**3GPP TSG-RAN2 Meeting #109bis E-meeting *R2-*** ***20xxxxx***

**20 – 30 Apr 2020**

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| *CR-Form-v11.4* |
| **CHANGE REQUEST** |
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|  | **38.331** | **CR** | **1533** | **rev** | **1** | **Current version:** | **16.0.0** |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network | **X** | Core Network |  |

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| ***Title:***  | Additional configuration for CLI resources |
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| ***Source to WG:*** | LGE |
| ***Source to TSG:*** | R2 |
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| ***Work item code:*** | NR\_CLI\_RIM |  | ***Date:*** |  2020-04-29 |
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| ***Category:*** | **F** |  | ***Release:*** | Rel-16 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)Rel-12 (Release 12)**Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)* |
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| ***Reason for change:*** | RAN1 sent a reply LS (R1-2001319) providing additional configuration for CLI resources. |
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| ***Summary of change:*** | Include BWP id and serving cell index in SRS resource configuration and include serving cell index in RSSI resource configuration.**Impact analysis**Impacted functionality:CLI measurementsInter-operability: If the UE is implementing according to this CR and the network is not, the UE may miscalculate the reference position of the CLI resources.If the network is implemented according to the CR and the UE is not, the UE may miscalculate the reference position of the CLI resources. |
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| ***Consequences if not approved:*** | The reference point of the CLI resources in frequency domain is not clear, so UE may fail to measure the CLI resource or measure wrong resource. |
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| ***Clauses affected:*** | 5.5.1, 5.5.3.1, 6.3.2 |
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|  | **Y** | **N** |  |  |
| ***Other specs*** | **X** |  |  Other core specifications  | TS 38.300 CR ...  |
| ***affected:*** | **X** |  |  Test specifications | TS 38.306 CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
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| ***Other comments:*** |  |
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### 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 configuration evaluation in accordance with the conditional configuration. 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.

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 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 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 'blacklisted' cells and a list of 'whitelisted' cells. Blacklisted cells are not applicable in event evaluation or measurement reporting. Whitelisted 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, a list of 'blacklisted' cells and a list of 'whitelisted' cells. Blacklisted cells are not applicable in event evaluation or measurement reporting. Whitelisted cells are the only ones 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 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 V2X sidelink communication, a measurement object is a set of transmission resource pool(s) on a carrier frequency for V2X sidelink communication.

- 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 configuration triggering configuration, each configuration consists of the following:

- Execution criteria: The criteria that triggers the UE to perform conditional configuration execution.

- RS type: The RS that the UE uses for beam and cell measurement results (SS/PBCH block or CSI-RS) for conditional configuration 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 configuration triggering, one measurement identity links to exactly one conditional configuration trigger configuration. And up to 2 measurement identities can be linked to one conditional configuration 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.

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) and inter-RAT objects. Similarly, the reporting configuration list includes NR and inter-RAT 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), 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 any reception 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).

Whenever the procedural specification, other than contained in sub-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.

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

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.

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| Unchanged parts are omitted |

#### 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 and CLI measurement results in RRC\_CONNECTED, except for RSSI, 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 configuration 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 configuration execution triggering quantities, the network can configure up to 2 quantities. The UE does not apply the layer 3 filtering as specified in 5.5.3.2 to derive the CBR 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.

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| Unchanged parts are omitted |

### 6.3.2 Radio resource control information elements

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| Unchanged parts are omitted |

#### – MeasObjectCLI

The IE *MeasObjectCLI* specifies information applicable for SRS-RSRP measurements and/or CLI-RSSI measurements.

*MeasObjectCLI* information element

-- ASN1START

-- TAG-MEASOBJECTCLI-START

MeasObjectCLI-r16 ::= SEQUENCE {

 cli-ResourceConfig-r16 CLI-ResourceConfig-r16,

 ...

}

CLI-ResourceConfig-r16 ::= SEQUENCE {

 srs-ResourceConfig-r16 SetupRelease { SRS-ResourceListConfigCLI-r16 } OPTIONAL, -- Need M

 rssi-ResourceConfig-r16 SetupRelease { RSSI-ResourceListConfigCLI-r16 } OPTIONAL -- Need M

}

SRS-ResourceListConfigCLI-r16 ::= SEQUENCE (SIZE (1.. maxNrofSRS-Resources-r16)) OF SRS-ResourceConfigCLI-r16

RSSI-ResourceListConfigCLI-r16 ::= SEQUENCE (SIZE (1.. maxNrofCLI-RSSI-Resources-r16)) OF RSSI-ResourceConfigCLI-r16

SRS-ResourceConfigCLI-r16 ::= SEQUENCE {

 srs-Resource-r16 SRS-Resource,

 srs-SCS-r16 SubcarrierSpacing,

 refServCellIndex-r16 ServCellIndex,

 refBWP-r16 BWP-id,

 ...

}

RSSI-ResourceConfigCLI-r16 ::= SEQUENCE {

 rssi-ResourceId-r16 RSSI-ResourceId-r16,

 rssi-SCS-r16 SubcarrierSpacing,

 startPRB-r16 INTEGER (0..2169),

 nrofPRBs-r16 INTEGER (4..maxNrofPhysicalResourceBlocksPlus1),

 startPosition-r16 INTEGER (0..13),

 nrofSymbols-r16 INTEGER (1..14),

 rssi-PeriodicityAndOffset-r16 RSSI-PeriodicityAndOffset-r16,

 refServCellIndex-r16 ServCellIndex,

 ...

}

RSSI-ResourceId-r16 ::= INTEGER (0.. maxNrofCLI-RSSI-Resources-r16-1)

RSSI-PeriodicityAndOffset-r16 ::= CHOICE {

 sl10 INTEGER(0..9),

 sl20 INTEGER(0..19),

 sl40 INTEGER(0..39),

 sl80 INTEGER(0..79),

 sl160 INTEGER(0..159),

 sl320 INTEGER(0..319),

 s1640 INTEGER(0..639),

 ...

}

-- TAG-MEASOBJECTCLI-STOP

-- ASN1STOP

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| *CLI-ResourceConfig* field descriptions |
| ***srs-ResourceConfig***SRS resources to be used for CLI measurements. |
| ***rssi-ResourceConfig***CLI-RSSI resources to be used for CLI measurements. |

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| *MeasObjectCLI* field descriptions |
| ***cli-ResourceConfig***SRS and/or CLI-RSSI resource configuration for CLI measurement. |

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| *SRS-ResourceConfigCLI* field descriptions |
| ***refBWP***DL BWP id that is used to derive the reference point of the SRS resource (see TS 38.211[16], clause 6.4.1.4.3) |
| ***refServCellIndex***The index of the serving cell that the *refBWP* belongs to. |
| ***srs-SCS***Subcarrier spacing for SRS. Only the values 15, 30 kHz or 60 kHz (FR1), and 60 or 120 kHz (FR2) are applicable. |

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| *RSSI-ResourceConfigCLI* field descriptions |
| ***nrofPRBs***Allowed size of the measurement BW. Only multiples of 4 are allowed. The smallest configurable number is the minimum of 4 and the width of the active DL BWP. If the configured value is larger than the width of the active DL BWP, the UE shall assume that the actual CLI-RSSI resource bandwidth is within the active DL BWP. |
| ***nrofSymbols***Within a slot that is configured for CLI-RSSI measurement (see slotConfiguration), the UE measures the RSSI from *startPosition* to *startPosition* + *nrofSymbols* - 1. The configured CLI-RSSI resource does not exceed the slot boundary of the reference SCS. If the SCS of configured DL BWP(s) is larger than the reference SCS, network configures *startPosition* and *nrofSymbols* such that the configured CLI-RSSI resource not to exceed the slot boundary corresponding to the configured BWP SCS. If the reference SCS is larger than SCS of configured DL BWP(s), network ensures *startPosition* and *nrofSymbols* are integer multiple of reference SCS divided by configured BWP SCS. |
| ***refServCellIndex***The index of the reference serving cell. Frequency reference point of the RSSI resource is subcarrier 0 of CRB0 of the reference serving cell. |
| ***rssi-PeriodicityAndOffset***Periodicity and slot offset for this CLI-RSSI resource. All values are in "number of slots". Value *sl1* corresponds to a periodicity of 1 slot, value *sl2* corresponds to a periodicity of 2 slots, and so on. For each periodicity the corresponding offset is given in number of slots. |
| ***rssi-scs***Reference subcarrier spacing for CLI-RSSI measurement. Only the values 15, 30 kHz or 60 kHz (FR1), and 60 or 120 kHz (FR2) are applicable. |
| ***startPosition***OFDM symbol location of the CLI-RSSI resource within a slot. |
| ***startPRB***Starting PRB index of the measurement bandwidth. For the case where the reference subcarrier spacing is smaller than subcarrier spacing of active DL BWP(s), network configures startPRB and nrofPRBs are as a multiple of active BW SCS divided by reference SCS. |