodical* and if a (first) measurement result is available:

3> include a measurement reporting entry within the *VarMeasReportList* for this *measId*;

3> set the *numberOfReportsSent* defined within the *VarMeasReportList* for this *measId* to 0;

3> initiate the measurement reporting procedure, as specified in 5.5.5;

2> upon expiry of the periodical reporting timer for this *measId*:

3> if *reportType* is set to *eventTriggered* and *reportOnBestCellChange* is configured for this *measId*

4> if *reportOnBestCellChange* is set to *n1*, and the first measured neighbouring cell among cells within *cellsTriggeredList* according to the sorting quantity is the same as the first cell in *reportedBestNeighbourCell* defined within the *VarMeasReportList* for this *measId*, or

4> if *reportOnBestCellChange* is set to *n2* and there is only one cell included in the *cellsTriggeredList* for this *measId*, and the best measured neighbouring cell according to the sorting quantity in the *cellsTriggeredList* is the same as the first cell in *reportedBestNeighbourCell* defined within the *VarMeasReportList* for this *measId*, or

4> if *reportOnBestCellChange* is set to *n2* and there is more than one cell included in the *cellsTriggeredList* for this *measId*, and the best measured neighbouring cell among cells within *cellsTriggeredList* according to the sorting quantity is the same as the first cell in *reportedBestNeighbourCell* defined within the *VarMeasReportList* for this *measId*, and the second best measured neighbouring cell among cells within *cellsTriggeredList* according to the sorting quantity is the same as the second cell in *reportedBestNeighbourCell* defined within the *VarMeasReportList* for this *measId*:

5> increment the *numberOfReportsSent* as defined within the *VarMeasReportList* for this *measId* by 1;

5> if the *numberOfReportsSent* as defined within the *VarMeasReportList* for this *measId* is less than the *reportAmount* as defined within the corresponding reportConfig for this *measId*:

6> restart the periodical reporting timer with the value of *reportInterval* as defined within the corresponding *reportConfig* for this *measId*;

4> else:

5> initiate the measurement reporting procedure, as specified in 5.5.5;3> else:

4> initiate the measurement reporting procedure, as specified in 5.5.5.

2> if the corresponding *reportConfig* includes a *reportType* is set to *reportSFTD*:

3> if the corresponding *measObject* concerns NR:

4> if the *drx-SFTD-NeighMeas* is included:

5> if the quantity to be reported becomes available for each requested pair of PCell and NR cell:

6> stop timer T322;

6> initiate the measurement reporting procedure, as specified in 5.5.5;

4> else

5> initiate the measurement reporting procedure, as specified in 5.5.5, immediately after the quantity to be reported becomes available for each requested pair of PCell and NR cell or the maximal measurement reporting delay as specified in TS 38.133 [14];

3> else if the corresponding *measObject* concerns E-UTRA:

4> initiate the measurement reporting procedure, as specified in 5.5.5, immediately after the quantity to be reported becomes available for the pair of PCell and E-UTRA PSCell or the maximal measurement reporting delay as specified in TS 38.133 [14];

2> if *reportType* is set to *reportCGI*:

3> if the UE acquired the *SIB1* or *SystemInformationBlockType1* for the requested cell; or

3> if the UE detects that the requested NR cell is not transmitting *SIB1* (see TS 38.213 [13], clause 13):

4> stop timer T321;

4> include a measurement reporting entry within the *VarMeasReportList* for this *measId*;

4> set the *numberOfReportsSent* defined within the *VarMeasReportList* for this *measId* to 0;

4> initiate the measurement reporting procedure, as specified in 5.5.5;

2> upon the expiry of T321 for this *measId*:

3> include a measurement reporting entry within the *VarMeasReportList* for this *measId*;

3> set the *numberOfReportsSent* defined within the *VarMeasReportList* for this *measId* to 0;

3> initiate the measurement reporting procedure, as specified in 5.5.5.

2> upon the expiry of T322 for this *measId*:

3> initiate the measurement reporting procedure, as specified in 5.5.5.

If AS security has been activated successfully and if SCell activation(s) indication is received from lower layer, the UE shall:

1> if *reportType* is set to *reportOnScellActivation* for any *measId* included in the *measIdList* within *VarMeasConfig*:

2> if the activated SCell(s) fulfills the measurement requirement as specified in TS 38.133 [14]:

3> include a measurement reporting entry within the *VarMeasReportList* for this *measId*:

3> set the *numberOfReportsSent* defined within the *VarMeasReportList* for this *measId* to 0;

4> initiate the measurement reporting procedure, as specified in 5.5.5.

#### 5.5.4.17 Event X1 (Serving L2 U2N Relay UE becomes worse than threshold1 and NR Cell becomes better than threshold2)

The UE shall:

1> consider the entering condition for this event to be satisfied when both condition X1-1 and condition X1-2, as specified below, are fulfilled;

1> consider the leaving condition for this event to be satisfied when condition X1-3 or condition X1-4, i.e. at least one of the two, as specified below, is fulfilled;

Inequality X1-1 (Entering condition 1)

*Mr + Hys < Thresh1*

Inequality X1-2 (Entering condition 2)

*Mn + Ofn + Ocn – Hys > Thresh2*

Inequality X1-3 (Leaving condition 1)

*Mr – Hys > Thresh1*

Inequality X1-4 (Leaving condition 2)

*Mn + Ofn + Ocn + Hys < Thresh2*

The variables in the formula are defined as follows:

***Mr*** is the measurement result of the serving L2 U2N Relay UE, not taking into account any offsets.

***Mn*** is the measurement result of the NR cell, not taking into account any offsets.

***Ofn*** is the measurement object specific offset of the reference signal of the NR cell (i.e. *offsetMO* as defined within *measObjectNR* corresponding to the frequency of the NR cell).

***Ocn*** is the cell specific offset of the NR cell (i.e. *cellIndividualOffset* as defined within *measObjectNR* corresponding to the frequency of the NR cell, or *cellIndividualOffset* as defined within *reportConfigNR*), and set to zero if not configured for the cell.

***Hys*** is the hysteresis parameter for this event.

***Thresh1*** is the threshold parameter for this event (i.e. *x1-Threshold1-Relay/eventX1-SD-Threshold1* as defined within *reportConfigNR* for this event).

***Thresh2*** is the threshold parameter for this event (i.e. *x1-Threshold2* as defined within *reportConfigNR* for this event).

***Mr*** is expressed in dBm.

***Mn*** is expressed in dBm in case of RSRP, or in dB in case of RSRQ and RS-SINR.

***Ofn, Ocn, Hys*** are expressed in dB.

***Thresh1*** is expressed in the same unit as ***Mr***.

***Thresh2*** is expressed in the same unit as ***Mn***.

#### 5.5.4.18 Event X2 (Serving L2 U2N Relay UE becomes worse than threshold)

The UE shall:

1> consider the entering condition for this event to be satisfied when condition X2-1, as specified below, is fulfilled;

1> consider the leaving condition for this event to be satisfied when condition X2-2, as specified below, is fulfilled;

Inequality X2-1 (Entering condition)

*Mr + Hys < Thresh*

Inequality X2-2 (Leaving condition)

*Mr – Hys > Thresh*

The variables in the formula are defined as follows:

***Mr*** is the measurement result of the serving L2 U2N Relay UE, not taking into account any offsets.

***Hys*** is the hysteresis parameter for this event.

***Thresh*** is the threshold parameter for this event (i.e. *x2-Threshold-Relay/eventX2-SD-Threshold* as defined within *reportConfigNR* for this event).

***Mr*** is expressed in dBm.

***Hys*** are expressed in dB.

***Thresh*** is expressed in the same unit as ***Mr***.

#### 5.5.4.20 Event Y2 (Candidate L2 U2N Relay UE becomes better than threshold)

The UE shall:

1> consider the entering condition for this event to be satisfied when condition Y2-1, as specified below, is fulfilled;

1> consider the leaving condition for this event to be satisfied when condition Y2-2, as specified below, is fulfilled;

Inequality Y2-1 (Entering condition)

*Mr– Hys > Thresh*

Inequality Y2-2 (Leaving condition)

*Mr + Hys < Thresh*

The variables in the formula are defined as follows:

***Mr*** is the measurement result of the candidate L2 U2N Relay UE, not taking into account any offsets.

***Hys*** is the hysteresis parameter for this event (i.e. *hysteresis* as defined within *reportConfigInterRAT* for this event).

***Thresh*** is the threshold parameter for this event (i.e. *y2-Threshold-Relay* as defined within *reportConfigInterRAT* for this event).

***Mr*** is expressed in dBm or dB, depending on the measurement quantity of candidate L2 U2N Relay UE.

***Hys*** are expressed in dB.

***Thresh*** is expressed in the same unit as ***Mr***.

#### 5.5.4.20b Event Z1 (Serving L2 U2N Relay UE becomes worse than threshold1 and Candidate L2 U2N Relay UE becomes better than threshold2)

The UE shall:

1> consider the entering condition for this event to be satisfied when both condition Z1-1 and condition Z1-2, as specified below, are fulfilled;

1> consider the leaving condition for this event to be satisfied when condition Z1-3 or condition Z1-4, i.e. at least one of the two, as specified below, is fulfilled;

Inequality Z1-1 (Entering condition 1)

*Mr* + *Hys* < *Thresh1*

Inequality Z1-2 (Entering condition 2)

*Mn* – *Hys* > *Thresh2*

Inequality Z1-3 (Leaving condition 1)

*Mr* – *Hys* > *Thresh1*

Inequality Z1-4 (Leaving condition 2)

*Mn* + *Hys* < *Thresh2*

The variables in the formula are defined as follows:

***Mr*** is the measurement result of the serving L2 U2N Relay UE, not taking into account any offsets.

***Mn*** is the measurement result of the candidate L2 U2N Relay UE, not taking into account any offsets.

***Hys*** is the hysteresis parameter for this event (i.e. *hysteresis* as defined within *reportConfigInterRAT* for this event).

***Thresh1*** is the threshold parameter for this event (i.e. *sl-rsrp* in *z1-Threshold1-Relay* as defined within *reportConfigInterRAT* if the UE measures SL-RSRP, or *sd-rsrp* in *z1-Threshold1-Relay* as defined within *reportConfigInterRAT* if the UE measures SD-RSRPfor this event).

***Thresh2*** is the threshold parameter for this event (i.e. *z1-Threshold2-Relay* as defined within *reportConfigInterRAT* for this event).

***Mr*** is expressed in dBm or dB, depending on the measurement quantity of serving L2 U2N Relay UE.

***Mn*** is expressed in dBm or dB, depending on the measurement quantity of candidate L2 U2N Relay UE.

***Hys*** are expressed in dB.

***Thresh1*** is expressed in the same unit as ***Mr***.

***Thresh2*** is expressed in the same unit as ***Mn.***

### 5.5.5 Measurement reporting

#### 5.5.5.1 General



Figure 5.5.5.1-1: Measurement reporting

The purpose of this procedure is to transfer measurement results from the UE to the network. The UE shall initiate this procedure only after successful AS security activation.

The UE shall, for each entry in the *VarMeasReportList*:

1> if the *eventH1* or *eventH2* is configured in the corresponding *reportConfig* associated with the *measId* that triggered the measurement reporting:

2> for all the entries in the *VarMeasReportList* for which the measurement reporting procedure was triggered and the corresponding *reportConfig* is configured with the same *eventID* and *simulMultiTriggerSingleMeasReport* set to *true*:

3> except for the entry corresponding to the event for which the difference between the configured altitude threshold and the altitude of the UE is the smallest, remove all other measurement reporting entries from the *VarMeasReportList*, if any, and stop the associated periodical reporting timer(s), if running;

1> else if the *eventA3H1* or *eventA3H2* or *eventA4H1* or *eventA4H2* or *eventA5H1* or *eventA5H2* is configured in the corresponding *reportConfig* associated with the *measId* that triggered the measurement reporting:

2> for all the entries in the *VarMeasReportList* associated with the same *measObjectNR* for which the measurement reporting procedure was triggered and the corresponding *reportConfig* is configured with the same *eventID* and *simulMultiTriggerSingleMeasReport* set to *true*:

3> except for the entry corresponding to the event for which the difference between the configured altitude threshold and the altitude of the UE is the smallest, remove all other measurement reporting entries from the *VarMeasReportList*, if any, and stop the associated periodical reporting timer(s), if running;

For the *measId* for which the measurement reporting procedure was triggered, the UE shall set the *measResults* within the *MeasurementReport* message as follows:

1> set the *measId* to the measurement identity that triggered the measurement reporting;

1> for each serving cell configured with *servingCellMO*:

2> if the *reportConfig* associated with the *measId* that triggered the measurement reporting includes *rsType*:

3> if the serving cell measurements based on the *rsType* included in the *reportConfig* that triggered the measurement report are available:

4> set the *measResultServingCell* within *measResultServingMOList* to include RSRP, RSRQ and the available SINR of the serving cell, derived based on the *rsType* included in the *reportConfig* that triggered the measurement report;

2> else:

3> if SSB based serving cell measurements are available:

4> set the *measResultServingCell* within *measResultServingMOList* to include RSRP, RSRQ and the available SINR of the serving cell, derived based on SSB;

3> else if CSI-RS based serving cell measurements are available:

4> set the *measResultServingCell* within *measResultServingMOList* to include RSRP, RSRQ and the available SINR of the serving cell, derived based on CSI-RS;

1> set the *servCellId* within *measResultServingMOList* to include each NR serving cell that is configured with *servingCellMO*, if any;

1> if the *reportConfig* associated with the *measId* that triggered the measurement reporting includes *reportQuantityRS-Indexes* and *maxNrofRS-IndexesToReport*:

2> for each serving cell configured with *servingCellMO*, include beam measurement information according to the associated *reportConfig* as described in 5.5.5.2;

1> if the *reportConfig* associated with the *measId* that triggered the measurement reporting includes *reportAddNeighMeas*:

2> for each *measObjectId* referenced in the *measIdList* which is also referenced with *servingCellMO*, other than the *measObjectId* corresponding with the *measId* that triggered the measurement reporting:

3> if the *measObjectNR* indicated by the *servingCellMO* includes the RS resource configuration corresponding to the *rsType* indicated in the *reportConfig*:

4> set the *measResultBestNeighCell* within *measResultServingMOList* to include the *physCellId* and the available measurement quantities based on the *reportQuantityCell* and *rsType* indicated in *reportConfig* of the non-serving cell corresponding to the concerned *measObjectNR* with the highest measured RSRP if RSRP measurement results are available for cells corresponding to this *measObjectNR*, otherwise with the highest measured RSRQ if RSRQ measurement results are available for cells corresponding to this *measObjectNR*, otherwise with the highest measured SINR;

4> if the *reportConfig* associated with the *measId* that triggered the measurement reporting includes *reportQuantityRS-Indexes* and *maxNrofRS-IndexesToReport:*

5> for each best non-serving cell included in the measurement report:

6> include beam measurement information according to the associated *reportConfig* as described in 5.5.5.2;

1> if the *reportConfig* associated with the *measId* that triggered the measurement reporting is set to *eventTriggered* and *eventID* is set to *eventA3*, or *eventA4*, or *eventA5*, or *eventB1*, or *eventB2,* or *eventA3H1,* or *eventA3H2,* or *eventA4H1,* or *eventA4H2,* or *eventA5H1,* or *eventA5H2*:

2> if the UE is in NE-DC and the measurement configuration that triggered this measurement report is associated with the MCG:

3> set the *measResultServFreqListEUTRA-SCG* to include an entry for each E-UTRA SCG serving frequency with the following:

4> include *carrierFreq* of the E-UTRA serving frequency;

4> set the *measResultServingCell* to include the available measurement quantities that the UE is configured to measure by the measurement configuration associated with the SCG;

4> if *reportConfig* associated with the *measId* that triggered the measurement reporting includes *reportAddNeighMeas*:

5> set the *measResultServFreqListEUTRA-SCG* to include within *measResultBestNeighCell* the quantities of the best non-serving cell, based on RSRP, on the concerned serving frequency;

1> if *reportConfig* associated with the *measId* that triggered the measurement reporting is set to *eventTriggered* and *eventID* is set to *eventA3*, or *eventA4*, or *eventA5,* or *eventA3H1,* or *eventA3H2,* or *eventA4H1,* or *eventA4H2,* or *eventA5H1,* or *eventA5H2*:

2> if the UE is in NR-DC and the measurement configuration that triggered this measurement report is associated with the MCG:

3> set the *measResultServFreqListNR-SCG* to include for each NR SCG serving cell that is configured with *servingCellMO*, if any, the following:

4> if the *reportConfig* associated with the *measId* that triggered the measurement reporting includes *rsType*:

5> if the serving cell measurements based on the *rsType* included in the *reportConfig* that triggered the measurement report are available according to the measurement configuration associated with the SCG:

6> set the *measResultServingCell* within *measResultServFreqListNR-SCG* to include RSRP, RSRQ and the available SINR of the serving cell, derived based on the *rsType* included in the *reportConfig* that triggered the measurement report;

4> else:

5> if SSB based serving cell measurements are available according to the measurement configuration associated with the SCG:

6> set the *measResultServingCell* within *measResultServFreqListNR-SCG* to include RSRP, RSRQ and the available SINR of the serving cell, derived based on SSB;

5> else if CSI-RS based serving cell measurements are available according to the measurement configuration associated with the SCG:

6> set the *measResultServingCell* within *measResultServFreqListNR-SCG* to include RSRP, RSRQ and the available SINR of the serving cell, derived based on CSI-RS;

4> if results for the serving cell derived based on SSB are included:

5> include the *ssbFrequency* to the value indicated by ssbFrequency as included in the *MeasObjectNR* of the serving cell;

4> if results for the serving cell derived based on CSI-RS are included:

5> include the *refFreqCSI-RS* to the value indicated by *refFreqCSI-RS* as included in the *MeasObjectNR* of the serving cell;

4> if the *reportConfig* associated with the *measId* that triggered the measurement reporting includes *reportQuantityRS-Indexes* and *maxNrofRS-IndexesToReport*:

5> for each serving cell configured with *servingCellMO*, include beam measurement information according to the associated *reportConfig* as described in 5.5.5.2, where availability is considered according to the measurement configuration associated with the SCG;

4> if *reportConfig* associated with the *measId* that triggered the measurement reporting includes *reportAddNeighMeas*:

5> if the *measObjectNR* indicated by the *servingCellMO* includes the RS resource configuration corresponding to the *rsType* indicated in the *reportConfig*:

6> set the *measResultNeighCellListNR* within *measResultServFreqListNR-SCG* to include one entry with the *physCellId* and the available measurement quantities based on the *reportQuantityCell* and *rsType* indicated in *reportConfig* of the non-serving cell corresponding to the concerned *measObjectNR* with the highest measured RSRP if RSRP measurement results are available for cells corresponding to this *measObjectNR*, otherwise with the highest measured RSRQ if RSRQ measurement results are available for cells corresponding to this *measObjectNR*, otherwise with the highest measured SINR, where availability is considered according to the measurement configuration associated with the SCG;

7> if the *reportConfig* associated with the *measId* that triggered the measurement reporting includes *reportQuantityRS-Indexes* and *maxNrofRS-IndexesToReport:*

8> for each best non-serving cell included in the measurement report:

9> include beam measurement information according to the associated *reportConfig* as described in 5.5.5.2, where availability is considered according to the measurement configuration associated with the SCG;

1> if the *measRSSI-ReportConfig* is configured within the corresponding *reportConfig* for this *measId*:

2> set the *rssi-Result* to the linear average of sample value(s) provided by lower layers in the *reportInterval;*

2> set the *channelOccupancy* to the rounded percentage of sample values which are beyond the *channelOccupancyThreshold* within all the sample values in the *reportInterval;*

1> if the UE is acting as L2 U2N Remote UE:

2> set the *sl-MeasResultServingRelay* in accordance with the following:

3> set the *cellIdentity* to include the *cellAccessRelatedInfo* contained in the discovery message received from the serving L2 U2N Relay UE;

3> set the *sl-RelayUE-Identity* to include the Source L2 ID of the serving L2 U2N Relay;

3> if the measurement of serving L2 U2N Relay UE is based on SL-RSRP:

4> set the *sl-MeasResult* to include the SL-RSRP of the serving L2 U2N Relay UE;

4> set the *sl-MeasQuantity* to *sl-rsrp*, if supported by the UE;

3> else:

4> set the *sl-MeasResult* to include the SD-RSRP of the serving L2 U2N Relay UE;

4> set the *sl-MeasQuantity* to *sd-rsrp*, if supported by the UE;

NOTE 1: In case of no data transmission from L2 U2N Relay UE to L2 U2N Remote UE, it is left to UE implementation whether to use SL-RSRP or SD-RSRP when setting the *sl-MeasResultServingRelay* of the serving L2 U2N Relay UE.

1> if there is at least one applicable neighbouring cell or candidate L2 U2N Relay UE to report:

2> if the *reportType* is set to *eventTriggered* or *periodical*:

3> if the measurement report concerns the candidate L2 U2N Relay UE:

4> set the *sl-MeasResultsCandRelay* in *measResultNeighCells* to include the best candidate L2 U2N Relay UEs up to *maxNrofRelayMeas* in accordance with the following:

5> if the *reportType* is set to *eventTriggered*:

6> include the L2 U2N Relay UEs included in the *relaysTriggeredList* as defined within the *VarMeasReportList* for this *measId*;

5> else:

6> include the applicable L2 U2N Relay UEs for which the new measurement results became available since the last periodical reporting or since the measurement was initiated or reset;

5> for each L2 U2N Relay UE that is included in the *sl-MeasResultsCandRelay*:

6> set the *cellIdentity* to include the *cellAccessRelatedInfo* contained in the discovery message received from the concerned L2 U2N Relay UE;

6> set the *sl-RelayUE-Identity* to include the Source L2 ID of the concerned L2 U2N Relay UE;

6> set the *sl-MeasResult* to include the SD-RSRP of the concerned L2 U2N Relay UE;

5> for each included L2 U2N Relay UE, include the layer 3 filtered measured results in accordance with the *reportConfig* for this *measId*, ordered as follows:

6> set the *sl-MeasResult* to include the quantity(ies) indicated in the *reportQuantityRelay* within the concerned *reportConfigRelay* in decreasing order of the sorting quantity, determined as specified in 5.5.5.3, i.e. the best L2 U2N Relay UE is included first;

6> if the UE supports *multipathRemoteUE-PC5L2* and idle/inactive relay UE reporting, and if the *sl-RelayIndication* is contained in the discovery message received from the concerned L2 U2N Relay UE:

7> set the *sl-RelayIndicationMP* in the *sl-MeasResultsCandRelay*;

3> else:

4> set the *measResultNeighCells* to include the best neighbouring cells up to *maxReportCells* in accordance with the following:

5> if the *reportType* is set to *eventTriggered* and *eventId* is not set to *eventD1* or *eventD2* or *eventH1* or *eventH2*:

6> include the cells included in the *cellsTriggeredList* as defined within the *VarMeasReportList* for this *measId*;

5> else:

6> include the applicable cells for which the new measurement results became available since the last periodical reporting or since the measurement was initiated or reset;

5> for each cell that is included in the *measResultNeighCells*, include the *physCellId*;

5> if the reportType is set to eventTriggered or periodical:

6> for each included cell, include the layer 3 filtered measured results in accordance with the *reportConfig* for this *measId*, ordered as follows:

7> if the *measObject* associated with this *measId* concerns NR:

8> if *rsType* in the associated *reportConfig* is set to *ssb*:

9> set *resultsSSB-Cell* within the *measResult* to include the SS/PBCH block based quantity(ies) indicated in the *reportQuantityCell* within the concerned *reportConfig*, in decreasing order of the sorting quantity, determined as specified in 5.5.5.3, i.e. the best cell is included first;

9> if *reportQuantityRS-Indexes* and *maxNrofRS-IndexesToReport* are configured, include beam measurement information as described in 5.5.5.2;

8> else if *rsType* in the associated *reportConfig* is set to *csi-rs*:

9> set *resultsCSI-RS-Cell* within the *measResult* to include the CSI-RS based quantity(ies) indicated in the *reportQuantityCell* within the concerned *reportConfig*, in decreasing order of the sorting quantity, determined as specified in 5.5.5.3, i.e. the best cell is included first;

9> if *reportQuantityRS-Indexes* and *maxNrofRS-IndexesToReport* are configured, include beam measurement information as described in 5.5.5.2;

7> if the *measObject* associated with this *measId* concerns E-UTRA:

8> set the *measResult* to include the quantity(ies) indicated in the *reportQuantity* within the concerned *reportConfigInterRAT* in decreasing order of the sorting quantity, determined as specified in 5.5.5.3, i.e. the best cell is included first;

7> if the *measObject* associated with this *measId* concerns UTRA-FDD and if *ReportConfigInterRAT* includes the *reportQuantityUTRA-FDD*:

8> set the *measResult* to include the quantity(ies) indicated in the *reportQuantityUTRA-FDD* within the concerned *reportConfigInterRAT* in decreasing order of the sorting quantity, determined as specified in 5.5.5.3, i.e. the best cell is included first;

6> if *reportType* is set to *eventTriggered* and *reportOnBestCellChange* is configured:

7> if *reportOnBestCellChange* is set to *n1*:

8> set the *reportedBestNeighbourCell* defined within the *VarMeasReportList* for this *measId* to the first cell listed in the *measResultNeighCells*;

7> if *reportOnBestCellChange* is set to *n2*:

8> set the first cell in *reportedBestNeighbourCell* defined within the *VarMeasReportList* for this *measId* to the first cell listed in the *measResultNeighCells* and the second cell in *reportedBestNeighbourCell* defined within the *VarMeasReportList* for this *measId* to the second cell listed in the *measResultNeighCells,* if available;

2> else:

3> if the cell indicated by *cellForWhichToReportCGI* is an NR cell:

4> if *plmn-IdentityInfoList* of the *cgi-Info* for the concerned cell has been obtained:

5> include the *plmn-IdentityInfoList* including *plmn-IdentityList*, *trackingAreaCode* (if available), *trackingAreaList* (if available)*, ranac* (if available), *cellIdentity* and *cellReservedForOperatorUse* for each entry of the *plmn-IdentityInfoList*;

5> include *frequencyBandList* if available;

5> for each *PLMN-IdentityInfo* in *plmn-IdentityInfoList*:

6> if the *gNB-ID-Length* is broadcast:

7> include *gNB-ID-Length*;

4> if *nr-CGI-Reporting-NPN* is supported by the UE and *npn-IdentityInfoList* of the *cgi-Info* for the concerned cell has been obtained:

5> include the *npn-IdentityInfoList* including *npn-IdentityList*, *trackingAreaCode*, *ranac* (if available), *cellIdentity* and *cellReservedForOperatorUse* for each entry of the *npn-IdentityInfoList*;

5> for each *NPN-IdentityInfo* in *NPN-IdentityInfoList*:

6> if the *gNB-ID-Length* is broadcast:

7> include *gNB-ID-Length*;

5> include *cellReservedForOtherUse* if available;

4> else if *MIB* indicates the *SIB1* is not broadcast:

5> include the *noSIB1* including the *ssb-SubcarrierOffset* and *pdcch-ConfigSIB1* obtained from *MIB* of the concerned cell;

3> if the cell indicated by *cellForWhichToReportCGI* is an E-UTRA cell:

4> if all mandatory fields of the *cgi-Info-EPC* for the concerned cell have been obtained:

5> include in the *cgi-Info-EPC* the fields broadcasted in E-UTRA *SystemInformationBlockType1* associated to EPC;

4> if the UE is E-UTRA/5GC capable and all mandatory fields of the *cgi-Info-5GC* for the concerned cell have been obtained:

5> include in the *cgi-Info-5GC* the fields broadcasted in E-UTRA *SystemInformationBlockType1* associated to 5GC;

4> if the mandatory present fields of the *cgi-Info* for the cell indicated by the *cellForWhichToReportCGI* in the associated *measObject* have been obtained:

5> include the *freqBandIndicator*;

5> if the cell broadcasts the *multiBandInfoList*, include the *multiBandInfoList*;

5> if the cell broadcasts the *freqBandIndicatorPriority*, include the *freqBandIndicatorPriority*;

1> if *reportConfig* associated with the *measId* that triggered the measurement reporting is set to *eventTriggered* and if *enteringLeavingReport* is configured:

2> for each cell that is included in *measResultNeighCells*:

3> if the *measObject* associated with this *measId* concerns NR:

4> if event entry condition for the event that triggered this measurement report has been fulfilled for the cell and the cell has just been included to *cellsTriggeredList*:

5> set *entering* to *true* for the concerned NR cell;

2> if the field *cellsMetLeavingCond* within the *VarMeasReportList* for this *measId* is not empty:

3> set cellsMetReportOnLeaveList to include the cell(s) in cellsMetLeavingCond;

1> if the corresponding *measObject* concerns NR:

2> if the *reportSFTD-Meas* is set to *true* within the corresponding *reportConfigNR* for this *measId*:

3> set the *measResultSFTD-NR* in accordance with the following:

4> set *sfn-OffsetResult* and *frameBoundaryOffsetResult* to the measurement results provided by lower layers;

4> if the *reportRSRP* is set to *true*;

5> set *rsrp-Result* to the RSRP of the NR PSCell derived based on SSB;

2> else if the *reportSFTD-NeighMeas* is included within the corresponding *reportConfigNR* for this *measId*:

3> for each applicable cell which measurement results are available, include an entry in the *measResultCellListSFTD-NR* and set the contents as follows:

4> set *physCellId* to the physical cell identity of the concerned NR neighbour cell.

4> set *sfn-OffsetResult* and *frameBoundaryOffsetResult* to the measurement results provided by lower layers;

4> if the *reportRSRP* is set to *true*:

5> set *rsrp-Result* to the RSRP of the concerned cell derived based on SSB;

1> else if the corresponding *measObject* concerns E-UTRA:

2> if the *reportSFTD-Meas* is set to *true* within the corresponding *reportConfigInterRAT* for this *measId*:

3> set the *measResultSFTD-EUTRA* in accordance with the following:

4> set *sfn-OffsetResult* and *frameBoundaryOffsetResult* to the measurement results provided by lower layers;

4> if the *reportRSRP* is set to *true*;

5> set *rsrpResult-EUTRA* to the RSRP of the EUTRA PSCell;

1> if average uplink PDCP delay values are available:

2> set the *ul-PDCP-DelayValueResultList* to include the corresponding average uplink PDCP delay values;

1> if PDCP excess delay measurements are available:

2> set the *ul-PDCP-ExcessDelayResultList* to include the corresponding PDCP excess delay measurements;

1> if the *includeCommonLocationInfo* is configured in the corresponding *reportConfig* for this *measId* and detailed location information that has not been reported is available, set the content of *commonLocationInfo* of the *locationInfo* as follows:

2> include the *locationTimestamp*;

2> include the *locationCoordinate*, if available;

2> include the *velocityEstimate*, if available;

2> include the *locationError*, if available;

2> include the *locationSource*, if available;

2> if available, include the *gnss-TOD-msec*,

1> if the *coarseLocationRequest* is set to *true* in the corresponding *reportConfig* for this *measId*:

2> include *coarseLocationInfo,* if available;

1> if the *includeWLAN-Meas* is configured in the corresponding *reportConfig* for this *measId*, set the *wlan-LocationInfo* of the *locationInfo* in the *measResults* as follows:

2> if available, include the *LogMeasResultWLAN*, in order of decreasing RSSI for WLAN APs;

1> if the *includeBT-Meas* is configured in the corresponding *reportConfig* for this *measId*, set the *BT-LocationInfo* of the *locationInfo* in the *measResults* as follows:

2> if available, include the *LogMeasResultBT*, in order of decreasing RSSI for Bluetooth beacons;

1> if the *includeSensor-Meas* is configured in the corresponding *reportConfig* for this *measId*, set the *sensor-LocationInfo* of the *locationInfo* in the *measResults* as follows:

2> if available, include the *sensor-MeasurementInformation*;

2> if available, include the *sensor-MotionInformation*;

1> if the *includeAltitudeUE* is set to *true* in the corresponding *reportConfig* for this *measId*:

2> set the *altitudeUE* to include the altitude of the UE;

1> if there is at least one applicable transmission resource pool for NR sidelink communication/discovery (for *measResultsSL*):

2> set the *measResultsListSL* to include the CBR measurement results in accordance with the following:

3> if the *reportType* is set to *eventTriggered*:

4> include the transmission resource pools included in the *poolsTriggeredList* as defined within the *VarMeasReportList* for this *measId*;

3> else:

4> include the applicable transmission resource pools for which the new measurement results became available since the last periodical reporting or since the measurement was initiated or reset;

3> if the corresponding *measObject* concerns NR sidelink communication/discovery, then for each transmission resource pool to be reported:

4> set the *sl-poolReportIdentity* to the identity of this transmission resource pool;

4> set the *sl-CBR-ResultsNR* to the CBR measurement results on PSSCH and PSCCH of this transmission resource pool provided by lower layers, if available;

NOTE 1: Void.

1> if there is at least one applicable CLI measurement resource to report:

2> if the *reportType* is set to *cli-EventTriggered* or *cli-Periodical*:

3> set the *measResultCLI* to include the most interfering SRS resources or most interfering CLI-RSSI resources up to *maxReportCLI* in accordance with the following:

4> if the *reportType* is set to *cli-EventTriggered*:

5> if trigger quantity is set to *srs-RSRP* i.e. *i1-Threshold* is set to *srs-RSRP*:

6> include the SRS resource included in the *cli-TriggeredList* as defined within the *VarMeasReportList* for this *measId*;

5> if trigger quantity is set to *cli-RSSI* i.e. *i1-Threshold* is set to *cli-RSSI*:

6> include the CLI-RSSI resource included in the *cli-TriggeredList* as defined within the *VarMeasReportList* for this *measId*;

4> else:

5> if *reportQuantityCLI* is set to *srs-rsrp*:

6> include the applicable SRS resources for which the new measurement results became available since the last periodical reporting or since the measurement was initiated or reset;

5> else:

6> include the applicable CLI-RSSI resources for which the new measurement results became available since the last periodical reporting or since the measurement was initiated or reset;

4> for each SRS resource that is included in the *measResultCLI*:

5> include the *srs-ResourceId*;

5> set *srs-RSRP-Result* to include the layer 3 filtered measured results in decreasing order, i.e. the most interfering SRS resource is included first;

4> for each CLI-RSSI resource that is included in the *measResultCLI*:

5> include the *rssi-ResourceId*;

5> set *cli-RSSI-Result* to include the layer 3 filtered measured results in decreasing order, i.e. the most interfering CLI-RSSI resource is included first;

1> if there is at least one applicable UE Rx-Tx time difference measurement to report:

2> set *measResultRxTxTimeDiff* to the latest measurement result;

1> increment the *numberOfReportsSent* as defined within the *VarMeasReportList* for this *measId* by 1;

1> stop the periodical reporting timer, if running;

1> if the *numberOfReportsSent* as defined within the *VarMeasReportList* for this *measId* is less than the *reportAmount* as defined within the corresponding *reportConfig* for this *measId*:

2> start the periodical reporting timer with the value of *reportInterval* as defined within the corresponding *reportConfig* for this *measId*;

1> else:

2> if the *reportType* is set to *periodical* or *cli-Periodical* or *rxTxPeriodical*:

3> remove the entry within the *VarMeasReportList* for this *measId*;

3> remove this *measId* from the *measIdList* within *VarMeasConfig*;

1> if the measurement reporting was configured by a *sl-ConfigDedicatedNR* received within the *RRCConnectionReconfiguration*:

2> submit the *MeasurementReport* message to lower layers for transmission via SRB1, embedded in E-UTRA RRC message *ULInformationTransferIRAT* as specified TS 36.331 [10], clause 5.6.28;

1> else if the UE is in (NG)EN-DC:

2> if SRB3 is configured and the SCG is not deactivated:

3> submit the *MeasurementReport* message via SRB3 to lower layers for transmission, upon which the procedure ends;

2> else:

3> submit the *MeasurementReport* message via E-UTRA embedded in E-UTRA RRC message *ULInformationTransferMRDC* as specified in TS 36.331 [10].

1> else if the UE is in NR-DC:

2> if the measurement configuration that triggered this measurement report is associated with the SCG:

3> if SRB3 is configured and the SCG is not deactivated:

4> submit the *MeasurementReport* message via SRB3 to lower layers for transmission, upon which the procedure ends;

3> else:

4> submit the *MeasurementReport* message via SRB1 embedded in NR RRC message *ULInformationTransferMRDC* as specified in5.7.2a.3;

2> else:

3> submit the *MeasurementReport* message via SRB1 to lower layers for transmission, upon which the procedure ends;

1> else:

2> submit the *MeasurementReport* message to lower layers for transmission, upon which the procedure ends.

NEXT CHANGE

6.3.2 Radio resource control information elements

#### – *CellGroupConfig*

The *CellGroupConfig* IE is used to configure a master cell group (MCG) or secondary cell group (SCG). A cell group comprises of one MAC entity, a set of logical channels with associated RLC entities and of a primary cell (SpCell) and one or more secondary cells (SCells). For an NCR-MT, the *CellGroupConfig* IE is also used to provide the configuration of side control information for the NCR-Fwd access link.

*CellGroupConfig* information element

-- ASN1START

-- TAG-CELLGROUPCONFIG-START

-- Configuration of one Cell-Group:

CellGroupConfig ::= SEQUENCE {

cellGroupId CellGroupId,

rlc-BearerToAddModList SEQUENCE (SIZE(1..maxLC-ID)) OF RLC-BearerConfig OPTIONAL, -- Need N

rlc-BearerToReleaseList SEQUENCE (SIZE(1..maxLC-ID)) OF LogicalChannelIdentity OPTIONAL, -- Need N

mac-CellGroupConfig MAC-CellGroupConfig OPTIONAL, -- Need M

physicalCellGroupConfig PhysicalCellGroupConfig OPTIONAL, -- Need M

spCellConfig SpCellConfig OPTIONAL, -- Need M

sCellToAddModList SEQUENCE (SIZE (1..maxNrofSCells)) OF SCellConfig OPTIONAL, -- Need N

sCellToReleaseList SEQUENCE (SIZE (1..maxNrofSCells)) OF SCellIndex OPTIONAL, -- Need N

...,

[[

reportUplinkTxDirectCurrent ENUMERATED {true} OPTIONAL -- Cond BWP-Reconfig

]],

[[

bap-Address-r16 BIT STRING (SIZE (10)) OPTIONAL, -- Need M

bh-RLC-ChannelToAddModList-r16 SEQUENCE (SIZE(1..maxBH-RLC-ChannelID-r16)) OF BH-RLC-ChannelConfig-r16 OPTIONAL, -- Need N

bh-RLC-ChannelToReleaseList-r16 SEQUENCE (SIZE(1..maxBH-RLC-ChannelID-r16)) OF BH-RLC-ChannelID-r16 OPTIONAL, -- Need N

f1c-TransferPath-r16 ENUMERATED {lte, nr, both} OPTIONAL, -- Need M

simultaneousTCI-UpdateList1-r16 SEQUENCE (SIZE (1..maxNrofServingCellsTCI-r16)) OF ServCellIndex OPTIONAL, -- Need R

simultaneousTCI-UpdateList2-r16 SEQUENCE (SIZE (1..maxNrofServingCellsTCI-r16)) OF ServCellIndex OPTIONAL, -- Need R

simultaneousSpatial-UpdatedList1-r16 SEQUENCE (SIZE (1..maxNrofServingCellsTCI-r16)) OF ServCellIndex OPTIONAL, -- Need R

simultaneousSpatial-UpdatedList2-r16 SEQUENCE (SIZE (1..maxNrofServingCellsTCI-r16)) OF ServCellIndex OPTIONAL, -- Need R

uplinkTxSwitchingOption-r16 ENUMERATED {switchedUL, dualUL} OPTIONAL, -- Need R

uplinkTxSwitchingPowerBoosting-r16 ENUMERATED {enabled} OPTIONAL -- Need R

]],

[[

reportUplinkTxDirectCurrentTwoCarrier-r16 ENUMERATED {true} OPTIONAL -- Need N

]],

[[

f1c-TransferPathNRDC-r17 ENUMERATED {mcg, scg, both} OPTIONAL, -- Need M

uplinkTxSwitching-2T-Mode-r17 ENUMERATED {enabled} OPTIONAL, -- Cond 2Tx

uplinkTxSwitching-DualUL-TxState-r17 ENUMERATED {oneT, twoT} OPTIONAL, -- Cond 2Tx

uu-RelayRLC-ChannelToAddModList-r17 SEQUENCE (SIZE(1..maxUu-RelayRLC-ChannelID-r17)) OF Uu-RelayRLC-ChannelConfig-r17

OPTIONAL, -- Need N

uu-RelayRLC-ChannelToReleaseList-r17 SEQUENCE (SIZE(1..maxUu-RelayRLC-ChannelID-r17)) OF Uu-RelayRLC-ChannelID-r17

OPTIONAL, -- Need N

simultaneousU-TCI-UpdateList1-r17 SEQUENCE (SIZE (1..maxNrofServingCellsTCI-r16)) OF ServCellIndex OPTIONAL, -- Need R

simultaneousU-TCI-UpdateList2-r17 SEQUENCE (SIZE (1..maxNrofServingCellsTCI-r16)) OF ServCellIndex OPTIONAL, -- Need R

simultaneousU-TCI-UpdateList3-r17 SEQUENCE (SIZE (1..maxNrofServingCellsTCI-r16)) OF ServCellIndex OPTIONAL, -- Need R

simultaneousU-TCI-UpdateList4-r17 SEQUENCE (SIZE (1..maxNrofServingCellsTCI-r16)) OF ServCellIndex OPTIONAL, -- Need R

rlc-BearerToReleaseListExt-r17 SEQUENCE (SIZE(1..maxLC-ID)) OF LogicalChannelIdentityExt-r17 OPTIONAL, -- Need N

iab-ResourceConfigToAddModList-r17 SEQUENCE (SIZE(1..maxNrofIABResourceConfig-r17)) OF IAB-ResourceConfig-r17 OPTIONAL, -- Need N

iab-ResourceConfigToReleaseList-r17 SEQUENCE (SIZE(1..maxNrofIABResourceConfig-r17)) OF IAB-ResourceConfigID-r17 OPTIONAL -- Need N

]],

[[

reportUplinkTxDirectCurrentMoreCarrier-r17 ReportUplinkTxDirectCurrentMoreCarrier-r17 OPTIONAL -- Need N

]],

[[

prioSCellPRACH-OverSP-PeriodicSRS-r17 ENUMERATED {enabled} OPTIONAL -- Need R

]],

[[

ncr-FwdConfig-r18 SetupRelease { NCR-FwdConfig-r18 } OPTIONAL, -- Cond NCR

autonomousDenialParameters-r18 SetupRelease {AutonomousDenialParameters-r18} OPTIONAL, -- Need M

nonCollocatedTypeMRDC-r18 ENUMERATED { true } OPTIONAL, -- Need R

nonCollocatedTypeNR-CA-r18 ENUMERATED { true } OPTIONAL, -- Need R

uplinkTxSwitchingMoreBands-r18 SetupRelease { UplinkTxSwitchingMoreBands-r18 } OPTIONAL -- Need M

]]

}

-- Serving cell specific MAC and PHY parameters for a SpCell:

SpCellConfig ::= SEQUENCE {

servCellIndex ServCellIndex OPTIONAL, -- Cond SCG

reconfigurationWithSync ReconfigurationWithSync OPTIONAL, -- Cond ReconfWithSync

rlf-TimersAndConstants SetupRelease { RLF-TimersAndConstants } OPTIONAL, -- Need M

rlmInSyncOutOfSyncThreshold ENUMERATED {n1} OPTIONAL, -- Need S

spCellConfigDedicated ServingCellConfig OPTIONAL, -- Need M

...,

[[

lowMobilityEvaluationConnected-r17 SEQUENCE {

s-SearchDeltaP-Connected-r17 ENUMERATED {dB3, dB6, dB9, dB12, dB15, spare3, spare2, spare1},

t-SearchDeltaP-Connected-r17 ENUMERATED {s5, s10, s20, s30, s60, s120, s180, s240, s300, spare7, spare6, spare5,

spare4, spare3, spare2, spare1}

} OPTIONAL, -- Need R

goodServingCellEvaluationRLM-r17 GoodServingCellEvaluation-r17 OPTIONAL, -- Need R

goodServingCellEvaluationBFD-r17 GoodServingCellEvaluation-r17 OPTIONAL, -- Need R

deactivatedSCG-Config-r17 SetupRelease { DeactivatedSCG-Config-r17 } OPTIONAL -- Cond SCG-Opt

]]

}

ReconfigurationWithSync ::= SEQUENCE {

spCellConfigCommon ServingCellConfigCommon OPTIONAL, -- Need M

newUE-Identity RNTI-Value,

t304 ENUMERATED {ms50, ms100, ms150, ms200, ms500, ms1000, ms2000, ms10000},

rach-ConfigDedicated CHOICE {

uplink RACH-ConfigDedicated,

supplementaryUplink RACH-ConfigDedicated

} OPTIONAL, -- Need N

...,

[[

smtc SSB-MTC OPTIONAL -- Need S

]],

[[

daps-UplinkPowerConfig-r16 DAPS-UplinkPowerConfig-r16 OPTIONAL -- Need N

]],

[[

sl-PathSwitchConfig-r17 SL-PathSwitchConfig-r17 OPTIONAL -- Cond DirectToIndirect-PathSwitch

]],

[[

rach-LessHO-r18 RACH-LessHO-r18 OPTIONAL, -- Need N

sl-IndirectPathMaintain-r18 ENUMERATED{true} OPTIONAL -- Cond MP

]]

}

DAPS-UplinkPowerConfig-r16 ::= SEQUENCE {

p-DAPS-Source-r16 P-Max,

p-DAPS-Target-r16 P-Max,

uplinkPowerSharingDAPS-Mode-r16 ENUMERATED {semi-static-mode1, semi-static-mode2, dynamic }

}

SCellConfig ::= SEQUENCE {

sCellIndex SCellIndex,

sCellConfigCommon ServingCellConfigCommon OPTIONAL, -- Cond SCellAdd

sCellConfigDedicated ServingCellConfig OPTIONAL, -- Cond SCellAddMod

...,

[[

smtc SSB-MTC OPTIONAL -- Need S

]],

[[

sCellState-r16 ENUMERATED {activated} OPTIONAL, -- Cond SCellAddSync

secondaryDRX-GroupConfig-r16 ENUMERATED {true} OPTIONAL -- Need S

]],

[[

preConfGapStatus-r17 BIT STRING (SIZE (maxNrofGapId-r17)) OPTIONAL, -- Cond PreConfigMG

goodServingCellEvaluationBFD-r17 GoodServingCellEvaluation-r17 OPTIONAL, -- Need R

sCellSIB20-r17 SetupRelease { SCellSIB20-r17 } OPTIONAL -- Need M

]],

[[

plmn-IdentityInfoList-r17 SetupRelease {PLMN-IdentityInfoList} OPTIONAL, -- Cond SCellSIB20-Opt

npn-IdentityInfoList-r17 SetupRelease {NPN-IdentityInfoList-r16} OPTIONAL -- Cond SCellSIB20-Opt

]]

}

SCellSIB20-r17 ::= OCTET STRING (CONTAINING SystemInformation)

DeactivatedSCG-Config-r17 ::= SEQUENCE {

bfd-and-RLM-r17 BOOLEAN,

...

}

GoodServingCellEvaluation-r17 ::= SEQUENCE {

offset-r17 ENUMERATED {db2, db4, db6, db8} OPTIONAL -- Need S

}

SL-PathSwitchConfig-r17 ::= SEQUENCE {

targetRelayUE-Identity-r17 SL-SourceIdentity-r17,

t420-r17 ENUMERATED {ms50, ms100, ms150, ms200, ms500, ms1000, ms2000, ms10000},

...

}

IAB-ResourceConfig-r17 ::= SEQUENCE {

iab-ResourceConfigID-r17 IAB-ResourceConfigID-r17,

slotList-r17 SEQUENCE (SIZE (1..5120)) OF INTEGER (0..5119) OPTIONAL, -- Need M

periodicitySlotList-r17 ENUMERATED {ms0p5, ms0p625, ms1, ms1p25, ms2, ms2p5, ms5, ms10, ms20, ms40, ms80, ms160} OPTIONAL, -- Need M

slotListSubcarrierSpacing-r17 SubcarrierSpacing OPTIONAL, -- Need M

...

}

IAB-ResourceConfigID-r17 ::= INTEGER(0..maxNrofIABResourceConfig-1-r17)

ReportUplinkTxDirectCurrentMoreCarrier-r17 ::= SEQUENCE (SIZE(1.. maxSimultaneousBands)) OF IntraBandCC-CombinationReqList-r17

IntraBandCC-CombinationReqList-r17::= SEQUENCE {

servCellIndexList-r17 SEQUENCE (SIZE(1.. maxNrofServingCells)) OF ServCellIndex,

cc-CombinationList-r17 SEQUENCE (SIZE(1.. maxNrofReqComDC-Location-r17)) OF IntraBandCC-Combination-r17

}

IntraBandCC-Combination-r17::= SEQUENCE (SIZE(1.. maxNrofServingCells)) OF CC-State-r17

CC-State-r17::= SEQUENCE {

dlCarrier-r17 CarrierState-r17 OPTIONAL, -- Need N

ulCarrier-r17 CarrierState-r17 OPTIONAL -- Need N

}

CarrierState-r17::= CHOICE {

deActivated-r17 NULL,

activeBWP-r17 INTEGER (0..maxNrofBWPs)

}

AutonomousDenialParameters-r18 ::= SEQUENCE {

autonomousDenialSlots-r18 ENUMERATED {n2, n5, n10, n15, n20, n30, spare2, spare1},

autonomousDenialValidity-r18 ENUMERATED {n200, n500, n1000, n2000}

}

RACH-LessHO-r18 ::= SEQUENCE {

targetNTA-r18 ENUMERATED {zero, source} OPTIONAL, -- Need N

beamIndication-r18 CHOICE {

tci-StateID-r18 TCI-StateId,

ssb-Index-r18 SSB-Index

} OPTIONAL, -- Need N

...

}

UplinkTxSwitchingMoreBands-r18::= SEQUENCE {

uplinkTxSwitchingBandList-r18 SEQUENCE (SIZE (1..maxSimultaneousBands)) OF FreqBandIndicatorNR OPTIONAL, -- Need M

uplinkTxSwitchingBandPairList-r18 UplinkTxSwitchingBandPairList-r18 OPTIONAL, -- Need M

uplinkTxSwitchingAssociatedBandDualUL-List-r18 UplinkTxSwitchingAssociatedBandDualUL-List-r18 OPTIONAL, -- Need M

...

}

UplinkTxSwitchingBandPairList-r18::= SEQUENCE (SIZE (1.. maxULTxSwitchingBandPairs)) OF UplinkTxSwitchingBandPairConfig-r18

UplinkTxSwitchingBandPairConfig-r18::= SEQUENCE {

bandInfoUL1-r18 UplinkTxSwitchingBandIndex-r18,

bandInfoUL2-r18 UplinkTxSwitchingBandIndex-r18,

switchingOptionConfigForBandPair-r18 ENUMERATED {switchedUL, dualUL},

switching2T-Mode-r18 ENUMERATED {enabled} OPTIONAL, -- Need S

switchingPeriodConfigForBandPair-r18 ENUMERATED {n35us, n140us} OPTIONAL, -- Need S

...

}

UplinkTxSwitchingAssociatedBandDualUL-List-r18::= SEQUENCE (SIZE (0..maxSimultaneousBands)) OF UplinkTxSwitchingAssociatedBandDualUL-r18

UplinkTxSwitchingAssociatedBandDualUL-r18::= SEQUENCE {

transmitBand-r18 UplinkTxSwitchingBandIndex-r18,

associatedBand-r18 UplinkTxSwitchingBandIndex-r18

}

UplinkTxSwitchingBandIndex-r18::= INTEGER (1..maxSimultaneousBands)

-- TAG-CELLGROUPCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *AutonomousDenialParamters* field descriptions |
| ***autonomousDenialSlots***  Indicates the maximum number of the UL slots for which the UE is allowed to deny any UL transmission. Value *n2* corresponds to 2 slots, value *n5* to 5 slots and so on. |
| ***autonomousDenialValidity***  Indicates the validity period over which the UL autonomous denial slots shall be counted. Value *n200* corresponds to 200 slots, value *n500* corresponds to 500 slots and so on. |

|  |
| --- |
| *CC-State* field descriptions |
| ***dlCarrier***  Indicates DL carrier activation state for this carrier and the related active BWP Index, if activated. |
| ***ulCarrier***  Indicates UL carrier activation state for this carrier and the related active BWP Index, if activated. |

|  |
| --- |
| *CellGroupConfig* field descriptions |
| ***bap-Address***  BAP address of the parent node in cell group. |
| ***bh-RLC-ChannelToAddModList***  Configuration of the backhaul RLC entities and the corresponding MAC Logical Channels to be added and modified. |
| ***bh-RLC-ChannelToReleaseList***  List of the backhaul RLC entities and the corresponding MAC Logical Channels to be released. |
| ***f1c-TransferPath***  The F1-C transfer path that an EN-DC IAB-MT should use for transferring F1-C packets to the IAB-donor-CU. If IAB-MT is configured with *lte*, IAB-MT can only use LTE leg for F1-C transfer. If IAB-MT is configured with *nr*, IAB-MT can only use NR leg for F1-C transfer. If IAB-MT is configured with *both*, it is up to IAB-MT to select an LTE leg or a NR leg for F1-C transfer. If the field is not configured, the IAB node uses the NR leg as the default one. |
| ***f1c-TransferPathNRDC***  The F1-C transfer path that an NR-DC IAB-MT should use for transferring F1-C packets to the IAB-donor-CU. If IAB-MT is configured with *mcg*, IAB-MT can only use the MCG for F1-C transfer. If IAB-MT is configured with *scg*, IAB-MT can only use the SCG for F1-C transfer. If IAB-MT is configured with *both*, it is up to IAB-MT to select the MCG or the SCG for F1-C transfer. |
| ***mac-CellGroupConfig***  MAC parameters applicable for the entire cell group. |
| ***ncr-FwdConfig***  Configuration of side control information for the NCR-Fwd access link. |
| ***nonCollocatedTypeMRDC***  This field is only present for a UE configured with *maxMIMO-Layers* with value less than or equal to 2 for all corresponding serving cells, in case of TDD-TDD inter-band (NG) EN-DC with overlapping or partially overlapping bands. If this field is present, the UE applies (NG)EN-DC MTTD/MRTD according to clause 7.5.3/7.6.3 in TS 38.133 [14] and inter-band RF requirements. If this field is absent, the UE applies (NG)EN-DC MTTD/MRTD according to clause 7.5.2/7.6.2 in TS 38.133 [14] and inter-band RF requirements when indicating support of *interBandMRDC-WithOverlapDL-Bands-r16*. |
| ***nonCollocatedTypeNR-CA***  This field is only present for a UE configured with *maxMIMO-Layers* with value less than or equal to 2 for all corresponding serving cells, in case of TDD-TDD intra-band NR-CA. If this field is present, the UE applies MRTD according to Table 7.6.4-1 in TS 38.133 [14] and UE RF requirements for intra-band NR-CA except for 7.10A in TS 38.101-1 [15]. If this field is absent, the UE applies MTTD/MRTD requirements according to Table 7.5.4-1/Table 7.6.4-2 in TS 38.133 [14] and UE RF requirements for intra-band non-collocated NR-CA including 7.10A in TS 38.101-1 [15] when indicating support of *intraBandNR-CA-non-collocated-r18*. |
| ***npn-IdentityInfoList***  This field is used to transfer *npn-IdentityInfoList* in *SIB1* of the SCell. The UE uses this field to translate the *plmn-Index* in MCCH of SCell to SNPN Identity. If this field and *plmn-IdentityInfoList* are both absent, the UE uses the *npn-IdentityInfoList* in *SIB1* of the PCell. |
| ***plmn-IdentityInfoList***  This field is used to transfer *plmn-IdentityInfoList* in *SIB1* of the SCell. The UE uses this field to translate the *plmn-Index* in MCCH of SCell to PLMN Identity. If this field and *npn-IdentityInfoList* are both absent, the UE uses the *plmn-IdentityInfoList* in *SIB1* of the PCell. |
| ***prioSCellPRACH-OverSP-PeriodicSRS***  When configured, the UE applies UL power control prioritization by prioritizing PRACH transmission on SCell over semi-persistent and/or periodic SRS transmission as defined in clause 7.5 of TS 38.213 [13]. |
| ***rlc-BearerToAddModList***  Configuration of the MAC Logical Channel, the corresponding RLC entities and association with radio bearers. |
| ***reportUplinkTxDirectCurrent***  Enables reporting of uplink and supplementary uplink Direct Current location information upon BWP configuration and reconfiguration. This field is only present when the BWP configuration is modified or any serving cell is added or removed. This field is absent in the IE *CellGroupConfig* when provided as part of *RRCSetup* message. If UE is configured with SUL carrier, UE reports both UL and SUL Direct Current locations. |
| ***reportUplinkTxDirectCurrentMoreCarrier***  Enables reporting of uplink Direct Current location information when the UE is configured with intra-band CA. This field is absent in the IE *CellGroupConfig* when provided as part of *RRCSetup* message. The UE only reports the uplink Direct Current location information that are related to the indicated *cc-CombinationList*. The network does not include carriers which locate in DL only spectrum described in TS 38.101-2 [39], clause 5.3A.4 and defined by Fsd according to Table 5.3A.4-3 in FR2 in the *IntraBandCC-CombinationReqList*. I.e. DL-only carrier in FR2 frequency spectrum is not used to calculate the default DC location. |
| ***reportUplinkTxDirectCurrentTwoCarrier***  Enables reporting of uplink Direct Current location information when the UE is configured with uplink intra-band CA with two carriers. This field is absent in the IE *CellGroupConfig* when provided as part of *RRCSetup* message. |
| ***rlc-BearerToReleaseListExt***  List of the RLC entities and the corresponding MAC Logical Channels to be released for multicast MRBs. |
| ***rlmInSyncOutOfSyncThreshold***  BLER threshold pair index for IS/OOS indication generation, see TS 38.133 [14]. *n1* corresponds to the value 1. When the field is absent, the UE applies the value 0. Whenever this is reconfigured, UE resets N310 and N311, and stops T310, if running. Network does not include this field. |
| ***sCellSIB20***  This field is used to transfer *SIB20* of the SCell in order to allow the UE for MBS broadcast reception on SCell. The network configures this field only for a single SCell at a time. |
| ***sCellToAddModList***  List of secondary serving cells (SCells) to be added or modified. |
| ***sCellToReleaseList***  List of secondary serving cells (SCells) to be released. |
| ***simultaneousSpatial-UpdatedList1, simultaneousSpatial-UpdatedList2***  List of serving cells which can be updated simultaneously for spatial relation with a MAC CE. The *simultaneousSpatial-UpdatedList1* and *simultaneousSpatial-UpdatedList2* shall not contain same serving cells. Network should not configure serving cells that are configured with a BWP with two different values for the *coresetPoolIndex* in these lists. |
| ***simultaneousTCI-UpdateList1, simultaneousTCI-UpdateList2***  List of serving cells which can be updated simultaneously for TCI relation with a MAC CE. The *simultaneousTCI-UpdateList1* and *simultaneousTCI-UpdateList2* shall not contain same serving cells. Network should not configure serving cells that are configured with a BWP with two different values for the *coresetPoolIndex* in these lists. |
| ***simultaneousU-TCI-UpdateList1, simultaneousU-TCI-UpdateList2, simultaneousU-TCI-UpdateList3, simultaneousU-TCI-UpdateList4***  List of serving cells for which the Unified TCI States Activation/Deactivation MAC CE applies simultaneously, as specified in TS 38.321 [3] clause 6.1.3.47. The different lists shall not contain same serving cells. Network only configures in these lists serving cells that are configured with *unifiedTCI-StateType*. Network should not configure serving cells that are configured with a BWP with different number of *coresetPoolIndexes* in these lists. |
| ***spCellConfig***  Parameters for the SpCell of this cell group (PCell of MCG or PSCell of SCG). |
| ***uplinkTxSwitchingOption***  Indicates which option is configured for dynamic UL Tx switching for inter-band UL CA or (NG)EN-DC. The field is set to *switchedUL* if network configures option 1 as specified in TS 38.214 [19], or *dualUL* if network configures option 2 as specified in TS 38.214 [19]. Network always configures UE with a value for this field in inter-band UL CA case and (NG)EN-DC case where UE supports dynamic UL Tx switching. |
| ***uplinkTxSwitchingPowerBoosting***  Indicates whether the UE is allowed to enable 3dB boosting on the maximum output power for transmission on carrier2 under the operation state in which 2-port transmission can be supported on carrier2 for inter-band UL CA case with dynamic UL Tx switching as defined in TS 38.101-1 [15]. Network can only configure this field for dynamic UL Tx switching in inter-band UL CA case with power Class 3 as defined in TS 38.101-1 [15]. |
| ***uplinkTxSwitching-2T-Mode***  Indicates 2Tx-2Tx switching mode is configured for inter-band UL CA or SUL, in which the switching gap duration for a triggered uplink switching (as specified in TS 38.214 [19]) is equal to the switching time capability value reported for the switching mode.  If this field is absent and *uplinkTxSwitching* is configured, it is interpreted that 1Tx-2Tx UL Tx switching is configured as specified in TS 38.214 [19]. In this case, there is one uplink (or one uplink band in case of intra-band) configured with *uplinkTxSwitching*, on which the maximum number of antenna ports among all configured P-SRS/A-SRS and activated SP-SRS resources should be 1 and non-codebook based UL MIMO is not configured. |
| ***uplinkTxSwitching-DualUL-TxState***  Indicates the state of Tx chains if the state of Tx chains after the UL Tx switching is not unique (as specified in TS 38.214 [19]) in case of 2Tx-2Tx switching is configured and *uplinkTxSwitchingOption* is set to *dualUL*. Value *oneT* indicates 1Tx is assumed to be supported on the carriers on each band, value *twoT* indicates 2Tx is assumed to be supported on that carrier.  This field applies for all band pairs if *uplinkTxSwitchingMoreBands* is configured. |
| ***uplinkTxSwitchingMoreBands***  Indicates UL band list, band pair list and other configurations for ULTx switching. |
| ***uu-RelayRLC-ChannelToAddModList***  List of the Uu RLC entities and the corresponding MAC Logical Channels to be added or modified. |
| ***uu-RelayRLC-ChannelToReleaseList***  List of the Uu RLC entities and the corresponding MAC Logical Channels to be released. |

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| *DeactivatedSCG-Config* field descriptions |
| ***bfd-and-RLM***  If the field is set to *true*, the UE shall perform RLM and BFD on the PSCell when the SCG is deactivated and the network ensures that *beamFailure-r17* is not configured in the *radioLinkMonitoringConfig* of the DL BWP of the PSCell in which the UE performs BFD. If set to *false*, the UE is not required to perform RLM and BFD on the PSCell when the SCG is deactivated. |

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| *DAPS-UplinkPowerConfig* field descriptions |
| ***p-DAPS-Source***  The maximum total transmit power to be used by the UE in the source cell group during DAPS handover. |
| ***p-DAPS-Target***  The maximum total transmit power to be used by the UE in the target cell group during DAPS handover. |
| ***uplinkPowerSharingDAPS-Mode***  Indicates the uplink power sharing mode that the UE uses in DAPS handover (see TS 38.213 [13]). |

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| *GoodServingCellEvaluation* field descriptions |
| ***offset***  The parameter "X" (dB) for the good serving cell quality criterion in RRC\_CONNECTED, for a cell operating in FR1 and FR2, respectively. If this field is absent, the UE applies the (default) value of 0 dB for "X". |

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| *IAB-ResourceConfig* field descriptions |
| ***iab-ResourceConfigID***  This ID is used to indicate the specific resource configuration addressed by the MAC CEs specified in TS 38.321 [3]. |
| ***periodicitySlotList***  Indicates the periodicity in ms of the list of slot indexes indicated in *slotList*. |
| ***slotList***  Indicates the list of slot indexes to which the information indicated in the specific MAC CE applies to, as specified in TS 38.321 [3]. The values of the entries in the *slotList* are strictly less than the value of the *periodicitySlotList*. |
| ***slotListSubcarrierSpacing***  Subcarrier spacing used as reference for the *slotList* configuration.  Only the following values are applicable depending on the used frequency:  FR1: 15 or 30 kHz  FR2-1: 60 or 120 kHz  FR2-2: 120 or 480 kHz |

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| *RACH-LessHO* field descriptions |
| ***ssb-Index***  This field indicates a beam that the UE should use in the target cell to monitor PDCCH for initial uplink transmission, see TS 38.321 [3]. The network configures this field when *cg-RRC-Configuration* is not configured for the initial uplink transmission in RACH-less handover in NTN or in case this cell is not a mobile IAB cell. |
| ***targetNTA***  This field refers to the timing adjustment, see TS 38.213 [13] and TS 38.321 [3], indicating the NTA value which the UE shall use for the target PTAG of handover. The value *zero* corresponds to NTA=0, while the value *source* corresponds to the NTA value of the source PTAG indicated by the *tag-Id*. Only value *source* is configured by the network in case source cell is a mobile IAB cell. In this version of the specification, the network shall always configure this field if *rach-LessHO* is part of an *RRCReconfiguration* message. |
| ***tci-StateID***  This field indicates a beam that the UE should use in the target cell to monitor PDCCH for initial uplink transmission and also indicates the TCI state information to be used in the target cell. The network configures this field in case this cell is not a NTN cell. |

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| *ReconfigurationWithSync* field descriptions |
| ***rach-ConfigDedicated***  Random access configuration to be used for the reconfiguration with sync (e.g. handover). The UE performs the RA according to these parameters in the *firstActiveUplinkBWP* (see *UplinkConfig*). |
| ***sl-IndirectPathMaintain***  Indicates that the L2 U2N Remote UE keeps the PC5 connection with its connected L2 U2N Relay UE. |
| ***smtc***  The SSB periodicity/offset/duration configuration of target cell for NR PSCell change and NR PCell change. The network sets the *periodicityAndOffset* to indicate the same periodicity as *ssb-periodicityServingCell* in *spCellConfigCommon* or sets to the same periodicity as *ssb-Periodicity-r17* in *nonCellDefiningSSB-r17* if the first active DL BWP included in this RRC message is configured with *nonCellDefiningSSB-r17*.  For case of NR PCell change, the *smtc* is based on the timing reference of (source) PCell. For case of NR PSCell change, it is based on the timing reference of source PSCell.  If both this field and *targetCellSMTC-SCG* are 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. If the first active DL BWP included in this RRC message is configured with *nonCellDefiningSSB-r17*, this field corresponds to the NCD-SSB indicated by *nonCellDefiningSSB-r17*, otherwise, this field corresponds to the CD-SSB indicated by *absoluteFrequencySSB* in *frequencyInfoDL*. |

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| *ReportUplinkTxDirectCurrentMoreCarrier* field descriptions |
| ***IntraBandCC-Combination***  Indicates the state of the carriers and BWPs indexes of the carriers in a CC combination, each carrier in this combination corresponds to an entry in *servCellIndexList* with same order. This IE shall have the same size as *servCellIndexList*. |
| ***IntraBandCC-CombinationReqList***  Indicates the list of the requested carriers/BWPs combinations for an intra-band CA component. |
| ***servCellIndexList***  indicates the list of cell index for an intra-band CA component. |

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| *SCellConfig* field descriptions |
| ***goodServingCellEvaluationBFD***  Indicates the criterion for a UE to detect the good serving cell quality for BFD relaxation in an SCell in RRC\_CONNECTED. This field is always configured when the network enables BFD relaxation for the UE in this SCell. This field is absent if *failureDetectionSetN* is present for the SCell. |
| ***preConfGapStatus***  Indicates whether the pre-configured measurement gaps (i.e. the gaps configured with *preConfigInd*) are activated or deactivated while this SCell is deactivated. If this field is configured, the UE shall apply network-controlled mechanism for activation and deactivation of the pre-configured measurement gaps, otherwise the UE shall apply the autonomous activation/deactivation mechanism, as specified in TS 38.133 [14]. The first/leftmost bit corresponds to the measurement gap with gap ID 1, the second bit corresponds to measurement gap with gap ID 2, and so on. Value 0 indicates that the corresponding pre-configured measurement gap is deactivated while value 1 indicates that the corresponding pre-configured measurement gap is activated. The UE shall ignore the bit if the corresponding measurement gap is not a pre-configured measurement gap. |
| ***sCellState***  Indicates whether the SCell shall be considered to be in activated state upon SCell configuration. If the field is included for an SCell configured with TRS for fast activation of the SCell, such TRS is not used for the corresponding SCell. |
| ***secondaryDRX-GroupConfig***  The field is used to indicate whether the SCell belongs to the secondary DRX group. All serving cells in the secondary DRX group shall belong to one Frequency Range and all serving cells in the default DRX group shall belong to another Frequency Range. If *drx-ConfigSecondaryGroup* is configured, the field is optionally present. The network always includes the field if the field was previously configured for this SCell and the SCell remains in the secondary DRX group. Removal of an individual SCell from the secondary DRX group is supported by using an SCell release and addition. Otherwise, if *drx-ConfigSecondaryGroup* is not configured, the field is absent and the UE shall release the field. The UE shall also release the field if *drx-ConfigSecondaryGroup* is released without including *sCellToAddModList*. |
| ***smtc***  The SSB periodicity/offset/duration configuration of target cell for NR SCell addition. The network sets the *periodicityAndOffset* to indicate the same periodicity as *ssb-periodicityServingCell* in *sCellConfigCommon*. The *smtc* is based on the timing of the SpCell of associated cell group. In case of inter-RAT handover to NR, the timing reference is the NR PCell. In case of intra-NR PCell change (standalone NR) or NR PSCell change (EN-DC), the timing reference is the target SpCell. If the field is absent and *absoluteFrequencySSB* is included, 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. If the SCell is an SSB-less SCell (i.e., the IE *absoluteFrequencySSB* in *ServingCellConfigCommon* is absent), this field is absent. |

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| *SpCellConfig* field descriptions |
| ***deactivatedSCG-Config***  Configuration applicable when the SCG is deactivated. The network always configures this field before or when indicating that the SCG is deactivated in an *RRCReconfiguration*, *RRCResume*, E-UTRA *RRCConnectionReconfiguration* or E-UTRA *RRCConnectionResume* message. |
| ***goodServingCellEvaluationBFD***  Indicates the criterion for a UE to detect the good serving cell quality for BFD relaxation in the SpCell in RRC\_CONNECTED. The field is always configured when the network enables BFD relaxation for the UE in this SpCell. This field is absent if *failureDetectionSetN* is present for the SpCell. |
| ***goodServingCellEvaluationRLM***  Indicates the criterion for a UE to detect the good serving cell quality for RLM relaxation in the SpCell in RRC\_CONNECTED. The field is always configured when the network enables RLM relaxation for the UE in this SpCell. |
| ***lowMobilityEvaluationConnected***  Indicates the criterion for a UE to detect low mobility in RRC\_CONNECTED in an SpCell. The *s-SearchDeltaP-Connected* is the parameter "SSearchDeltaP-connected". Value *dB*3 corresponds to 3 dB, *dB*6 corresponds to 6 dB and so on. The *t-SearchDeltaP-Connected* is the parameter "TSearchDeltaP-Connected". Value *s5* means 5 seconds, value *s10* means 10 seconds and so on. Low mobility criterion is configured in NR PCell for the case of NR SA/ NR CA/ NE-DC/NR-DC, and in the NR PSCell for the case of EN-DC. |
| ***reconfigurationWithSync***  Parameters for the synchronous reconfiguration to the target SpCell. |
| ***rlf-TimersAndConstants***  Timers and constants for detecting and triggering cell-level radio link failure. For the SCG, *rlf-TimersAndConstants* can only be set to *setup* and is always included at SCG addition. |
| ***servCellIndex***  Serving cell ID of a PSCell. The PCell of the Master Cell Group uses ID = 0. |

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| *SL-PathSwitchConfig* field descriptions |
| ***targetRelayUE-Identity***  Indicates the L2 source ID of the target L2 U2N Relay UE during path switch. |
| ***t420***  Indicates the timer value of *T420* to be used during path switch. |

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| *UplinkTxSwitchingMoreBands* field descriptions |
| ***uplinkTxSwitchingBandList***  Indicates the NR frequency band number of the UL bands for UL Tx switching. If the UE needs to determine location of switching period as specified in TS 38.101-1 [15], the UE considers that the bands are listed in decreasing order of priority, i.e. the first/leftmost entry corresponds to the band with the highest priority, the next entry corresponds to the band with the second highest priority, and so on. The last entry corresponds the band with the lowest priority. |
| ***uplinkTxSwitchingBandPairList***  Indicates the band pairs involved in UL Tx switching, as well as the per band pair configurations. |
| ***uplinkTxSwitchingAssociatedBandDualUL-List***  Indicates the associated band for the transmitting band indicated by *transmitBand* which the transmitting carrier(s) is on as specified in TS 38.214 [19], clause 6.1.6. The network ensures that each band pair of a transmitting band and an associated band supports the *dualUL* switching option. |
| ***UplinkTxSwitchingBandIndex***  The value n indicates the band included at the n-th entry of *uplinkTxSwitchingBandList*. |

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| *UplinkTxSwitchingBandPairConfig* field descriptions |
| ***bandInfoUL1, bandInfoUL2***  Indicates the band index for a band pair. The value n indicates the band included at the n-th entry of *uplinkTxSwitchingBandList*. |
| ***switching2T-Mode***  Indicates 2Tx-2Tx switching mode is configured to the band pair.  If this field is absent when uplink Tx switching is configured, it is interpreted that 1Tx-2Tx/1Tx-1Tx UL Tx switching is configured as specified in TS 38.214 [19]. |
| ***switchingOptionConfigForBandPair***  Indicates the switching option for the band pair as specified in TS 38.214 [19], clause 6.1.6. |
| ***switchingPeriodConfigForBandPair***  Indicates the value of switching period for the band pair as specified in TS 38.214 [19], clause 6.1.6. Value *n35us* represents 35 us, *n140us* represents 140us. If the field is absent, 210 us is applied. |

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| Conditional Presence | Explanation |
| *2Tx* | The field is optionally present, Need R, if *uplinkTxSwitching* is configured; otherwise it is absent, Need R. |
| *BWP-Reconfig* | The field is optionally present, Need N, if the BWPs are reconfigured or if serving cells are added or removed. Otherwise it is absent. |
| *DirectToIndirect-PathSwitch* | * The field is mandatory present for the L2 U2N remote UE at path switch to the target L2 U2N Relay UE (including direct to indirect path switch, single-hop indirect to single-hop indirect path switch, multi-hop indirect to single-hop indirect path switch and direct/single-hop indirect to multi-hop indirect path switch). It is absent otherwise. * Note: the target L2 U2N Relay UE should not be the same as serving L2 U2N Relay UE for inter-gNB indirect to indirect path switch. |
| *MP* | This field is optionally present, Need N, if a L2 U2N remote UE is configured to perform MP direct path addition during indirect-to-direct path swith procedure, or to perform MP direct path release during direct-to-indirect path switch procedure. It is absent otherwise. |
| *NCR* | The field is optionally present, Need M, for NCR-MT. It is absent otherwise. |
| *PreConfigMG* | The field is optionally present, Need R, if there is at least one per UE gap configured with *preConfigInd* or there is at least one per FR gap of the same FR which the SCell belongs to and configured with *preConfigInd*. It is absent, Need R, otherwise. |
| *ReconfWithSync* | The field is mandatory present in the *RRCReconfiguration* message:  - in each configured *CellGroupConfig* for which the SpCell changes,  - in the *masterCellGroup:*  - at change of AS security key derived from KgNB,  - in an *RRCReconfiguration* message contained in a *DLInformationTransferMRDC* message,  - path switch of L2 U2N remote UE to the target PCell,  - path switch of L2 U2N remote UE to the target L2 U2N Relay UE,  - in the *secondaryCellGroup* at:  - PSCell addition,  - SCG resume with NR-DC or (NG)EN-DC,  - update of required SI for PSCell,  - change of AS security key derived from S-KgNB in NR-DC while the UE is configured with at least one radio bearer with *keyToUse* set to *secondary* and that is not released by this *RRCReconfiguration* message,  - MN handover in (NG)EN-DC.  Otherwise, it is optionally present, need M. The field is absent in the *masterCellGroup* in *RRCResume* and *RRCSetup* messages and is absent in the *masterCellGroup* in *RRCReconfiguration* messages if source configuration is not released during DAPS handover. |
| *SCellAdd* | The field is mandatory present upon SCell addition; otherwise it is absent, Need M. |
| *SCellAddMod* | The field is mandatory present upon SCell addition; otherwise it is optionally present, need M. |
| *SCellAddSync* | The field is optionally present, Need N:  - in the *masterCellGroup* at  - SCell addition,  - reconfiguration with sync,  - resume of an RRC connection.  - in the *secondaryCellGroup*, when the SCG is not indicated as deactivated at:  - SCG activation while the SCG was previously deactivated,  - SCell addition,  - reconfiguration with sync.  It is absent otherwise. |
| *SCG* | The field is mandatory present in an *SpCellConfig* for the PSCell. It is absent otherwise. |
| *SCellSIB20-Opt* | This field is optionally present, Need M, if the field sCellSIB20 is configured. It is absent otherwise. |
| *SCG-Opt* | The field is optionally present, Need M, in an SpCellConfig for the PSCell. It is absent otherwise. |

NOTE: In case of change of AS security key derived from S-KgNB/S-KeNB, if *reconfigurationWithSync* is not included in the *masterCellGroup*, the network releases all existing MCG RLC bearers associated with a radio bearer with *keyToUse* set to *secondary*. In case of change of AS security key derived from KgNB/KeNB, if *reconfigurationWithSync* is not included in the *secondaryCellGroup*, the network releases all existing SCG RLC bearers associated with a radio bearer with *keyToUse* set to *master*.

#### *– ReportConfigInterRAT*

The IE *ReportConfigInterRAT* specifies criteria for triggering of an inter-RAT measurement reporting event, or an L2 U2N relay measurement reporting event. The inter-RAT measurement reporting events for E-UTRA and UTRA-FDD are labelled B*N* with *N* equal to 1, 2 and so on. The measurement reporting events for L2 U2N relay UE are labelled Y*N* with *N* equal to 1, 2 and so on, and Z1.

Event B1: Neighbour becomes better than absolute threshold;

Event B2: PCell becomes worse than absolute threshold1 AND Neighbour becomes better than another absolute threshold2;

Event Y1: PCell becomes worse than absolute threshold1 AND candidate L2 U2N Relay UE becomes better than another absolute threshold2;

Event Y2: Candidate L2 U2N Relay UE becomes better than absolute threshold;

Event Z1: Serving L2 U2N Relay UE becomes worse than absolute threshold1 AND candidate L2 U2N Relay UE becomes better than another absolute threshold2;

*ReportConfigInterRAT* information element

-- ASN1START

-- TAG-REPORTCONFIGINTERRAT-START

ReportConfigInterRAT ::= SEQUENCE {

reportType CHOICE {

periodical PeriodicalReportConfigInterRAT,

eventTriggered EventTriggerConfigInterRAT,

reportCGI ReportCGI-EUTRA,

...,

reportSFTD ReportSFTD-EUTRA

}

}

ReportCGI-EUTRA ::= SEQUENCE {

cellForWhichToReportCGI EUTRA-PhysCellId,

...,

[[

useAutonomousGaps-r16 ENUMERATED {setup} OPTIONAL -- Need R

]]

}

ReportSFTD-EUTRA ::= SEQUENCE {

reportSFTD-Meas BOOLEAN,

reportRSRP BOOLEAN,

...

}

EventTriggerConfigInterRAT ::= SEQUENCE {

eventId CHOICE {

eventB1 SEQUENCE {

b1-ThresholdEUTRA MeasTriggerQuantityEUTRA,

reportOnLeave BOOLEAN,

hysteresis Hysteresis,

timeToTrigger TimeToTrigger,

...

},

eventB2 SEQUENCE {

b2-Threshold1 MeasTriggerQuantity,

b2-Threshold2EUTRA MeasTriggerQuantityEUTRA,

reportOnLeave BOOLEAN,

hysteresis Hysteresis,

timeToTrigger TimeToTrigger,

...

},

...,

[[

eventB1-UTRA-FDD-r16 SEQUENCE {

b1-ThresholdUTRA-FDD-r16 MeasTriggerQuantityUTRA-FDD-r16,

reportOnLeave-r16 BOOLEAN,

hysteresis-r16 Hysteresis,

timeToTrigger-r16 TimeToTrigger,

...

},

eventB2-UTRA-FDD-r16 SEQUENCE {

b2-Threshold1-r16 MeasTriggerQuantity,

b2-Threshold2UTRA-FDD-r16 MeasTriggerQuantityUTRA-FDD-r16,

reportOnLeave-r16 BOOLEAN,

hysteresis-r16 Hysteresis,

timeToTrigger-r16 TimeToTrigger,

...

}

]],

[[

eventY1-Relay-r17 SEQUENCE {

y1-Threshold1-r17 MeasTriggerQuantity,

y1-Threshold2-Relay-r17 SL-MeasTriggerQuantity-r16,

reportOnLeave-r17 BOOLEAN,

hysteresis-r17 Hysteresis,

timeToTrigger-r17 TimeToTrigger,

...

},

eventY2-Relay-r17 SEQUENCE {

y2-Threshold-Relay-r17 SL-MeasTriggerQuantity-r16,

reportOnLeave-r17 BOOLEAN,

hysteresis-r17 Hysteresis,

timeToTrigger-r17 TimeToTrigger,

...

}

]],

[[

eventZ1-Relay-r18 SEQUENCE {

z1-Threshold1-Relay-r18 SEQUENCE {

sl-RSRP-r18 SL-MeasTriggerQuantity-r16,

sd-RSRP-r18 SL-MeasTriggerQuantity-r16 OPTIONAL -- Need S

},

z1-Threshold2-Relay-r18 SL-MeasTriggerQuantity-r16,

reportOnLeave-r18 BOOLEAN,

hysteresis-r18 Hysteresis,

timeToTrigger-r18 TimeToTrigger,

...

}

]]

},

rsType NR-RS-Type,

reportInterval ReportInterval,

reportAmount ENUMERATED {r1, r2, r4, r8, r16, r32, r64, infinity},

reportQuantity MeasReportQuantity,

maxReportCells INTEGER (1..maxCellReport),

...,

[[

reportQuantityUTRA-FDD-r16 MeasReportQuantityUTRA-FDD-r16 OPTIONAL -- Need R

]],

[[

includeCommonLocationInfo-r16 ENUMERATED {true} OPTIONAL, -- Need R

includeBT-Meas-r16 SetupRelease {BT-NameList-r16} OPTIONAL, -- Need M

includeWLAN-Meas-r16 SetupRelease {WLAN-NameList-r16} OPTIONAL, -- Need M

includeSensor-Meas-r16 SetupRelease {Sensor-NameList-r16} OPTIONAL -- Need M

]],

[[

reportQuantityRelay-r17 SL-MeasReportQuantity-r16 OPTIONAL -- Need R

]],

[[

cellIndividualOffsetList-r18 SEQUENCE (SIZE (1..maxCellMeasEUTRA)) OF CellIndividualOffsetList-EUTRA-r18 OPTIONAL -- Need R

]]

}

PeriodicalReportConfigInterRAT ::= SEQUENCE {

reportInterval ReportInterval,

reportAmount ENUMERATED {r1, r2, r4, r8, r16, r32, r64, infinity},

reportQuantity MeasReportQuantity,

maxReportCells INTEGER (1..maxCellReport),

...,

[[

reportQuantityUTRA-FDD-r16 MeasReportQuantityUTRA-FDD-r16 OPTIONAL -- Need R

]],

[[

includeCommonLocationInfo-r16 ENUMERATED {true} OPTIONAL, -- Need R

includeBT-Meas-r16 SetupRelease {BT-NameList-r16} OPTIONAL, -- Need M

includeWLAN-Meas-r16 SetupRelease {WLAN-NameList-r16} OPTIONAL, -- Need M

includeSensor-Meas-r16 SetupRelease {Sensor-NameList-r16} OPTIONAL -- Need M

]],

[[

reportQuantityRelay-r17 SL-MeasReportQuantity-r16 OPTIONAL -- Need R

]]

}

MeasTriggerQuantityUTRA-FDD-r16 ::= CHOICE{

utra-FDD-RSCP-r16 INTEGER (-5..91),

utra-FDD-EcN0-r16 INTEGER (0..49)

}

MeasReportQuantityUTRA-FDD-r16 ::= SEQUENCE {

cpich-RSCP BOOLEAN,

cpich-EcN0 BOOLEAN

}

CellIndividualOffsetList-EUTRA-r18 ::= SEQUENCE {

physCellId-r18 EUTRA-PhysCellId,

cellIndividualOffset-r18 EUTRA-Q-OffsetRange,

carrierFreq-r18 ARFCN-ValueEUTRA OPTIONAL -- Need R

}

-- TAG-REPORTCONFIGINTERRAT-STOP

-- ASN1STOP

|  |
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| *ReportConfigInterRAT field descriptions* |
| ***reportType***  Type of the configured measurement report. In (NG)EN-DC, and NR-DC, network does not configure report of type *ReportCGI-EUTRA* for SCG. |

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| *ReportCGI-EUTRA field descriptions* |
| ***useAutonomousGaps***  Indicates whether or not the UE is allowed to use autonomous gaps in acquiring system information from the E-UTRAN neighbour cell. When the field is included, the UE applies the corresponding value for T321. |

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| *EventTriggerConfigInterRAT* field descriptions |
| ***b2-Threshold1***  NR threshold to be used in inter RAT measurement report triggering condition for event B2. |
| ***bN-ThresholdEUTRA***  E-UTRA threshold value associated with the selected trigger quantity (RSRP, RSRQ, SINR) to be used in inter RAT measurement report triggering condition for event number bN. In the same *eventB2*, the network configures the same CHOICE name (*rsrp*, *rsrq* or *sinr*) for the *MeasTriggerQuantity* of the *b2-Threshold1* and for the *MeasTriggerQuantityEUTRA* of the *b2-Threshold2EUTRA*. |
| ***eventId***  Choice of inter RAT event triggered reporting criteria. |
| ***maxReportCells***  Max number of non-serving cells/candidate L2 U2N Relay UEs to include in the measurement report. |
| ***reportAmount***  *Number* of measurement reports applicable for *eventTriggered* as well as for *periodical* report types |
| ***reportOnLeave***  Indicates whether or not the UE shall initiate the measurement reporting procedure when the leaving condition is met for a cell in *cellsTriggeredList* or for a L2 U2N Relay UE in *relaysTriggeredList*, as specified in 5.5.4.1. |
| ***reportQuantity, reportQuantityUTRA-FDD***  The cell measurement quantities to be included in the measurement report. If the field *eventB1-UTRA-FDD* or *eventB2-UTRA-FDD* is present, the UE shall ignore the value(s) provided in *reportQuantity*. |
| ***reportQuantityRelay***  The L2 U2N Relay UE measurement quantity to be included in measuremet report. |
| ***timeToTrigger***  Time during which specific criteria for the event needs to be met in order to trigger a measurement report. |
| ***bN-ThresholdUTRA-FDD***  UTRA-FDD threshold value associated with the selected trigger quantity (RSCP, EcN0) to be used in inter RAT measurement report triggering condition for event number bN.  *utra-FDD-RSCP* corresponds to CPICH\_RSCP in TS 25.133 [46] for FDD. *utra-FDD-EcN0* corresponds to CPICH\_Ec/No in TS 25.133 [46] for FDD.  For *utra-FDD-RSCP*: The actual value is field value – 115 dBm.  For *utra-FDD-EcN0*: The actual value is (field value – 49)/2 dB. |
| ***y1-Threshold1***  NR threshold to be used in measurement report triggering condition for event Y1. |
| ***y1-Threshold2-Relay***  L2 U2N Relay threshold value associated with the selected trigger quantity (i.e. RSRP) to be used in measurement report triggering condition for event Y1. |
| ***y2-Threshold-Relay***  L2 U2N Relay threshold value associated with the selected trigger quantity (i.e. RSRP) to be used in measurement report triggering condition for event Y2. |
| ***z1-Threshold1-Relay***  L2 U2N Relay threshold value associated with the selected trigger quantity (i.e. SL-RSRP and/or SD-RSRP) to be used in measurement report triggering condition for serving Relay UE in event Z1. If the field sd-RSRP is not included, the UE considers it to be equal to sl-RSRP. |
| ***z1-Threshold2-Relay***  L2 U2N Relay threshold value associated with the selected trigger quantity (i.e. SD-RSRP) to be used in measurement report triggering condition for candidate Relay UE in event Z1. |

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| --- |
| *PeriodicalReportConfigInterRAT* field descriptions |
| ***maxReportCells***  Max number of non-serving cells/candidate L2 U2N Relay UEs to include in the measurement report. |
| ***reportAmount***  Number of measurement reports applicable for *eventTriggered* as well as for *periodical* report types |
| ***reportQuantity, reportQuantityUTRA-FDD***  The cell measurement quantities to be included in the measurement report. If the field *reportQuantityUTRA-FDD* is present, the UE shall ignore the value(s) provided in *reportQuantity*. |

|  |
| --- |
| *CellIndividualOffsetList-EUTRA* field descriptions |
| ***carrierFreq***  Indicates the EUTRA frequency for which *cellIndividualOffset* is applicable. If the field is not configured, the EUTRA frequency indicated by *carrierFreq* within the *MeasObjectEUTRA* of the *measID* associated with this *ReportConfigInterRAT* applies. |
| ***cellIndividualOffset***  Cell individual offsets applicable to a specific measurement event. If this field is present, the UE, for the same cell, shall ignore the cell individual offset configured within the *MeasObjectEUTRA* of the *measID* associated with this *ReportConfigInterRAT*. |
| ***physCellId***  Physical cell identity of a E-UTRAN cell in the cell list. |

#### – *ReportConfigNR*

The IE *ReportConfigNR* specifies criteria for triggering of an NR measurement reporting event or of a CHO, CPA or CPC event or of an L2 U2N relay measurement reporting event. For events labelled AN with N equal to 1, 2 and so on, measurement reporting events and CHO, CPA or CPC events are based on cell measurement results, which can either be derived based on SS/PBCH block or CSI-RS.

Event A1: Serving becomes better than absolute threshold;

Event A2: Serving becomes worse than absolute threshold;

Event A3: Neighbour becomes amount of offset better than PCell/PSCell;

Event A4: Neighbour becomes better than absolute threshold;

Event A5: PCell/PSCell becomes worse than absolute threshold1 AND Neighbour/SCell becomes better than another absolute threshold2;

Event A6: Neighbour becomes amount of offset better than SCell;

Event D1: Distance between UE and a reference location *referenceLocation1* becomes larger than configured threshold *distanceThreshFromReference1* and distance between UE and a reference location *referenceLocation2* becomes shorter than configured threshold *distanceThreshFromReference2*;

Event D2: Distance between UE and the serving cell moving reference location determined based on *movingReferenceLocation* and its corresponding satellite ephemeris and epoch time broadcast in *SIB19* becomes larger than configured threshold *distanceThreshFromReference1* and distance between UE and a moving reference location determined based on *referenceLocation* and its corresponding satellite ephemeris and epoch time for the neighbor cell provided in the associated *MeasObjectNR* becomes shorter than configured threshold *distanceThreshFromReference2*;

CondEvent A3: Conditional reconfiguration candidate becomes amount of offset better than PCell/PSCell;

CondEvent A4: Conditional reconfiguration candidate becomes better than absolute threshold where *condEventA4* can also be used for current PSCell (i.e., in case it is configured as candidate PSCell for CondEvent A4 evaluation) for CHO with candidate SCG(s) case;

CondEvent A5: PCell/PSCell becomes worse than absolute threshold1 AND Conditional reconfiguration candidate becomes better than another absolute threshold2;

CondEvent D1: Distance between UE and a reference location *referenceLocation1* becomes larger than configured threshold *distanceThreshFromReference1* and distance between UE and a reference location *referenceLocation2* of conditional reconfiguration candidate becomes shorter than configured threshold *distanceThreshFromReference2*;

CondEvent D2: Distance between UE and the serving cell moving reference location determined based on *movingReferenceLocation* and its corresponding satellite ephemeris and epoch time broadcast in *SIB19* becomes larger than configured threshold *distanceThreshFromReference1* and distance between UE and a moving reference location determined based on *referenceLocation* and its corresponding satellite ephemeris and epoch time for the conditional reconfiguration candidate provided in the associated *MeasObjectNR* becomes shorter than configured threshold *distanceThreshFromReference2*;

CondEvent T1: Time measured at UE becomes more than configured threshold *t1-Threshold* but is less than *t1-Threshold + duration*;

Event X1: Serving L2 U2N Relay UE becomes worse than absolute threshold1 AND NR Cell becomes better than another absolute threshold2;

Event X2: Serving L2 U2N Relay UE becomes worse than absolute threshold;

For event I1, measurement reporting event is based on CLI measurement results, which can either be derived based on SRS-RSRP or CLI-RSSI.

Event I1: Interference becomes higher than absolute threshold;

The reporting events concerning Aerial UE altitude are labelled H*N* with *N* equal to 1 and 2. Additionally, the reporting events concerning Aerial UE altitude and the neighboring cell measurements simultaneously are labelled A*M*H*N* with *M* equal to 3, 4, 5 and *N* equal to 1, 2.

Event H1: Aerial UE altitude becomes higher than a threshold;

Event H2: Aerial UE altitude becomes lower than a threshold;

Event A3H1: Neighbour becomes offset better than SpCell and the Aerial UE altitude becomes higher than a threshold;

Event A3H2: Neighbour becomes offset better than SpCell and the Aerial UE altitude becomes lower than a threshold;

Event A4H1: Neighbour becomes better than threshold1 and the Aerial UE altitude becomes higher than a threshold2;

Event A4H2: Neighbour becomes better than threshold1 and the Aerial UE altitude becomes lower than a threshold2;

Event A5H1: SpCell becomes worse than threshold1 and neighbour becomes better than threshold2 and the Aerial UE altitude becomes higher than a threshold3;

Event A5H2: SpCell becomes worse than threshold1 and neighbour becomes better than threshold2 and the Aerial UE altitude becomes lower than a threshold3.

*ReportConfigNR* information element

-- ASN1START

-- TAG-REPORTCONFIGNR-START

ReportConfigNR ::= SEQUENCE {

reportType CHOICE {

periodical PeriodicalReportConfig,

eventTriggered EventTriggerConfig,

...,

reportCGI ReportCGI,

reportSFTD ReportSFTD-NR,

condTriggerConfig-r16 CondTriggerConfig-r16,

cli-Periodical-r16 CLI-PeriodicalReportConfig-r16,

cli-EventTriggered-r16 CLI-EventTriggerConfig-r16,

rxTxPeriodical-r17 RxTxPeriodical-r17,

reportOnScellActivation-r18 ReportOnScellActivation-r18

}

}

ReportCGI ::= SEQUENCE {

cellForWhichToReportCGI PhysCellId,

...,

[[

useAutonomousGaps-r16 ENUMERATED {setup} OPTIONAL -- Need R

]]

}

ReportSFTD-NR ::= SEQUENCE {

reportSFTD-Meas BOOLEAN,

reportRSRP BOOLEAN,

...,

[[

reportSFTD-NeighMeas ENUMERATED {true} OPTIONAL, -- Need R

drx-SFTD-NeighMeas ENUMERATED {true} OPTIONAL, -- Need R

cellsForWhichToReportSFTD SEQUENCE (SIZE (1..maxCellSFTD)) OF PhysCellId OPTIONAL -- Need R

]]

}

CondTriggerConfig-r16 ::= SEQUENCE {

condEventId CHOICE {

condEventA3 SEQUENCE {

a3-Offset MeasTriggerQuantityOffset,

hysteresis Hysteresis,

timeToTrigger TimeToTrigger

},

condEventA5 SEQUENCE {

a5-Threshold1 MeasTriggerQuantity,

a5-Threshold2 MeasTriggerQuantity,

hysteresis Hysteresis,

timeToTrigger TimeToTrigger

},

...,

condEventA4-r17 SEQUENCE {

a4-Threshold-r17 MeasTriggerQuantity,

hysteresis-r17 Hysteresis,

timeToTrigger-r17 TimeToTrigger

},

condEventD1-r17 SEQUENCE {

distanceThreshFromReference1-r17 INTEGER(0.. 65525),

distanceThreshFromReference2-r17 INTEGER(0.. 65525),

referenceLocation1-r17 ReferenceLocation-r17,

referenceLocation2-r17 ReferenceLocation-r17,

hysteresisLocation-r17 HysteresisLocation-r17,

timeToTrigger-r17 TimeToTrigger

},

condEventT1-r17 SEQUENCE {

t1-Threshold-r17 INTEGER (0..549755813887),

duration-r17 INTEGER (1..6000)

},

condEventD2-r18 SEQUENCE {

distanceThreshFromReference1-r18 INTEGER(0.. 65535),

distanceThreshFromReference2-r18 INTEGER(0.. 65535),

hysteresisLocation-r18 HysteresisLocation-r17,

timeToTrigger-r18 TimeToTrigger

}

},

rsType-r16 NR-RS-Type,

...,

[[

nesEvent-r18 ENUMERATED {true} OPTIONAL -- Need R

]]

}

EventTriggerConfig ::= SEQUENCE {

eventId CHOICE {

eventA1 SEQUENCE {

a1-Threshold MeasTriggerQuantity,

reportOnLeave BOOLEAN,

hysteresis Hysteresis,

timeToTrigger TimeToTrigger

},

eventA2 SEQUENCE {

a2-Threshold MeasTriggerQuantity,

reportOnLeave BOOLEAN,

hysteresis Hysteresis,

timeToTrigger TimeToTrigger

},

eventA3 SEQUENCE {

a3-Offset MeasTriggerQuantityOffset,

reportOnLeave BOOLEAN,

hysteresis Hysteresis,

timeToTrigger TimeToTrigger,

useAllowedCellList BOOLEAN

},

eventA4 SEQUENCE {

a4-Threshold MeasTriggerQuantity,

reportOnLeave BOOLEAN,

hysteresis Hysteresis,

timeToTrigger TimeToTrigger,

useAllowedCellList BOOLEAN

},

eventA5 SEQUENCE {

a5-Threshold1 MeasTriggerQuantity,

a5-Threshold2 MeasTriggerQuantity,

reportOnLeave BOOLEAN,

hysteresis Hysteresis,

timeToTrigger TimeToTrigger,

useAllowedCellList BOOLEAN

},

eventA6 SEQUENCE {

a6-Offset MeasTriggerQuantityOffset,

reportOnLeave BOOLEAN,

hysteresis Hysteresis,

timeToTrigger TimeToTrigger,

useAllowedCellList BOOLEAN

},

...,

[[

eventX1-r17 SEQUENCE {

x1-Threshold1-Relay-r17 SL-MeasTriggerQuantity-r16,

x1-Threshold2-r17 MeasTriggerQuantity,

reportOnLeave-r17 BOOLEAN,

hysteresis-r17 Hysteresis,

timeToTrigger-r17 TimeToTrigger,

useAllowedCellList-r17 BOOLEAN

},

eventX2-r17 SEQUENCE {

x2-Threshold-Relay-r17 SL-MeasTriggerQuantity-r16,

reportOnLeave-r17 BOOLEAN,

hysteresis-r17 Hysteresis,

timeToTrigger-r17 TimeToTrigger

},

eventD1-r17 SEQUENCE {

distanceThreshFromReference1-r17 INTEGER(1.. 65525),

distanceThreshFromReference2-r17 INTEGER(1.. 65525),

referenceLocation1-r17 ReferenceLocation-r17,

referenceLocation2-r17 ReferenceLocation-r17,

reportOnLeave-r17 BOOLEAN,

hysteresisLocation-r17 HysteresisLocation-r17,

timeToTrigger-r17 TimeToTrigger

}

]],

[[

eventH1-r18 SEQUENCE {

h1-Threshold-r18 Altitude-r18,

h1-Hysteresis-r18 HysteresisAltitude-r18,

reportOnLeave-r18 BOOLEAN,

timeToTrigger-r18 TimeToTrigger,

includeAltitudeUE-r18 BOOLEAN,

simulMultiTriggerSingleMeasReport-r18 BOOLEAN

},

eventH2-r18 SEQUENCE {

h2-Threshold-r18 Altitude-r18,

h2-Hysteresis-r18 HysteresisAltitude-r18,

reportOnLeave-r18 BOOLEAN,

timeToTrigger-r18 TimeToTrigger,

includeAltitudeUE-r18 BOOLEAN,

simulMultiTriggerSingleMeasReport-r18 BOOLEAN

},

eventA3H1-r18 SEQUENCE {

a3-Offset-r18 MeasTriggerQuantityOffset,

reportOnLeave-r18 BOOLEAN,

a3-Hysteresis-r18 Hysteresis,

timeToTrigger-r18 TimeToTrigger,

useAllowedCellList-r18 BOOLEAN,

h1-Threshold-r18 Altitude-r18,

h1-Hysteresis-r18 HysteresisAltitude-r18,

includeAltitudeUE-r18 BOOLEAN,

simulMultiTriggerSingleMeasReport-r18 BOOLEAN

},

eventA3H2-r18 SEQUENCE {

a3-Offset-r18 MeasTriggerQuantityOffset,

reportOnLeave-r18 BOOLEAN,

a3-Hysteresis-r18 Hysteresis,

timeToTrigger-r18 TimeToTrigger,

useAllowedCellList-r18 BOOLEAN,

h2-Threshold-r18 Altitude-r18,

h2-Hysteresis-r18 HysteresisAltitude-r18,

includeAltitudeUE-r18 BOOLEAN,

simulMultiTriggerSingleMeasReport-r18 BOOLEAN

},

eventA4H1-r18 SEQUENCE {

a4-Threshold-r18 MeasTriggerQuantity,

reportOnLeave-r18 BOOLEAN,

a4-Hysteresis-r18 Hysteresis,

timeToTrigger-r18 TimeToTrigger,

useAllowedCellList-r18 BOOLEAN,

h1-Threshold-r18 Altitude-r18,

h1-Hysteresis-r18 HysteresisAltitude-r18,

includeAltitudeUE-r18 BOOLEAN,

simulMultiTriggerSingleMeasReport-r18 BOOLEAN

},

eventA4H2-r18 SEQUENCE {

a4-Threshold-r18 MeasTriggerQuantity,

reportOnLeave-r18 BOOLEAN,

a4-Hysteresis-r18 Hysteresis,

timeToTrigger-r18 TimeToTrigger,

useAllowedCellList-r18 BOOLEAN,

h2-Threshold-r18 Altitude-r18,

h2-Hysteresis-r18 HysteresisAltitude-r18,

includeAltitudeUE-r18 BOOLEAN,

simulMultiTriggerSingleMeasReport-r18 BOOLEAN

},

eventA5H1-r18 SEQUENCE {

a5-Threshold1-r18 MeasTriggerQuantity,

a5-Threshold2-r18 MeasTriggerQuantity,

reportOnLeave-r18 BOOLEAN,

a5-Hysteresis-r18 Hysteresis,

timeToTrigger-r18 TimeToTrigger,

useAllowedCellList-r18 BOOLEAN,

h1-Threshold-r18 Altitude-r18,

h1-Hysteresis-r18 HysteresisAltitude-r18,

includeAltitudeUE-r18 BOOLEAN,

simulMultiTriggerSingleMeasReport-r18 BOOLEAN

},

eventA5H2-r18 SEQUENCE {

a5-Threshold1-r18 MeasTriggerQuantity,

a5-Threshold2-r18 MeasTriggerQuantity,

reportOnLeave-r18 BOOLEAN,

a5-Hysteresis-r18 Hysteresis,

timeToTrigger-r18 TimeToTrigger,

useAllowedCellList-r18 BOOLEAN,

h2-Threshold-r18 Altitude-r18,

h2-Hysteresis-r18 HysteresisAltitude-r18,

includeAltitudeUE-r18 BOOLEAN,

simulMultiTriggerSingleMeasReport-r18 BOOLEAN

},

eventD2-r18 SEQUENCE {

distanceThreshFromReference1-r18 INTEGER(1.. 65535),

distanceThreshFromReference2-r18 INTEGER(1.. 65535),

reportOnLeave-r18 BOOLEAN,

hysteresisLocation-r18 HysteresisLocation-r17,

timeToTrigger-r18 TimeToTrigger

}

]]

},

rsType NR-RS-Type,

reportInterval ReportInterval,

reportAmount ENUMERATED {r1, r2, r4, r8, r16, r32, r64, infinity},

reportQuantityCell MeasReportQuantity,

maxReportCells INTEGER (1..maxCellReport),

reportQuantityRS-Indexes MeasReportQuantity OPTIONAL, -- Need R

maxNrofRS-IndexesToReport INTEGER (1..maxNrofIndexesToReport) OPTIONAL, -- Need R

includeBeamMeasurements BOOLEAN,

reportAddNeighMeas ENUMERATED {setup} OPTIONAL, -- Need R

...,

[[

measRSSI-ReportConfig-r16 MeasRSSI-ReportConfig-r16 OPTIONAL, -- Need R

useT312-r16 BOOLEAN OPTIONAL, -- Need M

includeCommonLocationInfo-r16 ENUMERATED {true} OPTIONAL, -- Need R

includeBT-Meas-r16 SetupRelease {BT-NameList-r16} OPTIONAL, -- Need M

includeWLAN-Meas-r16 SetupRelease {WLAN-NameList-r16} OPTIONAL, -- Need M

includeSensor-Meas-r16 SetupRelease {Sensor-NameList-r16} OPTIONAL -- Need M

]],

[[

coarseLocationRequest-r17 ENUMERATED {true} OPTIONAL, -- Need R

reportQuantityRelay-r17 SL-MeasReportQuantity-r16 OPTIONAL -- Need R

]],

[[

numberOfTriggeringCells-r18 INTEGER (2..maxCellReport) OPTIONAL, -- Need R

cellIndividualOffsetList-r18 SEQUENCE (SIZE (1..maxNrofCellMeas)) OF CellIndividualOffsetList-r18 OPTIONAL, -- Need R

eventX1-SD-Threshold1-r18 SL-MeasTriggerQuantity-r16 OPTIONAL, -- Need S

eventX2-SD-Threshold-r18 SL-MeasTriggerQuantity-r16 OPTIONAL, -- Need S

reportOnBestCellChange-r18 ENUMERATED {n1, n2} OPTIONAL, -- Need R

enteringLeavingReport-r18 ENUMERATED {true} OPTIONAL -- Need R

]]

}

PeriodicalReportConfig ::= SEQUENCE {

rsType NR-RS-Type,

reportInterval ReportInterval,

reportAmount ENUMERATED {r1, r2, r4, r8, r16, r32, r64, infinity},

reportQuantityCell MeasReportQuantity,

maxReportCells INTEGER (1..maxCellReport),

reportQuantityRS-Indexes MeasReportQuantity OPTIONAL, -- Need R

maxNrofRS-IndexesToReport INTEGER (1..maxNrofIndexesToReport) OPTIONAL, -- Need R

includeBeamMeasurements BOOLEAN,

useAllowedCellList BOOLEAN,

...,

[[

measRSSI-ReportConfig-r16 MeasRSSI-ReportConfig-r16 OPTIONAL, -- Need R

includeCommonLocationInfo-r16 ENUMERATED {true} OPTIONAL, -- Need R

includeBT-Meas-r16 SetupRelease {BT-NameList-r16} OPTIONAL, -- Need M

includeWLAN-Meas-r16 SetupRelease {WLAN-NameList-r16} OPTIONAL, -- Need M

includeSensor-Meas-r16 SetupRelease {Sensor-NameList-r16} OPTIONAL, -- Need M

ul-DelayValueConfig-r16 SetupRelease { UL-DelayValueConfig-r16 } OPTIONAL, -- Need M

reportAddNeighMeas-r16 ENUMERATED {setup} OPTIONAL -- Need R

]],

[[

ul-ExcessDelayConfig-r17 SetupRelease { UL-ExcessDelayConfig-r17 } OPTIONAL, -- Need M

coarseLocationRequest-r17 ENUMERATED {true} OPTIONAL, -- Need R

reportQuantityRelay-r17 SL-MeasReportQuantity-r16 OPTIONAL -- Need R

]]

}

NR-RS-Type ::= ENUMERATED {ssb, csi-rs}

MeasTriggerQuantity ::= CHOICE {

rsrp RSRP-Range,

rsrq RSRQ-Range,

sinr SINR-Range

}

MeasTriggerQuantityOffset ::= CHOICE {

rsrp INTEGER (-30..30),

rsrq INTEGER (-30..30),

sinr INTEGER (-30..30)

}

MeasReportQuantity ::= SEQUENCE {

rsrp BOOLEAN,

rsrq BOOLEAN,

sinr BOOLEAN

}

MeasRSSI-ReportConfig-r16 ::= SEQUENCE {

channelOccupancyThreshold-r16 RSSI-Range-r16 OPTIONAL -- Need R

}

CLI-EventTriggerConfig-r16 ::= SEQUENCE {

eventId-r16 CHOICE {

eventI1-r16 SEQUENCE {

i1-Threshold-r16 MeasTriggerQuantityCLI-r16,

reportOnLeave-r16 BOOLEAN,

hysteresis-r16 Hysteresis,

timeToTrigger-r16 TimeToTrigger

},

...

},

reportInterval-r16 ReportInterval,

reportAmount-r16 ENUMERATED {r1, r2, r4, r8, r16, r32, r64, infinity},

maxReportCLI-r16 INTEGER (1..maxCLI-Report-r16),

...

}

CLI-PeriodicalReportConfig-r16 ::= SEQUENCE {

reportInterval-r16 ReportInterval,

reportAmount-r16 ENUMERATED {r1, r2, r4, r8, r16, r32, r64, infinity},

reportQuantityCLI-r16 MeasReportQuantityCLI-r16,

maxReportCLI-r16 INTEGER (1..maxCLI-Report-r16),

...

}

RxTxPeriodical-r17 ::= SEQUENCE {

rxTxReportInterval-r17 RxTxReportInterval-r17 OPTIONAL, -- Need R

reportAmount-r17 ENUMERATED {r1, infinity, spare6, spare5, spare4, spare3, spare2, spare1},

...

}

RxTxReportInterval-r17 ::= ENUMERATED {ms80,ms120,ms160,ms240,ms320,ms480,ms640,ms1024,ms1280,ms2048,ms2560,ms5120,spare4,spare3,spare2,spare1}

MeasTriggerQuantityCLI-r16 ::= CHOICE {

srs-RSRP-r16 SRS-RSRP-Range-r16,

cli-RSSI-r16 CLI-RSSI-Range-r16

}

MeasReportQuantityCLI-r16 ::= ENUMERATED {srs-rsrp, cli-rssi}

ReportOnScellActivation-r18 ::= SEQUENCE {

rsType-r18 NR-RS-Type,

reportQuantityRS-Indexes-r18 MeasReportQuantity,

maxNrofRS-IndexesToReport-r18 INTEGER (1..maxNrofIndexesToReport),

includeBeamMeasurements-r18 BOOLEAN

}

CellIndividualOffsetList-r18 ::= SEQUENCE {

physCellId-r18 PhysCellId,

cellIndividualOffset-r18 Q-OffsetRangeList,

ssbFrequency-r18 ARFCN-ValueNR OPTIONAL -- Need R

}

-- TAG-REPORTCONFIGNR-STOP

-- ASN1STOP

|  |
| --- |
| *CondTriggerConfig* field descriptions |
| ***a3-Offset***  Offset value(s) to be used in NR conditional reconfiguration triggering condition for cond event a3. The actual value is field value \* 0.5 dB. |
| ***a4-Threshold***  Threshold value associated to the selected trigger quantity (e.g. RSRP, RSRQ, SINR) per RS Type (e.g. SS/PBCH block, CSI-RS) to be used in NR conditional reconfiguration triggering condition for cond event a4. |
| ***a5-Threshold1/ a5-Threshold2***  Threshold value associated to the selected trigger quantity (e.g. RSRP, RSRQ, SINR) per RS Type (e.g. SS/PBCH block, CSI-RS) to be used in NR conditional reconfiguration triggering condition for cond event a5. In the same *condeventA5*, the network configures the same quantity for the *MeasTriggerQuantity* of the *a5-Threshold1* and for the *MeasTriggerQuantity* of the *a5-Threshold2*. |
| ***condEventId***  Choice of NR conditional reconfiguration event triggered criteria. |
| ***distanceThreshFromReference1, distanceThreshFromReference2***  Distance from a fixed reference location configured with *referenceLocation1* or *referenceLocation2* for *condEventD1*. Distance from a moving reference location determined by the UE based on the serving cell *movingReferenceLocation* broadcast in *SIB19* or *referenceLocation* and the corresponding epoch time and satellite ephemeris configured within the *MeasObjectNR* associated to the event for *condEventD2*. Each step represents 50m. |
| ***duration***  This field is used for defining the leaving condition T1-2 for conditional HO event *condEventT1*. Each step represents 100ms. |
| ***nesEvent***  Indicates the event is a NES-specific CHO event and the event is only considered to be satisfied if indication from lower layers is received indicating the applicability of NES-specific CHO event and the related entry condition(s) is fulfilled. This field can only be configured for *condEventA3*, *condEventA4* or *condEventA5*. This field cannot be configured for CPAC. |
| ***referenceLocation1, referenceLocation2***  The r*eferenceLocation1* is associated to serving cell and *referenceLocation2* is associated to candidate target cell. |
| ***t1-Threshold***  The field counts the number of UTC seconds in 10 ms units since 00:00:00 on Gregorian calendar date 1 January, 1900 (midnight between Sunday, December 31, 1899 and Monday, January 1, 1900). |
| ***timeToTrigger***  Time during which specific criteria for the event needs to be met in order to execute the conditional reconfiguration evaluation. |

|  |
| --- |
| *ReportConfigNR* field descriptions |
| ***reportType***  Type of the configured measurement report. In MR-DC, network does not configure report of type *reportCGI* using SRB3. The *condTriggerConfig is* used for CHO, CPA or CPC configuration. |

|  |
| --- |
| *ReportCGI* field descriptions |
| ***useAutonomousGaps***  Indicates whether or not the UE is allowed to use autonomous gaps in acquiring system information from the NR neighbour cell. When the field is included, the UE applies the corresponding value for T321. |

|  |
| --- |
| *EventTriggerConfig* field descriptions |
| ***a3-Offset/a6-Offset***  Offset value(s) to be used in NR measurement report triggering condition for event a3/a6. The actual value is field value \* 0.5 dB. |
| ***aN-ThresholdM***  Threshold value associated to the selected trigger quantity (e.g. RSRP, RSRQ, SINR) per RS Type (e.g. SS/PBCH block, CSI-RS) to be used in NR measurement report triggering condition for event number aN. If multiple thresholds are defined for event number aN, the thresholds are differentiated by M. In the same *eventA5*, *eventA5H1, eventA5H2,* the network configures the same quantity for the *MeasTriggerQuantity* of the *a5-Threshold1* and for the *MeasTriggerQuantity* of the *a5-Threshold2*. |
| ***channelOccupancyThreshold***  RSSI threshold which is used for channel occupancy evaluation. |
| ***coarseLocationRequest***  This field is used to request UE to report coarse location information. |
| ***distanceThreshFromReference1, distanceThreshFromReference2***  Distance from a fixed reference location configured with *referenceLocation1* or *referenceLocation2* for *eventD1*. Distance from a moving reference location determined by the UE based on the serving cell *movingReferenceLocation* broadcast in *SIB19* or *referenceLocation* and the corresponding epoch time and satellite ephemeris configured within the *MeasObjectNR* associated to the event for *eventD2*. Each step represents 50m. |
| ***eventId***  Choice of NR event triggered reporting criteria. |
| ***eventXN-SD-Threshold***  Indicates the SD-RSRP threshold value for the serving L2 U2N Relay UE in event *XN* (*N* equals 1 or 2). If this field is not included, the UE considers the SD-RSRP threshold value equals to the one indicated by *x1-Threshold1-Relay*/ *x2-Threshold-Relay*. |
| ***includeAltitudeUE***  This field is used to request UE to report altitude information. |
| ***maxNrofRS-IndexesToReport***  Max number of RS indexes to include in the measurement report for A1-A6 events. |
| ***maxReportCells***  Max number of non-serving cells to include in the measurement report. |
| ***numberOfTriggeringCells***  Indicates the number of cells detected that are required to fulfill an event for a measurement report to be triggered. This field is applicable only for the events concerning neighbor cells, i.e. *eventA3*, *eventA4, eventA5, eventA3H1, eventA3H2, eventA4H1, eventA4H2, eventA5H1, eventA5H2*. |
| ***referenceLocation1, referenceLocation2***  The *referenceLocation1* is associated to serving cell and *referenceLocation2* is associated to neighbour cell. |
| ***reportAddNeighMeas***  Indicates that the UE shall include the best neighbour cells per serving frequency. |
| ***reportAmount***  Number of measurement reports applicable for *eventTriggered* as well as for *periodical* report types. |
| ***reportOnBestCellChange***  Indicates whether the UE shall only send measurement report if the measured best cell (when configured to *n1*) or two best cells (when configured to *n2*) have changed. In this release of the specification, this field is applicable only for the events concerning neighbor cells. This field can only be configured when the value of the field *reportAmount* is set to any other value than *r1*. |
| ***reportOnLeave***  Indicates whether or not the UE shall initiate the measurement reporting procedure when the leaving condition is met for a cell in *cellsTriggeredList* or for a L2 U2N Relay UE in *relaysTriggeredList*, as specified in 5.5.4.1.  Indicates whether or not the UE shall initiate the measurement reporting procedure when the leaving condition is met if configured in *eventD1*, *eventD2*, *eventH1*, *eventH2* as specified in 5.5.4.1. |
| ***reportQuantityCell***  The cell measurement quantities to be included in the measurement report. |
| ***reportQuantityRS-Indexes***  Indicates which measurement information per RS index the UE shall include in the measurement report. |
| ***simulMultiTriggerSingleMeasReport***  Indicates when multiple events with the same *eventID* satisfy the measurement report triggering condition(s), whether to consider only the event with the smallest value between the altitude of the UE and the configured altitude threshold. |
| ***timeToTrigger***  Time during which specific criteria for the event needs to be met in order to trigger a measurement report. |
| ***useAllowedCellList***  Indicates whether only the cells included in the allow-list of the associated measObject are applicable as specified in 5.5.4.1. |
| ***useT312***  If value *TRUE* is configured, the UE shall use the timer T312 with the value *t312* as specified in the corresponding *measObjectNR*. If value FALSE is configured, the timer T312 is considered as disabled. Network configures value *TRUE* only if *reportType* is set to *eventTriggered*. |
| ***xN-ThresholdM***  Threshold value associated to the selected trigger quantity (e.g. RSRP, RSRQ, SINR) per RS Type (e.g. SS/PBCH block, CSI-RS) to be used in NR measurement report triggering condition for event xN. If multiple thresholds are defined for event number xN, the thresholds are differentiated by M. *x1-Threshold1* and *x2-Threshold* indicates the threshold value for the serving L2 U2N Relay UE , *x1-Threshold2* indicates the threshold value for the NR Cells. |

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| *CLI-EventTriggerConfig* field descriptions |
| ***i1-Threshold***  Threshold value associated to the selected trigger quantity (e.g. SRS-RSRP, CLI-RSSI) to be used in CLI measurement report triggering condition for event i1. |
| ***eventId***  Choice of CLI event triggered reporting criteria. |
| ***maxReportCLI***  Max number of CLI measurement resource to include in the measurement report. |
| ***reportAmount***  *Number* of measurement reports. |
| ***reportOnLeave***  Indicates whether or not the UE shall initiate the measurement reporting procedure when the leaving condition is met for a CLI measurement resource in *srsTriggeredList* or *rssiTriggeredList*, as specified in 5.5.4.1. |
| ***timeToTrigger***  Time during which specific criteria for the event needs to be met in order to trigger a measurement report. |

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| *CLI-PeriodicalReportConfig* field descriptions |
| ***maxReportCLI***  Max number of CLI measurement resource to include in the measurement report. |
| ***reportAmount***  *Number* of measurement reports. |
| ***reportQuantityCLI***  The CLI measurement quantities to be included in the measurement report. |

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| *PeriodicalReportConfig* field descriptions |
| ***coarseLocationRequest***  This field is used to request UE to report coarse location information. |
| ***maxNrofRS-IndexesToReport***  Max number of RS indexes to include in the measurement report. |
| ***maxReportCells***  Max number of non-serving cells to include in the measurement report. |
| ***reportAddNeighMeas***  Indicates that the UE shall include the best neighbour cells per serving frequency. |
| ***reportAmount***  *Number* of measurement reports applicable for *eventTriggered* as well as for *periodical* report types |
| ***reportQuantityCell***  The cell measurement quantities to be included in the measurement report. |
| ***reportQuantityRS-Indexes***  Indicates which measurement information per RS index the UE shall include in the measurement report. |
| ***ul-DelayValueConfig***  Indicates that the UE shall perform the actual UL PDCP Packet Average Delay measurement per DRB as specified in TS 38.314 [53] and the UE shall ignore the fields *reportQuantityCell* and *maxReportCells*. The applicable values for the corresponding *reportInterval* are (one of the) {ms120, ms240, ms480, ms640, ms1024, ms2048, ms5120, ms10240, ms20480, ms40960, min1,min6, min12, min30}. The *reportInterval* indicates the periodicity for performing and reporting of UL PDCP Packet Average Delay per DRB measurement as specified in TS 38.314 [53]. |
| ***ul-ExcessDelayConfig***  Indicates that the UE shall perform the actual UL PDCP Excess Packet Delay per DRB measurement as specified in TS 38.314 [53] and the UE shall ignore the fields *reportQuantityCell* and *maxReportCells*. The applicable values for the corresponding *reportInterval* are (one of the) {ms120, ms240, ms480, ms640, ms1024, ms2048, ms5120, ms10240, ms20480, ms40960, min1,min6, min12, min30}. The *reportInterval* indicates the periodicity for performing and reporting of UL PDCP Excess Packet Delay per DRB measurement as specified in TS 38.314 [53]. |
| ***useAllowedCellList***  Indicates whether only the cells included in the allow-list of the associated measObject are applicable as specified in 5.5.4.1. |

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| *ReportSFTD-NR* field descriptions |
| ***cellForWhichToReportSFTD***  Indicates the target NR neighbour cells for SFTD measurement between PCell and NR neighbour cells. |
| ***drx-SFTD-NeighMeas***  Indicates that the UE shall use available idle periods (i.e. DRX off periods) for the SFTD measurement in NR standalone. The network only includes *drx-SFTD-NeighMeas* field when *reprtSFTD-NeighMeas* is set to true. |
| ***reportSFTD-Meas***  Indicates whether UE is required to perform SFTD measurement between PCell and NR PSCell in NR-DC. |
| ***reportSFTD-NeighMeas***  Indicates whether UE is required to perform SFTD measurement between PCell and NR neighbour cells in NR standalone. The network does not include this field if *reportSFTD-Meas* is set to *true*. |
| ***reportRSRP***  Indicates whether UE is required to include RSRP result of NR PSCell or NR neighbour cells in SFTD measurement result, derived based on SSB. If it is set to true, the network should ensure that *ssb-ConfigMobility* is included in the measurement object for NR PSCell or NR neighbour cells. |

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| *RxTxPeriodical field descriptions* |
| ***reportAmount***  This field indicates the number of UE Rx-Tx time difference measurement reports. If configured to *r1,* the network does not configure *rxTxReportInterval* and only one measurement is reported. If configured to *infinity*, UE periodically reports measurements according to the periodicity configured by *rxTxReportInterval*. |
| ***rxTxReportInterval***  This field indicates the measurement reporting periodicity of UE Rx-Tx time difference. |

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| otherfield descriptions |
| ***MeasTriggerQuantity***  SINR is applicable only for CONNECTED mode events. |

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| *ReportOnScellActivation* field descriptions |
| ***rsType***  Indicates which RS is used to provide the measurement result. Only value *ssb* can be set in this release. |
| ***reportQuantityRS-Indexes***  Indicates which measurement information per RS index is used to sort the reported measurement results and is included in the measurement report. |
| ***maxNrofRS-IndexesToReport***  Max number of RS indexes to include in the measurement report. |
| ***includeBeamMeasurements***  Indicates whether to include the measurement result per RS index in the measurement report. |

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| *CellIndividualOffsetList* field descriptions |
| ***cellIndividualOffset***  Cell individual offsets applicable to a specific measurement event. If this field is present, the UE, for the same cell, shall ignore the cell individual offset configured within the *MeasObjectNR* of the *measID* associated with this *ReportConfigNR*. |
| ***physCellId***  Physical cell identity of a cell in the cell list. |
| ***ssbFrequency***  Indicates the NR frequency of SS for which *cellIndividualOffset* is applicable. If the field is not configured, the NR frequency of SS indicated by *ssbFrequency* indicated within the *MeasObjectNR* of the *measID* associated with this *ReportConfigNR* applies. |

# Annex (not part of the specification): RAN2 Agreements

This Annex contains the RAN2 agreements on Rel-19 WI for “NR sidelink relay enhancements”. The agreements are provided verbatim for reference.This annex shall be removed once the WI is completed.

RAN2#128

* For scenario B, RAN2 supports the case that the target U2N relay UE is a new relay UE which is not on the source relay path, and existing Rel-18 indirect path to indirect path switching can be reused.
* For scenario B, RAN2 will support the case that the target single-hop relay UE is the last relay UE on the source path using the existing Rel-18 i2i path switching. Spec impact will be minimised.
* For scenario B, RAN2 does not specify anything to support the case that that the target U2N relay UE is an intermediate relay UE which is on the source relay path using a single procedure. This case can be handled in the baseline control plane model, if necessary and subject to network implementation, by sequential path switches for the remote UE and the target intermediate relay UE.
* The intra-gNB switching from indirect to direct path procedure defined in TS 38.300 for single hop case can be used as the baseline for multi-hop indirect to direct path switching.
* Event X1 /X2 can be reused in multi-hop indirect to direct path switching with the understanding that the “first relay UE” in multi-hop relay link is “serving L2 U2N Relay UE” to be reported.
* The intra-gNB switching from indirect path to indirect path procedure defined in TS 38.300 in single hop case can be used as baseline for multi-hop indirect to single hop indirect path switching procedure.
* The following measurement events can be reused in multi-hop indirect to single-hop indirect path switching:

- Event Y2

- Event Z1 with the understanding that the “first relay UE” in multi-hop relay link is “serving L2 U2N Relay UE” to be reported.

* Figure 1 of R2-2410589 can be used as a baseline for intra-gNB multi-hop indirect to direct path switching procedure to be captured in TS 38.300.
* Figure 2 of R2-2410589 can be used as a baseline for intra-gNB multi-hop indirect to single-hop indirect path switching to be captured in TS 38.300.

RAN2#129

* For multi-hop i2d, Remote UE evaluates both relay link (for the link between remote UE and serving first relay UE) and Uu link, where the sidelink relay measurement report shall include at least serving first relay UE's source L2 ID, serving cell ID and sidelink measurement quantity result.
* For multi-hop i2d, first relay UE evaluates adjacent upstream relay link and Uu link, where the sidelink relay measurement report shall include at least measured relay UE's source L2 ID, serving cell ID and sidelink measurement quantity result. FFS if intermediate relay UE reports.
* For multi-hop i2i, the remote UE reports serving first relay UE and candidate single-hop relay UE(s), including at least a source L2 ID, serving cell ID, and a sidelink measurement quantity information.
* For multi-hop i2i, first evaluates adjacent upstream relay link and candidate relay link, where the sidelink relay measurement report shall include at least serving intermediate/ last relay UE's source L2 ID, serving cell ID and sidelink measurement quantity result. FFS if intermediate relay UE reports.

RAN2#129bis

* In scenarios A/B, the Intermediate Relay UE could be configured to perform the measurement on adjacent upstream relay link, Uu link and candidate relay link.
* In scenarios A/B, the measurement report from Intermediate relay UE will also include at least serving intermediate/last relay UE's source L2 ID, serving cell ID and sidelink measurement quantity result.
* Upon Intermediate Relay UE (including first relay UE) receiving reconfigurationWithSync, it either indicates to upper layers (to trigger PC5 unicast link release) or sends NotificationMessageSidelink message to the downstream intermediate Relay/Remote UE. The choice is implementation-based.
* Measurement event X2 could be applied to scenario B with multi-hop indirect to single-hop indirect path switching.
* reconfigurationWithSync without sl-PathSwitchConfig can be reused to trigger Case A (Intra-gNB multi-hop indirect to direct path switching).
* reconfigurationWithSync with sl-PathSwitchConfig can be reused to trigger Case B (Intra-gNB multi-hop indirect to single-hop indirect path switching).
* RAN2 will not address cases of service continuity towards a relay path with intermediate relays in idle/inactive under the current WID.

RAN2#130

* For scenario C, the legacy path-switching command and procedure are reused for the Remote UE and the target first Relay UE. Upon receiving the path-switching command, the Remote UE performs the legacy UE behavior toward the target first Relay UE. The (first)intermediate/last Relay UE belonging to the target path should be in the RRC-connected state.
* For scenario D, the legacy path-switching command and procedure are reused for the Remote UE and the first Relay UE in the target path. Upon receiving the path-switching command, the Remote UE performs legacy UE behavior toward the first Relay UE on the target path. The (first)intermediate/last Relay UE belonging to the target path should be in the RRC-connected state.
* Event Y1 and Y2 can be reused in path switching Scenario C with the understanding that the “first relay UE” in a candidate multi-hop relay link is “candidate L2 U2N Relay UE”.
* Event X2, Y2 and Z1 can be reused in path switching Scenario D with the understanding that the “first relay UE” in a candidate multi-hop relay link is “candidate L2 U2N Relay UE”.
* Wording for the multihop case to be checked in CR implementation.
* For intra-gNB direct to multi-hop indirect path switch (scenario C), remote UE evaluates both relay link (for the link between remote UE and candidate first relay UE) and Uu link, where the sidelink relay measurement report shall include at least candidate first relay UE's source L2 ID, serving cell ID and sidelink measurement quantity result.
* For intra-gNB single-hop indirect to multi-hop indirect path switch (scenario D), the remote UE reports serving single-hop relay UE and candidate first relay UE(s), including at least a source L2 ID, serving cell ID, and a sidelink measurement quantity information.
* The target last relay UE can be the same as the source single-hop U2N relay UE, but the target first/intermediate relay UE cannot be the source single-hop U2N relay UE. No spec impact specific to this decision is expected (rely on the baseline procedure).
* The gNB is expected to avoid triggering mobility to a path where the first/intermediate relay UE is the same as the source relay UE.
* Timer T420 can be reused for path switching towards multi-hop path i.e., both case C and case D. T420 is not scaled by the hop count (rely on the gNB to set an appropriate value).