# 5 Test environments for RF test

## 5.0 General

### 5.0.1 Single PDU configuration for RF testing

For RF and performance test case execution on 5G SA UE's defined in TS 38.521-1 [14], TS 38.521-2 [15], TS 38.521-4 [17], IMS shall not be considered and UE's shall be able use RRC (IDLE, CONNECTED) preambles defined in TS 38.508-1 clause 4.5. Before entering RRC\_CONNECTED or RRC\_IDLE state during initial conditions or test procedure, it is recommended that UE is pre-configured with 0 or 1 PDU (non-IMS).

For EN-DC settings the corresponding requirement holds that IMS shall not be considered and it is recommended that UE is pre-configured with 0PDU/0PDN or 1PDU/1 PDN.

## 5.1 Requirements of test equipment

### 5.1.1 Requirements for transmission and reception tests

#### 5.1.1.1 Requirements common for conducted and OTA tests

No common RF test environment requirements are specified in addition to the common requirements described in clause 4.2.

#### 5.1.1.2 Requirements for conducted tests

No common RF test environment requirements are specified in addition to the common requirements described in clause 4.2.

#### 5.1.1.3 Requirements for OTA tests

Editor’s Note:

- The UE pre-configuration mentioned below to disable UL Tx diversity schemes shall be voided once a test methodology solution to minimize spectral flatness artefacts between TE and UE over all test points is defined.

- The permitted test methods for transmission and reception test are DFF, DFF with simplification for centre of beam measurements, IFF and NFTF and are described in TR 38.810[24]. The minimum requirements for each test setup are described in the following clauses.

- For conformance testing using the OTA test environment, the UE under test shall be pre-configured with UL Tx diversity schemes disabled to account for single polarization System Simulator (SS) in the test environment. The UE under test may transmit with dual polarization.

##### 5.1.1.3.1 DFF and DFF with simplification for centre of beam measurements

- Far-field measurement system in an anechoic chamber.

- The minimum far-field distance R for a traditional far field anechoic chamber can be calculated based on the following equation: , where D is the diameter of the smallest sphere that encloses the radiating parts of the DUT.

- A positioning system such that the angle between the dual-polarized measurement antenna and the DUT has at least two axes of freedom and maintains a polarization reference.

- For DFF(without simplification), a positioning system such that the angle between the link antenna and the DUT has at least two axes of freedom and maintains a polarization reference; this positioning system for the link antenna is in addition to the positioning system for the measurement antenna and provides for an angular relationship independently controllable from the measurement antenna.

- For setups intended for measurements of UE RF characteristics in non-standalone (NSA) mode with 1 UL configuration, an LTE link antenna is used to provide the LTE link to the DUT. The LTE link antenna provides a stable LTE signal without precise path loss or polarization control.

- For setups intended for measurements in NR CA mode with FR1 and FR2 inter-band NR CA, test setup provides NR FR1 link to the DUT. The NR FR1 link has a stable and noise-free signal without precise path loss or polarization control.

- Maximum permitted test system uncertainty is specified in Annex F in 38.521-2[15].

##### 5.1.1.3.2 IFF

- Indirect Far field of Compact Antenna Test Range(CATR) with quiet zone diameter at least D.

- The CATR system does not require a measurement distance of  to achieve a plane wave as in a standard far field range.

- A positioning system such that the angle between the dual-polarized measurement antenna and the DUT has at least two axes of freedom and maintains a polarization reference.

- For setups intended for measurements of UE RF characteristics in non-standalone (NSA) mode with 1UL configuration, an LTE link antenna is used to provide the LTE link to the DUT. The LTE link antenna provides a stable LTE signal without precise path loss or polarization control.

- For setups intended for measurements in NR CA mode with FR1 and FR2 inter-band NR CA, test setup provides NR FR1 link to the DUT. The NR FR1 link has a stable and noise-free signal without precise path loss or polarization control.

- Maximum permitted test system uncertainty is specified in Annex F in 38.521-2[15].

##### 5.1.1.3.3 NFTF

- Radiated Near Field UE beam pattern are measured and based on the NFTF mathematical transform, the final metric such as EIRP is the same as the metric for the DFF setup

- A positioning system such as the angle between the dual-polarized measurement/link antenna and the DUT has at least two axes of freedom and maintains a polarization reference

- For setups intended for measurements of UE RF characteristics in non-standalone (NSA) mode with 1UL configuration, an LTE link antenna is used to provide the LTE link to the DUT. The LTE link antenna provides a stable LTE signal without precise path loss or polarization control.

- For setups intended for measurements in NR CA mode with FR1 and FR2 inter-band NR CA, test setup provides NR FR1 link to the DUT. The NR FR1 link has a stable and noise-free signal without precise path loss or polarization control.

- Maximum permitted test system uncertainty is specified in Annex F in 38.521-2[15].

### 5.1.2 Requirements for performance tests

#### 5.1.2.1 Void

#### 5.1.2.2 Void

#### 5.1.2.3 Requirements for OTA test method

Editor’s Note: This subclause is intended to describe the test equipment requirements which are specific to OTA test environment for performance tests.

- The UE pre-configuration mentioned below to disable UL Tx diversity schemes shall be voided once a test methodology solution to minimize spectral flatness artefacts between TE and UE over all test points is defined.

- For conformance testing using the OTA test environment, the UE under test shall be pre-configured with UL Tx diversity schemes disabled to account for single polarization System Simulator (SS) in the test environment. The UE under test may transmit with dual polarization.

## 5.2 Reference test conditions

### 5.2.1 Signal levels

#### 5.2.1.1 Signal Levels for conducted testing

For NR FR1 cell, the downlink power settings are specified in TS 38.521-1[14] and TS 38.521-3[16].

The uncertainty value is specified in TS 38.521-1 [14] Annex F or in TS 38.521-3 [16] Annex F.

#### 5.2.1.2 Signal Levels for OTA testing

#### 5.2.1.2.1 Downlink Signal Levels

For E-UTRA cell in EN-DC with FR2 NR, the downlink power settings are specified in clause 4.7 of TS 38.521-3[16].

For FR2 NR cell, the downlink power settings are specified in Annex C.0 of TS 38.521-2[15] and Annex C.0 of TS 38.521-3[16].

The uncertainty value is specified in TS 38.521-2 [15] Annex F or in TS 38.521-3 [16] Annex F.

### 5.2.2 Test Frequencies

As defined in clause 4.3.1.1 with the following exceptions for Demodulation test cases

#### 5.2.2.1 NR operating bands in FR1

##### 5.2.2.1.1 Reference test frequencies for NR operating band n1

Table 5.2.2.1-1: Void

Table 5.2.2.1.1-1: Test frequencies for NR operating band n1 and SCS 15 kHz

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CBW [MHz] | *carrierBandwidth*  [PRBs] | Range | | Carrier centre  [MHz] | Carrier centre  [ARFCN] | point A [MHz] | *absoluteFrequencyPointA* [ARFCN] | *offsetToCarrier* [Carrier PRBs] | SS block SCS  [kHz] | GSCN | *absoluteFrequencySSB*  [ARFCN] |  | **Offset Carrier CORESET#0**  **[RBs]**  Note 2 | CORESET#0 Index (Offset  **[RBs])**  Note 1 | offsetToPointA (SIB1)  [PRBs]  Note 1 |
| 10 | 52 | Downlink | Mid | 2140 | 428000 | 2135.32 | 427064 | 0 | 15 | 5344 | 427490 | 10 | 1 | 0 (0) | 1 |
|  |  | Uplink | Mid | 1950 | 390000 | 1945.32 | 389064 | 0 | - | - | - | - | - | - | - |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-1 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs. | | | | | | | | | | | | | | | |

##### 5.2.2.1.2 Reference test frequencies for NR operating band n2

Table 5.2.2.1.2-1: Test frequencies for NR operating band n2 and SCS 15 kHz

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CBW  [MHz] | *carrierBandwidth*  [PRBs] | Range | | Carrier centre  [MHz] | Carrier centre  [ARFCN] | point A [MHz] | *absoluteFrequencyPointA* [ARFCN] | *offsetToCarrier* [Carrier PRBs] | SS block SCS  [kHz] | GSCN | *absoluteFrequencySSB*  [ARFCN] |  | **Offset Carrier CORESET#0**  **[RBs]**  Note 2 | CORESET#0 Index (Offset  **[RBs])**  Note 1 | offsetToPointA (SIB1)  [PRBs]  Note 1 |
| 10 | 52 | Downlink | Mid | 1960 | 392000 | 1955.32 | 391064 | 0 | 15 | 4894 | 391490 | 10 | 1 | 0 (0) | 1 |
|  |  | Uplink | Mid | 1880 | 376000 | 1875.32 | 375064 | 0 | - | - | - | - | - | - | - |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-1 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs. | | | | | | | | | | | | | | | |

##### 5.2.2.1.3 Reference test frequencies for NR operating band n3

Table 5.2.2.1.3-1: Test frequencies for NR operating band n3 and SCS 15 kHz

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CBW [MHz] | *carrierBandwidth*  [PRBs] | Range | | Carrier centre  [MHz] | Carrier centre  [ARFCN] | point A [MHz] | *absoluteFrequencyPointA* [ARFCN] | *offsetToCarrier* [Carrier PRBs] | SS block SCS  [kHz] | GSCN | *absoluteFrequencySSB*  [ARFCN] |  | **Offset Carrier CORESET#0**  **[RBs]**  Note 2 | CORESET#0 Index (Offset  [RBs])  Note 1 | offsetToPointA (SIB1)  [PRBs]  Note 1 |
| 10 | 52 | Downlink | Mid | 1842.5 | 368500 | 1837.82 | 367564 | 0 | 15 | 4598 | 367930 | 2 | 0 | 0 (0) | 0 |
|  |  | Uplink | Mid | 1747.5 | 349500 | 1742.82 | 348564 | 0 | - | - | - | - | - | - | - |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-1 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs. | | | | | | | | | | | | | | | |

##### 5.2.2.1.4 FFS

##### 5.2.2.1.5 Reference test frequencies for NR operating band n5

Table 5.2.2.1.5-1: Test frequencies for NR operating band n5 and SCS 15 kHz

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CBW [MHz] | *carrierBandwidth*  [PRBs] | Range | | Carrier centre  [MHz] | Carrier centre  [ARFCN] | point A [MHz] | *absoluteFrequencyPointA* [ARFCN] | *offsetToCarrier* [Carrier PRBs] | SS block SCS  [kHz] | GSCN | *absoluteFrequencySSB*  [ARFCN] |  | **Offset Carrier CORESET#0**  **[RBs]**  Note 2 | CORESET#0 Index (Offset  **[RBs])**  Note 1 | offsetToPointA (SIB1)  [PRBs]  Note 1 |
| 10 | 52 | Downlink | Mid | 881.5 | 176300 | 876.82 | 175364 | 0 | 15 | 2197 | 175730 | 2 | 0 | 0 (0) | 0 |
|  |  | Uplink | Mid | 836.5 | 167300 | 831.82 | 166364 | 0 | - | - | - | - | - | - | - |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-1 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs.  Note 3: This UE channel bandwidth is applicable only to downlink. | | | | | | | | | | | | | | | |

##### 5.2.2.1.6 FFS

##### 5.2.2.1.7 Reference test frequencies for NR operating band n7

Table 5.2.2.1.7-1: Test frequencies for NR operating band n7 and SCS 15 kHz

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CBW [MHz] | *carrierBandwidth*  [PRBs] | Range | | Carrier centre  [MHz] | Carrier centre  [ARFCN] | point A [MHz] | *absoluteFrequencyPointA* [ARFCN] | *offsetToCarrier* [Carrier PRBs] | SS block SCS  [kHz] | GSCN | *absoluteFrequencySSB*  [ARFCN] |  | **Offset Carrier CORESET#0**  **[RBs]**  Note 2 | CORESET#0 Index (Offset  **[RBs])**  Note 1 | offsetToPointA (SIB1)  [PRBs]  Note 1 |
| 10 | 52 | Downlink | Mid | 2655 | 531000 | 2650.32 | 530064 | 0 | 15 | 6630 | 530430 | 2 | 0 | 0 (0) | 0 |
|  |  | Uplink | Mid | 2535 | 507000 | 2530.32 | 506064 | 0 | - | - | - | - | - | - | - |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-1 in TS 38.213 [22]. The value of CORESET#0 Index is controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs. | | | | | | | | | | | | | | | |

##### 5.2.2.1.8 Reference test frequencies for NR operating band n8

Table 5.2.2.1.8-1: Test frequencies for NR operating band n8 and SCS 15 kHz

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CBW [MHz] | *carrierBandwidth*  [PRBs] | Range | | Carrier centre  [MHz] | Carrier centre  [ARFCN] | point A [MHz] | *absoluteFrequencyPointA* [ARFCN] | *offsetToCarrier* [Carrier PRBs] | SS block SCS  [kHz] | GSCN | *absoluteFrequencySSB*  [ARFCN] |  | **Offset Carrier CORESET#0**  **[RBs]**  Note 2 | CORESET#0 Index (Offset  **[RBs])**  Note 1 | offsetToPointA (SIB1)  [PRBs]  Note 1 |
| 10 | 52 | Downlink | Mid | 942.5 | 188500 | 937.82 | 187564 | 0 | 15 | 2348 | 187930 | 2 | 0 | 0 (0) | 0 |
|  |  | Uplink | Mid | 897.5 | 179500 | 892.82 | 178564 | 0 | - | - | - | - | - | - | - |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-1 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs. | | | | | | | | | | | | | | | |

##### 5.2.2.1.9 - 5.2.2.1.11 FFS

##### 5.2.2.1.12 Reference test frequencies for NR operating band n12

Table 5.2.2.1.12-1: Test frequencies for NR operating band n12 and SCS 15 kHz

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CBW [MHz] | *carrierBandwidth*  [PRBs] | Range | | Carrier centre  [MHz] | Carrier centre  [ARFCN] | point A [MHz] | *absoluteFrequencyPointA* [ARFCN] | *offsetToCarrier* [Carrier PRBs] | SS block SCS  [kHz] | GSCN | *absoluteFrequencySSB*  [ARFCN] |  | **Offset Carrier CORESET#0**  **[RBs]**  Note 2 | CORESET#0 Index (Offset  **[RBs])**  Note 1 | offsetToPointA (SIB1)  [PRBs]  Note 1 |
| 10 | 52 | Downlink | Mid | 737.5 | 147500 | 732.82 | 146564 | 0 | 15 | 1837 | 146930 | 2 | 0 | 0 (0) | 0 |
|  |  | Uplink | Mid | 707.5 | 141500 | 702.82 | 140564 | 0 | - | - | - | - | - | - | - |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-1 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs. | | | | | | | | | | | | | | | |

##### 5.2.2.1.13 FFS

##### 5.2.2.1.14 Reference test frequencies for NR operating band n14

Table 5.2.2.1.14-1: Test frequencies for NR operating band n14 and SCS 15 kHz

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CBW [MHz] | *carrierBandwidth*  [PRBs] | Range | | Carrier centre  [MHz] | Carrier centre  [ARFCN] | point A [MHz] | *absoluteFrequencyPointA* [ARFCN] | *offsetToCarrier* [Carrier PRBs] | SS block SCS  [kHz] | GSCN | *absoluteFrequencySSB*  [ARFCN] |  | **Offset Carrier CORESET#0**  **[RBs]**  Note 2 | CORESET#0 Index (Offset  **[RBs])**  Note 1 | offsetToPointA (SIB1)  [PRBs]  Note 1 |
| 10 | 52 | Downlink | Mid | 763 | 152600 | 758.32 | 151664 | 0 | 15 | 1903 | 152210 | 2 | 1 | 2 (4) | 5 |
|  |  | Uplink | Mid | 793 | 158600 | 788.32 | 157664 | 0 | - | - | - | - | - | - | - |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-1 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcchConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET0Carrier in Annex C expressed in number of common RBs.  Note 3: 10 MHz test channel bandwidth is tested with Low range test frequency only. Low range test frequency shall be used instead of Mid range and High range test frequencies. | | | | | | | | | | | | | | | |

##### 5.2.2.1.15 – 5.2.2.1.19 FFS

##### 5.2.2.1.20 Reference test frequencies for NR operating band n20

Table 5.2.2.1.20-1: Test frequencies for NR operating band n20 and SCS 15 kHz

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CBW [MHz] | *carrierBandwidth*  [PRBs] | Range | | Carrier centre  [MHz] | Carrier centre  [ARFCN] | point A [MHz] | *absoluteFrequencyPointA* [ARFCN] | *offsetToCarrier* [Carrier PRBs] | SS block SCS  [kHz] | GSCN | *absoluteFrequencySSB*  [ARFCN] |  | **Offset Carrier CORESET#0**  **[RBs]**  Note 2 | CORESET#0 Index (Offset  **[RBs])**  Note 1 | offsetToPointA (SIB1)  [PRBs]  Note 1 |
| 10 | 52 | Downlink | Mid | 806 | 161200 | 801.32 | 160264 | 0 | 15 | 2009 | 160810 | 2 | 1 | 2 (4) | 5 |
|  |  | Uplink | Mid | 847 | 169400 | 842.32 | 168464 | 0 | - | - | - | - | - | - | - |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-1 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs. | | | | | | | | | | | | | | | |

##### 5.2.2.1.21 – 5.2.2.1.23 FFS

##### 5.2.2.1.24 Reference test frequencies for NR operating band n24

Table 5.2.2.1.24-1: Test frequencies for NR operating band n24 and SCS 15 kHz

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| UL/DL CBW [MHz] | *carrierBandwidth*  [PRBs] | Range | | Carrier centre  [MHz]  Note 3 | Carrier centre  [ARFCN] | point A [MHz] | *absoluteFrequencyPointA* [ARFCN] | *offsetToCarrier* [Carrier PRBs] | SS block SCS  [kHz] | GSCN | *absoluteFrequencySSB*  [ARFCN] |  | **Offset Carrier CORESET#0**  **[RBs]**  Note 2 | CORESET#0 Index (Offset  **[RBs])**  Note 1 | offsetToPointA (SIB1)  [PRBs]  Note 1 |
| 10/10 | 52 | Downlink | Mid | 1531.0 | 306200 | 1526.32 | 305264 | 0 | 15 | 3823 | 305810 | 2 | 1 | 2 (4) | 5 |
|  |  | Uplink | Mid | 1632.5 | 326500 | 1627.82 | 325564 | 0 | - | - | - | - | - | - | - |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-1 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs.  Note 3: For symmetric CBW combinations, Low and Mid test frequencies are specified using Tx-Rx spacing of -101.5 MHz and High test frequency is specified using Tx-Rx spacing of -120.5 MHz  Note 4: For asymmetric CBW combination UL=10MHz and DL=5MHz, Low and Mid test frequencies are specified using Tx-Rx spacing of -104 MHz and High test frequency is specified using Tx-Rx spacing of -118 MHz. | | | | | | | | | | | | | | | |

##### 5.2.2.1.25 Reference test frequencies for NR operating band n25

Table 5.2.2.1.25-1: Test frequencies for NR operating band n25 and SCS 15 kHz

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CBW [MHz] | *carrierBandwidth*  [PRBs] | Range | | Carrier centre  [MHz] | Carrier centre  [ARFCN] | point A [MHz] | *absoluteFrequencyPointA* [ARFCN] | *offsetToCarrier* [Carrier PRBs] | SS block SCS  [kHz] | GSCN | *absoluteFrequencySSB*  [ARFCN] |  | **Offset Carrier CORESET#0**  **[RBs]**  Note 2 | CORESET#0 Index (Offset  **[RBs])**  Note 1 | offsetToPointA (SIB1)  [PRBs]  Note 1 |
| 10 | 52 | Downlink | Mid | 1962.5 | 392500 | 1957.82 | 391564 | 0 | 15 | 4898 | 391930 | 2 | 0 | 0 (0) | 0 |
|  |  | Uplink | Mid | 1882.5 | 376500 | 1877.82 | 375564 | 0 | - | - | - | - | - | - | - |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-1 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs. | | | | | | | | | | | | | | | |

##### 5.2.2.1.26 Reference test frequencies for NR operating band n26

Table 5.2.2.1.26-1: Test frequencies for NR operating band n26 and SCS 15 kHz

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CBW [MHz] | *carrierBandwidth*  [PRBs] | Range | | Carrier centre  [MHz] | Carrier centre  [ARFCN] | point A [MHz] | *absoluteFrequencyPointA* [ARFCN] | *offsetToCarrier* [Carrier PRBs] | SS block SCS  [kHz] | GSCN | *absoluteFrequencySSB*  [ARFCN] |  | Offset carrier CORESET#0 [RBs]  Note 2 | CORESET#0 Index (Offset  **[RBs])**  Note 1 | offsetToPointA (SIB1)  [PRBs]  Note 1 |
| 10 | 52 | Downlink | Mid | 876.5 | 175300 | 871.82 | 174364 | 0 | 15 | 2183 | 174730 | 2 | 0 | 0 (0) | 0 |
|  |  | Uplink | Mid | 831.5 | 166300 | 826.82 | 165364 | 0 | - | - | - | - | - | - | - |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-1 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs. | | | | | | | | | | | | | | | |

##### 5.2.2.1.27 FFS

##### 5.2.2.1.28 Reference test frequencies for NR operating band n28

Table 5.2.2.1.28-1: Test frequencies for NR operating band n28 and SCS 15 kHz

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CBW [MHz] | *carrierBandwidth*  [PRBs] | Range | | Carrier centre  [MHz] | Carrier centre  [ARFCN] | point A [MHz] | *absoluteFrequencyPointA* [ARFCN] | *offsetToCarrier* [Carrier PRBs] | SS block SCS  [kHz] | GSCN | *absoluteFrequencySSB*  [ARFCN] |  | **Offset Carrier CORESET#0**  **[RBs]**  Note 3 | CORESET#0 Index (Offset  **[RBs])**  Note 1 | offsetToPointA (SIB1)  [PRBs]  Note 1 |
| 10 | 52 | Downlink | Mid | 780.5 | 156100 | 775.82 | 155164 | 0 | 15 | 1943 | 155530 | 2 | 0 | 0 (0) | 0 |
|  |  | Uplink | Mid | 725.5 | 145100 | 720.82 | 144164 | 0 | - | - | - | - | - | - | - |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-1 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: Carrier centre frequency moved for Mid Range and CBW=20 MHz due to Note 7 in TS 38.101-1 [7], Table 5.3.5-1.  Note 3: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs.  Note 4: No carrier centre frequency specified for Mid Range and CBW=30 MHz due to Note 7 in TS 38.101-1 [7], Table 5.3.5-1. For test cases specifying Mid range and CBW=30 MHz to be tested, use Low range and CBW=30 MHz instead. | | | | | | | | | | | | | | | |

##### 5.2.2.1.29 FFS

##### 5.2.2.1.30 Reference test frequencies for NR operating band n30

Table 5.2.2.1.30-1: Test frequencies for NR operating band n30 and SCS 15 kHz

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CBW [MHz] | *carrierBandwidth*  [PRBs] | Range | | Carrier centre  [MHz] | Carrier centre  [ARFCN] | point A [MHz] | *absoluteFrequencyPointA* [ARFCN] | *offsetToCarrier* [Carrier PRBs] | SS block SCS  [kHz] | GSCN | *absoluteFrequencySSB*  [ARFCN] |  | **Offset Carrier CORESET#0**  **[RBs]**  Note 2 | CORESET#0 Index (Offset  **[RBs])**  Note 1 | offsetToPointA (SIB1)  [PRBs]  Note 1 |
| 10 | 52 | Downlink | Mid | 2355 | 471000 | 2350.32 | 470064 | 0 | 15 | 5880 | 470430 | 2 | 0 | 0 (0) | 0 |
|  |  | Uplink | Mid | 2310 | 462000 | 2396.04 | 479208 | 0 | - | - | - | - | - | - | - |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-1 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs. | | | | | | | | | | | | | | | |

##### 5.2.2.1.31 – 5.2.2.1.37 FFS

##### 5.2.2.1.38 Reference test frequencies for NR operating band n38

Table 5.2.2.1.38-1: Test frequencies for NR operating band n38 and SCS 15 kHz

FFS

Table 5.2.2.1.38-2: Test frequencies for NR operating band n38 and SCS 30 kHz

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CBW [MHz] | *carrierBandwidth*  [PRBs] | Range | | Carrier centre  [MHz] | Carrier centre  [ARFCN] | point A [MHz] | *absoluteFrequencyPointA* [ARFCN] | *offsetToCarrier* [Carrier PRBs] | SS block SCS  [kHz] | GSCN | *absoluteFrequencySSB*  [ARFCN] |  | **Offset Carrier CORESET#0**  **[RBs]**  Note 2 | CORESET#0 Index (Offset  **[RBs])**  Note 1 | offsetToPointA (SIB1)  [PRBs]  Note 1 |
| 40 | 106 | Downlink  &  Uplink | Mid | 2595 | 519000 | 2575.92 | 515184 | 0 | 30 | 6450 | 516030 | 18 | 0 | 1 (1) | 2 |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-4 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs. | | | | | | | | | | | | | | | |

##### 5.2.2.1.39 Reference test frequencies for NR operating band n39

Table 5.2.2.1.39-1: Test frequencies for NR operating band n39 and SCS 15 kHz

FFS

Table 5.2.2.1.39-2: Test frequencies for NR operating band n39 and SCS 30 kHz

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CBW [MHz] | *carrierBandwidth*  [PRBs] | Range | | Carrier centre  [MHz] | Carrier centre  [ARFCN] | point A [MHz] | *absoluteFrequencyPointA* [ARFCN] | *offsetToCarrier* [Carrier PRBs] | SS block SCS  [kHz] | GSCN | *absoluteFrequencySSB*  [ARFCN] |  | **Offset Carrier CORESET#0**  **[RBs]**  Note 2 | CORESET#0 Index (Offset  **[RBs])**  Note 1 | offsetToPointA (SIB1)  [PRBs]  Note 1 |
| 40 | 106 | Downlink  &  Uplink | Mid | 1900 | 380000 | 1880.92 | 376184 | 0 | 30 | 4714 | 377090 | 14 | 0 | 2 (2) | 4 |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-2 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs. | | | | | | | | | | | | | | | |

##### 5.2.2.1.40 Reference test frequencies for NR operating band n40

Table 5.2.2.1.40-1: Test frequencies for NR operating band n40 and SCS 15 kHz

FFS

Table 5.2.2.1.40-2: Test frequencies for NR operating band n40 and SCS 30 kHz

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CBW [MHz] | *carrierBandwidth*  [PRBs] | Range | | Carrier centre  [MHz] | Carrier centre  [ARFCN] | point A [MHz] | *absoluteFrequencyPointA* [ARFCN] | *offsetToCarrier* [Carrier PRBs] | SS block SCS  [kHz] | GSCN | *absoluteFrequencySSB*  [ARFCN] |  | **Offset Carrier CORESET#0**  **[RBs]**  Note 2 | CORESET#0 Index (Offset  **[RBs])**  Note 1 | offsetToPointA (SIB1)  [PRBs]  Note 1 |
| 40 | 106 | Downlink  &  Uplink | Mid | 2350 | 470000 | 2330.92 | 466184 | 0 | 30 | 5839 | 467090 | 14 | 0 | 2 (2) | 4 |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-2 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs. | | | | | | | | | | | | | | | |

##### 5.2.2.1.41 Reference test frequencies for NR operating band n41

Table 5.2.2.1.41-1: Test frequencies for NR operating band n41, SCS 15 kHz and ΔFRaster 15 kHz

FFS

Table 5.2.2.1.41-2: Test frequencies for NR operating band n41, SCS 30 kHz and ΔFRaster 30 kHz

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CBW [MHz] | *carrierBandwidth*  [PRBs] | Range | | Carrier centre  [MHz] | Carrier centre  [ARFCN] | point A [MHz] | *absoluteFrequencyPointA* [ARFCN] | *offsetToCarrier* [Carrier PRBs] | SS block SCS  [kHz] | GSCN | *absoluteFrequencySSB*  [ARFCN] |  | **Offset Carrier CORESET#0**  **[RBs]**  Note 2 | CORESET#0 Index (Offset  **[RBs])**  Note 1 | offsetToPointA (SIB1)  [PRBs]  Note 1 |
| 40 | 106 | Downlink  &  Uplink | Mid | 2592.99 | 518598 | 2573.91 | 514782 | 0 | 30 | 6444 | 515550 | 16 | 0 | 0 (0) | 0 |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-4 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs. | | | | | | | | | | | | | | | |

##### 5.2.2.1.42 – 5.2.2.1.47 FFS

##### 5.2.2.1.48 Reference test frequencies for NR operating band n48

Table 5.2.2.1.48-1: Test frequencies for NR operating band n48 and SCS 15 kHz

FFS

Table 5.2.2.1.48-2: Test frequencies for NR operating band n48 and SCS 30 kHz

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CBW [MHz] | *carrierBandwidth*  [PRBs] | Range | | Carrier centre  [MHz] | Carrier centre  [ARFCN] | point A [MHz] | *absoluteFrequencyPointA* [ARFCN] | *offsetToCarrier* [Carrier PRBs] | SS block SCS  [kHz] | GSCN | *absoluteFrequencySSB*  [ARFCN] |  | **Offset Carrier CORESET#0**  **[RBs]**  Note 2 | CORESET#0 Index (Offset  **[RBs])**  Note 1 | offsetToPointA (SIB1)  [PRBs]  Note 1 |
| 40 | 106 | Downlink  &  Uplink | Mid | 3624.99 | 641666 | 3605.91 | 640394 | 0 | 30 | 7923 | 640704 | 22 | 0 | 2 (2) | 4 |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-4 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs.  Note 3: For this bandwidth, the minimum requirements are restricted to operation when carrier is configured as a downlink only SCell part of a CA configuration. As the bandwidth is limited to SCell then absence of CORESET#0 is indicated in the MIB by setting =31, *controlResourceSetZero*=0 and *searchSpaceZero = 0* (TS 38.213 [22], clause 13). | | | | | | | | | | | | | | | |

##### 5.2.2.1.49 FFS

##### 5.2.2.1.50 Reference test frequencies for NR operating band n50

Table 5.2.2.1.50-1: Test frequencies for NR operating band n50 and SCS 15 kHz

FFS

Table 5.2.2.1.50-2: Test frequencies for NR operating band n50 and SCS 30 kHz

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CBW [MHz] | *carrierBandwidth*  [PRBs] | Range | | Carrier centre  [MHz] | Carrier centre  [ARFCN] | point A [MHz] | *absoluteFrequencyPointA* [ARFCN] | *offsetToCarrier* [Carrier PRBs] | SS block SCS  [kHz] | GSCN | *absoluteFrequencySSB*  [ARFCN] |  | **Offset Carrier CORESET#0**  **[RBs]**  Note 2 | CORESET#0 Index (Offset  **[RBs])**  Note 1 | offsetToPointA (SIB1)  [PRBs]  Note 1 |
| 40 | 106 | Downlink  &  Uplink | Mid | 1474.5 | 294900 | 1455.42 | 291084 | 0 | 30 | 3648 | 291870 | 22 | 0 | 0 (0) | 0 |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-2 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs.  Note 3: This UE channel bandwidth is applicable only to downlink (TS 38.101-1 table 5.3.5-1). | | | | | | | | | | | | | | | |

##### 5.2.2.1.51 – 5.2.2.1.64 FFS

##### 5.2.2.1.65 Reference test frequencies for NR operating band n65

Table 5.2.2.1.65-1: Test frequencies for NR operating band n65 and SCS 15 kHz

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CBW [MHz] | *carrierBandwidth*  [PRBs] | Range | | Carrier centre  [MHz] | Carrier centre  [ARFCN] | point A [MHz] | *absoluteFrequencyPointA* [ARFCN] | *offsetToCarrier* [Carrier PRBs] | SS block SCS  [kHz] | GSCN | *absoluteFrequencySSB*  [ARFCN] |  | **Offset Carrier CORESET#0**  **[RBs]**  Note 2 | CORESET#0 Index (Offset  **[RBs])**  Note 1 | offsetToPointA (SIB1)  [PRBs]  Note 1 |
| 10 | 52 | Downlink | Mid | 2155 | 431000 | 2150.32 | 430064 | 0 | 15 | 5383 | 430610 | 2 | 1 | 2 (4) | 5 |
|  |  | Uplink | Mid | 1965 | 393000 | 1960.32 | 392064 | 0 | - | - | - | - | - | - | - |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-1 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs. | | | | | | | | | | | | | | | |

##### 5.2.2.1.66 Reference test frequencies for NR operating band n66

Table 5.2.2.1.66-1: Test frequencies for NR operating band n66, uplink and downlink channel bandwidth combinations and SCS 15 kHz

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| UL/DLCBW  Combination  (Asymmetric BCS)  Note 3 | CBW [MHz] | *carrierBandwidth*  [PRBs] | Range | | Carrier centre  [MHz] | Carrier centre  [ARFCN] | point A [MHz] | *absoluteFrequencyPointA* [ARFCN] | *offsetToCarrier* [Carrier PRBs] | SS block SCS  [kHz] | GSCN | *absoluteFrequencySSB*  [ARFCN] |  | **Offset Carrier CORESET#0**  **[RBs]**  Note 2 | CORESET#0 Index (Offset  **[RBs])**  Note 1 | offsetToPointA (SIB1)  [PRBs]  Note 1 |
| 10/10 | 10 | 52 | Downlink | Mid | 2145 | 429000 | 2140.32 | 428064 | 0 | 15 | 5355 | 428430 | 2 | 0 | 0 (0) | 0 |
|  | 10 | 52 | Uplink | Mid | 1745 | 349000 | 1740.32 | 348064 | 0 | - | - | - | - | - | - | - |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-1 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs.  Note 3 Asymmetric CBW BCS refers to applicable asymmetric UL and DL channel bandwidth combination set as specified in TS 38.101-1 [7], Table 5.3.6-1 for NR band n66. | | | | | | | | | | | | | | | | |

##### 5.2.2.1.67 – 5.2.2.1.69 FFS

##### 5.2.2.1.70 Reference test frequencies for NR operating band n70

Table 5.2.2.1.70-1: Test frequencies for NR operating band n70, default Tx-RX frequency separation 300MHz, uplink and downlink channel bandwidth combinations and SCS 15 kHz

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| UL/DLBandwidth  combination | CBW [MHz] | *carrierBandwidth*  [PRBs] | Range | | Carrier centre  [MHz] | Carrier centre  [ARFCN] | point A [MHz] | *absoluteFrequencyPointA* [ARFCN] | *offsetToCarrier* [Carrier PRBs] | SS block SCS  [kHz] | GSCN | *absoluteFrequencySSB*  [ARFCN] |  | **Offset Carrier CORESET#0**  **[RBs]**  **Note 2** | **CORESET#0 Index (Offset**  **[RBs])**  **Note 1** | offsetToPointA (SIB1)  [PRBs]  Note 1 |
| 10/10 | 10 | 52 | Downlink | Mid | 2002.5 | 400500 | 1997.82 | 399564 | 0 | 15 | 5001 | 400110 | 2 | 1 | 2 (4) | 5 |
|  | 10 | 52 | Uplink | Mid | 1702.5 | 340500 | 1697.82 | 339564 | 0 | - | - | - | - | - | - | - |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-1 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs. | | | | | | | | | | | | | | | | |

##### 5.2.2.1.71 Reference test frequencies for NR operating band n71

Table 5.2.2.1.71-1: Test frequencies for NR operating band n71 and SCS 15 kHz

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CBW [MHz] | *carrierBandwidth*  [PRBs] | Range | | Carrier centre  [MHz] | Carrier centre  [ARFCN] | point A [MHz] | *absoluteFrequencyPointA* [ARFCN] | *offsetToCarrier* [Carrier PRBs] | SS block SCS  [kHz] | GSCN | *absoluteFrequencySSB*  [ARFCN] |  | **Offset Carrier CORESET#0**  **[RBs]**  Note 2 | CORESET#0 Index (Offset  **[RBs])**  Note 1 | offsetToPointA (SIB1)  [PRBs]  Note 1 |
| 10 | 52 | Downlink | Mid | 634.5 | 126900 | 629.82 | 125964 | 0 | 15 | 1581 | 126510 | 2 | 1 | 2 (4) | 5 |
|  |  | Uplink | Mid | 680.5 | 136100 | 675.82 | 135164 | 0 | - | - | - | - | - | - | - |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-1 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs. | | | | | | | | | | | | | | | |

##### 5.2.2.1.72 – 5.2.2.1.73 FFS

##### 5.2.2.1.74 Reference test frequencies for NR operating band n74

Table 5.2.2.1.74-1: Test frequencies for NR operating band n74 and SCS 15 kHz

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CBW [MHz] | *carrierBandwidth*  [PRBs] | Range | | Carrier centre  [MHz] | Carrier centre  [ARFCN] | point A [MHz] | *absoluteFrequencyPointA* [ARFCN] | *offsetToCarrier* [Carrier PRBs] | SS block SCS  [kHz] | GSCN | *absoluteFrequencySSB*  [ARFCN] |  | **Offset Carrier CORESET#0**  **[RBs]**  Note 2 | CORESET#0 Index (Offset  **[RBs])**  Note 1 | offsetToPointA (SIB1)  [PRBs]  Note 1 |
| 10 | 52 | Downlink | Mid | 1496.5 | 299300 | 1491.82 | 298364 | 0 | 15 | 3736 | 298850 | 6 | 1 | 1 (2) | 3 |
|  |  | Uplink | Mid | 1448.5 | 289700 | 1443.82 | 288764 | 0 | - | - | - | - | - | - | - |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-1 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs. | | | | | | | | | | | | | | | |

##### 5.2.2.1.75 – 5.2.2.1.76 FFS

##### 5.2.2.1.77 Reference test frequencies for NR operating band n77

Table 5.2.2.1.77-1: Test frequencies for NR operating band n77, SCS 15 kHz and ΔFRaster 15 kHz

FFS

Table 5.2.2.1.77-2: Test frequencies for NR operating band n77, SCS 30 kHz and ΔFRaster 30 kHz

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CBW [MHz]** | ***carrierBandwidth***  **[PRBs]** | **Range** | | **Carrier centre**  **[MHz]** | **Carrier centre**  **[ARFCN]** | **point A [MHz]** | ***absoluteFrequencyPointA* [ARFCN]** | ***offsetToCarrier* [Carrier PRBs]** | **SS block SCS**  **[kHz]** | **GSCN** | ***absoluteFrequencySSB***  **[ARFCN]** |  | **Offset Carrier CORESET#0**  **[RBs]**  **Note 2** | **CORESET#0 Index (Offset**  **[RBs])**  **Note 1** | **offsetToPointA (SIB1)**  **[PRBs]**  **Note 1** |
| 40 | 106 | Downlink  &  Uplink | Mid | 3750 | 650000 | 3730.92 | 648728 | 0 | 30 | 8010 | 649056 | 16 | 0 | 3 (3) | 6 |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-4 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs. | | | | | | | | | | | | | | | |

##### 5.2.2.1.78 Reference test frequencies for NR operating band n78

Table 5.2.2.1.78-1: Test frequencies for NR operating band n78, SCS 15 kHz and ΔFRaster 15 kHz

FFS

Table 5.2.2.1.78-2: Test frequencies for NR operating band n78, SCS 30 kHz and ΔFRaster 30 kHz

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CBW [MHz]** | ***carrierBandwidth***  **[PRBs]** | **Range** | | **Carrier centre**  **[MHz]** | **Carrier centre**  **[ARFCN]** | **point A [MHz]** | ***absoluteFrequencyPointA* [ARFCN]** | ***offsetToCarrier* [Carrier PRBs]** | **SS block SCS**  **[kHz]** | **GSCN** | ***absoluteFrequencySSB***  **[ARFCN]** |  | **Offset Carrier CORESET#0**  **[RBs]**  **Note 2** | **CORESET#0 Index (Offset**  **[RBs])**  **Note 1** | **offsetToPointA (SIB1)**  **[PRBs]**  **Note 1** |
| 40 | 106 | Downlink  &  Uplink | Mid | 3549.99 | 636666 | 3530.91 | 635394 | 0 | 30 | 7871 | 635712 | 6 | 0 | 3 (3) | 6 |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-4 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs. | | | | | | | | | | | | | | | |

##### 5.2.2.1.79 Reference test frequencies for NR operating band n79

Table 5.2.2.1.79-1: Test frequencies for NR operating band n79, SCS 15 kHz and ΔFRaster 15 kHz

FFS

Table 5.2.2.1.79-2: Test frequencies for NR operating band n79, SCS 30 kHz and ΔFRaster 30 kHz

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CBW [MHz]** | ***carrierBandwidth***  **[PRBs]** | **Range** | | **Carrier centre**  **[MHz]** | **Carrier centre**  **[ARFCN]** | **point A [MHz]** | ***absoluteFrequencyPointA* [ARFCN]** | ***offsetToCarrier* [Carrier PRBs]** | **SS block SCS**  **[kHz]** | **GSCN** | ***absoluteFrequencySSB***  **[ARFCN]** |  | **Offset Carrier CORESET#0**  **[RBs]**  **Note 2** | **CORESET#0 Index (Offset**  **[RBs])**  **Note 1** | **offsetToPointA (SIB1)**  **[PRBs]**  **Note 1** |
| 40 | 106 | Downlink  &  Uplink | Mid | 4700.01 | 713334 | 4680.93 | 712062 | 0 | 30 | 8672 | 712608 | 18 | 8 | 1 (4) | 24 |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-6 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs. | | | | | | | | | | | | | | | |

#### 5.2.2.2 NR operating bands in FR2

##### 5.2.2.2.1 Reference test frequencies for NR operating band n257

Table 5.2.2.2.1-1: Test frequencies for NR operating band n257, SCS 60 kHz and ΔFRaster 60 kHz

FFS

Table 5.2.2.2.1-2: Test frequencies for NR operating band n257, SCS 120 kHz and ΔFRaster 120 kHz

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CBW [MHz]** | ***carrierBandwidth***  **[PRBs]** | **Range** | | **Carrier centre**  **[MHz]** | **Carrier centre**  **[ARFCN]** | **point A [MHz]** | ***absoluteFrequencyPointA* [ARFCN]** | ***offsetToCarrier* [Carrier PRBs]** | **SS block SCS**  **[kHz]** | **GSCN** | ***absoluteFrequencySSB***  **[ARFCN]** |  | **Offset Carrier CORESET#0**  **[RBs]**  **Note 2** | **CORESET#0 Index (Offset**  **[RBs])**  **Note 1** | **offsetToPointA (SIB1)**  **[PRBs]**  **Note 1** |
| 100 | 66 | Downlink  &  Uplink | Mid | 27999.96 | 2079165 | 27952.44 | 2078373 | 0 | 120 | 22472 | 2078875 | 11 | 6 | 1 (4) | 20 |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-8 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs. | | | | | | | | | | | | | | | |

##### 5.2.2.2.2 Reference test frequencies for NR operating band n258

Table 5.2.2.2.2-1: Test frequencies for NR operating band n258, SCS 60 kHz and ΔFRaster 60 kHz

FFS

Table 5.2.2.2.2-2: Test frequencies for NR operating band n258, SCS 120 kHz and ΔFRaster 120 kHz

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CBW [MHz] | *carrierBandwidth*  [PRBs] | Range | | Carrier centre  [MHz] | Carrier centre  [ARFCN] | point A [MHz] | *absoluteFrequencyPointA* [ARFCN] | *offsetToCarrier* [Carrier PRBs] | SS block SCS  [kHz] | GSCN | *absoluteFrequencySSB*  [ARFCN] |  | **Offset Carrier CORESET#0**  **[RBs]**  **Note 2** | **CORESET#0 Index (Offset**  **[RBs])**  **Note 1** | offsetToPointA (SIB1)  [PRBs]  Note 1 |
| 100 | 66 | Downlink  &  Uplink | Mid | 25875 | 2043749 | 25827.48 | 2042957 | 0 | 120 | 22349 | 2043451 | 7 | 6 | 1 (4) | 20 |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-8 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs. | | | | | | | | | | | | | | | |

##### 5.2.2.2.3 Reference test frequencies for NR operating band n259

Table 5.2.2.2.3-1: Test frequencies for NR operating band n260, SCS 60 kHz and ΔFRaster 60 kHz

FFS

Table 5.2.2.2.3-2: Test frequencies for NR operating band n260, SCS 120 kHz and ΔFRaster 120 kHz

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CBW [MHz]** | ***carrierBandwidth***  **[PRBs]** | **Range** | | **Carrier centre**  **[MHz]** | **Carrier centre**  **[ARFCN]** | **point A [MHz]** | ***absoluteFrequencyPointA* [ARFCN]** | ***offsetToCarrier* [Carrier PRBs]** | **SS block SCS**  **[kHz]** | **GSCN** | ***absoluteFrequencySSB***  **[ARFCN]** |  | **Offset Carrier CORESET#0**  **[RBs]**  **Note 2** | **CORESET#0 Index (Offset**  **[RBs])**  **Note 1** | **offsetToPointA (SIB1)**  **[PRBs]**  **Note 1** |
| 100 | 66 | Downlink  &  Uplink | Mid | 41499.96 | 2304165 | 41452.44 | 2303373 | 102 | 120 | 23253 | 2303803 | 11 | 3 | 1 (4) | 14 |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-8 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs. | | | | | | | | | | | | | | | |

##### 5.2.2.2.4 Reference test frequencies for NR operating band n260

Table 5.2.2.2.4-1: Test frequencies for NR operating band n260, SCS 60 kHz and ΔFRaster 60 kHz

FFS

Table 5.2.2.2.4-2: Test frequencies for NR operating band n260, SCS 120 kHz and ΔFRaster 120 kHz

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CBW [MHz]** | ***carrierBandwidth***  **[PRBs]** | **Range** | | **Carrier centre**  **[MHz]** | **Carrier centre**  **[ARFCN]** | **point A [MHz]** | ***absoluteFrequencyPointA* [ARFCN]** | ***offsetToCarrier* [Carrier PRBs]** | **SS block SCS**  **[kHz]** | **GSCN** | ***absoluteFrequencySSB***  **[ARFCN]** |  | **Offset Carrier CORESET#0**  **[RBs]**  **Note 2** | **CORESET#0 Index (Offset**  **[RBs])**  **Note 1** | **offsetToPointA (SIB1)**  **[PRBs]**  **Note 1** |
| 100 | 66 | Downlink  &  Uplink | Mid | 38499.96 | 2254165 | 38452.44 | 2253373 | 0 | 120 | 23079 | 2253691 | 3 | 3 | 0 (0) | 6 |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-8 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs. | | | | | | | | | | | | | | | |

##### 5.2.2.2.5 Reference test frequencies for NR operating band n261

Table 5.2.2.2.5-1: Test frequencies for NR operating band n261, SCS 60 kHz and ΔFRaster 60 kHz

FFS

Table 5.2.2.2.5-2: Test frequencies for NR operating band n261, SCS 120 kHz and ΔFRaster 120 kHz

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CBW [MHz]** | ***carrierBandwidth***  **[PRBs]** | **Range** | | **Carrier centre**  **[MHz]** | **Carrier centre**  **[ARFCN]** | **point A [MHz]** | ***absoluteFrequencyPointA* [ARFCN]** | ***offsetToCarrier* [Carrier PRBs]** | **SS block SCS**  **[kHz]** | **GSCN** | ***absoluteFrequencySSB***  **[ARFCN]** |  | **Offset Carrier CORESET#0**  **[RBs]**  **Note 2** | **CORESET#0 Index (Offset**  **[RBs])**  **Note 1** | **offsetToPointA (SIB1)**  **[PRBs]**  **Note 1** | |
| 100 | 66 | Downlink  &  Uplink | Mid | 27924.96 | 2077915 | 27877.44 | 2077123 | 0 | 120 | 22467 | 2077435 | 0 | 3 | 0 (0) | 6 | |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-8 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs. | | | | | | | | | | | | | | | |

## 5.3 Void

Editor‘s Note: Reserved for future use.

## 5.4 Default NG-RAN RRC message and information elements contents

### 5.4.1 Radio resource control information elements

As defined in clause 4.6.3 with the following exceptions:

For Tx and Rx test cases in which Power Class 3 UEs verifying Power Class 3 requirements, refer to Table 5.4.1-1; For Tx and Rx test cases in which Power Class 2 UEs verifying Power Class 2 requirements, refer to Table 5.4.1-2; For Tx and Rx test cases in which Power Class 1.5 UEs verifying Power Class 1.5 requirements, refer to Table 5.4.1-2A.

Table 5.4.1-1: *P-Max-PC3*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-89 | | | |
| Information Element | Value/remark | Comment | Condition |
| P-Max | Not present |  | SA |
|  | 23 |  | EN-DC |

Table 5.4.1-2: *P-Max-PC2*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-89 | | | |
| Information Element | Value/remark | Comment | Condition |
| P-Max | Not present |  | SA |
|  | 26 |  | EN-DC |

|  |  |
| --- | --- |
| Condition | Explanation |
| SA | NR standalone RF tests cases |
| EN-DC | EN-DC RF tests cases specified in 38.521-3 |

Table 5.4.1-2A: *P-Max-PC1.5*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-89 | | | |
| **Information Element** | **Value/remark** | **Comment** | **Condition** |
| P-Max | Not present |  | SA |

Table 5.4.1-3: Void

Table 5.4.1-4: PUSCH-Config

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Clause 4.6.3 Table 4.6.3-118 | | | |
| Information Element | Value/remark | Comment | Condition |
| PUSCH-Config ::= SEQUENCE { |  |  |  |
| maxRank | 2 |  | 2TX\_UL\_MIMO |
|  | 1 |  | ULFPTx\_Mode1 or ULFPTx\_Mode2 or ULFPTx\_ModeFull |
| ul-FullPowerTransmission-r16 | Not present |  | 2TX\_UL\_MIMO |
|  | fullpowerMode1 |  | ULFPTx\_Mode1 |
|  | fullpowerMode2 |  | ULFPTx\_Mode2 |
|  | fullpower |  | ULFPTx\_ModeFull |
| } |  |  |  |

|  |  |
| --- | --- |
| Condition | Explanation |
| 2TX\_UL\_MIMO | UL-MIMO test cases with 2 Tx antenna ports |
| ULFPTx\_Mode1 | UL-MIMO test cases with UEs supporting UL full power transmission Mode-1 |
| ULFPTx\_Mode2 | UL-MIMO test cases with UEs supporting UL full power transmission Mode-2 |
| ULFPTx\_ModeFull | UL-MIMO test cases with UEs supporting UL full power transmission Mode-full power |

CSI-RS for Tracking

Table 5.4.1-5: CSI-RS-ResourceMapping for TRS

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-45 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-RS-ResourceMapping ::= SEQUENCE { |  |  |  |
| frequencyDomainAllocation CHOICE { |  |  |  |
| row1 | 0001 |  | TRS |
| } |  |  |  |
| firstOFDMSymbolInTimeDomain | 6 | l0 = 6 for CSI-RS resource 1 and 3 | TRS AND FR1 |
| 10 | l0 = 10 for CSI-RS resource 2 and 4 | TRS AND FR1 |
| 8 | l0 = 8 for CSI-RS resource 1 | TRS AND FR2 |
| 12 | l0 = 12 for CSI-RS resource 2 | TRS AND FR2 |
| nrofPorts | p1 |  | TRS |
| Cdm-Type | noCDM |  | TRS |
| Density CHOICE{ |  |  |  |
| three | Null |  | TRS |
| } |  |  |  |
| freqBand | CSI-FrequencyOccupation for TRS |  | TRS |
| } |  |  |  |

|  |  |
| --- | --- |
| Condition | Explanation |
| TRS | Tracking-Reference Signal |

Table 5.4.1-6: CSI-ResourcePeriodicityAndOffset for TRS

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-43 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ResourcePeriodicityAndOffset ::= CHOICE { |  |  |  |
| slots20 | 0 | SCS 15kHz, CSI-RS resource 1 and 2 | TRS AND FR1\_15kHz |
| 1 | SCS 15kHz, CSI-RS resource 3 and 4 | TRS AND FR1\_15kHz |
| Slots40 | 1 | SCS 30kHz, CSI-RS resource 1 and 2 | TRS AND FR1\_30kHz |
| 2 | SCS 30kHz, CSI-RS resource 3 and 4 | TRS AND FR1\_30kHz |
| Slots80 | 2 | SCS 60kHz, FR1, CSI-RS resource 1 and 2 | TRS AND FR1\_60kHz |
| 3 | SCS 60kHz, FR1, CSI-RS resource 3 and 4 | TRS AND FR1\_60kHz |
|  | 40 | SCS 60kHz, FR2, CSI-RS resource 1 and 2 | TRS AND FR2\_60kHz |
| Slots160 | 80 | SCS 120kHz, CSI-RS resource 1 and 2 | TRS AND FR2\_120kHz |
| } |  |  |  |

|  |  |
| --- | --- |
| Condition | Explanation |
| FR1\_15kHz | FR1 is used under the test. SCS is set to 15kHz. |
| FR1\_30kHz | FR1 is used under the test. SCS is set to 30kHz. |
| FR1\_60kHz | FR1 is used under the test. SCS is set to 60kHz. |
| FR2\_60kHz | FR2 is used under the test. SCS is set to 60kHz. |
| FR2\_120kHz | FR2 is used under the test. SCS is set to 120kHz. |
| TRS | Tracking-Reference Signal |

Table 5.4.1-7: *CSI-MeasConfig for TRS*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 Table 4.6.3-38 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-MeasConfig::= SEQUENCE { |  |  |  |
| nzp-CSI-RS-ResourceToAddModList SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-Resources)) OF NZP-CSI-RS-Resource { | 2 entries in case of FR2  4 entries in case of FR1 | 2 entries in case of FR2  4 entries in case of FR1 |  |
| NZP-CSI-RS-Resource[1] | NZP-CSI-RS-Resource for TRS (1) | entry 1  CSI-RS resource 1 |  |
| NZP-CSI-RS-Resource[2] | NZP-CSI-RS-Resource for TRS (2) | entry 2  CSI-RS resource 2 |  |
| NZP-CSI-RS-Resource[3] | NZP-CSI-RS-Resource for TRS (3) | entry 3  CSI-RS resource 3 | FR1 |
| NZP-CSI-RS-Resource[4] | NZP-CSI-RS-Resource for TRS (4) | entry 4  CSI-RS resource 4 | FR1 |
| } |  |  |  |
| nzp-CSI-RS-ResourceSetToAddModList SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-ResourceSets)) OF NZP-CSI-RS-ResourceSet { | 1 entry |  |  |
| NZP-CSI-RS-ResourceSet[1] | NZP-CSI-RS-ResourceSet for TRS | entry 1 |  |
| } |  |  |  |
| csi-IM-ResourceToAddModList | Not present |  |  |
| csi-IM-ResourceSetToAddModList | Not present |  |  |
| csi-SSB-ResourceSetToAddModList | Not present |  |  |
| csi-ResourceConfigToAddModList SEQUENCE (SIZE (1..maxNrofCSI-ResourceConfigurations)) OF CSI-ResourceConfig { | 1 entry |  |  |
| CSI-ResourceConfig[1] | CSI-ResourceConfig for TRS | entry 1 |  |
| } |  |  |  |
| reportTriggerSize | Not present |  |  |
| aperiodicTriggerStateList SetupRelease | Not present |  |  |
| } |  |  |  |

Table 5.4.1-8: NZP-CSI-RS-Resource for TRS

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: 38.508-1 Table 4.6.3-85 | | | |
| Information Element | Value/remark | Comment | Condition |
| NZP-CSI-RS-Resource ::= SEQUENCE { |  |  |  |
| NZP-CSI-RS-ResourceId | 0 | CSI-RS resource 1 |  |
| 1 | CSI-RS resource 2 |  |
| 2 | CSI-RS resource 3 |  |
| 3 | CSI-RS resource 4 |  |
| CSI-RS-ResourceMapping | CSI-RS-ResourceMapping for TRS |  | Content conditioned by the CSI-RS resource # |
| powerControlOffset | 0 |  |  |
| powerControlOffsetSS | db0 |  |  |
| scramblingID | ScramblingId |  |  |
| periodicityAndOffset | CSI-ResourcePeriodicityAndOffset for TRS |  | Content conditioned by the CSI-RS resource # |
| qcl-InfoPeriodicCSI-RS | TCI-StateId |  |  |
| } |  |  |  |

Table 5.4.1-9: NZP-CSI-RS-ResourceSet for TRS

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-87 | | | |
| Information Element | Value/remark | Comment | Condition |
| NZP-CSI-RS-ResourceSet ::= SEQUENCE { |  |  |  |
| nzp\_CSI\_ResourceSetId | 0 |  |  |
| nzp-CSI-RS-Resources SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-ResourcesPerSet)) OF NZP-CSI-RS-ResourceId { | 2 entries in case of FR2  4 entries in case of FR1 |  |  |
| NZP-CSI-RS-ResourceId[1] | 0 | entry 1  CSI-RS resource 1 |  |
| NZP-CSI-RS-ResourceId[2] | 1 | entry 2  CSI-RS resource 2 |  |
| NZP-CSI-RS-ResourceId[3] | 2 | entry 3  CSI-RS resource 3 | FR1 |
| NZP-CSI-RS-ResourceId[4] | 3 | entry 4  CSI-RS resource 4 | FR1 |
| } |  |  |  |
| repetition | off |  |  |
| aperiodicTriggeringOffset | Not present |  |  |
| trs\_Info | true |  |  |
| } |  |  |  |

Table 5.4.1-10: CSI-ResourceConfig for TRS

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 Table 4.6.3-41 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ResourceConfig ::= SEQUENCE { |  |  |  |
| csi-ResourceConfigId | CSI-ResourceConfigId |  |  |
| csi-RS-ResourceSetList CHOICE { |  |  |  |
| nzp-CSI-RS-SSB SEQUENCE { |  |  |  |
| nzp-CSI-RS-ResourceSetList SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-ResourceSetsPerConfig)) OF NZP-CSI-RS-ResourceSetId { | 1 entry |  |  |
| NZP-CSI-RS-ResourceSetId[1] | 0 | entry 1 |  |
| } |  |  |  |
| csi-SSB-ResourceSetList | Not present |  |  |
| } |  |  |  |
| } |  |  |  |
| bwp-Id | BWP-Id |  |  |
| resourceType | periodic |  |  |
| } |  |  |  |

Table 5.4.1-11: CSI-FrequencyOccupation for TRS

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 Table 4.6.3-33 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-FrequencyOccupation ::= SEQUENCE { |  |  |  |
| startingRB | 0 |  |  |
| nrofRBs | max(4\*ceil(m/4),24) | m is the bandwidth of active BWP |  |
| } |  |  |  |

Table 5.4.1-12: *ServingCellConfig*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-167 | | | |
| Information Element | Value/remark | Comment | Condition |
| ServingCellConfig ::= SEQUENCE { |  |  |  |
| csi-MeasConfig CHOICE { |  |  |  |
| setup | csi-MeasConfig for TRS |  | TRS |
| } |  |  |  |

PDCCH Configuration

PDCCH-config

Table 5.4.1-16: PDCCH *ControlResourceSet*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-28 | | | |
| **Information Element** | **Value/remark** | **Comment** | **Condition** |
| frequencyDomainResources | 11111111 00000000 00000000 00000000 00000000 00000 | CORESET to use the least significant 48 RBs of the BWP | RFACS AND AL8 |
| 11111111 11111111 00000000 00000000 00000000 00000 | CORESET to use the least significant 96 RBs of the BWP | RFACS AND  AL16 |
| pdcch-DMRS-ScramblingID | 1008 | DMRS scrambling ID different from Physical Cell ID | SA AND FR1 |

|  |  |
| --- | --- |
| **Condition** | **Explanation** |
| RFACS | Used in RF Adjacent Channel Selectivity testing |
| AL8 | PDCCH aggregationLevel 8 is configured |
| AL16 | PDCCH aggregationLevel 16 is configured |
| SA | NR standalone RF tests cases |

Table 5.4.1-17: PDCCH *Search Space*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-162 | | | |
| Information Element | Value/remark | Comment | Condition |
| nrofCandidates SEQUENCE { |  |  |  |
| aggregationLevel1 | n2 |  | RFACS |
| aggregationLevel8 | n2 |  | RFACS |
| aggregationLevel16 | n2 |  | RFACS |
| } |  |  |  |
| } |  |  |  |

|  |  |
| --- | --- |
| Condition | Explanation |
| RFACS | Used in RF Adjacent Channel Selectivity testing |

PDSCH-ServingCellConfig

Table 5.4.1-18: PDSCH-ServingCellConfig

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-102 | | | |
| **Information Element** | **Value/remark** | **Comment** | **Condition** |
| PDSCH-ServingCellConfig ::= SEQUENCE { |  |  |  |
| nrofHARQ-ProcessesForPDSCH | Set according to definition in 38.521-1 [14], Table A.3.1-3 |  | FR1 AND CA |
| } |  |  |  |

PUCCH-Config

Table 5.4.1-19: PUCCH-Config

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-112 | | | |
| **Information Element** | **Value/remark** | **Comment** | **Condition** |
| PUCCH-Config ::= SEQUENCE { |  |  |  |
| dl-DataToUL-ACK SEQUENCE (SIZE (1..8)) OF INTEGER { | 8 entries |  | FR1 AND CA |
| INTEGER[1] | 2 | entry 1 |  |
| INTEGER[2] | 3 | entry 2 |  |
| INTEGER[3] | 4 | entry 3 |  |
| INTEGER[4] | 5 | entry 4 |  |
| INTEGER[5] | 6 | entry 5 |  |
| INTEGER[6] | 7 | entry 6 |  |
| INTEGER[7] | 8 | entry 7 |  |
| INTEGER[8] | 10 | entry 8 |  |
| } |  |  |  |
| } |  |  |  |

PDSCH-Config

Table 5.4.1-20: *PDSCH-Config*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-100 | | | |
| **Information Element** | **Value/remark** | **Comment** | **Condition** |
| PDSCH-Config ::= SEQUENCE { |  |  |  |
| tci-StatesToAddModList SEQUENCE(SIZE (1.. maxNrofTCI-States)) OF TCI-State { | 1 entry |  |  |
| TCI-State[1] SEQUENCE { |  | entry 1 |  |
| tci-StateId | 0 | TCI-StateId 0 |  |
| qcl-type1 SEQUENCE { |  |  |  |
| cell | Not present |  |  |
| bwp-id | Not present |  |  |
| referenceSignal CHOICE { |  |  |  |
| ssb | SSB-Index |  |  |
| } |  |  |  |
| qcl-Type | Type C |  |  |
| } |  |  |  |
| qcl-type2 SEQUENCE { |  |  |  |
| cell | Not present |  |  |
| bwp-id | Not present |  |  |
| referenceSignal CHOICE { |  |  |  |
| ssb | SSB-Index |  |  |
| } |  |  |  |
| qcl-Type | Type D |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

### 5.4.2 Radio resource control information elements for Demodulation Performance and CSI reporting tests

As defined in clause 4.6.3 with the following exceptions: -

Table 5.4.2-1 to 5.4.2.20: Void

#### 5.4.2.0 Parameters common to all Demod and CSI tests

Physical layer parameters

Table 5.4.2.0-1: Physical layer parameters for DCI format 1\_1 and DCI format 1\_0

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.3.6.1.2.2-1 | | | |
| Parameter | Value | Value in binary | Condition |
| PUCCH resource indicator | *PUCCH-ResourceId[1]* = 0 in pucch-ResourceSetID[1] or  *PUCCH-ResourceId[1]* = 8 in pucch-ResourceSetID[2] as defined in Table 4.6.3-112 (Mapping as per Table 9.2.3-2 in TS 38.213) | ‘000’B | FR1 |
| *PUCCH-ResourceId[5]* = 12 in pucch-ResourceSetID[2] as defined in Table 4.6.3-112 (Mapping as per Table 9.2.3-2 in TS 38.213) | ‘100’B | FR2\_SCS60kHz |
| *PUCCH-ResourceId[7]* = 14 in pucch-ResourceSetID[2] as defined in Table 4.6.3-112 (Mapping as per Table 9.2.3-2 in TS 38.213) | ‘110’B | FR2\_SCS120kHz |
| PDSCH-to-HARQ\_feedback timing indicator | K1 slots as defined in 9.2.3 in TS 38.213. K1 value used for the test is specified in the test description of each test case in TS 38.521-4. |  |  |

Common Serving Parameters

ServingCellConfigCommon

Table 5.4.2.0-2: ServingCellConfigCommon

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-168 | | | |
| Information Element | Value/remark | Comment | Condition |
| ServingCellConfigCommon ::= SEQUENCE { |  |  |  |
| physCellId | PhysCellId |  |  |
| downlinkConfigCommon | DownlinkConfigCommon |  |  |
| ssb-PositionsInBurst CHOICE { |  |  |  |
| shortBitmap | 1000 |  | FR1  AND  SSB#0  AND  (1.88GHz<FREQ<=3GHz  AND  (FDD  OR  (TDD AND SCS15))  OR  FREQ<=1.88GHz) |
| mediumBitmap | 10000000 |  | FR1  AND  SSB#0  AND  (1.88GHz<FREQ<=3GHz  AND  (TDD AND SCS30)  OR FREQ>3GHz) |
| } |  |  |  |
| ssb-periodicityServingCell | ms20 |  |  |
| dmrs-TypeA-Position | pos2 |  |  |
| subcarrierSpacing | SubcarrierSpacing according to test case id |  |  |
| tdd-UL-DL-ConfigurationCommon | TDD-UL-DL-ConfigCommon |  |  |
|  | Not present |  | FR1.30-1A  FR2.120-1A  FR1.FDD |
| ss-PBCH-BlockPower | 0 |  |  |
| } |  |  |  |

|  |  |
| --- | --- |
| **Condition** | **Explanation** |
| FREQ<=1.88GHz | Frequency range <= 1.88GHz |
| 1.88GHz<FREQ<=3GHz | Frequency range > 1.88GHz and <= 3GHz |
| FREQ>3GHz | Frequency range > 3GHz |
| FR1.30-1A | TDD UL-DL pattern FR1.30-1A is used. Ref Annex A.1.2 of TS 38.521-4 |
| FR2.120-1A | TDD UL-DL pattern FR2.120-1A is used. Ref Annex A.1.3 of TS 38.521-4 |
| SSB#N | Cell configured with SSB-Index set to N as defined in Table 4.4.2-2 |

TDD-UL-DL-Config

Table 5.4.2.0-3: TDD-UL-DL-Config

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-192 | | | |
| Information Element | Value/remark | Comment | Condition |
| TDD-UL-DL-ConfigCommon ::= SEQUENCE { |  |  |  |
| referenceSubcarrierSpacing | SubcarrierSpacing |  |  |
| pattern1 SEQUENCE { |  |  |  |
| dl-UL-TransmissionPeriodicity | ms5 |  | FR1.15-1,  FR1.30-1 |
|  | ms2p5 |  | FR1.30-2,  FR1.30-3 |
|  | ms3 |  | FR1.30-4 |
|  | ms2 |  | FR1.30-5 |
|  | ms1 |  | FR1.30-6  FR2.60-1 |
|  | ms0p625 |  | FR2.120.1 |
|  | ms0p5 |  | FR2.120.2 |
| nrofDownlinkSlots | 7 |  | FR1.30-1 |
|  | 3 |  | FR1.15-1  FR1.30-2  FR1.30-3  FR1.30-4  FR2.120.1 |
|  | 1 |  | FR1.30-5  FR1.30-6 |
|  | 2 |  | FR2.60-1  FR2.120.2 |
| nrofDownlinkSymbols | 6 |  | FR1.30-1  FR1.30-4 |
|  | 10 |  | FR1.15-1  FR1.30-2  FR1.30-3  FR1.30-6  FR2.120.1 |
|  | 12 |  | FR1.30-5 |
|  | 11 |  | FR2.60-1  FR2.120.2 |
| nrofUplinkSlots | 2 |  | FR1.30-1  FR1.30-4  FR1.30-5 |
|  | 1 |  | FR1.15-1  FR1.30-2  FR1.30-3  FR2.60-1  FR2.120.1  FR2.120.2 |
|  | 0 |  | FR1.30-6 |
| nrofUplinkSymbols | 4 |  | FR1.30-1  FR1.30-4  FR1.30-5 |
|  | 0 |  | FR1.30-6  FR2.60-1  FR2.120.2 |
|  | 2 |  | FR1.15-1  FR1.30-2  FR1.30-3  FR2.60-1  FR2.120.1  FR2.120.2 |
| } |  |  |  |
| pattern2 | Not present |  | FR1.15-1,  FR1.30-1  FR1.30-2  FR1.30-5  FR2.60-1  FR2.120.1  FR2.120.2 |
| pattern2 SEQUENCE { |  |  |  |
| dl-UL-TransmissionPeriodicity | ms2p5 |  | FR1.30-3 |
| ms2 |  | FR1.30-4 |
| ms1 |  | FR1.30-6 |
| nrofDownlinkSlots | 2 |  | FR1.30-3 |
| 4 |  | FR1.30-4 |
| 0 |  | FR1.30-6 |
| nrofDownlinkSymbols | 10 |  | FR1.30-3 |
| 0 |  | FR1.30-4 |
| 12 |  | FR1.30-6 |
| nrofUplinkSlots | 2 |  | FR1.30-3 |
| 0 |  | FR1.30-4 |
| 1 |  | FR1.30-6 |
| nrofUplinkSymbols | 2 |  | FR1.30-3 |
| 0 |  | FR1.30-4  FR1.30-6 |
| } |  |  |  |
| } |  |  |  |

|  |  |
| --- | --- |
| Condition | Explanation |
| FR1.15-1 | TDD UL-DL pattern FR1.15-1 is used. Ref Annex A.1.2 of TS 38.521-4 |
| FR1.30-1 | TDD UL-DL pattern FR1.30-1 is used. Ref Annex A.1.2 of TS 38.521-4 |
| FR1.30-2 | TDD UL-DL pattern FR1.30-2 is used. Ref Annex A.1.2 of TS 38.521-4 |
| FR1.30-3 | TDD UL-DL pattern FR1.30-3 is used. Ref Annex A.1.2 of TS 38.521-4 |
| FR1.30-4 | TDD UL-DL pattern FR1.30-4 is used. Ref Annex A.1.2 of TS 38.521-4 |
| FR1.30-5 | TDD UL-DL pattern FR1.30-5 is used. Ref Annex A.1.2 of TS 38.521-4 |
| FR1.30-6 | TDD UL-DL pattern FR1.30-6 is used. Ref Annex A.1.2 of TS 38.521-4 |
| FR2.60-1 | TDD UL-DL pattern FR2.60-1 is used. Ref Annex A.1.3 of TS 38.521-4 |
| FR2.120-1 | TDD UL-DL pattern FR2.120-1 is used. Ref Annex A.1.3 of TS 38.521-4 |
| FR2.120-2 | TDD UL-DL pattern FR2.120-2 is used. Ref Annex A.1.3 of TS 38.521-4 |

PDCCH Configuration

PDCCH-ConfigCommon

Table 5.4.2.0-4: *PDCCH-ConfigCommon*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-96 | | | |
| Information Element | Value/remark | Comment | Condition |
| PDCCH-ConfigCommon::= SEQUENCE { |  |  |  |
| commonSearchSpaceList SEQUENCE (SIZE (1..4)) OF SearchSpace { | 1 entry | 1 search space for both SA and NSA |  |
| SearchSpace [1] | SearchSpace with condition CSS | entry 1 |  |
| } |  |  |  |
| searchSpaceOtherSystemInformation | Not present |  |  |
| } |  |  |  |

|  |  |
| --- | --- |
| Condition | Explanation |
| CSS | Common SearchSpace |

ServingCellConfig

Table 5.4.2.0-5: *ServingCellConfig*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-167 | | | |
| Information Element | Value/remark | Comment | Condition |
| ServingCellConfig ::= SEQUENCE { |  |  |  |
| csi-MeasConfig CHOICE { |  |  |  |
| setup | csi-MeasConfig |  |  |
| } |  |  |  |

PDCCH-config

Table 5.4.2.0-6: PDCCH-ControlResourceSet

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-28 | | | |
| Information Element | Value/remark | Comment | Condition |
| ControlResourceSet ::= SEQUENCE { |  |  |  |
| controlResourceSetId | ControlResourceSetId |  |  |
| frequencyDomainResources | Table 5.2-2 for tested channel bandwidth and subcarrier spacing |  | FR1 |
| frequencyDomainResources | Table 7.2-2 for tested channel bandwidth and subcarrier spacing |  | FR2 |
| Duration | 2 | SearchSpace duration of 2 symbols | DEMOD\_FR1, CSI\_FR1, CSI\_FR2 |
|  | 1 | SearchSpace duration of 1 symbols | DEMOD\_FR2, PDCCH\_FR1, PDCCH\_FR2 |
| cce-REG-MappingType CHOICE { |  |  |  |
| nonInterleaved | Null |  |  |
| } |  |  |  |
| precoderGranularity | sameAsREG-bundle |  |  |
| tci-StatesPDCCH-ToAddList SEQUENCE(SIZE (1..maxNrofTCI-StatesPDCCH)) OF TCI-StateId { | 1 entry |  |  |
| TCI-StateId[1] | 0 | entry 1  TCI State #0 |  |
|  | 1 | TCI State #1 |  |
| } |  |  |  |
| pdcch-DMRS-ScramblingID | 1008 | DMRS scrambling ID different from Physical Cell ID | SA AND FR1 |
| } |  |  |  |

|  |  |
| --- | --- |
| Condition | Explanation |
| DEMOD\_FR1 | DEMOD testing in FR1. |
| DEMOD\_FR2 | DEMOD testing in FR2. |
| PDCCH\_FR1 | PDCCH testing in FR1 |
| PDCCH\_FR2 | PDCCH testing in FR2 |
| CSI\_FR1 | CSI testing in FR1 |
| CSI\_FR2 | CSI testing in FR2 |
| SA | NR standalone Demod, PDCCH, SDR and CSI tests cases |

Table 5.4.2.0-7: PDCCH *Search Space*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-162 | | | |
| Information Element | Value/remark | Comment | Condition |
| SearchSpace ::= SEQUENCE { |  |  |  |
| monitoringSlotPeriodicityAndOffset CHOICE { |  |  |  |
| sl1 | NULL |  |  |
| } |  |  |  |
| monitoringSymbolsWithinSlot | 10000000000000 | Starting symbol 0 |  |
| nrofCandidates SEQUENCE { |  |  |  |
| aggregationLevel1 | n0 |  |  |
| aggregationLevel2 | n0 |  |  |
| aggregationLevel4 | n0 |  |  |
| aggregationLevel8 | n1 | AL8 |  |
| aggregationLevel16 | n0 |  |  |
| } |  |  |  |
| searchSpaceType CHOICE { |  |  |  |
| ue-Specific SEQUENCE { |  |  | USS |
| dci-Formats | formats0-1-And-1-1 | DCI Format 1\_1 |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

|  |  |
| --- | --- |
| **Condition** | **Explanation** |
| USS | UE-Specific SearchSpace |

Table 5.4.2.0-7a: PDCCH *Search Space Ext*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.331 [6], clause 6.3.2 | | | |
| Information Element | Value/remark | Comment | Condition |
| SearchSpaceExt-r16 ::= SEQUENCE { |  |  |  |
| controlResourceSetId-r16 | ControlResourceSetId |  |  |
| searchSpaceType-r16 | Not present |  |  |
| searchSpaceGroupIdList-r16 | Not present |  |  |
| freqMonitorLocations-r16 | Not present |  |  |
| } |  |  |  |

NZP-CSI-RS for Tracking

NZP-CSI-RS-Resource

Table 5.4.2.0-8: NZP-CSI-RS-Resource for TRS

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-85 | | | |
| Information Element | Value/remark | Comment | Condition |
| NZP-CSI-RS-Resource ::= SEQUENCE { |  |  |  |
| nzp-CSI-RS-ResourceId | 0 | CSI-RS resource 1 |  |
| 1 | CSI-RS resource 2 |  |
| 2 | CSI-RS resource 3 |  |
| 3 | CSI-RS resource 4 |  |
| resourceMapping | CSI-RS-ResourceMapping for TRS |  |  |
| powerControlOffset | 0 |  |  |
| periodicityAndOffset | CSI-ResourcePeriodicityAndOffset for TRS |  |  |
| qcl-InfoPeriodicCSI-RS | TCI-StateId 0 |  |  |
| } |  |  |  |

CSI-RS-ResourceMapping

Table 5.4.2.0-9: CSI-RS-ResourceMapping for TRS

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-45 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-RS-ResourceMapping ::= SEQUENCE { |  |  |  |
| frequencyDomainAllocation CHOICE { |  |  |  |
| row1 | 0001 | k0=0 for CSI-RS resource 1,2,3,4 | TRS |
| } |  |  |  |
| firstOFDMSymbolInTimeDomain | 6 | l0 = 6 for CSI-RS resource 1 and 3 | TRS |
|  | 10 | l0 = 10 for CSI-RS resource 2 and 4 | TRS |
| nrofPorts | p1 | 1 for CSI-RS resource 1,2,3,4 | TRS |
| Cdm-Type | noCDM |  | TRS |
| Density CHOICE{ |  |  |  |
| three | Null |  | TRS |
| } |  |  |  |
| freqBand | CSI-FrequencyOccupation |  | TRS |
| } |  |  |  |

CSI-ResourcePeriodicityAndOffset

Table 5.4.2.0-10: CSI-ResourcePeriodicityAndOffset for TRS

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-43 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ResourcePeriodicityAndOffset ::= CHOICE { |  |  |  |
| slots20 | 10 | Periodicity 20 slots and offset 10 for CSI-RS resource 1 and 2 | SCS 15KHz |
| slots20 | 11 | Periodicity 20 slots and offset 11 for CSI-RS resource 3 and 4 | SCS 15 kHz |
| Slots40 | 20 | Periodicity 40 slots and offset 20 for CSI-RS resource 1 and 2 | SCS 30 kHz |
| Slots40 | 21 | Periodicity 40 slots and offset 21 for CSI-RS resource 3 and 4 | SCS 30 kHz |
| Slots80 | 40 | Periodicity 80 slots and offset 40 for CSI-RS resource 1 and 2 | SCS 60 kHz |
| Slots80 | 41 | Periodicity 80 slots and offset 41 for CSI-RS resource 3 and 4 | SCS 60 kHz |
| Slots160 | 80 | Periodicity 160 slots and offset 80 for CSI-RS resource 1 and 2 | SCS 120 kHz |
| Slots160 | 81 | Periodicity 160 slots and offset 81 for CSI-RS resource 3 and 4 | SCS 120 kHz |
| } |  |  |  |

CSI-FrequencyOccupation

Table 5.4.2.0-11: CSI-FrequencyOccupation for TRS

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-33 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-FrequencyOccupation ::= SEQUENCE { |  |  |  |
| nrofRBs | 52 | BW 10 MHz SCS 15kHz | TRS |
| 52 | BW 20 MHz SCS 30kHz | TRS |
| 108 | BW 40 MHz SCS 30kHz | TRS |
|  | 68 | BW 100 MHz SCS 120 kHz | TRS |
|  | 132 | BW 200 MHz SCS 120 kHz | TRS |
| } |  |  |  |

NZP-CSI-RS-ResourceSet

Table 5.4.2.0-12: NZP-CSI-RS-ResourceSet for TRS

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-87 | | | |
| Information Element | Value/remark | Comment | Condition |
| NZP-CSI-RS-ResourceSet ::= SEQUENCE { |  |  |  |
| nzp\_CSI\_ResourceSetId | 0 |  |  |
| nzp-CSI-RS-Resources SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-ResourcesPerSet)) OF NZP-CSI-RS-ResourceId { | 4 entries |  | FR1, FR2 |
| NZP-CSI-RS-ResourceId[1] | 0 | entry 1  CSI-RS resource 1 |  |
| NZP-CSI-RS-ResourceId[2] | 1 | entry 2  CSI-RS resource 2 |  |
| NZP-CSI-RS-ResourceId[3] | 2 | entry 3  CSI-RS resource 3 |  |
| NZP-CSI-RS-ResourceId[4] | 3 | entry 4  CSI-RS resource 4 |  |
| } |  |  |  |
| repetition | off |  |  |
| aperiodicTriggeringOffset | Not present |  |  |
| trs\_Info | true |  |  |
| } |  |  |  |

CSI-ResourceConfig

Table 5.4.2.0-13: CSI-ResourceConfig for TRS

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-41 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ResourceConfig ::= SEQUENCE { |  |  |  |
| csi-ResourceConfigId | CSI-ResourceConfigId |  |  |
| csi-RS-ResourceSetList CHOICE { |  |  |  |
| nzp-CSI-RS-SSB SEQUENCE { |  |  |  |
| nzp-CSI-RS-ResourceSetList SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-ResourceSetsPerConfig)) OF NZP-CSI-RS-ResourceSetId { | 1 entry |  |  |
| NZP-CSI-RS-ResourceSetId[1] | 0 | entry 1 |  |
| } |  |  |  |
| csi-SSB-ResourceSetList | Not present |  |  |
| } |  |  |  |
| } |  |  |  |
| bwp-Id | BWP-Id |  |  |
| resourceType | periodic |  |  |
| } |  |  |  |

NZP CSI-RS for CSI Acquisition

NZP-CSI-RS-Resource

Table 5.4.2.0-14: NZP-CSI-RS-Resource

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-85 | | | |
| Information Element | Value/remark | Comment | Condition |
| NZP-CSI-RS-Resource ::= SEQUENCE { |  |  | DEMOD\_FR1  DEMOD\_FR2 |
| nzp-CSI-RS-ResourceId | 4 | CSI-RS resource 5 |  |
| resourceMapping | CSI-RS-ResourceMapping |  |  |
| powerControlOffset | 0 |  |  |
| periodicityAndOffset | CSI-ResourcePeriodicityAndOffset |  |  |
| qcl-InfoPeriodicCSI-RS | TCI-State #1 |  |  |
| } |  |  |  |

CSI-RS-ResourceMapping

Table 5.4.2.0-15: CSI-RS-ResourceMapping

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-45 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-RS-ResourceMapping ::= SEQUENCE { |  |  |  |
| frequencyDomainAllocation CHOICE { |  |  |  |
| row2 | 000000000001 | K0 = 0,  1Tx test cases |  |
| other | 000001 | K0 = 0, row3,  2Tx test cases |  |
| row4 | 001 | K0 = 0,  4Tx test cases |  |
| } |  |  |  |
| nrofPorts | P2 | 2Tx test cases |  |
|  | P4 | 4Tx test cases |  |
|  | P1 | 1Tx test cases |  |
| firstOFDMSymbolInTimeDomain | 12 | I0 = 12 |  |
| cdm-Type | fd-CDM2 | 2Tx and 4Tx test cases |  |
|  | noCDM | 1Tx test cases |  |
| density CHOICE { |  |  |  |
| one | NULL |  |  |
| } |  |  |  |
| freqBand | CSI-FrequencyOccupation |  |  |
| } |  |  |  |

CSI-ResourcePeriodicityAndOffset

Table 5.4.2.0-16: CSI-ResourcePeriodicityAndOffset

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-43 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ResourcePeriodicityAndOffset ::= CHOICE { |  |  |  |
| Slots20 | 0 |  | SCS 15kHz |
| Slots40 | 0 |  | SCS 30kHz |
| Slots80 | 0 |  | SCS 60kHz |
| Slots160 | 0 |  | SCS 120kHz |
| } |  |  |  |

CSI-FrequencyOccupation

Table 5.4.2.0-17: CSI-FrequencyOccupation for CSI Acquisition

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-33 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-FrequencyOccupation ::= SEQUENCE { |  |  |  |
| nrofRBs | 52 |  | BW 10 MHz SCS 15kHz |
| 52 |  | BW 20 MHz SCS 30kHz |
| 108 |  | BW 40 MHz SCS 30kHz |
|  | 68 |  | BW 100MHz SCS 120kHz |
|  | 132 |  | BW 200 MHz SCS 120 kHz |
| } |  |  |  |

NZP-CSI-RS-ResourceSet

Table 5.4.2.0-18: NZP-CSI-RS-ResourceSet for CSI Acquisition

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-87 | | | |
| Information Element | Value/remark | Comment | Condition |
| NZP-CSI-RS-ResourceSet ::= SEQUENCE { |  |  |  |
| nzp\_CSI\_ResourceSetId | 1 |  |  |
| nzp-CSI-RS-Resources SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-ResourcesPerSet)) OF NZP-CSI-RS-ResourceId { | 1 entry |  | FR1, FR2 |
| NZP-CSI-RS-ResourceId[1] | 4 | entry 1  CSI-RS resource 5 |  |
| } |  |  |  |
| repetition | off |  |  |
| aperiodicTriggeringOffset | Not present |  |  |
| trs\_Info | Not present |  |  |
| } |  |  |  |

CSI-ResourceConfig

Table 5.4.2.0-19: CSI-ResourceConfig for CSI Acquisition

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-41 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ResourceConfig ::= SEQUENCE { |  |  |  |
| csi-ResourceConfigId | 1 |  |  |
| csi-RS-ResourceSetList CHOICE { |  |  |  |
| nzp-CSI-RS-SSB SEQUENCE { |  |  |  |
| nzp-CSI-RS-ResourceSetList SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-ResourceSetsPerConfig)) OF NZP-CSI-RS-ResourceSetId { | 1 entry |  |  |
| NZP-CSI-RS-ResourceSetId[1] | 1 | entry 1 |  |
| } |  |  |  |
| csi-SSB-ResourceSetList | Not present |  |  |
| } |  |  |  |
| } |  |  |  |
| bwp-Id | BWP-Id |  |  |
| resourceType | periodic |  |  |
| } |  |  |  |

ZP CSI-RS for CSI Acquisition

ZP-CSI-RS-Resource

Table 5.4.2.0-20: ZP-CSI-RS-Resource

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-204 | | | |
| Information Element | Value/remark | Comment | Condition |
| ZP-CSI-RS-Resource ::= SEQUENCE { |  |  | DEMOD\_FR1  DEMOD\_FR2 |
| zp-CSI-RS-ResourceId | ZP-CSI-RS-ResourceId |  |  |
| resourceMapping | ZP CSI-RS-ResourceMapping |  |  |
| periodicityAndOffset | ZP CSI-ResourcePeriodicityAndOffset |  |  |
| } |  |  |  |

CSI-RS-ResourceMapping

Table 5.4.2.0-21: ZP CSI-RS-ResourceMapping

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-45 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-RS-ResourceMapping ::= SEQUENCE { |  |  |  |
| frequencyDomainAllocation CHOICE { |  |  |  |
| other | 000100 | K0 = 4 |  |
| } |  |  |  |
| nrofPorts | p4 |  |  |
| firstOFDMSymbolInTimeDomain | 12 | I0 = 12 |  |
| cdm-Type | fd-CDM2 |  |  |
| density CHOICE { |  |  |  |
| one | NULL |  |  |
| } |  |  |  |
| freqBand | ZP CSI-FrequencyOccupation |  |  |
| } |  |  |  |

CSI-ResourcePeriodicityAndOffset

Table 5.4.2.0-22: ZP CSI-ResourcePeriodicityAndOffset

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-43 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ResourcePeriodicityAndOffset ::= CHOICE { |  |  |  |
| Slots20 | 0 |  | SCS 15kHz |
| Slots40 | 0 |  | SCS 30kHz |
| Slots80 | 0 |  | SCS 60kHz |
| Slots160 | 0 |  | SCS 120kHz |
| } |  |  |  |

CSI-FrequencyOccupation

Table 5.4.2.0-23: ZP CSI-FrequencyOccupation

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-33 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-FrequencyOccupation ::= SEQUENCE { |  |  |  |
| nrofRBs | 52 |  | BW 10 MHz SCS 15kHz |
| 52 |  | BW 20 MHz SCS 30kHz |
| 108 |  | BW 40 MHz SCS 30KHz |
|  | 68 |  | BW 100 MHz SCS 120KHz |
|  | 132 |  | BW 200 MHz SCS 120kHz |
| } |  |  |  |

PDSCH DMRS Configuration

DMRS-DownlinkConfig

Table 5.4.2.0-24: DMRS-DownlinkConfig

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-50 | | | |
| Information Element | Value/remark | Comment | Condition |
| DMRS-DownlinkConfig ::= SEQUENCE { |  |  |  |
| dmrs-AdditionalPosition | pos1 |  |  |
| phaseTrackingRS | Not present |  | DEMOD\_FR1 |
| phaseTrackingRS SEQUENCE { |  |  | DEMOD\_FR2 |
| epre-Ratio | 0 |  |  |
| resourceElementOffset | Offset10 |  |  |
| } |  |  |  |
| } |  |  |  |

PDSCH Configuration

PDSCH-ServingCellConfig

Table 5.4.2.0-25: PDSCH-ServingCellConfig

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-102 | | | |
| Information Element | Value/remark | Comment | Condition |
| PDSCH-ServingCellConfig ::= SEQUENCE { |  |  |  |
| codeBlockGroupTransmission | Not present |  |  |
| xOverhead | Not present |  |  |
| xOverhead | xOh6 |  | DEMOD\_FR2 |
| nrofHARQ-ProcessesForPDSCH | Set according to the test id | Typically n4 for FDD, n8 for TDD |  |
| pucch-Cell | Not present |  |  |
| } |  |  |  |

PDSCH-Config

Table 5.4.2.0-26: *PDSCH-Config*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-100 | | | |
| Information Element | Value/remark | Comment | Condition |
| PDSCH-Config ::= SEQUENCE { |  |  |  |
| dataScramblingIdentityPDSCH | 0 |  |  |
| dmrs-DownlinkForPDSCH-MappingTypeA CHOICE { |  |  |  |
| Setup | DMRS-DownlinkConfig |  |  |
| } |  |  |  |
| tci-StatesToAddModList SEQUENCE(SIZE (1.. maxNrofTCI-States)) OF TCI-State { | 2 entries |  |  |
| TCI-State[1] SEQUENCE { |  | entry 1 |  |
| tci-StateId | TCI-StateId 0 |  |  |
| qcl-type1 SEQUENCE { | QCL Type is Type1 |  |  |
| Cell | not present |  |  |
| Bwp-id | Not present | BWP ID |  |
| referenceSignal | Ssb : 0 | SSB # 0 |  |
| Qcl-Type | Type C |  |  |
| } |  |  |  |
| qcl-type2 SEQUENCE { | QCL Type is Type2 |  | DEMOD\_FR2 |
| Cell | not present |  |  |
| Bwp-id | Not present | BWP ID |  |
| referenceSignal | Ssb : 0 | SSB # 0 |  |
| Qcl-Type | Type D |  |  |
| } |  |  |  |
| } |  |  |  |
| TCI-State[2] SEQUENCE { |  | entry 2 |  |
| tci-StateId | TCI-StateId 1 |  |  |
| qcl-type1 { | QCL Type is Type1 |  |  |
| Cell | Not present |  |  |
| Bwp-id | 0 | BWP ID |  |
| referenceSignal | csi-rs : 0 | CSI-RS # 0 |  |
| Qcl-Type | Type A |  |  |
| } |  |  |  |
| qcl-type2 SEQUENCE { | QCL Type is Type2 |  | DEMOD\_FR2 |
| Cell | Not present |  |  |
| Bwp-id | 0 | BWP ID |  |
| referenceSignal | csi-rs : 0 | CSI-RS # 0 |  |
| Qcl-Type | Type D |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| vrb-ToPRB-Interleaver | Not present |  |  |
| resourceAllocation | resourceAllocationType0 |  |  |
| pdsch-AggregationFactor | Not present |  |  |
| rbg-Size | config2 | The UE ignores this field if *resourceAllocation* is set to *resourceAllocationType1* (see TS 38.214 [21], clause 5.1.2.2.1). |  |
| prb-BundlingType CHOICE { |  |  |  |
| staticBundling SEQUENCE { |  |  |  |
| bundleSize | Not present | PRB Bundling size of 2 |  |
| } |  |  |  |
| } |  |  |  |
| ZP-CSI-RS-ResourceToAddModList SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-Resources)) OF NZP-CSI-RS-Resource { | 1 entry |  |  |
| ZP-CSI-RS-Resource[1] | ZP-CSI-RS-Resource | entry 1 |  |
| } |  |  |  |
| p-ZP-CSI-RS-ResourceSet | p-ZP-CSI-RS-ResourceSet |  |  |
| } |  |  |  |

PDSCH-TimeDomainResourceAllocationList

Table 5.4.2.0-27: PDSCH-TimeDomainResourceAllocationList

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-103 | | | |
| Information Element | Value/remark | Comment | Condition |
| PDSCH-TimeDomainResourceAllocationList ::= SEQUENCE(SIZE(1..maxNrofDL-Allocations)) OF PDSCH-TimeDomainResourceAllocation { | 2 entries |  | FR1 |
| PDSCH-TimeDomainResourceAllocation[1] SEQUENCE { |  | entry 1 |  |
| K0 | Not present |  |  |
| mappingType | typeA |  |  |
| startSymbolAndLength | 44 | Start symbol(S)=2, Length(L)=4 | For Slot i, if mod(i, 10) = 7 for i from {0,…,39} |
| } |  |  |  |
| PDSCH-TimeDomainResourceAllocation[2] SEQUENCE { |  | entry 2 |  |
| K0 | Not present |  |  |
| mappingType | typeA |  |  |
| startSymbolAndLength | 53 | Start symbol(S)=2, Length(L)=12 | For Slot i, if mod(i, 10) = {0,1,2,3,4,5,}) for i from {1,…,39} |
| } |  |  |  |
| } |  |  |  |
| PDSCH-TimeDomainResourceAllocationList ::= SEQUENCE(SIZE(1..maxNrofDL-Allocations)) OF PDSCH-TimeDomainResourceAllocation { | 3 entries |  | FR2 |
| PDSCH-TimeDomainResourceAllocation[1] SEQUENCE { |  | entry 1 |  |
| K0 | Not present |  |  |
| mappingType | typeA |  |  |
| startSymbolAndLength | 53 | Start symbol(S)=2, Length(L)=12 |  |
| } |  |  |  |
| PDSCH-TimeDomainResourceAllocation[2] SEQUENCE { |  | entry 2 |  |
| K0 | Not present |  |  |
| mappingType | typeA |  |  |
| startSymbolAndLength | 96 | Start symbol(S)=1, Length(L)=9 |  |
| } |  |  |  |
| PDSCH-TimeDomainResourceAllocation[3] SEQUENCE { |  | entry 3 |  |
| K0 | Not present |  |  |
| mappingType | typeA |  |  |
| startSymbolAndLength | 40 | Start symbol(S)=1, Length(L)=13 |  |
| } |  |  |  |
| } |  |  |  |

CRS for Rate Matching

RateMatchPatternLTE-CRS

Table 5.4.2.0-28: RateMatchPatternLTE-CRS

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-138 | | | |
| Information Element | Value/remark | Comment | Condition |
| RateMatchPatternLTE-CRS ::= SEQUENCE { |  |  | TC 5.2.2.1.4-2 and TC 5.2.3.1.4-2 of TS 38.521-4 |
| carrierFreqDL | LTE EARFCN |  |  |
| carrierBandwidthDL | n50 | 10MHz |  |
| nrofCRS-Ports | n4 |  |  |
| v-Shift | n0 |  |  |
| } |  |  |  |

CSI-RS for beam refinement

NZP-CSI-RS-Resource

Table 5.4.2.0-29: NZP-CSI-RS-Resource

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-85 | | | |
| Information Element | Value/remark | Comment | Condition |
| NZP-CSI-RS-Resource ::= SEQUENCE { |  |  | DEMOD\_FR2 |
| nzp-CSI-RS-ResourceId | 5 | CSI-RS resource 6 | Beam refinement |
|  | 6 | CSI-RS resource 7 | Beam refinement |
| resourceMapping | CSI-RS-ResourceMapping |  |  |
| powerControlOffset | 0 |  |  |
| periodicityAndOffset | CSI-ResourcePeriodicityAndOffset |  |  |
| qcl-InfoPeriodicCSI-RS | TCI-State #1 |  |  |
| } |  |  |  |

CSI-RS-ResourceMapping

Table 5.4.2.0-30: CSI-RS-ResourceMapping

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-45 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-RS-ResourceMapping ::= SEQUENCE { |  |  | DEMOD\_FR2 |
| frequencyDomainAllocation CHOICE { |  |  |  |
| row1 | 0001 | K0 = 0, row1 for resource 1 and 2 |  |
| } |  |  |  |
| nrofPorts | p1 |  |  |
| firstOFDMSymbolInTimeDomain | 8 | I0 = 8 for resource 1 |  |
|  | 9 | I0 = 9 for resource 2 |  |
| cdm-Type | noCDM |  |  |
| density CHOICE { |  |  |  |
| three | NULL |  |  |
| } |  |  |  |
| freqBand | CSI-FrequencyOccupation |  |  |
| } |  |  |  |

CSI-ResourcePeriodicityAndOffset

Table 5.4.2.0-31: CSI-ResourcePeriodicityAndOffset

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-43 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ResourcePeriodicityAndOffset ::= CHOICE { |  |  | DEMOD\_FR2 |
| Slots80 | 0 |  | SCS 60kHz |
| Slots160 | 0 |  | SCS 120kHz |
| } |  |  |  |

CSI-FrequencyOccupation

Table 5.4.2.0-32: CSI-FrequencyOccupation for beam refinement

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-33 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-FrequencyOccupation ::= SEQUENCE { |  |  | DEMOD\_FR2 |
| nrofRBs | 68 |  | BW 100MHz SCS 120kHz |
|  | 132 |  | BW 200MHz SCS 120kHz |
| } |  |  |  |

NZP-CSI-RS-ResourceSet

Table 5.4.2.0-33: NZP-CSI-RS-ResourceSet for beam refinement

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-87 | | | |
| Information Element | Value/remark | Comment | Condition |
| NZP-CSI-RS-ResourceSet ::= SEQUENCE { |  |  | DEMOD\_FR2 |
| nzp\_CSI\_ResourceSetId | 2 |  |  |
| nzp-CSI-RS-Resources SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-ResourcesPerSet)) OF NZP-CSI-RS-ResourceId { | 2 entries |  |  |
| NZP-CSI-RS-ResourceId[1] | 5 | entry 1  CSI-RS resource 6 |  |
| NZP-CSI-RS-ResourceId[2] | 6 | entry 1  CSI-RS resource 7 |  |
| } |  |  |  |
| repetition | off |  |  |
| aperiodicTriggeringOffset | Not present |  |  |
| trs\_Info | Not present |  |  |
| } |  |  |  |

CSI-ResourceConfig

Table 5.4.2.0-34: CSI-ResourceConfig for beam refinement

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-41 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ResourceConfig ::= SEQUENCE { |  |  |  |
| csi-ResourceConfigId | 2 |  |  |
| csi-RS-ResourceSetList CHOICE { |  |  |  |
| nzp-CSI-RS-SSB SEQUENCE { |  |  |  |
| nzp-CSI-RS-ResourceSetList SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-ResourceSetsPerConfig)) OF NZP-CSI-RS-ResourceSetId { | 1 entry |  |  |
| NZP-CSI-RS-ResourceSetId[1] | 2 | entry 1 |  |
| } |  |  |  |
| csi-SSB-ResourceSetList | Not present |  |  |
| } |  |  |  |
| } |  |  |  |
| bwp-Id | BWP-Id |  |  |
| resourceType | periodic |  |  |
| } |  |  |  |

CSI-RS for beam management

NZP-CSI-RS-Resource

Table 5.4.2.0-35: NZP-CSI-RS-Resource for beam management

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-85 | | | |
| Information Element | Value/remark | Comment | Condition |
| NZP-CSI-RS-Resource ::= SEQUENCE { |  |  | PDCCH\_FR2 |
| nzp-CSI-RS-ResourceId | 4 | CSI-RS resource 5 |  |
|  | 5 | CSI-RS resource 6 |  |
| resourceMapping | CSI-RS-ResourceMapping for beam management |  |  |
| powerControlOffset | 0 |  |  |
| periodicityAndOffset | CSI-ResourcePeriodicityAndOffset for beam management |  |  |
| qcl-InfoPeriodicCSI-RS | TCI-State #1 |  |  |
| } |  |  |  |

CSI-RS-ResourceMapping

Table 5.4.2.0-36: CSI-RS-ResourceMapping for beam management

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-45 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-RS-ResourceMapping ::= SEQUENCE { |  |  | PDCCH\_FR2 |
| frequencyDomainAllocation CHOICE { |  |  |  |
| row1 | 0001 | K0 = 0, row1 for resource 1 and 2 |  |
| } |  |  |  |
| nrofPorts | p1 |  |  |
| firstOFDMSymbolInTimeDomain | 8 | I0 = 8 for resource 1 |  |
|  | 9 | I0 = 9 for resource 2 |  |
| cdm-Type | noCDM |  |  |
| density CHOICE { |  |  |  |
| three | NULL |  |  |
| } |  |  |  |
| freqBand | CSI-FrequencyOccupation for beam management |  |  |
| } |  |  |  |

CSI-ResourcePeriodicityAndOffset

Table 5.4.2.0-37: CSI-ResourcePeriodicityAndOffset for beam management

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-43 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ResourcePeriodicityAndOffset ::= CHOICE { |  |  | PDCCH\_FR2 |
| Slots80 | 0 |  | SCS 60kHz |
| Slots160 | 0 |  | SCS 120kHz |
| } |  |  |  |

CSI-FrequencyOccupation

Table 5.4.2.0-38: CSI-FrequencyOccupation for beam management

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-33 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-FrequencyOccupation ::= SEQUENCE { |  |  | PDCCH\_FR2 |
| nrofRBs | 68 |  | BW 100MHz SCS 120kHz |
|  | 132 |  | BW 200MHz SCS 120kHz |
| } |  |  |  |

NZP-CSI-RS-ResourceSet

Table 5.4.2.0-39: NZP-CSI-RS-ResourceSet for beam management

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-87 | | | |
| Information Element | Value/remark | Comment | Condition |
| NZP-CSI-RS-ResourceSet ::= SEQUENCE { |  |  | PDCCH\_FR2 |
| nzp\_CSI\_ResourceSetId | 1 |  |  |
| nzp-CSI-RS-Resources SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-ResourcesPerSet)) OF NZP-CSI-RS-ResourceId { | 2 entries |  |  |
| NZP-CSI-RS-ResourceId[1] | 4 | entry 1  CSI-RS resource 5 |  |
| NZP-CSI-RS-ResourceId[2] | 5 | entry 1  CSI-RS resource 6 |  |
| } |  |  |  |
| repetition | off |  |  |
| aperiodicTriggeringOffset | Not present |  |  |
| trs\_Info | Not present |  |  |
| } |  |  |  |

CSI-ResourceConfig

Table 5.4.2.0-40: CSI-ResourceConfig for beam management

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-41 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ResourceConfig ::= SEQUENCE { |  |  |  |
| csi-ResourceConfigId | 1 |  |  |
| csi-RS-ResourceSetList CHOICE { |  |  |  |
| nzp-CSI-RS-SSB SEQUENCE { |  |  |  |
| nzp-CSI-RS-ResourceSetList SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-ResourceSetsPerConfig)) OF NZP-CSI-RS-ResourceSetId { | 1 entry |  |  |
| NZP-CSI-RS-ResourceSetId[1] | 1 | entry 1 |  |
| } |  |  |  |
| csi-SSB-ResourceSetList | Not present |  |  |
| } |  |  |  |
| } |  |  |  |
| bwp-Id | BWP-Id |  |  |
| resourceType | periodic |  |  |
| } |  |  |  |

PUCCH-Config

Table 5.4.2.0-41: PUCCH-Config

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-112 | | | |
| Information Element | Value/remark | Comment | Condition |
| PUCCH-Config ::= SEQUENCE { |  |  |  |
| dl-DataToUL-ACK SEQUENCE (SIZE (1..8)) OF INTEGER { | 4 entries |  | FR1.15-1  FR1.30-2  FR2.120-1  FR2.120-1A |
| INTEGER[1] | 2 | entry 1 |  |
| INTEGER[2] | 3 | entry 2 |  |
| INTEGER[3] | 4 | entry 3 |  |
| INTEGER[4] | 6 | entry 4 |  |
| } |  |  |  |
| } |  |  |  |
| dl-DataToUL-ACK SEQUENCE (SIZE (1..8)) OF INTEGER { | 7 entries |  | FR1.30-1  FR1.30-1A  FR1.30-4 |
| INTEGER[1] | 2 | entry 1 |  |
| INTEGER[2] | 3 | entry 2 |  |
| INTEGER[3] | 4 | entry 3 |  |
| INTEGER[4] | 5 | entry 4 |  |
| INTEGER[5] | 6 | entry 5 |  |
| INTEGER[6] | 7 | entry 6 |  |
| INTEGER[7] | 8 | entry 7 |  |
| } |  |  |  |
| } |  |  |  |
| dl-DataToUL-ACK SEQUENCE (SIZE (1..8)) OF INTEGER { | 4 entries |  | FR1.30-3 |
| INTEGER[1] | 2 | entry 1 |  |
| INTEGER[2] | 3 | entry 2 |  |
| INTEGER[3] | 4 | entry 3 |  |
| INTEGER[4] | 5 | entry 4 |  |
| } |  |  |  |
| } |  |  |  |
| dl-DataToUL-ACK SEQUENCE (SIZE (1..8)) OF INTEGER { | 2 entries |  | FR1.30-5  FR1.30-6 |
| INTEGER[1] | 2 | entry 1 |  |
| INTEGER[2] | 3 | entry 2 |  |
| } |  |  |  |
| } |  |  |  |
| dl-DataToUL-ACK SEQUENCE (SIZE (1..8)) OF INTEGER { | 3 entries |  | FR2.60-1  FR2.120-2 |
| INTEGER[1] | 2 | entry 1 |  |
| INTEGER[2] | 3 | entry 2 |  |
| INTEGER[3] | 5 | entry 3 |  |
| } |  |  |  |
| } |  |  |  |
| dl-DataToUL-ACK SEQUENCE (SIZE (1..8)) OF INTEGER { | 2 entries |  | FR2.120-1\_CSI |
| INTEGER[1] | 3 | entry 1 |  |
| INTEGER[2] | 6 | entry 2 |  |
| } |  |  |  |
| } |  |  |  |
| dl-DataToUL-ACK SEQUENCE (SIZE (1..8)) OF INTEGER { | 3 entries |  | FR2.120-2\_CSI |
| INTEGER[1] | 6 | entry 1 |  |
| INTEGER[2] | 7 | entry 2 |  |
| INTEGER[3] | 11 | entry 3 |  |
| } |  |  |  |
| } |  |  |  |

|  |  |
| --- | --- |
| Condition | Explanation |
| FR1.15-1 | TDD UL-DL pattern FR1.15-1 is used. Ref Annex A.1.2 of TS 38.521-4 |
| FR1.30-1 | TDD UL-DL pattern FR1.30-1 is used. Ref Annex A.1.2 of TS 38.521-4 |
| FR1.30-2 | TDD UL-DL pattern FR1.30-2 is used. Ref Annex A.1.2 of TS 38.521-4 |
| FR1.30-3 | TDD UL-DL pattern FR1.30-3 is used. Ref Annex A.1.2 of TS 38.521-4 |
| FR1.30-4 | TDD UL-DL pattern FR1.30-4 is used. Ref Annex A.1.2 of TS 38.521-4 |
| FR1.30-5 | TDD UL-DL pattern FR1.30-5 is used. Ref Annex A.1.2 of TS 38.521-4 |
| FR1.30-6 | TDD UL-DL pattern FR1.30-6 is used. Ref Annex A.1.2 of TS 38.521-4 |
| FR2.60-1 | TDD UL-DL pattern FR2.60-1 is used. Ref Annex A.1.3 of TS 38.521-4 |
| FR2.120-1 | TDD UL-DL pattern FR2.120-1 is used. Ref Annex A.1.3 of TS 38.521-4 |
| FR2.120-2 | TDD UL-DL pattern FR2.120-2 is used. Ref Annex A.1.3 of TS 38.521-4 |
| FR2.120-1\_CSI | TDD UL-DL pattern FR2.120-1 is used for CSI reporting test cases. Ref Table 8.1.2-1 of TS 38.521-4 |
| FR2.120-2\_CSI | TDD UL-DL pattern FR2.120-2 is used for CSI reporting test cases. Ref Table 8.1.2-1 of TS 38.521-4 |

SearchSpaceZero

Table 5.4.2.0-42: SearchSpaceZero

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-164 | | | |
| **Information Element** | **Value/remark** | **Comment** | **Condition** |
| searchSpaceZero | 4 |  | FDD  FR1.15-1  FR1.30-1  FR1.30-2  FR1.30-3  FR1.30-4  FR2.60-1  FR2.120-1  FR2.120-2 |
|  | 2 |  | FR1.30-5  FR1.30-6 |

#### 5.4.2.1 Message contents for PDSCH Demodulation requirements

ZP CSI-RS for CSI Acquisition

p-ZP-CSI-RS-ResourceSet

Table 5.4.2.1-0: p-ZP-CSI-RS-ResourceSet

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.331 [6], clause 6.3.2. | | | |
| Information Element | Value/remark | Comment | Condition |
| p-ZP-CSI-RS-ResourceSet CHOICE { |  |  |  |
| setup | ZP-CSI-RS-ResourceSet |  |  |
| } |  |  |  |

Table 5.4.2.1-1: ZP-CSI-RS-ResourceSet

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-87 | | | |
| Information Element | Value/remark | Comment | Condition |
| p-ZP-CSI-RS-ResourceSet ::= SEQUENCE { |  |  |  |
| zp\_CSI-RS\_ResourceSetId | 0 |  |  |
| zp-CSI-RS-ResourceIdList SEQUENCE (SIZE (1..maxNrofZP-CSI-RS-ResourcesPerSet)) OF ZP-CSI-RS-ResourceId { |  | 1 entry |  |
| ZP-CSI-RS-ResourceId[1] | 0 | entry 1  ZP CSI-RS resource 1 |  |
| } |  |  |  |
| } |  |  |  |

CSI-MeasConfig

Table 5.4.2.1-2: *CSI-MeasConfig*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-38 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-MeasConfig::= SEQUENCE { |  |  |  |
| nzp-CSI-RS-ResourceToAddModList SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-Resources)) OF NZP-CSI-RS-Resource { | n entries | dependent on test condition |  |
| NZP-CSI-RS-Resource[1] | NZP-CSI-RS-Resource for TRS (1) | entry 1  CSI-RS resource 1 |  |
| NZP-CSI-RS-Resource[2] | NZP-CSI-RS-Resource for TRS (2) | entry 2  CSI-RS resource 2 |  |
| NZP-CSI-RS-Resource[3] | NZP-CSI-RS-Resource for TRS (3) | entry 3  CSI-RS resource 3 |  |
| NZP-CSI-RS-Resource[4] | NZP-CSI-RS-Resource for TRS (4) | entry 4  CSI-RS resource 4 |  |
| NZP-CSI-RS-Resource[5] | NZP-CSI-RS-Resource for CSI Acquisition | entry 5  CSI-RS resource 5 |  |
| NZP-CSI-RS-Resource[6] | CSI-RS-Resource for beam refinement | entry 5  CSI-RS resource 6 | DEMOD\_FR2 |
| NZP-CSI-RS-Resource[7] | CSI-RS-Resource for beam refinement | entry 5  CSI-RS resource 7 | DEMOD\_FR2 |
| } |  |  |  |
| nzp-CSI-RS-ResourceSetToAddModList SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-ResourceSets)) OF NZP-CSI-RS-ResourceSetId { | n entries | dependent on test condition |  |
| NZP-CSI-RS-ResourceSet[1] | NZP-CSI-RS-ResourceSet for TRS | entry 1 |  |
| NZP-CSI-RS-ResourceSet[2] | NZP-CSI-RS-ResourceSet for CSI Acquisition | entry 2 |  |
| NZP-CSI-RS-ResourceSet[3] | CSI-RS-ResourceSet for beam refinement | entry 3 | DEMOD\_FR2 |
| } |  |  |  |
| csi-IM-ResourceToAddModList | Not present |  |  |
| csi-IM-ResourceSetToAddModList | Not present |  |  |
| csi-SSB-ResourceSetToAddModList | Not present |  |  |
| csi-ResourceConfigToAddModList SEQUENCE (SIZE (1..maxNrofCSI-ResourceConfigurations)) OF CSI-ResourceConfig { | n entries | dependent on test condition |  |
| CSI-ResourceConfig[1] | CSI-ResourceConfig for TRS | entry 1 |  |
| CSI-ResourceConfig[2] | CSI-ResourceConfig for CSI Acquisition | entry 2 |  |
| CSI-ResourceConfig[2] | CSI-ResourceConfig for beam refinement | entry 3 | DEMOD\_FR2 |
| } |  |  |  |
| csi-ReportConfigToAddModList | Not present |  |  |
| reportTriggerSize | Not present |  |  |
| aperiodicTriggerStateList | Not present |  |  |
| } |  |  |  |

#### 5.4.2.2 Message contents for PDCCH Demodulation requirements

NZP-CSI-RS for Tracking

CSI-RS-ResourceMapping

Table 5.4.2.2-1: CSI-RS-ResourceMapping for TRS

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-45 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-RS-ResourceMapping ::= SEQUENCE { |  |  |  |
| frequencyDomainAllocation CHOICE { |  |  |  |
| row1 | 0001 | k0=0 for CSI-RS resource 1,2,3,4 | TRS |
| } |  |  |  |
| firstOFDMSymbolInTimeDomain | 4 | l0 = 4 for CSI-RS resource 1 and 3 | TRS |
|  | 8 | l0 = 8 for CSI-RS resource 2 and 4 | TRS |
| nrofPorts | p1 | 1 for CSI-RS resource 1,2,3,4 | TRS |
| Cdm-Type | noCDM |  | TRS |
| Density CHOICE{ |  |  |  |
| three | Null |  | TRS |
| } |  |  |  |
| freqBand | CSI-FrequencyOccupation |  | TRS |
| } |  |  |  |

CSI-MeasConfig

Table 5.4.2.2-2: *CSI-MeasConfig*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-38 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-MeasConfig::= SEQUENCE { |  |  |  |
| nzp-CSI-RS-ResourceToAddModList SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-Resources)) OF NZP-CSI-RS-Resource { | n entries | Dependent on test condition |  |
| NZP-CSI-RS-Resource[1] | NZP-CSI-RS-Resource for TRS (1) | entry 1  CSI-RS resource 1 |  |
| NZP-CSI-RS-Resource[2] | NZP-CSI-RS-Resource for TRS (2) | entry 2  CSI-RS resource 2 |  |
| NZP-CSI-RS-Resource[3] | NZP-CSI-RS-Resource for TRS (3) | entry 3  CSI-RS resource 3 |  |
| NZP-CSI-RS-Resource[4] | NZP-CSI-RS-Resource for TRS (4) | entry 4  CSI-RS resource 4 |  |
| NZP-CSI-RS-Resource[5] | NZP-CSI-RS-Resource for beam management (5) | entry 4  CSI-RS resource 5 | PDCCH\_FR2 |
| NZP-CSI-RS-Resource[6] | NZP-CSI-RS-Resource for beam management (6) | entry 4  CSI-RS resource 6 | PDCCH\_FR2 |
| } |  |  |  |
| nzp-CSI-RS-ResourceSetToAddModList SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-ResourceSets)) OF NZP-CSI-RS-ResourceSetId { | 1 entry |  |  |
| NZP-CSI-RS-ResourceSet[1] | NZP-CSI-RS-ResourceSet for TRS | entry 1 |  |
| NZP-CSI-RS-ResourceSet[2] | NZP-CSI-RS-ResourceSet for beam management | entry 1 | PDCCH\_FR2 |
| } |  |  |  |
| csi-IM-ResourceToAddModList | Not present |  |  |
| csi-IM-ResourceSetToAddModList | Not present |  |  |
| csi-SSB-ResourceSetToAddModList | Not present |  |  |
| csi-ResourceConfigToAddModList SEQUENCE (SIZE (1..maxNrofCSI-ResourceConfigurations)) OF CSI-ResourceConfig { | 1 entry |  |  |
| CSI-ResourceConfig[1] | CSI-ResourceConfig | entry 1 |  |
| CSI-ResourceConfig[2] | CSI-ResourceConfig for beam management | entry 1 | PDCCH\_FR2 |
| } |  |  |  |
| csi-ReportConfigToAddModList | Not present |  |  |
| reportTriggerSize | Not present |  |  |
| aperiodicTriggerStateList | Not present |  |  |
| } |  |  |  |

PDSCH Configuration

PDSCH-Config

Table 5.4.2.2-3: *PDSCH-Config*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-100 | | | |
| Information Element | Value/remark | Comment | Condition |
| PDSCH-Config ::= SEQUENCE { |  |  |  |
| dataScramblingIdentityPDSCH | 0 |  |  |
| dmrs-DownlinkForPDSCH-MappingTypeA CHOICE { |  |  |  |
| Setup | DMRS-DownlinkConfig |  |  |
| } |  |  |  |
| tci-StatesToAddModList SEQUENCE(SIZE (1.. maxNrofTCI-States)) OF TCI-State { | 2 entries |  |  |
| TCI-State[1] SEQUENCE { |  | entry 1 |  |
| tci-StateId | TCI-StateId 0 |  |  |
| qcl-type1 SEQUENCE { | QCL Type is Type1 |  |  |
| Cell | Not Present |  |  |
| Bwp-id | Not present | BWP ID |  |
| referenceSignal | Ssb : 0 | SSB # 0 |  |
| Qcl-Type | Type C |  |  |
| } |  |  |  |
| qcl-type2 SEQUENCE { | QCL Type is Type2 |  |  |
| Cell | Not Present |  |  |
| Bwp-id | Not present | BWP ID |  |
| referenceSignal | Ssb : 0 | SSB # 0 |  |
| Qcl-Type | Type D |  |  |
| } |  |  |  |
| } |  |  |  |
| TCI-State[2] SEQUENCE { |  | entry 2 |  |
| tci-StateId | TCI-StateId 1 |  |  |
| qcl-type1 SEQUENCE { | QCL Type is Type1 |  |  |
| Cell | Not Present |  |  |
| Bwp-id | 0 | BWP ID |  |
| referenceSignal | csi-rs : 0 | CSI-RS # 0 |  |
| Qcl-Type | Type A |  |  |
| } |  |  |  |
| qcl-type2 SEQUENCE { | QCL Type is Type2 |  |  |
| Cell | Not Present |  |  |
| Bwp-id | 0 | BWP ID |  |
| referenceSignal | csi-rs : 0 | CSI-RS # 0 |  |
| Qcl-Type | Type D |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| vrb-ToPRB-Interleaver | Not present |  |  |
| resourceAllocation | resourceAllocationType0 |  |  |
| pdsch-AggregationFactor | Not present |  |  |
| prb-BundlingType CHOICE { |  |  |  |
| staticBundling SEQUENCE { |  |  |  |
| bundleSize | Not present | PRB Bundling size of 2 |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

#### 5.4.2.3 Message contents for Sustained downlink data rate requirements

Physical layer parameters

Table 5.4.2.3-1: Physical layer parameters for DCI format 1\_1

|  |
| --- |
| Derivation Path: Table 5.4.2.0-1 |

Common Serving Parameters

ServingCellConfigCommon

Table 5.4.2.3-2: ServingCellConfigCommon

|  |
| --- |
| Derivation Path: Table 5.4.2.0-2 |

TDD-UL-DL-Config

Table 5.4.2.3-3: TDD-UL-DL-Config

|  |
| --- |
| Derivation Path: Table 5.4.2.0-3 |

PDCCH Configuration

PDCCH-ConfigCommon

Table 5.4.2.3-4: *PDCCH-ConfigCommon*

|  |
| --- |
| Derivation Path: Table 5.4.2.0-4 |

ServingCellConfig

Table 5.4.2.3-5: *ServingCellConfig*

|  |
| --- |
| Derivation Path: Table 5.4.2.0-5 |

PDCCH-config

Table 5.4.2.3-6: PDCCH-ControlResourceSet

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 5.4.2.0-6 | | | |
| Information Element | Value/remark | Comment | Condition |
| ControlResourceSet ::= SEQUENCE { |  |  |  |
| controlResourceSetId | ControlResourceSetId |  |  |
| frequencyDomainResources | xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx xxxxx | TS 38.521-4 Table 5.2-2 for tested channel bandwidth and subcarrier spacing | SDR\_FR1 |
| frequencyDomainResources | xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx xxxxx | TS 38.521-4 Table 7.2-2 for tested channel bandwidth and subcarrier spacing | SDR\_FR2 |
| duration | 1 | SearchSpace duration of 1 symbol | SDR\_FR1, SDR\_FR2 |
| cce-REG-MappingType CHOICE { |  |  |  |
| nonInterleaved | NULL |  |  |
| } |  |  |  |
| precoderGranularity | sameAsREG-bundle |  |  |
| tci-StatesPDCCH-ToAddList | Not present | SearchSpace seen from all TCI states |  |
| tci-StatesPDCCH-ToAddList SEQUENCE(SIZE (1..maxNrofTCI-StatesPDCCH)) OF TCI-StateId { | 1 entry |  | MBWP |
| TCI-StateId[1] | 0 | QCL ssb 0 |  |
|  | 1 | QCL csi-rs 0 |  |
| } |  |  |  |
| } |  |  |  |

|  |  |
| --- | --- |
| Condition | Explanation |
| SDR\_FR1 | SDR testing in FR1. |
| SDR\_FR2 | SDR testing in FR2. |

Table 5.4.2.3-7: PDCCH *Search Space*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 5.4.2.0-7 | | | |
| Information Element | Value/remark | Comment | Condition |
| SearchSpace ::= SEQUENCE { |  |  |  |
| monitoringSlotPeriodicityAndOffset CHOICE { |  |  |  |
| sl1 | NULL |  |  |
| } |  |  |  |
| duration | Not present | 1 slot per default |  |
| monitoringSymbolsWithinSlot | 10000000000000 | Starting symbol 0 |  |
| nrofCandidates SEQUENCE { |  |  |  |
| aggregationLevel1 | n0 |  |  |
| aggregationLevel2 | n2 | 1 for UL, 1 for DL | CORESET\_ge\_24\_RBs |
|  | n0 |  |  |
| aggregationLevel4 | n2 | 1 for UL, 1 for DL | CORESET\_ge\_48\_RBs |
|  | n0 |  |  |
| aggregationLevel8 | n2 | 1 for UL, 1 for DL | CORESET\_ge\_96\_RBs |
|  | n0 |  |  |
| aggregationLevel16 | n0 |  |  |
| } |  |  |  |
| searchSpaceType CHOICE { |  |  |  |
| ue-Specific SEQUENCE { |  |  | USS |
| dci-Formats | formats0-1-And-1-1 | DCI Format 1\_1 |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

|  |  |
| --- | --- |
| Condition | Explanation |
| CORESET\_ge\_24\_RBs | 5MHz in scs15; 10MHz, 15MHz in scs30. |
| CORESET\_ge\_48\_RBs | 10MHz in scs15; 20MHz in scs30. |
| CORESET\_ge\_96\_RBs | 15MHz and above in scs15; 25MHz and above in scs30. |

NZP-CSI-RS for Tracking

NZP-CSI-RS-Resource

Table 5.4.2.3-8: NZP-CSI-RS-Resource for TRS

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 5.4.2.0-8 | | | |
| **Information Element** | **Value/remark** | **Comment** | **Condition** |
| NZP-CSI-RS-Resource ::= SEQUENCE { |  |  |  |
| nzp-CSI-RS-ResourceId | 0 | CSI-RS resource 1 |  |
| 1 | CSI-RS resource 2 |  |
| 2 | CSI-RS resource 3 |  |
| 3 | CSI-RS resource 4 |  |
| resourceMapping | CSI-RS-ResourceMapping for TRS |  |  |
| powerControlOffset | 0 |  |  |
| periodicityAndOffset | CSI-ResourcePeriodicityAndOffset |  |  |
| qcl-InfoPeriodicCSI-RS | TCI-StateId 0 | QCL ssb 0 |  |
| } |  |  |  |

CSI-RS-ResourceMapping

Table 5.4.2.3-9: CSI-RS-ResourceMapping for TRS

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 5.4.2.0-9 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-RS-ResourceMapping ::= SEQUENCE { |  |  |  |
| frequencyDomainAllocation CHOICE { |  |  |  |
| row1 | 1000 | k0=3, row1 | 2TX, 4TX |
| } |  |  |  |
| firstOFDMSymbolInTimeDomain | 6 | l0=6 for CSI-RS resource 1 and 3 |  |
|  | 10 | l0=10 for CSI-RS resource 2 and 4 |  |
| nrofPorts | p1 | 1 for CSI-RS resource 1,2,3,4 | 2TX, 4TX |
| cdm-Type | noCDM |  |  |
| density CHOICE{ |  |  |  |
| three | Null |  |  |
| } |  |  |  |
| freqBand | CSI-FrequencyOccupation for TRS |  |  |
| } |  |  |  |

CSI-ResourcePeriodicityAndOffset

Table 5.4.2.3-10: CSI-ResourcePeriodicityAndOffset for TRS

|  |
| --- |
| Derivation Path: Table 5.4.2.0-10 |

CSI-FrequencyOccupation

Table 5.4.2.3-11: CSI-FrequencyOccupation for TRS

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 5.4.2.0-11 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-FrequencyOccupation ::= SEQUENCE { |  |  |  |
| nrofRBs | 52 | BW 10MHz SCS 15kHz, BW 20MHz SCS 30kHz |  |
|  | 108 | BW 20MHz SCS 15kHz |  |
|  | 276 | BW 100MHz SCS 30kHz |  |
| } |  |  |  |

NZP-CSI-RS-ResourceSet

Table 5.4.2.3-12: NZP-CSI-RS-ResourceSet for TRS

|  |
| --- |
| Derivation Path: Table 5.4.2.0-12 |

CSI-ResourceConfig

Table 5.4.2.3-13: CSI-ResourceConfig for TRS

|  |
| --- |
| Derivation Path: Table 5.4.2.0-13 |

NZP CSI-RS for CSI Acquisition

NZP-CSI-RS-Resource

Table 5.4.2.3-14: NZP-CSI-RS-Resource for CSI Acquisition

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 5.4.2.0-14 | | | |
| Information Element | Value/remark | Comment | Condition |
| NZP-CSI-RS-Resource ::= SEQUENCE { |  |  |  |
| nzp-CSI-RS-ResourceId | 4 | CSI-RS resource 5 |  |
| resourceMapping | CSI-RS-ResourceMapping |  |  |
| powerControlOffset | 0 |  |  |
| periodicityAndOffset | CSI-ResourcePeriodicityAndOffset |  |  |
| qcl-InfoPeriodicCSI-RS | TCI-StateId 1 | QCL csi-rs 0 |  |
| } |  |  |  |

CSI-RS-ResourceMapping

Table 5.4.2.3-15: CSI-RS-ResourceMapping for CSI Acquisition

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 5.4.2.0-15 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-RS-ResourceMapping ::= SEQUENCE { |  |  |  |
| frequencyDomainAllocation CHOICE { |  |  |  |
| other | 000100 | k0=4, row3 | 2TX |
| row4 | 010 | k0=4, row4 | 4TX |
| } |  |  |  |
| nrofPorts | p2 |  | 2TX |
|  | p4 |  | 4TX |
| firstOFDMSymbolInTimeDomain | 12 | I0=12 |  |
| cdm-Type | fd-CDM2 |  |  |
| density CHOICE { |  |  |  |
| one | NULL |  |  |
| } |  |  |  |
| freqBand | CSI-FrequencyOccupation for CSI Acquisition |  |  |
| } |  |  |  |

CSI-ResourcePeriodicityAndOffset

Table 5.4.2.3-16: CSI-ResourcePeriodicityAndOffset

|  |
| --- |
| Derivation Path: Table 5.4.2.0-16 |

CSI-FrequencyOccupation

Table 5.4.2.3-17: CSI-FrequencyOccupation for CSI Acquisition

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 5.4.2.0-17 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-FrequencyOccupation ::= SEQUENCE { |  |  |  |
| nrofRBs | 52 |  | BW 10MHz SCS 15kHz, BW 20MHz SCS 30kHz |
|  | 108 |  | BW 20MHz SCS 15kHz |
|  | 276 |  | BW 100MHz SCS 30kHz |
| } |  |  |  |

NZP-CSI-RS-ResourceSet

Table 5.4.2.3-18: NZP-CSI-RS-ResourceSet for CSI Acquisition

|  |
| --- |
| Derivation Path: Table 5.4.2.0-18 |

CSI-ResourceConfig

Table 5.4.2.3-19: CSI-ResourceConfig for CSI Acquisition

|  |
| --- |
| Derivation Path: Table 5.4.2.0-19 |

ZP CSI-RS for CSI Acquisition

ZP-CSI-RS-Resource

Table 5.4.2.3-20: ZP-CSI-RS-Resource

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 5.4.2.0-20 | | | |
| Information Element | Value/remark | Comment | Condition |
| ZP-CSI-RS-Resource ::= SEQUENCE { |  |  |  |
| zp-CSI-RS-ResourceId | ZP-CSI-RS-ResourceId |  |  |
| resourceMapping | ZP CSI-RS-ResourceMapping |  |  |
| periodicityAndOffset | ZP CSI-ResourcePeriodicityAndOffset |  |  |
| qcl-InfoPeriodicCSI-RS | TCI-StateId 1 | QCL csi-rs 0 |  |
| } |  |  |  |

CSI-RS-ResourceMapping

Table 5.4.2.3-21: ZP CSI-RS-ResourceMapping

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 5.4.2.0-21 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-RS-ResourceMapping ::= SEQUENCE { |  |  |  |
| frequencyDomainAllocation CHOICE { |  |  |  |
| row4 | 001 | k0=0, row4 | 2TX, 4TX |
| } |  |  |  |
| nrofPorts | p4 |  | 2TX, 4TX |
| firstOFDMSymbolInTimeDomain | 12 | I0=12 |  |
| cdm-Type | fd-CDM2 |  |  |
| density CHOICE { |  |  |  |
| one | NULL |  |  |
| } |  |  |  |
| freqBand | ZP CSI-FrequencyOccupation |  |  |
| } |  |  |  |

CSI-ResourcePeriodicityAndOffset

Table 5.4.2.3-22: ZP CSI-ResourcePeriodicityAndOffset

|  |
| --- |
| Derivation Path: Table 5.4.2.0-22 |

CSI-FrequencyOccupation

Table 5.4.2.3-23: ZP CSI-FrequencyOccupation

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 5.4.2.0-23 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-FrequencyOccupation ::= SEQUENCE { |  |  |  |
| nrofRBs | 52 |  | BW 10MHz SCS 15kHz, BW 20MHz SCS 30kHz |
|  | 108 |  | BW 20MHz SCS 15kHz |
|  | 276 |  | BW 100MHz SCS 30kHz |
| } |  |  |  |

PDSCH DMRS Configuration

DMRS-DownlinkConfig

Table 5.4.2.3-24: DMRS-DownlinkConfig

|  |
| --- |
| Derivation Path: Table 5.4.2.0-24 |

PDSCH Configuration

PDSCH-ServingCellConfig

Table 5.4.2.3-25: PDSCH-ServingCellConfig

|  |
| --- |
| Derivation Path: Table 5.4.2.0-25 |

PDSCH-Config

Table 5.4.2.3-26: *PDSCH-Config*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 5.4.2.0-26 | | | |
| Information Element | Value/remark | Comment | Condition |
| PDSCH-Config ::= SEQUENCE { |  |  |  |
| dataScramblingIdentityPDSCH | 0 |  |  |
| dmrs-DownlinkForPDSCH-MappingTypeA CHOICE { |  |  |  |
| setup | DMRS-DownlinkConfig |  |  |
| } |  |  |  |
| tci-StatesToAddModList SEQUENCE(SIZE (1.. maxNrofTCI-States)) OF TCI-State { | 2 entries |  |  |
| TCI-State[1] SEQUENCE { |  | entry 1 |  |
| tci-StateId | 0 | TCI-StateId 0 |  |
| qcl-type1 SEQUENCE { |  |  |  |
| cell | 0 |  |  |
| bwp-id | Not present | BWP\_ID |  |
| referenceSignal | ssb |  |  |
| ssb | 0 |  |  |
| qcl-Type | typeC |  |  |
| } |  |  |  |
| qcl-type2 SEQUENCE { |  |  | SDR\_FR2 |
| cell | 0 |  |  |
| bwp-id | Not present | BWP\_ID |  |
| referenceSignal | ssb |  |  |
| ssb | 0 |  |  |
| qcl-Type | typeD |  |  |
| } |  |  |  |
| } |  |  |  |
| TCI-State[2] SEQUENCE { |  | entry 2 |  |
| tci-StateId | 1 | TCI-StateId 1 |  |
| qcl-type1 { |  |  |  |
| cell | 0 |  |  |
| bwp-id | 0 | BWP ID |  |
| referenceSignal | csi-rs |  |  |
| csi-rs | 0 |  |  |
| qcl-Type | typeA |  |  |
| } |  |  |  |
| qcl-type2 SEQUENCE { |  |  | SDR\_FR2 |
| cell | 0 |  |  |
| bwp-id | 0 | BWP ID |  |
| referenceSignal | csi-rs |  |  |
| csi-rs | 0 |  |  |
| qcl-Type | typeD |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| vrb-ToPRB-Interleaver | Not present |  |  |
| resourceAllocation | resourceAllocationType0 |  |  |
| pdsch-AggregationFactor | Not present |  |  |
| rbg-Size | config1 | The UE ignores this field if *resourceAllocation* is set to *resourceAllocationType1* (see TS 38.214 [21], clause 5.1.2.2.1). |  |
| prb-BundlingType CHOICE { |  |  |  |
| staticBundling SEQUENCE { |  |  |  |
| bundleSize | wideband |  | SDR\_FR1, SDR\_FR2 |
| } |  |  |  |
| } |  |  |  |
| ZP-CSI-RS-ResourceToAddModList SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-Resources)) OF NZP-CSI-RS-Resource { | 1 entry |  |  |
| ZP-CSI-RS-Resource[1] | ZP-CSI-RS-Resource | entry 1 |  |
| } |  |  |  |
| p-ZP-CSI-RS-ResourceSet | p-ZP-CSI-RS-ResourceSet |  |  |
| } |  |  |  |

PDSCH-TimeDomainResourceAllocationList

Table 5.4.2.3-27: PDSCH-TimeDomainResourceAllocationList

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 5.4.2.0-27 | | | |
| Information Element | Value/remark | Comment | Condition |
| PDSCH-TimeDomainResourceAllocationList ::= SEQUENCE(SIZE(1..maxNrofDL-Allocations)) OF PDSCH-TimeDomainResourceAllocation { | 2 entries |  |  |
| PDSCH-TimeDomainResourceAllocation[1] SEQUENCE { |  | entry 1 |  |
| k0 | Not present |  |  |
| mappingType | typeA |  |  |
| startSymbolAndLength | 44 | Start symbol(S)=2, Length(L)=4 | SDR\_FR1 |
|  | 96 | Start symbol(S)=1, Length(L)=9 | SDR\_FR2 |
| } |  |  |  |
| PDSCH-TimeDomainResourceAllocation[2] SEQUENCE { |  | entry 2 |  |
| k0 | Not present |  |  |
| mappingType | typeA |  |  |
|  | 40 | Start symbol(S)=1, Length(L)=13 | SDR\_FR1, SDR\_FR2 |
| } |  |  |  |
| } |  |  |  |

– *SecurityAlgorithmConfig*

Table 5.4.2.3-A1: *SecurityAlgorithmConfig*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-165 | | | |
| Information Element | Value/remark | Comment | Condition |
| SecurityAlgorithmConfig ::= SEQUENCE { |  |  |  |
| cipheringAlgorithm | nea0 |  | SDR\_FR1, SDR\_FR2 |
| integrityProtAlgorithm | nia2 |  |  |
| } |  |  |  |

– *Security mode command*

Table 5.4.2.3-A2: SECURITY MODE COMMAND

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.7.1-25 | | | |
| Information Element | | Value/remark | Comment | Condition |
| Selected NAS security algorithms | |  |  |  |
| Type of ciphering algorithm | | ‘0000’B | 5G encryption algorithm 5G EA0 (null ciphering algorithm) | SDR\_FR1, SDR\_FR2 |
| Type of integrity protection algorithm | | Set according to PIXIT px\_NAS\_5GC\_IntegrityProtAlgorithm for default integrity protection algorithm | This value should not be equal to the null integrity algorithm. |  |
| Selected EPS NAS security algorithms | | Not Present |  |  |
| Selected EPS NAS security algorithms | |  |  | UE\_S1\_SUPPORTED |
| Type of ciphering algorithm | | ‘0000’B | EPS encryption algorithm EEA0 (null ciphering algorithm) | SDR\_FR1, SDR\_FR2 |
| Type of integrity protection algorithm | | Set according to PIXIT px\_NAS\_IntegrityProtAlgorithmfor default integrity protection algorithm |  |  |

#### 5.4.2.4 Message contents for CQI reporting requirements

NZP-CSI-RS for Tracking

CSI-RS-ResourceMapping

Table 5.4.2.4-1: CSI-RS-ResourceMapping for TRS

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-45 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-RS-ResourceMapping ::= SEQUENCE { |  |  |  |
| frequencyDomainAllocation CHOICE { |  |  |  |
| row1 | 0001 | k0=0 for CSI-RS resource 1,2,3,4 | TRS |
| } |  |  |  |
| firstOFDMSymbolInTimeDomain | 4 | l0 = 4 for CSI-RS resource 1 and 3 | TRS |
|  | 8 | l0 = 8 for CSI-RS resource 2 and 4 | TRS |
| nrofPorts | p1 | 1 for CSI-RS resource 1,2,3,4 | TRS |
| Cdm-Type | noCDM |  | TRS |
| Density CHOICE{ |  |  |  |
| three | Null |  | TRS |
| } |  |  |  |
| freqBand | CSI-FrequencyOccupation |  | TRS |
| } |  |  |  |

NZP CSI-RS for CSI Acquisition

CSI-RS-ResourceMapping

Table 5.4.2.4-2: CSI-RS-ResourceMapping

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-45 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-RS-ResourceMapping ::= SEQUENCE { |  |  |  |
| frequencyDomainAllocation CHOICE { |  |  |  |
| other | 001000 | K0 = 6, row3, | NOT 1Tx test cases |
| row1 | 0001 | K0 = 0, row1 | 1Tx test cases |
| } |  |  |  |
| nrofPorts | P2 |  | NOT 1Tx test cases |
|  | P1 |  | 1Tx test cases |
| firstOFDMSymbolInTimeDomain | 13 | I0 = 13 |  |
| cdm-Type | fd-CDM2 |  | NOT 1Tx test cases |
|  | noCDM |  | 1Tx test cases |
| density CHOICE { |  |  |  |
| one | NULL |  | NOT 1Tx test cases |
| three | NULL |  | 1Tx test cases |
| } |  |  |  |
| freqBand | CSI-FrequencyOccupation |  |  |
| } |  |  |  |

CSI-ResourcePeriodicityAndOffset

Table 5.4.2.4-2a: NZP CSI-ResourcePeriodicityAndOffset

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-43 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ResourcePeriodicityAndOffset ::= CHOICE { |  |  |  |
| slots5 | 1 |  | FR1\_FDD |
| slot10 | 1 |  | FR1\_TDD |
| slot8 | 1 |  | FR2 |
| } |  |  |  |

ZP CSI-RS for CSI Acquisition

CSI-RS-ResourceMapping

Table 5.4.2.4-3: ZP CSI-RS-ResourceMapping

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-45 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-RS-ResourceMapping ::= SEQUENCE { |  |  |  |
| frequencyDomainAllocation CHOICE { |  |  |  |
| other | 000100 | K0 = 4 | FR1 |
| row4 | 100 | K0=8 | FR2 |
| } |  |  |  |
| nrofPorts | P4 |  |  |
| firstOFDMSymbolInTimeDomain | 9 | I0 = 9 | FR1 |
|  | 13 | l0 = 13 | FR2 |
| cdm-Type | fd-CDM2 |  |  |
| density CHOICE { |  |  |  |
| one | NULL |  |  |
| } |  |  |  |
| freqBand | ZP CSI-FrequencyOccupation |  |  |
| } |  |  |  |

CSI-ResourcePeriodicityAndOffset

Table 5.4.2.4-4: ZP CSI-ResourcePeriodicityAndOffset

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-43 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ResourcePeriodicityAndOffset ::= CHOICE { |  |  |  |
| slots5 | 1 |  | FR1\_FDD |
| slot10 | 1 |  | FR1\_TDD |
| slot8 | 1 |  | FR2 |
| } |  |  |  |

p-ZP-CSI-RS-ResourceSet

Table 5.4.2.4-5: p-ZP-CSI-RS-ResourceSet

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-87 | | | |
| Information Element | Value/remark | Comment | Condition |
| p-ZP-CSI-RS-ResourceSet ::= SEQUENCE { |  |  |  |
| zp\_CSI-RS\_ResourceSetId | 0 |  |  |
| zp-CSI-RS-ResourceIdList SEQUENCE (SIZE (1..maxNrofZP-CSI-RS-ResourcesPerSet)) OF ZP-CSI-RS-ResourceId{ | 1 entry |  |  |
| ZP-CSI-RS-ResourceId[1] | 0 | entry 1  ZP CSI-RS resource 1 |  |
| } |  |  |  |
| } |  |  |  |

CSI-IM Configuration

CSI-IM-Resource

Table 5.4.2.4-6: *CSI-IM-Resource*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.331 [6], clause 6.3.2 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-IM-Resource ::= SEQUENCE { |  |  |  |
| csi-IM-ResourceId | CSI-IM-ResourceId |  |  |
| csi-IM-ResourceElementPattern CHOICE { |  |  |  |
| pattern0 SEQUENCE { |  |  | FR1 |
| subcarrierLocation-p0 | s4 |  |  |
| symbolLocation-p0 | 9 |  |  |
| } |  |  |  |
| pattern1 SEQUENCE { |  |  | FR2 |
| subcarrierLocation-p1 | s8 |  |  |
| symbolLocation-p1 | 13 |  |  |
| } |  |  |  |
| } |  |  |  |
| freqBand | CSI-FrequencyOccupation |  |  |
| periodicityAndOffset | CSI-ResourcePeriodicityAndOffset |  |  |
| } |  |  |  |

CSI-FrequencyOccupation

Table 5.4.2.4-6a: *CSI-FrequencyOccupation for CSI-IM-Resource*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-33 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-FrequencyOccupation ::= SEQUENCE { |  |  |  |
| nrofRBs | 52 |  | BW 10 MHz SCS 15kHz |
| 52 |  | BW 20 MHz SCS 30kHz |
| 108 |  | BW 40 MHz SCS 30kHz |
|  | 68 |  | BW 100MHz SCS 120kHz |
|  | 132 |  | BW 200 MHz SCS 120 kHz |
| } |  |  |  |

CSI-IM-ResourceId

Table 5.4.2.4-7: *CSI-IM-ResourceId*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.331 [6], clause 6.3.2 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-IM-ResourceId | 0 |  |  |

CSI-IM-ResourceSet

Table 5.4.2.4-8: *CSI-IM-ResourceSet*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.331 [6], clause 6.3.2 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-IM-ResourceSet ::= SEQUENCE { |  |  |  |
| csi-IM-ResourceSetId | CSI-IM-ResourceSetId |  |  |
| csi-IM-Resources SEQUENCE (SIZE(1..maxNrofCSI-IM-ResourcesPerSet)) { | 1 entry |  |  |
| CSI-IM-ResourceId[1] | CSI-IM-ResourceId | entry 1 |  |
| } |  |  |  |
| } |  |  |  |

CSI-IM-ResourceSetId

Table 5.4.2.4-9: *CSI-IM-ResourceSetId*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.331 [6], clause 6.3.2 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-IM-ResourceSetId | 0 |  |  |

CSI-IM-ResourceConfig

Table 5.4.2.4-10: *CSI-IM-ResourceConfig*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.331 [6], clause 6.3.2 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ResourceConfig ::= SEQUENCE { |  |  |  |
| csi-ResourceConfigId | 2 |  |  |
| csi-RS-ResourceSetList CHOICE { |  |  |  |
| csi-IM-ResourceSetList SEQUENCE (SIZE (1..maxNrofCSI-IM-ResourceSetsPerConfig)) OF CSI-IM-ResourceSetId { | 1 entry |  |  |
| csi-IM-ResourceSetId[0] | 0 | entry 1 |  |
| } |  |  |  |
| } |  |  |  |
| bwp-Id | BWP-Id |  |  |
| resourceType | periodic |  |  |
| } |  |  |  |

CSI-MeasConfig

Table 5.4.2.4-11: *CSI-MeasConfig*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-38 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-MeasConfig::= SEQUENCE { |  |  |  |
| nzp-CSI-RS-ResourceToAddModList SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-Resources)) OF NZP-CSI-RS-Resource { | n entries | n=5 for FR1  n=7 for FR2 |  |
| NZP-CSI-RS-Resource[1] | NZP-CSI-RS-Resource for TRS (1) | entry 1  CSI-RS resource 1 |  |
| NZP-CSI-RS-Resource[2] | NZP-CSI-RS-Resource for TRS (2) | entry 2  CSI-RS resource 2 |  |
| NZP-CSI-RS-Resource[3] | NZP-CSI-RS-Resource for TRS (3) | entry 3  CSI-RS resource 3 |  |
| NZP-CSI-RS-Resource[4] | NZP-CSI-RS-Resource for TRS (4) | entry 4  CSI-RS resource 4 |  |
| NZP-CSI-RS-Resource[5] | NZP-CSI-RS-Resource for CSI Acquisition | entry 5  CSI-RS resource 5 |  |
| NZP-CSI-RS-Resource[6] | CSI-RS-Resource for beam refinement | entry 6  CSI-RS resource 6 | FR2 |
| NZP-CSI-RS-Resource[7] | CSI-RS-Resource for beam refinement | entry 7  CSI-RS resource 7 | FR2 |
| } |  |  |  |
| nzp-CSI-RS-ResourceSetToAddModList SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-ResourceSets)) OF NZP-CSI-RS-ResourceSet { | n entries | n=2 for FR1  n=3 for FR2 |  |
| NZP-CSI-RS-ResourceSet[1] | NZP-CSI-RS-ResourceSet for TRS | entry 1 |  |
| NZP-CSI-RS-ResourceSet[2] | NZP-CSI-RS-ResourceSet for CSI Acquisition | entry 2 |  |
| NZP-CSI-RS-ResourceSet[3] | NZP-CSI-RS-ResourceSet for beam refinement | entry 3 | FR2 |
| } |  |  |  |
| csi-IM-ResourceToAddModList SEQUENCE (SIZE (1..maxNrofCSI-IM-Resources)) OF CSI-IM-Resource { | 1 entry |  |  |
| CSI-IM-Resource[1] | CSI-IM-Resource |  |  |
| } |  |  |  |
| csi-IM-ResourceSetToAddModList SEQUENCE (SIZE (1..maxNrofCSI-IM-ResourceSets)) OF CSI-IM-ResourceSet { | 1 entry |  |  |
| CSI-IM-ResourceSet[1] | CSI-IM-ResourceSet | entry 1 |  |
| } |  |  |  |
| csi-SSB-ResourceSetToAddModList | Not present |  |  |
| csi-ResourceConfigToAddModList SEQUENCE (SIZE (1..maxNrofCSI-ResourceConfigurations)) OF CSI-ResourceConfig { | n entries | n=3 for FR1  n=4 for FR2 |  |
| CSI-ResourceConfig[1] | CSI-ResourceConfig for TRS | entry 1 |  |
| CSI-ResourceConfig[2] | CSI-ResourceConfig for CSI Acquisition | entry 2 |  |
| CSI-ResourceConfig[3] | CSI-IM-ResourceConfig | entry 3 |  |
| CSI-ResourceConfig[4] | CSI-ResourceConfig for beam refinement | entry 4 | FR2 |
| } |  |  |  |
| } |  |  |  |

CSI-ReportConfig

Table 5.4.2.4-12: *CSI-ReportConfig*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.331 [6], clause 6.3.2 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ReportConfig ::= SEQUENCE { |  |  |  |
| reportConfigId | CSI-ReportConfigId |  |  |
| carrier | ServCellIndex |  |  |
| resourcesForChannelMeasurement | CSI-ResourceConfigId for CSI Acquisition |  |  |
| csi-IM-ResourcesForInterference | CSI-ResourceConfigId for CSI-IM |  |  |
| nzp-CSI-RS-ResourcesForInterference | not present |  |  |
| reportConfigType CHOICE { |  |  |  |
| periodic SEQUENCE { |  |  |  |
| reportSlotConfig | CSI-ReportPeriodicityAndOffset |  |  |
| pucch-CSI-ResourceList SEQUENCE (SIZE (1..maxNrofBWPs)) OF PUCCH-CSI-Resource { | 2 entry |  |  |
| PUCCH-CSI-Resource [1] | PUCCH-CSI-Resource | entry 1 |  |
| } |  |  |  |
| } |  |  |  |
| reportQuantity CHOICE { |  |  |  |
| cri-RI-PMI-CQI | NULL |  | FR1, FR2 |
| } |  |  |  |
| reportFreqConfiguration SEQUENCE { |  |  |  |
| cqi-FormatIndicator | widebandCQI |  |  |
| pmi-FormatIndicator | widebandPMI |  |  |
| csi-ReportingBand CHOICE { |  |  |  |
| subbands7 | '1111111'B |  | FR1 |
| subbands9 | ‘111111111’B |  | FR2 |
| } |  |  |  |
| } |  |  |  |
| timeRestrictionForChannelMeasurements | notConfigured |  |  |
| timeRestrictionForInterferenceMeasurements | notConfigured |  |  |
| codebookConfig | CodebookConfig |  |  |
| dummy | Not present |  |  |
| groupBasedBeamReporting CHOICE { |  |  |  |
| disabled SEQUENCE { |  |  |  |
| nrofReportedRS | not present |  |  |
| } |  |  |  |
| } |  |  |  |
| cqi-Table | table2 |  | FR1 |
|  | table1 |  | FR2 |
| subbandSize | value2 |  |  |
| non-PMI-PortIndication | Not present |  |  |
| } |  |  |  |

CSI-ReportPeriodicityAndOffset

Table 5.4.2.4-13: *CSI-ReportPeriodicityAndOffset*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.331 [6], clause 6.3.2 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ReportPeriodicityAndOffset ::= CHOICE { |  |  |  |
| slots10 | 9 |  | FR1\_TDD |
| slots5 | 0 |  | FR1\_FDD |
| slot8 | 3 |  | FR2 |
| } |  |  |  |

PUCCH-CSI-Resource

Table 5.4.2.4-14: PUCCH-CSI-Resource

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.331 [6], clause 6.3.2 | | | |
| Information Element | Value/remark | Comment | Condition |
| PUCCH-CSI-Resource ::= SEQUENCE { |  |  |  |
| uplinkBandwidthPartId | BWP-id |  | FR1, FR2 |
| pucch-Resource | 8 |  | FR1 |
| 14 |  | FR2 |
| } |  |  |  |

CodebookConfig

Table 5.4.2.4-15: *CodebookConfig*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-25 | | | |
| Information Element | Value/remark | Comment | Condition |
| CodebookConfig ::= SEQUENCE { |  |  |  |
| codebookType CHOICE { |  |  |  |
| type1 SEQUENCE { |  |  |  |
| subType CHOICE { |  |  |  |
| typeI-SinglePanel SEQUENCE { |  |  |  |
| nrOfAntennaPorts CHOICE { |  |  |  |
| two SEQUENCE { |  |  |  |
| twoTX-CodebookSubsetRestriction | '010000'B |  |  |
| } |  |  |  |
| } |  |  |  |
| typeI-SinglePanel-ri-Restriction | ‘11111111’B |  |  |
| } |  |  |  |
| } |  |  |  |
| codebookMode | 1 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

Physical layer parameters

Table 5.4.2.4-16: Phy sical layer parameters for DCI format 1\_1

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.3.6.1.2.2-1 | | | |
| Parameter | Value | Value in binary | Condition |
| PUCCH resource indicator | *PUCCH-ResourceId[1]* = 8 in pucch-ResourceSetID[2] as defined in Table 4.6.3-112 (Mapping as per Table 9.2.3-2 in TS 38.213) | ‘110’B | SUBBAND\_CQI |

PUSCH-TimeDomainResourceAllocationList

Table 5.4.2.4-17: *PUSCH-TimeDomainResourceAllocationList*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 5.4.2.0-27 | | | |
| Information Element | Value/remark | Comment | Condition |
| PUSCH-TimeDomainResourceAllocationList ::= SEQUENCE (SIZE(1..maxNrofUL-Allocations)) OF PUSCH-TimeDomainResourceAllocation { | 2 entries |  | SUBBAND\_CQI |
| PUSCH-TimeDomainResourceAllocation[1] SEQUENCE { |  | entry 1 |  |
| startSymbolAndLength | 55 | Start symbol(S)=0, Length(L)=12 |  |
| } |  |  |  |
| PUSCH-TimeDomainResourceAllocation[2] SEQUENCE { |  | entry 2 |  |
| startSymbolAndLength | 55 | Start symbol(S)=0, Length(L)=12 |  |
| } |  |  |  |
| } |  |  |  |

|  |  |
| --- | --- |
| Condition | Explanation |
| SUBBAND\_CQI | For aperiodic subband CQI reporting under fading condition test cases |

CSI-ResourceConfig

Table 5.4.2.4-18: CSI-ResourceConfig for CSI Acquisition

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 5.4.2.0-19 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ResourceConfig ::= SEQUENCE { |  |  |  |
| csi-ResourceConfigId | 1 |  |  |
| csi-RS-ResourceSetList CHOICE { |  |  |  |
| nzp-CSI-RS-SSB SEQUENCE { |  |  |  |
| nzp-CSI-RS-ResourceSetList SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-ResourceSetsPerConfig)) OF NZP-CSI-RS-ResourceSetId { | 1 entry |  |  |
| NZP-CSI-RS-ResourceSetId[1] | 1 | entry 1 |  |
| } |  |  |  |
| csi-SSB-ResourceSetList | Not present |  |  |
| } |  |  |  |
| } |  |  |  |
| bwp-Id | BWP-Id |  |  |
| resourceType | periodic |  |  |
| } |  |  |  |

#### 5.4.2.5 Message contents for PMI reporting requirements

NZP-CSI-RS for Tracking

CSI-RS-ResourceMapping

Table 5.4.2.5-1: CSI-RS-ResourceMapping for TRS

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-45 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-RS-ResourceMapping ::= SEQUENCE { |  |  |  |
| frequencyDomainAllocation CHOICE { |  |  |  |
| row1 | 0001 | k0=0 for CSI-RS resource 1,2,3,4 | TRS |
| } |  |  |  |
| firstOFDMSymbolInTimeDomain | 4 | l0 = 4 for CSI-RS resource 1 and 3 | TRS |
|  | 8 | l0 = 8 for CSI-RS resource 2 and 4 | TRS |
| nrofPorts | p1 | 1 for CSI-RS resource 1,2,3,4 | TRS |
| cdm-Type | noCDM |  | TRS |
| density CHOICE{ |  |  |  |
| three | Null |  | TRS |
| } |  |  |  |
| freqBand | CSI-FrequencyOccupation |  | TRS |
| } |  |  |  |

NZP CSI-RS for CSI Acquisition

CSI-RS-ResourceMapping

Table 5.4.2.5-2: CSI-RS-ResourceMapping

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-45 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-RS-ResourceMapping ::= SEQUENCE { |  |  |  |
| frequencyDomainAllocation CHOICE { |  |  |  |
| row3 | 001000 | K0 = 6, row3 | 2Tx |
| row4 | 001 | K0 = 0, row4 | 4Tx |
| other | 001100 | K0 = 4, K1 = 6, row8 | 8Tx |
|  | 011110 | K0=2, row 12 | 16Tx |
| } |  |  |  |
| nrofPorts | p2 |  | 2Tx |
| p4 |  | 4Tx |
|  | p8 |  | 8Tx |
|  | p16 |  | 16Tx |
| firstOFDMSymbolInTimeDomain | 13 | I0 = 13 | 2Tx, 4Tx |
|  | 5 | I0 = 5 | 8Tx, 16Tx |
| cdm-Type | fd-CDM2 |  | 2Tx, 4Tx |
|  | cdm4-FD2-TD2 |  | 8Tx, 16Tx |
| density CHOICE { |  |  |  |
| one | NULL |  |  |
| } |  |  |  |
| freqBand | CSI-FrequencyOccupation |  |  |
| } |  |  |  |

|  |  |
| --- | --- |
| Condition | Explanation |
| 2Tx | For test cases using 2 CSI-RS ports for NZP-CSI-RS for CSI acquisition. |
| 4Tx | For test cases using 4 CSI-RS ports for NZP-CSI-RS for CSI acquisition. |
| 8Tx | For test cases using 8 CSI-RS ports for NZP-CSI-RS for CSI acquisition. |
| 16Tx | For test cases using 16 CSI-RS ports for NZP-CSI-RS for CSI acquisition. |

ZP CSI-RS for CSI Acquisition

CSI-RS-ResourceMapping

Table 5.4.2.5-3: ZP CSI-RS-ResourceMapping

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-45 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-RS-ResourceMapping ::= SEQUENCE { |  |  |  |
| frequencyDomainAllocation CHOICE { |  |  |  |
| other | 000100 | K0 = 4 | FR1 |
| row4 | 100 | K0 = 8 | FR2 |
| } |  |  |  |
| nrofPorts | p4 |  |  |
| firstOFDMSymbolInTimeDomain | 9 | I0 = 9 | FR1 |
|  | 13 | l0 = 13 | FR2 |
| cdm-Type | fd-CDM2 |  |  |
| density CHOICE { |  |  |  |
| one | NULL |  |  |
| } |  |  |  |
| freqBand | ZP CSI-FrequencyOccupation |  |  |
| } |  |  |  |

Table 5.4.2.5-4: Void

CSI-ResourcePeriodicityAndOffset

Table 5.4.2.5-4A: ZP CSI-ResourcePeriodicityAndOffset

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-43 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ResourcePeriodicityAndOffset ::= CHOICE { |  |  |  |
| slots5 | 1 |  | FR1\_FDD |
| slot10 | 1 |  | FR1\_TDD |
| slot8 | 1 |  | FR2 |
| } |  |  |  |

Table 5.4.2.5-5: Void

p-ZP-CSI-RS-ResourceSet

Table 5.4.2.5-5A: p-ZP-CSI-RS-ResourceSet

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-87 | | | |
| Information Element | Value/remark | Comment | Condition |
| p-ZP-CSI-RS-ResourceSet ::= SEQUENCE { |  |  |  |
| zp\_CSI-RS\_ResourceSetId | 0 |  |  |
| zp-CSI-RS-ResourceIdList SEQUENCE (SIZE (1..maxNrofZP-CSI-RS-ResourcesPerSet)) OF ZP-CSI-RS-ResourceId{ | 1 entry |  |  |
| ZP-CSI-RS-ResourceId[1] | 0 | entry 1  ZP CSI-RS resource 1 |  |
| } |  |  |  |
| } |  |  |  |

CSI-ResourceConfig

Table 5.4.2.5-6: CSI-ResourceConfig for CSI Acquisition

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-41 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ResourceConfig ::= SEQUENCE { |  |  |  |
| csi-ResourceConfigId | 1 |  |  |
| csi-RS-ResourceSetList CHOICE { |  |  |  |
| nzp-CSI-RS-SSB SEQUENCE { |  |  |  |
| nzp-CSI-RS-ResourceSetList SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-ResourceSetsPerConfig)) OF NZP-CSI-RS-ResourceSetId { | 1 entry |  |  |
| NZP-CSI-RS-ResourceSetId[1] | 1 | entry 1 |  |
| } |  |  |  |
| csi-SSB-ResourceSetList | Not present |  |  |
| } |  |  |  |
| } |  |  |  |
| bwp-Id | BWP-Id |  |  |
| resourceType | aperiodic |  |  |
| } |  |  |  |

CSI-IM Configuration

CSI-IM-Resource

Table 5.4.2.5-7: *CSI-IM-Resource*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.331 [6], clause 6.3.2 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-IM-Resource ::= SEQUENCE { |  |  |  |
| csi-IM-ResourceId | CSI-IM-ResourceId |  |  |
| csi-IM-ResourceElementPattern CHOICE { |  |  |  |
| pattern0 SEQUENCE { |  |  | FR1 |
| subcarrierLocation-p0 | s4 |  |  |
| symbolLocation-p0 | 9 |  |  |
| } |  |  |  |
| pattern1 SEQUENCE { |  |  | FR2 |
| subcarrierLocation-p1 | s8 |  |  |
| symbolLocation-p1 | 13 |  |  |
| } |  |  |  |
| } |  |  |  |
| freqBand | CSI-FrequencyOccupation |  |  |
| periodicityAndOffset | Not present |  |  |
| } |  |  |  |

CSI-IM-ResourceId

Table 5.4.2.5-8: *CSI-IM-ResourceId*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.331 [6], clause 6.3.2 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-IM-ResourceId | 0 |  |  |

CSI-IM-ResourceSet

Table 5.4.2.5-9: *CSI-IM-ResourceSet*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.331 [6], clause 6.3.2 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-IM-ResourceSet ::= SEQUENCE { |  |  |  |
| csi-IM-ResourceSetId | CSI-IM-ResourceSetId |  |  |
| csi-IM-Resources SEQUENCE (SIZE(1..maxNrofCSI-IM-ResourcesPerSet)) { | 1 entry |  |  |
| CSI-IM-ResourceId[1] | CSI-IM-ResourceId | entry 1 |  |
| } |  |  |  |
| } |  |  |  |

CSI-IM-ResourceSetId

Table 5.4.2.5-10: *CSI-IM-ResourceSetId*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.331 [6], clause 6.3.2 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-IM-ResourceSetId | 0 |  |  |

CSI-IM-ResourceConfig

Table 5.4.2.5-11: *CSI-IM-ResourceConfig*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.331 [6], clause 6.3.2 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ResourceConfig ::= SEQUENCE { |  |  |  |
| csi-ResourceConfigId | 2 |  |  |
| csi-RS-ResourceSetList CHOICE { |  |  |  |
| csi-IM-ResourceSetList SEQUENCE (SIZE (1..maxNrofCSI-IM-ResourceSetsPerConfig)) OF CSI-IM-ResourceSetId { | 1 entry |  |  |
| csi-IM-ResourceSetId[0] | 0 | entry 1 |  |
| } |  |  |  |
| } |  |  |  |
| bwp-Id | BWP-Id |  |  |
| resourceType | aperiodic |  |  |
| } |  |  |  |

CSI-MeasConfig

Table 5.4.2.5-12: *CSI-MeasConfig*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-38 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-MeasConfig::= SEQUENCE { |  |  |  |
| nzp-CSI-RS-ResourceToAddModList SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-Resources)) OF NZP-CSI-RS-Resource { | n entries | n=5 for FR1  n=7 for FR2 |  |
| NZP-CSI-RS-Resource[1] | NZP-CSI-RS-Resource for TRS (1) | entry 1  CSI-RS resource 1 |  |
| NZP-CSI-RS-Resource[2] | NZP-CSI-RS-Resource for TRS (2) | entry 2  CSI-RS resource 2 |  |
| NZP-CSI-RS-Resource[3] | NZP-CSI-RS-Resource for TRS (3) | entry 3  CSI-RS resource 3 |  |
| NZP-CSI-RS-Resource[4] | NZP-CSI-RS-Resource for TRS (4) | entry 4  CSI-RS resource 4 |  |
| NZP-CSI-RS-Resource[5] | NZP-CSI-RS-Resource for CSI Acquisition | entry 5  CSI-RS resource 5 |  |
| NZP-CSI-RS-Resource[6] | CSI-RS-Resource for beam refinement | entry 6  CSI-RS resource 6 | FR2 |
| NZP-CSI-RS-Resource[7] | CSI-RS-Resource for beam refinement | entry 7  CSI-RS resource 7 | FR2 |
| } |  |  |  |
| nzp-CSI-RS-ResourceSetToAddModList SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-ResourceSets)) OF NZP-CSI-RS-ResourceSet { | n entries | n=2 for FR1  n=3 for FR2 |  |
| NZP-CSI-RS-ResourceSet[1] | NZP-CSI-RS-ResourceSet for TRS | entry 1 |  |
| NZP-CSI-RS-ResourceSet[2] | NZP-CSI-RS-ResourceSet for CSI Acquisition | entry 2 |  |
| NZP-CSI-RS-ResourceSet[3] | NZP-CSI-RS-ResourceSet for beam refinement | entry 3 | FR2 |
| } |  |  |  |
| csi-IM-ResourceToAddModList SEQUENCE (SIZE (1..maxNrofCSI-IM-Resources)) OF CSI-IM-Resource { | 1 entry |  |  |
| CSI-IM-Resource[1] | CSI-IM-Resource |  |  |
| } |  |  |  |
| csi-IM-ResourceSetToAddModList SEQUENCE (SIZE (1..maxNrofCSI-IM-ResourceSets)) OF CSI-IM-ResourceSet { | 1 entry |  |  |
| CSI-IM-ResourceSet[1] | CSI-IM-ResourceSet |  |  |
| } |  |  |  |
| csi-SSB-ResourceSetToAddModList | Not present |  |  |
| csi-ResourceConfigToAddModList SEQUENCE (SIZE (1..maxNrofCSI-ResourceConfigurations)) OF CSI-ResourceConfig { | n entries | n=3 for FR1  n=4 for FR2 |  |
| CSI-ResourceConfig[1] | CSI-ResourceConfig for TRS | entry 1 |  |
| CSI-ResourceConfig[2] | CSI-ResourceConfig for CSI Acquisition | entry 2 |  |
| CSI-ResourceConfig[3] | CSI-IM-ResourceConfig | entry 3 |  |
| CSI-ResourceConfig[4] | CSI-ResourceConfig for beam refinement | entry 4 | FR2 |
| } |  |  |  |
| } |  |  |  |

CSI-ReportConfig

Table 5.4.2.5-13: *CSI-ReportConfig*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.331 [6], clause 6.3.2 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ReportConfig ::= SEQUENCE { |  |  |  |
| reportConfigId | CSI-ReportConfigId |  |  |
| carrier | ServCellIndex |  |  |
| resourcesForChannelMeasurement | CSI-ResourceConfigId for CSI Acquisition |  |  |
| csi-IM-ResourcesForInterference | CSI-ResourceConfigId for CSI-IM |  |  |
| nzp-CSI-RS-ResourcesForInterference | not present |  |  |
| reportConfigType CHOICE { |  |  |  |
| aperiodic SEQUENCE { |  |  |  |
| reportSlotOffsetList SEQUENCE { | 2 entries |  |  |
| reportSlotOffsetList[1] | 4 | entry 1 | FR1\_FDD\_4Tx, FR1\_FDD\_16Tx |
|  | 5 |  | FR1\_FDD\_8Tx |
|  | 8 |  | FR1\_TDD |
|  | 6 |  | FR2 |
| reportSlotOffsetList[2] | 4 | entry 2 | FR1\_FDD\_4Tx, FR1\_FDD\_16Tx |
|  | 5 |  | FR1\_FDD\_8Tx |
|  | 8 |  | FR1\_TDD |
|  | 6 |  | FR2 |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| reportQuantity CHOICE { |  |  |  |
| cri-RI-PMI-CQI | NULL |  |  |
| } |  |  |  |
| reportFreqConfiguration SEQUENCE { |  |  |  |
| cqi-FormatIndicator | widebandCQI |  |  |
| pmi-FormatIndicator | widebandPMI |  |  |
| csi-ReportingBand CHOICE { |  |  | FR1 |
| subbands7 | '1111111'B |  |  |
| } |  |  |  |
| csi-ReportingBand CHOICE { |  |  | FR2 |
| subbands9 | '111111111'B |  |  |
| } |  |  |  |
| } |  |  |  |
| timeRestrictionForChannelMeasurements | notConfigured |  |  |
| timeRestrictionForInterferenceMeasurements | notConfigured |  |  |
| codebookConfig | CodebookConfig |  |  |
| dummy | Not present |  |  |
| groupBasedBeamReporting CHOICE { |  |  |  |
| disabled SEQUENCE { |  |  |  |
| nrofReportedRS | not present |  |  |
| } |  |  |  |
| } |  |  |  |
| cqi-Table | table1 |  |  |
| subbandSize | value2 |  |  |
| non-PMI-PortIndication | Not present |  |  |
| } |  |  |  |

CodebookConfig

Table 5.4.2.5-14: *CodebookConfig*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-25 | | | |
| Information Element | Value/remark | Comment | Condition |
| CodebookConfig ::= SEQUENCE { |  |  |  |
| codebookType CHOICE { |  |  |  |
| type1 SEQUENCE { |  |  |  |
| subType CHOICE { |  |  |  |
| typeI-SinglePanel SEQUENCE { |  |  |  |
| nrOfAntennaPorts CHOICE { |  |  |  |
| two SEQUENCE { |  |  | 2Tx |
| twoTX-CodebookSubsetRestriction | '001111'B |  |  |
| } |  |  |  |
| moreThanTwo SEQUENCE { |  |  | 4Tx, 8Tx |
| n1-n2 CHOICE { |  |  |  |
| two-one-TypeI-SinglePanel-Restriction | '11111111'B |  |  |
| } |  |  |  |
| typeI-SinglePanel-codebookSubsetRestriction-i2 | Not present |  |  |
| } |  |  |  |
| } |  |  |  |
| typeI-SinglePanel-ri-Restriction | '11111111'B |  | 2Tx |
|  | '00000001'B |  | 4Tx |
|  | '00000010'B |  | 8Tx |
| } |  |  |  |
| codebookMode | 1 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

CSI-AperiodicTriggerStateList

Table 5.4.2.5-15: *CSI-AperiodicTriggerStateList*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-32 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-AperiodicTriggerStateList ::= SEQUENCE (SIZE (1..maxNrOfCSI-AperiodicTriggers)) OF CSI-AperiodicTriggerState { | 1 entry |  |  |
| CSI-AperiodicTriggerState[1] SEQUENCE { |  | entry 1 |  |
| associatedReportConfigInfoList SEQUENCE (SIZE(1..maxNrofReportConfigPerAperiodicTrigger)) OF CSI-AssociatedReportConfigInfo { | 1 entry |  |  |
| CSI-AssociatedReportConfigInfo[1] SEQUENCE { |  | entry 1 |  |
| reportConfigId | 0 |  |  |
| resourcesForChannel CHOICE { |  |  |  |
| nzp-CSI-RS SEQUENCE { |  |  |  |
| resourceSet | 1 |  |  |
| qcl-info SEQUENCE (SIZE(1..maxNrofAP-CSI-RS-ResourcesPerSet)) OF TCI-StateId { | 1 entry |  |  |
| TCI-StateId[1] | 1 | entry 1 |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| csi-IM-ResourcesforInteference | 1 |  |  |
| nzp-CSI-RS-ResourcesforInterference | Not present |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

Physical layer parameters

Table 5.4.2.5-16: Physical layer parameters for DCI format 1\_1

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 5.4.2.0-1 | | | |
| Parameter | Value | Value in binary | Condition |
| PUCCH resource indicator | *PUCCH-ResourceId[7]* = 6 in pucch-ResourceSetID[1] or *PUCCH-ResourceId[7]* = 14 in pucch-ResourceSetID[2] as defined in Table 4.6.3-112 (Mapping as per Table 9.2.3-2 in TS 38.213) | ‘110’B |  |

PUSCH-TimeDomainResourceAllocationList

Table 5.4.2.5-17: *PUSCH-TimeDomainResourceAllocationList*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 5.4.2.0-27 | | | |
| Information Element | Value/remark | Comment | Condition |
| PUSCH-TimeDomainResourceAllocationList ::= SEQUENCE (SIZE(1..maxNrofUL-Allocations)) OF PUSCH-TimeDomainResourceAllocation { | 2 entries |  |  |
| PUSCH-TimeDomainResourceAllocation[1] SEQUENCE { |  | entry 1 |  |
| startSymbolAndLength | 55 | Start symbol(S)=0, Length(L)=12 |  |
| } |  |  |  |
| PUSCH-TimeDomainResourceAllocation[2] SEQUENCE { |  | entry 2 |  |
| startSymbolAndLength | 55 | Start symbol(S)=0, Length(L)=12 |  |
| } |  |  |  |
| } |  |  |  |

#### 5.4.2.6 Message contents for RI reporting requirements

NZP-CSI-RS for Tracking

CSI-RS-ResourceMapping

Table 5.4.2.6-1: CSI-RS-ResourceMapping for TRS

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-45 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-RS-ResourceMapping ::= SEQUENCE { |  |  |  |
| frequencyDomainAllocation CHOICE { |  |  |  |
| row1 | 0001 | k0=0 for CSI-RS resource 1,2,3,4 | TRS |
| } |  |  |  |
| firstOFDMSymbolInTimeDomain | 4 | l0 = 4 for CSI-RS resource 1 and 3 | TRS |
|  | 8 | l0 = 8 for CSI-RS resource 2 and 4 | TRS |
| nrofPorts | p1 | 1 for CSI-RS resource 1,2,3,4 | TRS |
| cdm-Type | noCDM |  | TRS |
| density CHOICE{ |  |  |  |
| three | Null |  | TRS |
| } |  |  |  |
| freqBand | CSI-FrequencyOccupation |  | TRS |
| } |  |  |  |

NZP CSI-RS for CSI Acquisition

CSI-RS-ResourceMapping

Table 5.4.2.6-2: CSI-RS-ResourceMapping

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-45 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-RS-ResourceMapping ::= SEQUENCE { |  |  |  |
| frequencyDomainAllocation CHOICE { |  |  |  |
| row4 | 001 | K0 = 0, row4 | 4Tx |
| other | 001000 | K0 = 6, row3 | 2Tx |
| } |  |  |  |
| nrofPorts | p4 |  | 4Tx |
|  | p2 |  | 2Tx |
| firstOFDMSymbolInTimeDomain | 13 | I0 = 13 | 2Tx, 4Tx |
| cdm-Type | fd-CDM2 |  | 2Tx, 4Tx |
| density CHOICE { |  |  |  |
| one | NULL |  |  |
| } |  |  |  |
| freqBand | CSI-FrequencyOccupation |  |  |
| } |  |  |  |

|  |  |
| --- | --- |
| Condition | Explanation |
| 2Tx | For test cases using 2 CSI-RS ports for NZP-CSI-RS for CSI acquisition. |
| 4Tx | For test cases using 4 CSI-RS ports for NZP-CSI-RS for CSI acquisition. |

Table 5.4.2.6-3: CSI-ResourcePeriodicityAndOffset for CSI Acquisition

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-43 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ResourcePeriodicityAndOffset ::= CHOICE { |  |  |  |
| Slots5 | 1 |  | FR1\_FDD |
| Slots10 | 1 |  | FR1\_TDD |
| } |  |  |  |

ZP CSI-RS for CSI Acquisition

CSI-RS-ResourceMapping

Table 5.4.2.6-4: ZP CSI-RS-ResourceMapping

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-45 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-RS-ResourceMapping ::= SEQUENCE { |  |  |  |
| frequencyDomainAllocation CHOICE { |  |  |  |
| other | 000100 | K0 = 4, row5 | FR1 |
| row4 | 100 | K0 = 8, row4 | FR2 |
| } |  |  |  |
| nrofPorts | p4 |  |  |
| firstOFDMSymbolInTimeDomain | 9 | I0 = 9 | FR1 |
| 13 | I0 = 13 | FR2 |
| cdm-Type | fd-CDM2 |  |  |
| density CHOICE { |  |  |  |
| one | NULL |  |  |
| } |  |  |  |
| freqBand | ZP CSI-FrequencyOccupation |  |  |
| } |  |  |  |

CSI-ResourcePeriodicityAndOffset

Table 5.4.2.6-5: ZP CSI-ResourcePeriodicityAndOffset

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-43 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ResourcePeriodicityAndOffset ::= CHOICE { |  |  |  |
| Slots5 | 1 |  | FR1 FDD |
| Slots10 | 1 |  | FR1 TDD |
| Slots8 | 1 |  | FR2 |
| } |  |  |  |

PDSCH-Config

Table 5.4.2.6-6: *PDSCH-Config*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-100 | | | |
| Information Element | Value/remark | Comment | Condition |
| PDSCH-Config ::= SEQUENCE { |  |  |  |
| p-ZP-CSI-RS-ResourceSetsToAddModList | p-ZP-CSI-RS-ResourceSet |  |  |
| } |  |  |  |

p-ZP-CSI-RS-ResourceSet

Table 5.4.2.6-7: p-ZP-CSI-RS-ResourceSet

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-87 | | | |
| Information Element | Value/remark | Comment | Condition |
| p-ZP-CSI-RS-ResourceSetsToAddModList ::= SEQUENCE { |  |  |  |
| zp\_CSI-RS\_ResourceSetId | 0 |  |  |
| zp-CSI-RS-ResourceIdList SEQUENCE (SIZE (1..maxNrofZP-CSI-RS-ResourcesPerSet)) OF ZP-CSI-RS-ResourceId{ | 1 entry |  |  |
| ZP-CSI-RS-ResourceId[1] | 0 | entry 1  ZP CSI-RS resource 1 |  |
| } |  |  |  |
| } |  |  |  |

CSI-ResourceConfig

Table 5.4.2.6-8: CSI-ResourceConfig for CSI Acquisition

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-41 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ResourceConfig ::= SEQUENCE { |  |  |  |
| csi-ResourceConfigId | 1 |  |  |
| csi-RS-ResourceSetList CHOICE { |  |  |  |
| nzp-CSI-RS-SSB SEQUENCE { |  |  |  |
| nzp-CSI-RS-ResourceSetList SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-ResourceSetsPerConfig)) OF NZP-CSI-RS-ResourceSetId { | 1 entry |  |  |
| NZP-CSI-RS-ResourceSetId[1] | 1 | entry 1 |  |
| } |  |  |  |
| csi-SSB-ResourceSetList | Not present |  |  |
| } |  |  |  |
| } |  |  |  |
| bwp-Id | BWP-Id |  |  |
| resourceType | periodic |  | FR1 |
| aperiodic |  | FR2 |
| } |  |  |  |

Table 5.4.2.6-8A: CSI-ResourceConfig for beam refinement

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-41 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ResourceConfig ::= SEQUENCE { |  |  | FR2 |
| csi-ResourceConfigId | 3 |  |  |
| csi-RS-ResourceSetList CHOICE { |  |  |  |
| nzp-CSI-RS-SSB SEQUENCE { |  |  |  |
| nzp-CSI-RS-ResourceSetList SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-ResourceSetsPerConfig)) OF NZP-CSI-RS-ResourceSetId { | 1 entry |  |  |
| NZP-CSI-RS-ResourceSetId[1] | 2 | entry 1 |  |
| } |  |  |  |
| csi-SSB-ResourceSetList | Not present |  |  |
| } |  |  |  |
| } |  |  |  |
| bwp-Id | BWP-Id |  |  |
| resourceType | periodic |  |  |
| } |  |  |  |

CSI-IM Configuration

CSI-IM-Resource

Table 5.4.2.6-9: *CSI-IM-Resource*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-34 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-IM-Resource ::= SEQUENCE { |  |  |  |
| csi-IM-ResourceId | CSI-IM-ResourceId |  |  |
| csi-IM-ResourceElementPattern CHOICE { |  |  |  |
| Pattern0 SEQUENCE { |  |  |  |
| subcarrierLocation-p0 | s4 |  | FR1 |
| s8 |  | FR2 |
| symbolLocation-p0 | 9 |  | FR1 |
| 13 |  | FR2 |
| } |  |  |  |
| } |  |  |  |
| freqBand | CSI-FrequencyOccupation |  |  |
| periodicityAndOffset | CSI-ResourcePeriodicityAndOffset |  | FR1 |
| Not present |  | FR2 |
| } |  |  |  |

Table 5.4.2.6-10: CSI-ResourcePeriodicityAndOffset

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-43 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ResourcePeriodicityAndOffset ::= CHOICE { |  |  |  |
| Slots5 | 1 |  | FR1\_FDD |
| Slots10 | 1 |  | FR1\_TDD |
| } |  |  |  |

CSI-IM-ResourceId

Table 5.4.2.6-11: *CSI-IM-ResourceId*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-35 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-IM-ResourceId | 0 |  |  |

CSI-IM-ResourceSet

Table 5.4.2.6-12: *CSI-IM-ResourceSet*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-36 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-IM-ResourceSet ::= SEQUENCE { |  |  |  |
| csi-IM-ResourceSetId | CSI-IM-ResourceSetId |  |  |
| csi-IM-Resources SEQUENCE (SIZE(1..maxNrofCSI-IM-ResourcesPerSet)) { | 1 entry |  |  |
| CSI-IM-ResourceId[1] | CSI-IM-ResourceId | entry 1 |  |
| } |  |  |  |
| } |  |  |  |

CSI-IM-ResourceSetId

Table 5.4.2.6-13: *CSI-IM-ResourceSetId*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-37 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-IM-ResourceSetId | 0 |  |  |

CSI-IM-ResourceConfig

Table 5.4.2.6-14: *CSI-IM-ResourceConfig*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-41 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ResourceConfig ::= SEQUENCE { |  |  |  |
| csi-ResourceConfigId | 2 |  |  |
| csi-RS-ResourceSetList CHOICE { |  |  |  |
| csi-IM-ResourceSetList SEQUENCE (SIZE (1..maxNrofCSI-IM-ResourceSetsPerConfig)) OF CSI-IM-ResourceSetId { | 1 entry |  |  |
| csi-IM-ResourceSetId[0] | 0 |  |  |
| } |  |  |  |
| } |  |  |  |
| bwp-Id | BWP-Id |  |  |
| resourceType | periodic |  | FR1 |
| aperiodic |  | FR2 |
| } |  |  |  |

CSI-MeasConfig

Table 5.4.2.6-15: *CSI-MeasConfig*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-38 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-MeasConfig::= SEQUENCE { |  |  |  |
| nzp-CSI-RS-ResourceToAddModList SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-Resources)) OF NZP-CSI-RS-Resource { | n entries | n=5 for FR1  n=7 for FR2 |  |
| NZP-CSI-RS-Resource[1] | NZP-CSI-RS-Resource for TRS (1) | entry 1  CSI-RS resource 1 |  |
| NZP-CSI-RS-Resource[2] | NZP-CSI-RS-Resource for TRS (2) | entry 2  CSI-RS resource 2 |  |
| NZP-CSI-RS-Resource[3] | NZP-CSI-RS-Resource for TRS (3) | entry 3  CSI-RS resource 3 |  |
| NZP-CSI-RS-Resource[4] | NZP-CSI-RS-Resource for TRS (4) | entry 4  CSI-RS resource 4 |  |
| NZP-CSI-RS-Resource[5] | NZP-CSI-RS-Resource for CSI Acquisition | entry 5  CSI-RS resource 5 |  |
| NZP-CSI-RS-Resource[6] | NZP-CSI-RS-Resource for beam refinement | entry 6  CSI-RS resource 6 | FR2 |
| NZP-CSI-RS-Resource[7] | NZP-CSI-RS-Resource for beam refinement | entry 7  CSI-RS resource 7 | FR2 |
| } |  |  |  |
| nzp-CSI-RS-ResourceSetToAddModList SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-ResourceSets)) OF NZP-CSI-RS-ResourceSet { | n entries | n=2 for FR1  n=3 for FR2 |  |
| NZP-CSI-RS-ResourceSet[1] | NZP-CSI-RS-ResourceSet for TRS | entry 1 |  |
| NZP-CSI-RS-ResourceSet[2] | NZP-CSI-RS-ResourceSet for CSI Acquisition | entry 2 |  |
| NZP-CSI-RS-ResourceSet[3] | NZP-CSI-RS-ResourceSet for beam refinement | entry 3 | FR2 |
| } |  |  |  |
| csi-IM-ResourceToAddModList SEQUENCE (SIZE (1..maxNrofCSI-IM-Resources)) OF CSI-IM-Resource { | 1 entry |  |  |
| CSI-IM-Resource[1] | CSI-IM-Resource |  |  |
| } |  |  |  |
| csi-IM-ResourceSetToAddModList SEQUENCE (SIZE (1..maxNrofCSI-IM-ResourceSets)) OF CSI-IM-ResourceSet { | 1 entry |  |  |
| CSI-IM-ResourceSet[1] | CSI-IM-ResourceSet |  |  |
| } |  |  |  |
| csi-SSB-ResourceSetToAddModList | Not present |  |  |
| csi-ResourceConfigToAddModList SEQUENCE (SIZE (1..maxNrofCSI-ResourceConfigurations)) OF CSI-ResourceConfig { | n entries | n=3 for FR1  n=4 for FR2 |  |
| CSI-ResourceConfig[1] | CSI-ResourceConfig for TRS | entry 1 |  |
| CSI-ResourceConfig[2] | CSI-ResourceConfig for CSI Acquisition | entry 2 |  |
| CSI-ResourceConfig[3] | CSI-IM-ResourceConfig | entry 3 |  |
| CSI-ResourceConfig[4] | CSI-ResourceConfig for beam refinement | entry 4 | FR2 |
| } |  |  |  |
| } |  |  |  |

CSI-ReportConfig

Table 5.4.2.6-16: *CSI-ReportConfig*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-39 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ReportConfig ::= SEQUENCE { |  |  |  |
| reportConfigId | CSI-ReportConfigId |  |  |
| carrier | ServCellIndex |  |  |
| resourcesForChannelMeasurement | CSI-ResourceConfigId for CSI Acquisition |  |  |
| csi-IM-ResourcesForInterference | CSI-ResourceConfigId for CSI-IM |  |  |
| nzp-CSI-RS-ResourcesForInterference | not present |  |  |
| reportConfigType CHOICE { |  |  |  |
| periodic SEQUENCE { |  |  | FR1 |
| reportSlotConfig | CSI-ReportPeriodicityAndOffset |  |  |
| pucch-CSI-ResourceList SEQUENCE (SIZE (1..maxNrofBWPs)) OF PUCCH-CSI-Resource { |  |  |  |
| PUCCH-CSI-Resource [1] | PUCCH-CSI-Resource |  |  |
| } |  |  |  |
| aperiodic SEQUENCE { |  |  | FR2 |
| reportSlotOffsetList SEQUENCE { |  |  |  |
| reportSlotOffsetList[1] | 6 |  |  |
| reportSlotOffsetList[2] | 6 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| reportQuantity CHOICE { |  |  |  |
| cri-RI-PMI-CQI | NULL, |  |  |
| } |  |  |  |
| reportFreqConfiguration SEQUENCE { |  |  |  |
| cqi-FormatIndicator | widebandCQI |  |  |
| pmi-FormatIndicator | widebandPMI |  |  |
| csi-ReportingBand CHOICE { |  |  | FR1 |
| subbands7 | '1111111'B |  |  |
| } |  |  |  |
| csi-ReportingBand CHOICE { |  |  | FR2 |
| subbands9 | '111111111'B |  |  |
| } |  |  |  |
| } |  |  |  |
| timeRestrictionForChannelMeasurements | notConfigured |  |  |
| timeRestrictionForInterferenceMeasurements | notConfigured |  |  |
| codebookConfig | CodebookConfig |  |  |
| dummy | Not present |  |  |
| groupBasedBeamReporting CHOICE { |  |  |  |
| disabled SEQUENCE { |  |  |  |
| nrofReportedRS | not present |  |  |
| } |  |  |  |
| } |  |  |  |
| cqi-Table | table2 |  | FR1 |
| table1 |  | FR2 |
| subbandSize | value2 |  |  |
| non-PMI-PortIndication | Not present |  |  |
| } |  |  |  |

CodebookConfig

Table 5.4.2.6-17: *CodebookConfig*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-25 | | | |
| Information Element | Value/remark | Comment | Condition |
| CodebookConfig ::= SEQUENCE { |  |  |  |
| codebookType CHOICE { |  |  |  |
| type1 SEQUENCE { |  |  |  |
| subType CHOICE { |  |  |  |
| typeI-SinglePanel SEQUENCE { |  |  |  |
| nrOfAntennaPorts CHOICE { |  |  |  |
| two SEQUENCE { |  |  | 2Tx |
| twoTX-CodebookSubsetRestriction | '010000'B |  | Fixed rank2, 2x2, 2x4 |
|  | ‘010011’B |  | Follow rank, 2x2, 2x4 |
|  | ‘000011’B |  | Fixed rank1, 2x2, 2x4 |
| } |  |  |  |
| moreThanTwo SEQUENCE { |  |  | 4Tx |
| n1-n2 CHOICE { |  |  |  |
| two-one-TypeI-SinglePanel-Restriction | ‘11111111’B |  | 4x4 |
| } |  |  |  |
| } |  |  |  |
| typeI-SinglePanel-ri-Restriction | ‘11111111’B |  | 2x2, 2x4 |
|  | ‘00000010’B |  | Fixed rank2, 4x4 |
|  | ‘00001111’B |  | Follow RI, 4x4 |
| } |  |  |  |
| } |  |  |  |
| codebookMode | 1 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

CSI-ReportPeriodicityAndOffset

Table 5.4.2.6-18: *CSI-ReportPeriodicityAndOffset*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.331 [6], clause 6.3.2 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ReportPeriodicityAndOffset ::= CHOICE { |  |  |  |
| slots10 | 9 |  | FR1\_TDD |
| slots5 | 0 |  | FR1\_FDD |
| } |  |  |  |

PUCCH-CSI-Resource

Table 5.4.2.6-19: PUCCH-CSI-Resource

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.331 [6], clause 6.3.2 | | | |
| Information Element | Value/remark | Comment | Condition |
| PUCCH-CSI-Resource ::= SEQUENCE { |  |  |  |
| uplinkBandwidthPartId | BWP-id |  | FR1 |
| pucch-Resource | 8 |  | FR1 |
| } |  |  |  |

### 5.4.3 Sidelink information elements for Demodulation Performance tests

As defined in clause 4.6.3 with the following exceptions:

SL-ResourcePool

Table 5.4.3-1: *SL-ResourcePool*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.6-25 with condition SL\_HARQ | | | |
| Information Element | | Value/remark | Comment | Condition |
| SL-ResourcePool-r16 ::= SEQUENCE { | |  |  |  |
| sl-PSFCH-Config-r16 CHOICE { | |  |  |  |
| setup SEQUENCE { | |  |  |  |
| sl-PSFCH-RB-Set-r16 | | ones(1,50) | All "1" sequence with a length of 50 bits | BW = 20MHz |
|  | | ones(1,100) | All "1" sequence with a length of 100 bits | BW = 40MHz |
| sl-NumMuxCS-Pair-r16 | | n1 |  |  |
| sl-MinTimeGapPSFCH-r16 | | sl3 |  |  |
| sl-PSFCH-CandidateResourceType-r16 | | allocSubCH |  |  |
| } | |  |  |  |
| } | |  |  |  |
| sl-NumSubchannel-r16 | | 5 |  | BW = 20MHz |
|  | | 10 |  | BW = 40MHz |
| sl-RB-Number-r16 | | 50 |  | BW = 20MHz |
|  | | 100 |  | BW = 40MHz |
| sl-TimeResource-r16 | | one(1,160) | All "1" sequence with a length of 160 bits |  |
| } | |  |  |  |

SL-Thres-RSRP-List

Table 5.4.3-2: *SL-Thres-RSRP-List*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.6-32 | | | |
| Information Element | | Value/remark | Comment | Condition |
| SL-Thres-RSRP-List-r16 ::= SEQUENCE (SIZE (64)) OF INTEGER { | | 64 entries |  |  |
| INTEGER[k, k=1..64] | | 66 | entry k  corresponds to infinity dBm |  |
| } | |  |  |  |

## 5.5 Common procedures for RF testing

### 5.5.1 Procedure to configure SCC for NR RF CA testing

5.5.1.1 Scope

The purpose of this procedure is to establish one or more SCC for NR CA testing.

5.5.1.2 Procedure description

5.5.1.2.1 Initial conditions

UE is operating in NR RRC\_CONNECTED state on NR Cell 1 without any SCell configured.

System Simulator:

- SS configures the number of SCells used by the test case using NR parameters for NR Cell 2 for SCC1, NR Cell 3 for SCC2, NR Cell 4 for SCC3 etc. as specified in Table 4.4.2-2.

- System information combination NR-2 as defined in clause 4.4.3.1.2 is used in all NR cells.

5.5.1.2.2 Procedure sequence

Table 5.5.1.2.2-1: Procedure to configure SCC

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| St | Procedure | Message Sequence | | TP | Verdict |
|  |  | U - S | Message |  |  |
| 1 | The SS transmits an RRCReconfiguration message including sCellToAddModList with SCell addition for the SCC under test. | <-- | NR RRC: RRCReconfiguration | - | - |
| 2 | The UE transmits an RRCReconfigurationComplete message. | --> | NR RRC: RRCReconfigurationComplete | - | - |

5.5.1.2.3 Specific message contents

Table 5.5.1.2.3-1: RRCReconfiguration-SCell(n)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.1-13 with condition SCell\_add | | | |
| Information Element | | Value/remark | Comment | Condition |
| RRCReconfiguration ::= SEQUENCE { | |  |  |  |
| criticalExtensions CHOICE { | |  |  |  |
| rrcReconfiguration ::= SEQUENCE { | |  |  |  |
| nonCriticalExtension SEQUENCE { | |  |  |  |
| masterCellGroup | | CellGroupConfig-SCell(n) | n is number of SCC to be added. |  |
| } | |  |  |  |
| } | |  |  |  |
| } | |  |  |  |
| } | |  |  |  |

Table 5.5.1.2.3-2: CellGroupConfig-SCell(n) (Table 5.5.1.2.3-1)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-19 with condition SCell\_add | | | |
| Information Element | Value/remark | Comment | Condition |
| CellGroupConfig ::= SEQUENCE { |  |  |  |
| sCellToAddModList SEQUENCE (SIZE (1..maxNrofSCells)) OF SCellConfig { | n entries | n the number of SCC to be added |  |
| SCellConfig[k, k=1..n] SEQUENCE { |  | entry (1..n) |  |
| sCellIndex |  |  |  |
| sCellConfigCommon | ServingCellConfigCommon with condition SCell\_add |  |  |
| } |  |  |  |
| } |  |  |  |

### 5.5.2 Procedure to configure SCC for EN-DC RF CA testing

5.5.2.1 Scope

The purpose of this procedure is to establish one or more SCC for EN-DC CA testing.

5.5.2.2 Procedure description

5.5.2.2.1 Initial conditions

The UE is in RRC\_CONNECTED state.

5.5.2.2.2 Procedure sequence

Table 5.5.2.2.2-1: Procedure to configure SCC

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **St** | **Procedure** | **Message Sequence** | | **TP** | **Verdict** |
|  |  | **U - S** | **Message** |  |  |
| 1 | The SS transmits an *RRCConnectionReconfiguration* message using n. | <-- | RRC: *RRCConnectionReconfiguration* | - | - |
| 2 | The UE transmits an *RRCConnectionReconfigurationComplete* message. | --> | RRC: *RRCConnectionReconfigurationComplete* | - | - |
| - | EXCEPTION: Steps 3a1 to 3a3 describe the SS sequence depending on procedure parameters; the "lower case letter" identifies a step sequence that take place if a procedure parameter has a particular value | - | - | - | - |
| 3a1-3a3 | IF E-UTRA SCC > 0, same as TS 36.508 [2] table 5.2A.4-1, steps 1-3. | - | - | - | - |
| Note 1: n > 0 in step 1. | | | | | |

5.5.2.2.3 Specific message contents

Table 5.5.2.2.2.3-1: *RRCReconfiguration* (step 1, Table 5.5.2.2.2-1)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.1-13 with condition EN-DC\_SCell\_add | | | |
| Information Element | | Value/remark | Comment | Condition |
| RRCReconfiguration ::= SEQUENCE { | |  |  |  |
| criticalExtensions CHOICE { | |  |  |  |
| rrcReconfiguration ::= SEQUENCE { | |  |  |  |
| secondaryCellGroup | | CellGroupConfig (n) | n is number of SCC to be added. |  |
| } | |  |  |  |
| } | |  |  |  |
| } | |  |  |  |

Table 5.5.2.2.2.3-2: CellGroupConfig (n) (Table 5.5.2.2.2.3-1)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.1-13 with condition SCell\_add | | | |
| Information Element | Value/remark | Comment | Condition |
| CellGroupConfig ::= SEQUENCE { |  |  |  |
| sCellToAddModList SEQUENCE (SIZE (1..maxNrofSCells)) OF SCellConfig { | n entries | n is equal to the number of SCCs to be added |  |
| SCellConfig[ k, k=1..n] |  | entry (1..n) |  |
| sCellIndex |  |  |  |
| sCellConfigCommon | ServingCellConfigCommon with condition SCell\_add |  |  |
| sCellConfigDedicated | ServingCellConfig |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

## 5.6 Test environment for NTN testing

This section defines the test environment which applies to all RF and DEMOD test cases executed for NR NTN UEs, unless otherwise specified.

### 5.6.1 UE location

UE shall determine its location during the test using any of the following means.

1. UE location for the test shall be provided to the UE via pre-configured means. During the test the UE location is not expected to change unless explicitly stated as a requirement for the test.

2. Other options such as providing UE location via AT command are not precluded.

UE location provided to the UE before the start of the test is as follows for RF Tx/Rx and DEMOD test cases for both GSO and NGSO config is as follows:

Longitude: 121.56076999

Latitude: 25.08439333 (NGSO satellites), 55.0 (GSO satellites)

Altitude: 0

### 5.6.2 Ephemeris Information

Ephemeris information in this section has been generated as described in clause FFS in TR38.905 [FFS].

#### 5.6.2.0 Assumptions for Ephemeris generation

This section provides the assumptions used to generate Ephemeris information for GSO and NGSO orbits:

1. Ephemeris files are generated for 3 types of satellites: GSO (inclination equal to 7º), LEO-600 and LEO-1200.

2. UE location is as defined in section 5.6.1.

3. PositionVelocity state vectors are used for EphemerisInfo signaling.

4. For GSO, an altitude of 35,786 km is considered. For NGSO, 2 different altitudes are considered: 600 km and 1200 km.

5. One-way delay between UE and satellite to be in the range of 119.375 ms to 128.79 ms for GSO and between 2 ms (lowest value for LEO orbit 600 km) and 6.67 ms (highest value for LEO orbit 1200 km)

6. Doppler (frequency) shift up to [0.93] ppm for GSO and up to 24ppm for NGSO (LEO-600).

#### 5.6.2.1 Ephemeris for zero Doppler conditions

All NR NTN test cases defined in sections 6, 7 and 8 in TS 38.521-5 [57], unless otherwise stated, shall use the ephemeris configuration in tables 5.6.2.1-1 to 5.6.2.1-3, corresponding to zero Doppler and constant delay for the type of satellite under test, keeping such information constant throughout the duration of each measurement in the test:

- In case UE supports only NGSO satellites, ephemeris values in Table 5.6.2.1-3 shall be used except for test cases 8.2.1.2, where ephemeris values in Table 5.6.1.2.1-2 shall be used.

- In case UE supports both GSO and NGSO satellites, ephemeris values in Table 5.6.1.2.1-1 shall be used except for test cases 8.2.1.2, where ephemeris values in Table 5.6.1.2.1-2 shall be used.

Table 5.6.2.1-1: SIB19- NR NTN Ephemeris information for GSO satellites (zero Doppler conditions)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 5.6.3.1-1 | | | |
| Information Element | Value/remark | Comment | Condition |
| SIB19-r17 ::= SEQUENCE { |  |  |  |
| ntn-Config-r17 SEQUENCE { |  |  |  |
| epochTime-r17 | Not present |  |  |
| ephemerisInfo-r17 CHOICE { |  |  |  |
| positionVelocity-r17 SEQUENCE { |  |  |  |
| positionX-r17 | -16944523 |  |  |
| positionY-r17 | 27362209 |  |  |
| positionZ-r17 | 4019393 |  |  |
| velocityVX-r17 | -336 |  |  |
| velocityVY-r17 | -208 |  |  |
| velocityVZ-r17 | 1 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| NOTE 1: Satellite-UE elevation angle equal to 35.04 degrees, one-way delay equal to 127.33 ms and Doppler equal to 4.89E-06 ppm | | | |

Table 5.6.2.1-2: SIB19- NR NTN Ephemeris information for NGSO (LEO-600) satellites (zero Doppler conditions)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 5.6.3.1-1 | | | |
| Information Element | Value/remark | Comment | Condition |
| SIB19-r17 ::= SEQUENCE { |  |  |  |
| ntn-Config-r17 SEQUENCE { |  |  |  |
| epochTime-r17 | Not present |  |  |
| ephemerisInfo-r17 CHOICE { |  |  |  |
| positionVelocity-r17 SEQUENCE { |  |  |  |
| positionX-r17 | -2550081 |  |  |
| positionY-r17 | 4151097 |  |  |
| positionZ-r17 | 2263034 |  |  |
| velocityVX-r17 | 21970 |  |  |
| velocityVY-r17 | -48164 |  |  |
| velocityVZ-r17 | 114109 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| NOTE 1: Satellite-UE elevation angle equal to 89.61 degrees, one-way delay equal to 2.03 ms and Doppler equal to 0.013 ppm | | | |

Table 5.6.2.1-3: SIB19- NR NTN Ephemeris information for NGSO (LEO1200) satellites (zero Doppler conditions)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 5.6.3.1-1 | | | |
| Information Element | Value/remark | Comment | Condition |
| SIB19-r17 ::= SEQUENCE { |  |  |  |
| ntn-Config-r17 SEQUENCE { |  |  |  |
| epochTime-r17 | Not present |  |  |
| ephemerisInfo-r17 CHOICE { |  |  |  |
| positionVelocity-r17 SEQUENCE { |  |  |  |
| positionX-r17 | -2771542 |  |  |
| positionY-r17 | 4509243 |  |  |
| positionZ-r17 | 2455572 |  |  |
| velocityVX-r17 | 20837 |  |  |
| velocityVY-r17 | -46176 |  |  |
| velocityVZ-r17 | 109528 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| NOTE 1: Satellite-UE elevation angle equal to 89.54 degrees, one-way delay equal to 4.04 ms and Doppler equal to 3.6E-3 ppm | | | |

### 5.6.3 NR NTN message contents for RF Tx/Rx, Demodulation tests

#### 5.6.3.1 SIB19 IE values

The ntn-config-r17 values including the EphemerisInfo-r17 values in SIB19 shall be periodically signalled to the UE during test based on the Ephemeris information in clause 5.6.2 (kept constant throughout the duration of each measurement in the test).

Table 5.6.3.1-1: SIB19 for RF tests

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.2-18C | | | |
| **Information Element** | **Value/remark** | **Comment** | **Condition** |
| SIB19-r17 ::= SEQUENCE { |  |  |  |
| ntn-Config-r17::= SEQUENCE { |  |  |  |
| epochTime-r17 | Not present |  |  |
| ntn-UlSyncValidityDuration-r17 | s240 |  |  |
| cellSpecificKoffset-r17 | 258 |  | GSO |
|  | 14 |  | NGSO |
| kmac-r17 | Not present |  |  |
| ta-Info-r17 SEQUENCE { |  |  |  |
| ta-Common-r17 | 0 |  |  |
| ta-CommonDrift-r17 | 0 |  |  |
| ta-CommonDriftVariant-r17 | 0 |  |  |
| } |  |  |  |
| ntn-PolarizationDL-r17 | Not present |  |  |
| ntn-PolarizationUL-r17 | Not present |  |  |
| ephemerisInfo-r17 | See cl 5.6.2 |  |  |
| } |  |  |  |
| ta-Report-r17 | Not present |  |  |
| } |  |  |  |
| } |  |  |  |

|  |  |
| --- | --- |
| **Condition** | **Explanation** |
| GSO | Geosynchronous Orbit scenario |
| NGSO | Non-geosynchronous Orbit scenario |

### 5.6.4 FFS

## 5.7 Test environment for ATG testing

This section defines the test environment which applies to all RF and DEMOD test cases executed for NR ATG UEs, unless otherwise specified.

### 5.7.1 NR ATG message contents for RF Tx/Rx, Demodulation tests

#### 5.7.1.1 [*atg-Config-r18*] values in SIB22

The [*atg-Config-r18*] values including the atg gNB location information, cell Specific Koffset and TA Report indication values in SIB22 shall be periodically signalled to the UE during test (kept constant throughout the duration of each measurement in the test).

# 6 Test environments for Signalling test

## 6.1 Requirements of test equipment

### 6.1.1 Requirements common for conducted and OTA tests

The requirements of test equipment specified in this subclause apply to Signalling test cases defined in TS 38.523-1 [12], in addition to the common requirements of test equipment specified in clause 4.2 of this specification.

Test equipment shall be able to simulate cells of Radio Access Technologies NR, E-UTRA, UTRA, and GERAN. The number of cells to be simulated simultaneously by the test equipment shall not exceed the resources specified in Table 6.1-1

Table 6.1-1: Maximum resources in terms of number / configuration of cells to be simulated simultaneously in a test setup

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Simulation of** | **Max. number of cells  (NR)** | | | **Max. number of cells  (E-UTRA)** | | **Max. number of cells  (UTRA)** | | **Max. number of cells  (GERAN)** | |
| **Conducted** | **OTA(FR1+FR2)** | **OTA(FR2)** | **Conducted** | **OTA** | **Conducted** | **OTA** | **Conducted** | **OTA** |
| NR single-mode networks (FDD or TDD) | 4 cells | 4 cells | 4 cells | n/a | n/a | n/a | n/a | n/a | n/a |
| NR dual-mode networks (FDD and TDD) | 4 cells | 4 cells | 4 cells | n/a | n/a | n/a | n/a | n/a | n/a |
| NR networks involving Carrier Aggregation | 4 cells | 4 cells | 4 cells | n/a | n/a | n/a | n/a | n/a | n/a |
| NR dual connectivity (NR-DC) | 4 cells | 4 cells | 4 cells | n/a | n/a | n/a | n/a | n/a | n/a |
| NR dual connectivity (EN-DC) | 4 cells | 4 cells | 4 cells | 2 cells | 2 cells | n/a | n/a | n/a | n/a |
| NR dual connectivity (EN-DC) involving Carrier Aggregation | 4 cells | 4 cells | 4 cells | 2 cells | 2 cells | n/a | n/a | n/a | n/a |
| Mixed E-UTRA / NR networks | 4 cells | 4 cells | 4 cells | 2 cells | 2 cells | n/a | n/a | n/a | n/a |
| Mixed UTRA / NR networks | 4 cells | 4 cells | 4 cells | n/a | n/a | 2 cells | 2 cells | n/a | n/a |
| Mixed GERAN / NR networks | 4 cells | 4 cells | 4 cells | n/a | n/a | n/a | n/a | 2 cells | 2 cells |
| Note 1: No differentiation between cell configuration types (as defined in clause 6.3.1) here, because these types are only relevant to specific test cases and their TTCN-3 implementation.  Note 2: Only network scenarios specified in clauses 4.4.1 and 6.3.2.1 have been covered.  Note 3: In case of Carrier Aggregation, each cell can act as a SpCell, an SCell, or a standalone cell (not used as a CA component carrier).  Note 4: In order to support test case requirements for conducted and OTA test methods, the number of active cells at any given time should be minimised in order to ensure maximum re use of SS Tx/Rx resources. | | | | | | | | | |

Exceptions to the requirements outlined above are possible but need special evidence to be provided explicitly in the test case prose and should be allowed only if the test case purpose cannot be met otherwise.

Due to limited power level range for FR2 OTA test methods, when defining test cases requirements, care shall be taken to ensure that the number of active cells is minimised as this has an impact to have distinguishable power level difference. Cells that are used in initial parts of test cases and are no longer required for the rest of the procedure shall be clearly defined as Non-suitable "Off" cell to facilitate re use of SS Tx/Rx resources.

NR FR2 signal levels are defined along with a calibration procedure as well as uncertainty. Therefore, maximum 4 FR2 OTA Cells can be configured and activated including the test cases involving idle or connected mode measurements.

NR FR1+FR2 OTA calibration procedure is undefined which does not restrict to configure maximum 4 FR1+FR2 OTA cells. However, caution must be taken as specified in clause 6.2.2.2.3.

E-UTRA OTA calibration procedure is undefined which does not restrict to configure maximum 2 E-UTRA OTA cells. However, caution must be taken as specified in clause 6.2.2.2.4.

UTRA OTA calibration procedure is undefined which does not restrict to configure maximum 2 UTRA OTA cells. However, caution must be taken as specified in clause 6.2.2.2.5.

GERAN OTA calibration procedure is undefined which does not restrict to configure maximum 2 GERAN OTA cells. However, caution must be taken as specified in clause 6.2.2.2.6.

### 6.1.2 Requirements for conducted test method

No requirements are specified in addition to the common requirements described in clause 4.2 and clause 6.1.1.

### 6.1.3 Requirements for OTA test method

#### 6.1.3.1 General

Editor’s Note: The UE pre-configuration mentioned below to disable UL Tx diversity schemes shall be voided once a test methodology solution to minimize spectral flatness artefacts between TE and UE over all test points is defined.

The DFF or IFF based OTA test methodologies, defined in Annex B.1 should be used for Signalling test.

NOTE: For single cell test cases, usage of NF test methodology is not precluded.

Clause 6.1.3.2 describes a sample OTA measurement test setup and clause 6.1.3.3 describes approaches to select a UE orientation.

For conformance testing using the OTA test environment, the UE under test shall be pre-configured with UL Tx diversity schemes disabled to account for single polarization System Simulator (SS) in the test environment. The UE under test may transmit with dual polarization. This approach also applies to calibration stage..

#### 6.1.3.2 Sample OTA Measurement Test Setup

Please refer to Figure 6.1.3.2-1 for a sample OTA measurement test setup.



Figure 6.1.3.2-1: Sample OTA measurement setup

NOTE: Figure 6.1.3.2-1 is for illustrative purposes only.

For 5G NR signalling test cases, depending on the dynamic range of measurements the system complexity can be reduced. In the switch unit, as shown in Figure 6.1.3.2-1, the switches K7, K8, K9, K10 can be removed. The amplifier (PA/LNA) is optional. For the "single cell" and "multiple cell" test cases, the gNB emulator can be directly connected to the feed horn.

#### 6.1.3.3 Procedure for selecting UE Orientation and for calibration

Set calibrated power level at the centre of the quiet zone for each polarization individually [FFS].

Before starting the test, the UE orientation with which the test system can provide a wide enough dynamic range to perform the test scenarios needs to be identified in order to obtain sufficient link budget.

The UE orientation can be determined by either of the approaches below:

- Approach 1: UE vendor declares the direction in which the measurement has to be made. In this case, the declaration confirms that the Rx Beam peak conditions in FR2 specified in TS 38.133 [13] Annex B are met

- Approach 2: Perform an Rx-beam peak search

For Approach 2 an Rx beam peak search needs to be performed as per the procedure in TS 38.521-2 [15] Annex K, which finds the direction in which Rx Beam peak conditions in FR2 specified in TS 38.133 [13] Annex B are met.

RSRP measurements can be configured by SS in X2NR meas configurations using FFS preambles in NSA (Ex - RRC\_Connected with connectivity parameter E-UTRA with MCG Only bearer established and meas config enabled for event B1 (Ex-per TC 8.2.3.1.1 of TS 38.523-1)) and FFS preambles in SA modes.

When signal level calibrated with a reference antenna (only applicable to single-cell test cases without thresholds):

- The RSRP reported from the DUT is within [±FFSdB] of expected RSRP mentioned in Table 6.2.2.2-1.

When signal level calibrated with the RSRP-based calibration:

- Before starting the tests, Rx-beam peak directions need to be determined using Approach 1 or Approach 2 above. Rx beam peak direction may depend on the operating band under test. If Rx-beam peak directions for all the operating bands required for test scenarios are identical, three different levels in Table 6.2.2.2-2 can be used in the test scenarios.

- Rx-beam peak directions are decided to be ‘identical’, if the detected beam peak positions are direct neighbours on the measurement grid.

If Rx-beam peak directions are identical:

1. Position the UE so that the Rx beam peak direction is aligned towards the measurement antenna.

2. Make the UE report SS-RSRP at each frequency used in the test scenarios, while setting the downlink SS power at the centre of the quiet zone to -82dBm/SCS. Here, the SS-RSRP reported levels are denoted as PRSRP(f).

3. Calculate ‘Delta(NRf)’ for each carrier frequency used in the test case, using the equation: Delta(NRf) = PRSRP(f) + 82.

#### 6.1.3.4 Handling of Thresholds

Where a threshold value is specified in the test case (value identified as THtest case) it is signalled to the UE with a value THsig according to table 6.1.3.4-1.

Table 6.1.3.4-1: Handling of signalled threshold values

|  |  |  |
| --- | --- | --- |
| Type of Threshold | Signalled value | Comment |
| Absolute | THsig(f) = THtest case + Delta(NRf) | Delta(NRf) value according to the frequency of the cell being compared to the threshold |
| Relative, intra-frequency | THsig(f) = THtest case |  |
| Relative, inter-frequency | *a3-Offset* sig = *a3-Offset* test case + Delta(NRfn) - Delta(NRfp) | Delta(NRfp) is the Delta value for the SpCell frequency  Delta(NRfn) is the Delta value for the neighbour cell frequency |
| Relative, inter-frequency, Event A6 | *a6-Offset* sig = *a6-Offset* test case + Delta(NRfn) - Delta(NRfs) | Delta(NRfs) is the Delta value for the SCell frequency  Delta(NRfn) is the Delta value for the neighbour cell frequency |

### 6.1.4 Requirements for timer tolerances

The timer tolerances specified for the test environment in this subclause apply to all Signalling test cases defined in TS 38.523-1 [12] unless otherwise specified.

All the timers used during testing are within a tolerance margin given by the equation below. If for a specific test a different tolerance value is required, then this should be specified in the relevant test document (i.e. the document where the test is described).

Timer tolerance = 10%.

## 6.2 Reference test conditions

### 6.2.1 Physical Channel Allocations

#### 6.2.1.1 Antennas

If the UE has two or more Rx antennas, the same downlink signal is applied to each one, except if MIMO is tested. All UE Rx antennas shall be connected.

If the UE has one Rx antenna, the downlink signal is applied to it.

#### 6.2.1.2 Downlink physical channels and physical signals

In general for signalling test cases the power allocation for downlink physical channels and signals is specified in relation to a reference cell power.

Unless specifically specified otherwise in a signalling test case prose, all cells use only one beam.

In case of only one beam per cell this reference cell power is the EPRE of the secondary synchronization signal (SSS) and referred to as “SS/PBCH SSS EPRE”.

In case of more than one beam per cell the power levels of the different SS/PBCH blocks may be different what makes it difficult to specify the EPREs of other physical channels and signals relative to the EPRE of any SSS. Therefore for multiple beams test cases the power levels are specified relative to the reference cell power.

For single beam per cell test cases the power allocation of downlink physical channels for signalling test cases is specified in table 6.2.1.2-1, for multiple beams per cell test cases the power allocation is specified in table 6.2.1.2-2.

Table 6.2.1.2-1: Power allocation for OFDM symbols and reference signals for signalling test cases (single beam)

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Value | Comment |
| SSS transmit power | dBm/SCS | Test specific (Note 1, Note 2) | referred to as “SS/PBCH SSS EPRE” |
| EPRE ratio of PSS to SSS | dB | 0 |  |
| EPRE ratio of PBCH DMRS to SSS | dB | 0 |  |
| EPRE ratio of PBCH to PBCH DMRS | dB | 0 |  |
| EPRE ratio of PDCCH DMRS to SSS | dB | 0 |  |
| EPRE ratio of PDCCH to PDCCH DMRS | dB | 0 |  |
| EPRE ratio of PDSCH DMRS to SSS | dB | 0 |  |
| EPRE ratio of PDSCH to PDSCH DMRS | dB | -3 | To reduce interference from PDSCH of intra-frequency neighbour cells. |
| EPRE ratio of PTRS to PDSCH | dB | 3 | i.e. the EPRE ratio of PTRS to SSS is 0dB |
| EPRE ratio of PRS to SSS | dB | 0 |  |
| Note 1: Power level chosen to align with cell power level as specified in clause 6.2.2.  Note 2: The power level of CD-SSB and NCD-SSB with same SSB index is the same. | | | |

Table 6.2.1.2-2: Power allocation for OFDM symbols and reference signals for signalling test cases (multiple beam)

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Value | Comment |
| Reference cell power EPRECellRef | dBm/SCS | Test specific (Note 1) |  |
| EPRE ratio of SSSSSB#N to EPRECellRef | dB | Test specific (Note 2, Note 4) | power of SSS within SSB with index N |
| EPRE ratio of PSSSSB#N to SSSSSB#N | dB | 0 | power of PSS within SSB with index N |
| EPRE ratio of PBCH DMRSSSB#N to SSSSSB#N | dB | 0 | power of PBCH DMRS within SSB with index N |
| EPRE ratio of PBCHSSB#N to PBCH DMRSSSB#N | dB | 0 | power of PBCH within SSB with index N |
| EPRE ratio of PDCCH DMRS to EPRECellRef | dB | 0 | (Note 3) |
| EPRE ratio of PDCCH to PDCCH DMRS | dB | 0 |  |
| EPRE ratio of PDSCH DMRS to EPRECellRef | dB | 0 | (Note 3) |
| EPRE ratio of PDSCH to PDSCH DMRS | dB | -3 | To reduce interference from PDSCH of intra-frequency neighbour cells. |
| EPRE ratio of PTRS to PDSCH | dB | 3 | i.e. the EPRE ratio of PTRS to EPRECellRef is 0dB |
| EPRE ratio of CSI-RSN to EPRECellRef | dB | Test specific (Note 2) | power of CSI-RS with index N;  CSI-RS configured if required by a test case in TS 38.523-1 [12] |
| EPRE ratio of PRS to EPRECellRef | dB | 0(Note 4) |  |
| Note 1: Power level chosen to align with cell power level as specified in clause 6.2.2.  Note 2: Test cases may specify “OFF” in which case the attenuation shall result in an absolute EPRE value being equal or less than the power level specified for a non-suitable "Off" cell in clause 6.2.2.  Note 3: In general the UE cannot distinguish from which beam DL data is sent ⇒ PDCCH and PDSCH are considered as cell specific rather than beam specific.  Note 4: PRS resources independent from number of SSB(s) configured within the Cell. Hence, reference cell power is sufficient to allocate power to PRS  Note 5: The power level of CD-SSB and NCD-SSB with same SSB index is the same. | | | |

#### 6.2.1.3 Sidelink physical channels and physical signals

In general for signalling test cases the power allocation for sidelink physical channels and signals is specified in relation to a reference NR-SS-UE power.

The power allocation of sidelink physical channels for signalling test cases is specified in table 6.2.1.3-1.

Table 6.2.1.3-1: Power allocation for OFDM symbols and reference signals for signalling test cases

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Value | Comment |
| Reference NR-SS-UE power EPRENRSSUERef | dBm/SCS | Test specific (Note 1) |  |
| EPRE ratio of S-SSS to EPRENRSSUERef | dB | Test specific (Note 2) | Power of S-SSS within S-SSB  S-SSB configured if required by a test case in TS 38.523-1 [12] |
| EPRE ratio of S-PSS to S-SSS | dB | 0 | Power of S-PSS within S-SSB  S-SSB configured if required by a test case in TS 38.523-1 [12] |
| EPRE ratio of PSBCH DMRS to S-SSS | dB | 0 | Power of PSBCH DMRS within S-SSB  S-SSB configured if required by a test case in TS 38.523-1 [12] |
| EPRE ratio of PSBCH to PSBCH DMRS | dB | 0 | Power of PSBCH within S-SSB  S-SSB configured if required by a test case in TS 38.523-1 [12] |
| EPRE ratio of PSCCH DMRS to EPRENRSSUERef | dB | 0 |  |
| EPRE ratio of PSCCH to PSCCH DMRS | dB | 0 |  |
| EPRE ratio of PSSCH DMRS to EPRENRSSUERef | dB | 0 |  |
| EPRE ratio of PSSCH to PSSCH DMRS | dB | 0 |  |
| EPRE ratio of PSFCH to PSSCH | dB | 0 |  |
| EPRE ratio of SL CSI-RS to EPRENRSSUERef | dB | Test specific (Note 2) | Power of SL CSI-RS;  SL CSI-RS configured if required by a test case in TS 38.523-1 [12] |
| EPRE ratio of SL PT-RS to PSSCH | dB | 0 |  |
| Note 1: Power level chosen to align with NR-SS-UE power level as specified in clause 6.2.2.  Note 2: Test cases may specify “OFF” in which case the attenuation shall result in an absolute EPRE value being equal or less than the power level specified for a "Off" NR-SS-UE in clause 6.2.2. | | | |

### 6.2.2 Signal levels

#### 6.2.2.1 Signal Levels for conducted testing

This section applies to the test cases, which use conducted testing for each configured cell or each configured NR-SS-UE.

For NR FR1 cell, the downlink power settings in Table 6.2.2.1-1 and 6.2.2.1-2 are used unless otherwise specified in a test case.

Table 6.2.2.1-1: Default Downlink power levels for FR1 NR cell (5MHz – 25MHz)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | SCS(kHz) | Unit | Channel bandwidth | | | | |
| 5MHz | 10MHz | 15MHz | 20MHz | 25MHz |
| Channel BW Power | 15 | dBm | -63 | -60 | -58 | -57 | -56 |
| 30 | dBm | -67 | -63 | -61 | -60 | -59 |
| 60 | dBm | N/A | -67 | -65 | -63 | -62 |
| SS/PBCH  SSS EPRE | All | dBm/SCS  (Note 3) | -88 | -88 | -88 | -88 | -88 |
| Note 1: The channel bandwidth powers are informative, based on -88 dBm/ SCS(SubCarrier Spacing) SS/PBCH SSS EPRE, then scaled according to the number of RBs and rounded to the nearest integer dBm value. Full RE allocation with no boost or deboost is assumed.  Note 2: The power level is specified at each UE Rx antenna.  Note 3: DL level is applied for any of the Subcarrier Spacing configuration () with the same power spectrum density of -88 dBm/SCS(SubCarrier Spacing). | | | | | | | |

Table 6.2.2.1-2: Default Downlink power levels for FR1 NR cell (30MHz – 100MHz)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | SCS(kHz) | Unit | Channel bandwidth | | | | | | |
| 30MHz | 40MHz | 50MHz | 60MHz | 80MHz | 90MHz | 100MHz |
| Channel BW Power | 15 | dBm | -55 | -54 | -53 | N/A | N/A | N/A | N/A |
| 30 | dBm | -58 | -57 | -56 | -55 | -54 | -53 | -53 |
| 60 | dBm | -61 | -60 | -59 | -58 | -57 | -56 | -56 |
| SS/PBCH  SSS EPRE | All | dBm/SCS  (Note 3) | -88 | -88 | -88 | -88 | -88 | -88 | -88 |
| Note 1: The channel bandwidth powers are informative, based on -88dBm/SCS(SubCarrier Spacing) SS/PBCH SSS EPRE, then scaled according to the number of RBs and rounded to the nearest integer dBm value. Full RE allocation with no boost or deboost is assumed.  Note 2: The power level is specified at each UE Rx antenna.  Note 3: DL level is applied for any of the Subcarrier Spacing configuration () with a power spectrum density of -88dBm/SCS(SubCarrier Spacing). | | | | | | | | | |

With simultaneous transmission of 24 RBs, a maximum of -78dBm/SCS SS/PBCH SSS EPRE can be allocated as cell power level.

The default settings of suitable cells and non-suitable cells for NR are specified in table 6.2.2.1-3.

Cells which are expected to be undetectable for UE under test shall fulfil the condition of non-suitable "Off" cell in table 6.2.2.1-3.

Table 6.2.2.1-3: Default settings of suitable / non-suitable cells

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Power level type** | **NR (Note 1-3)** | | **E-UTRAN** | **UTRAN** | **GERAN** |
|  | **Unit** | **Power level** |  |  |  |
| Serving cell | dBm/SCS | -88 | Table 6.2.2.1-1 [2] | Table 6.1.1 (FDD) [52] | Table 6.1.10 [52] |
| Suitable neighbour intra-frequency cell | dBm/SCS | -94 | Table 6.2.2.1-1 [2] | Table 6.1.2 (FDD) [52] | n/a |
| Suitable neighbour inter-frequency cell | dBm/SCS | -99 | Table 6.2.2.1-1 [2] | Table 6.1.2 (FDD) [52] | Table 6.1.10 [52] |
| Non-suitable cell | dBm/SCS | -115 | Table 6.2.2.1-1 [2] | Table 6.1.3 (FDD) [52] | Table 6.1.11 [52] |
| Non-suitable "Off" cell | dBm/SCS | ≤ -145 | Table 6.2.2.1-1 [2] | Table 6.1.4 (FDD) [52] | Cell is switched-off |
| Note 1: The power level is specified in terms of SS/PBCH SSS EPRE instead of RSRP as RSRP is a measured value and cannot be directly controlled by the Full RE allocation with no boost or deboost is assumed. SS.  Note 2: The power level is specified at each UE Rx antenna.  Note 3: DL level is applied for any of the Subcarrier Spacing configuration () with the same power spectrum density of -88dBm/SCS.  Note 4: The default settings assume that the UE is making relative measurements of neighbour cells compared to the serving cell. | | | | | |

The default signal level uncertainty is specified in table 6.2.2.1-4 for any level specified, unless a tighter uncertainty is specified by a test case in TS 38.523-1 [12].

Table 6.2.2.1-4: SS signal level uncertainty

|  |  |  |
| --- | --- | --- |
|  | Absolute signal level uncertainty for each cell | Relative signal level uncertainty between multiple cells |
| Intra-frequency | +/-3 dB at each test port | +/-3 dB |
| Inter-frequency | +/-3 dB at each test port | See Note 1 |
| Note 1: For Inter-frequency cells the relative signal level uncertainty between multiple cells is determined by the absolute uncertainty of each cell, and does not have any additional constraint. | | |

SS/PBCH SSS EPRE setting should be equal to or higher than -115 dBm except for Non-suitable "Off" cell. The figure is chosen to ensure that for all bands the DL signal is within the RSRP measurement range specified in TS 38.133 [13], taking into account the SS default absolute signal level uncertainty.

NOTE: (The power spectral density of a white noise source; specified in TS 38.133 [13]) can be assumed to be -Infinity [dBm/SCS] for all intra and inter frequency test cases. It is applicable to both idle mode and connected mode in TS 38.523-1 [12], unless otherwise specified in specific test cases.

For NR-SS-UE, the sidelink power settings in Table 6.2.2.1-5 is used unless otherwise specified in a test case.

Table 6.2.2.1-5: Default settings of NR-SS-UE power and signal level uncertainty

|  |  |  |  |
| --- | --- | --- | --- |
| Power level type | NR-SS-UE (Note 1) | | Absolute signal level uncertainty for each NR-SS-UE |
|  | Unit | Power level |  |
| NR-SS-UE (default value) | dBm/15kHz | -85 | +/-3 dB |
| NR-SS-UE ("Off") | dBm/15kHz | ≤ -145 | +/-3 dB |
| Note 1: The power level is specified at each Rx antenna of the UE under test. | | | |

##### 6.2.2.1.1 Measurement accuracy and side conditions

RSRP measurement accuracy in RRC\_CONNECTED state is specified in table 6.2.2.1.1-1, derived from TS 38.133 [13] clauses 10.1.2 and 10.1.4 selecting Normal condition with maximum Io less than -50 dBm/BWChannel. The ranges and side conditions in TS 38.133 [13] clauses 10.1.2 and 10.1.4 apply. This measurement accuracy is applicable to connected mode test cases specified in TS 38.523-1 [12]. For the serving cell and suitable neighbour cells, the following side conditions shall be satisfied including the effect of signal level uncertainty.

- RSRP ≥ -124 dBm

- RSRP Ês/Iot > -6 dB

- Io: 117.5 dBm/SCS for 15kHz SCS and -114.5 dBm/SCS for 15kHz SCS dBm/SCS … -50 dBm/BWChannel (for absolute and relative RSRP measurement accuracy).

RSRP measurement accuracy in RRC\_CONNECTED state is specified in table 6.2.2.1.1-1, derived from TS 38.133 [13] clauses 10.1.2 and 10.1.4 selecting Normal condition.

Table 6.2.2.1.1-1: RSRP measurement accuracy in RRC\_CONNECTED state

|  |  |  |
| --- | --- | --- |
|  | Absolute RSRP measurement accuracy | Relative RSRP measurement accuracy |
| Intra-frequency | +/-8 dB | +/-3 dB |
| Inter-frequency | +/-8 dB | +/-4.5 dB |

#### 6.2.2.2 Signal Levels for OTA testing

##### 6.2.2.2.1 General

This section applies to the test cases, which require at least one of the configured cells to be a FR2 NR cell.

The following assumption is made for OTA testing:

- AWGN is not configured in the test case

##### 6.2.2.2.2 Signal Levels for FR2 OTA NR cells

For NR FR2 cell, the downlink power settings in Table 6.2.2.2.2-1 are used unless otherwise specified in a test case.

Table 6.2.2.2.2-1: Default Downlink power levels for FR2 NR cell (50MHz - 400MHz)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | SCS(kHz) | Unit | Channel bandwidth | | | |
| 50MHz | 100MHz | 200MHz | 400MHz |
| Channel BW Power | 60 | dBm | FFS | FFS | FFS | FFS |
| 120 | dBm | -57 | -57 | -57 | -57 |
| SS/PBCH  SSS EPRE | All | dBm/SCS | -82 | -82 | -82 | -82 |
| Note 1: The channel bandwidth powers are informative, based on -82 dBm/SCS SS/PBCH SSS EPRE, then scaled according to the number of RBs and rounded to the nearest integer dBm value. A maximumRE allocation of 24 simultaneously transmitted RBs with no boost or deboost is assumed.  Note 2: The power level is specified at the centre of quiet zone. | | | | | | |

The default settings of suitable cells and non-suitable cells for NR FR2 are specified in table 6.2.2.2.2-2.

NR FR2 cells which are expected to be undetectable for UE under test shall fulfil the condition of non-suitable "Off" cell in table 6.2.2.2.2-2.

Table 6.2.2.2.2-2: Default settings of suitable / non-suitable FR2 NR cells

|  |  |  |
| --- | --- | --- |
| Power level type | NR (Note 1-3) | |
|  | Unit | Power level |
| Serving cell | dBm/SCS | -82 |
| Suitable neighbour intra-frequency cell | dBm/SCS | -91 |
| Suitable neighbour inter-frequency cell | dBm/SCS | -91 |
| Non-suitable cell | dBm/SCS | -100 |
| Non-suitable "Off" cell | dBm/SCS | ≤-139 |
| Note 1: The power level is specified in terms of SS/PBCH SSS EPRE instead of RSRP as RSRP is a measured value and cannot be directly controlled by the SS.  Note 2: The power level is specified at the centre of quiet zone.  Note 3: DL level is applied for any of the Subcarrier Spacing configuration (*µ*) with the same power spectrum density in dBm/SCS (SubCarrier Spacing). | | | |

The test system default signal level uncertainty is specified in tables 6.2.2.2.2-3 and 6.2.2.2.2-4 for any level specified, unless a tighter uncertainty is specified by a test case in TS 38.523-1 [12].

Table 6.2.2.2.2-3: SS Absolute FR2 NR signal level uncertainty

|  |  |
| --- | --- |
|  | **Absolute signal level uncertainty** |
| At each frequency | +/-6 dB at centre of the quiet zone |

Table 6.2.2.2.2-4: SS Relative FR2 NR signal level uncertainty

|  |  |
| --- | --- |
|  | **Relative signal level uncertainty between any two SS EPRE levels at the same frequency** |
| At each frequency | +/-2.0 dB |

##### 6.2.2.2.3 Signal Levels for FR1 OTA NR cell(s) with FR2 OTA NR cell(s)

For NR cell in FR1 with FR2 NR, since the NR FR1 OTA link is uncalibrated in the signalling test setup, -88dBm/SCS should be applied as defined in the table 6.2.2.1-1 and table 6.2.2.1-2. -88dBm/SCS is suggested value and it is left to the TE vendor to ensure that NR cell power level fulfils the cell selection criteria.

The default settings of suitable cells and non-suitable cells for NR in FR1 with FR2 NR are specified in table 6.2.2.2-7.

NR Cells in FR1 with FR2 NR which are expected to be undetectable for UE under test shall fulfil the condition of non-suitable "Off" cell in table 6.2.2.2.3-1.

Table 6.2.2.2.3-1: Default settings of suitable / non-suitable NR cells in FR1 with NR FR2

|  |  |  |
| --- | --- | --- |
| Power level type | NR (Note 1-2) | |
|  | Unit | Power level |
| Serving cell or Suitable neighbour cell | dBm/SCS | -88 |
| Non-suitable "Off" cell | dBm/SCS | ≤-156 |
| Note 1: The power level is specified in terms of SS/PBCH SSS EPRE instead of RSRP as RSRP is a measured value and cannot be directly controlled by the SS.  Note 2: The power level is specified at the centre of quiet zone. | | | |

The following assumptions are considered for the test cases configuring at least one FR1 OTA NR cell:

- Multiple inter-frequency FR1 OTA NR cells can be configured.

- Only two power levels are allowed: (Serving cell power level or Suitable neighbour cell power level) and Non-suitable "Off" cell power level (as defined in Table 6.2.2.2.3-1)

- If FR1 OTA NR cell does not require:

- Cell Reselection measurements and

- Connected Mode measurements and

- Cell Selection between two active cells and

- Multiple Signal Levels

- Multiple FR1 OTA NR cells can be activated.

- Else

- No more than one FR1 OTA NR cell is activated.

##### 6.2.2.2.4 Signal Levels for OTA E-UTRA cell(s) with FR2 OTA NR cell(s)

For E-UTRA cell with FR2 NR, since the LTE OTA link is uncalibrated in the signalling test setup, the table 6.2.2.2.4-1 provides only suggestive value. It is left to the TE vendor to ensure that LTE cell power level fulfils the cell selection criteria.

Table 6.2.2.2.4-1: Default Downlink power levels for E-UTRA cells with NR FR2

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Unit | Channel bandwidth | | | | | |
|  |  | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz |
| Number of RBs |  | 6 | 15 | 25 | 50 | 75 | 100 |
| Channel BW Power | dBm | -77 | -73 | -71 | -68 | -66 | -65 |
| RS EPRE | dBm/15kHz | -96 | -96 | -96 | -96 | -96 | -96 |
| Note 1: The channel bandwidth powers are informative, based on -96 dBm/15kHz RS\_EPRE, then scaled according to the number of RBs and rounded to the nearest integer dBm value. Full RE allocation with no boost or deboost is assumed.  Note 2: The power level is specified at the centre of quiet zone. | | | | | | | |

The default setting of suitable cells for E-UTRA with FR2 NR are specified in table 6.2.2.2.4-2.

E-UTRA Cells with FR2 NR which are expected to be undetectable for UE under test shall fulfil the condition of non-suitable "Off" cell in table 6.2.2.2.4-2.

Table 6.2.2.2.4-2: Default settings of suitable / non-suitable E-UTRA cells with NR FR2

|  |  |  |
| --- | --- | --- |
| Power level type | E-UTRAN (Note 1-2) | |
|  | Unit | Power level |
| Serving cell or Suitable neighbour cell | dBm/15KHz | -96 |
| Non-suitable "Off" cell | dBm/15KHz | ≤-156 |
| Note 1: The power level is specified in terms ofcell-specific RS EPRE instead of RSRP as RSRP is a measured value and cannot be directly controlled by the SS.  Note 2: The power level is specified at the centre of quiet zone. | | | |

The following assumptions are considered for the test cases configuring at least one OTA E-UTRA cell:

- Multiple inter-frequency OTA E-UTRA cells can be configured.

- Only two power levels are allowed: (Serving cell power level or Suitable neighbour cell power level) and Non-suitable "Off" cell power level (as defined in Table 6.2.2.2.4-2)

- If OTA E-UTRA cell does not require:

- Cell Reselection measurements and

- Connected Mode measurements and

- Cell Selection between two active cells and

- Multiple Signal Levels,

- Multiple OTA E-UTRA cells can be activated.

- Else

- No more than one OTA E-UTRA cell is activated.

##### 6.2.2.2.5 Signal Levels for OTA UTRA cell(s) with FR2 OTA NR cell(s)

For UTRA OTA cell with FR2 NR, the UTRA OTA link is uncalibrated in the signalling test setup.

UTRA Cells with FR2 NR which are expected to be undetectable for UE under test shall fulfil the condition of non-suitable "Off" cell in table 6.2.2.2.5-1.

Table 6.2.2.2.5-1: Default settings of suitable / non-suitable UTRA cells with NR FR2

|  |  |  |
| --- | --- | --- |
| Power level type | UTRAN (Note 1-2) | |
|  | Unit | Power level |
| Serving cell or Suitable neighbour cell | dBm/3.84 MHz | -60 |
| Non-suitable "Off" cell | dBm/3.84 MHz | ≤-132 |
| Note 1: The power level is specified in terms of CPICH\_Ec instead of CPICH\_RSCP as RSCP is a receiver measurement and only CPICH\_Ec can be directly controlled by the SS.  Note 2: The power level is specified at the centre of quiet zone. | | | |

The following assumptions are considered for the test cases configuring at least one OTA UTRA cell:

- Multiple inter-frequency OTA UTRA cells can be configured.

- Only two power levels are allowed: (Serving cell power level or Suitable neighbour cell power level) and Non-suitable "Off" cell power level (as defined in Table 6.2.2.2.5-1)

- If OTA UTRA cell does not require:

- Cell Reselection measurements and

- Connected Mode measurements and

- Cell Selection between two active cells and

- Multiple Signal Levels,

- Multiple OTA UTRA cells can be activated.

- Else

- No more than one OTA UTRA cell is activated.

##### 6.2.2.2.6 Signal Levels for OTA GERAN cell(s) with FR2 OTA NR cell(s)

For GERAN OTA cell with FR2 NR, the GERAN OTA link is uncalibrated in the signalling test setup.

GERAN Cells with FR2 NR which are expected to be undetectable for UE under test shall fulfil the condition of non-suitable "Off" cell in table 6.2.2.2.6-1.

Table 6.2.2.2.6-1: Default settings of suitable / non-suitable GERAN cells with NR FR2

|  |  |  |
| --- | --- | --- |
| **Power level type** | **GERAN (Note 1)** | |
|  | **Unit** | **Power level** |
| Serving cell or Suitable Neighbour cell | dBm | -48 |
| Non-suitable "Off" cell | dBm | ≤-100 |
| Note 1: The power level is specified at the centre of quiet zone. | | | |

The following assumptions are considered for the test cases configuring at least one OTA GERAN cell:

- Multiple inter-frequency OTA GERAN cells can be configured.

- Only two power levels are allowed: (Serving cell power level or Suitable Neighbour cell power level) and Non-suitable "Off" cell power level (as defined in Table 6.2.2.2.6-1)

- If OTA GERAN cell does not require:

- Cell Reselection measurements and

- Connected Mode measurements and

- Cell Selection between two active cells and

- Multiple Signal Levels,

- Multiple OTA GERAN cells can be activated.

- Else

- No more than one OTA GERAN cell is activated.

### 6.2.3 Default test frequencies

Editor’s note: For FR2 test frequencies using 100 MHz default channel bandwidth it is FFS if 100MHz channel bandwidth can be used for FR2 multicell protocol testing.

#### 6.2.3.1 Test frequencies for NR standalone signalling testing

The default channel bandwidth for signalling test is specified per NR band. The test frequencies are defined so that no frequency overlapping takes place, in order to avoid unnecessary inter-frequency interference.

For signalling test cases, the mapping of frequency ranges to NR test frequencies are as follows:

- for band with only one test frequency (e.g. n51): Low Range (NRf1);

- for band with up to two test frequencies: Low Range (NRf1) and High Range (NRf2);

- for band with up to three test frequencies: Low Range (NRf1), Mid Range (NRf2) and High Range (NRf3);

- for band with up to four test frequencies: Low Range (NRf1), Mid Low Range (NRf2), Mid High Range (NRf3) and High Range (NRf4);

The signalling test frequencies NRf5, NRf6, NRf7 are mapped respectively as NRf1, NRf2, NRf3 on the operating band for inter-band.

The test frequencies, subcarrier spacing, default channel bandwidth, SS/PBCH block and CORESET#0 parameters for signalling is specified in Table 6.2.3.1-1 (FDD FR1 BW 5MHz), Table 6.2.3.1-2 (FDD FR1 BW 10MHz), Table 6.2.3.1-3 (TDD FR1 BW 5MHz), Table 6.2.3.1-4 (TDD FR1 BW 10MHz), Table 6.2.3.1-4A (TDD FR1 BW 60MHz), Table 6.2.3.1-4B (TDD FR1 BW 20MHz for RedCap UE), Table 6.2.3.1-5 (TDD FR1 BW 100MHz), Table 6.2.3.1-5A (TDD FR1 BW 20MHz for RedCap UE),Table 6.2.3.1-6 (TDD FR2 BW 100MHz) and Table 6.2.3.1-7 (NR FDD FR1 SUL bands).

For signalling test cases requiring an additional BWP without CORESET#0, the test frequencies for Low Range (NRf1), subcarrier spacing, highest mandatory UL and DL channel bandwidth, SS/PBCH block for CD-SSB and NCD-SSB, and BWP without CORESET#0 parameters is specified in Table 6.2.3.1-8 (FR1), Table 6.2.3.1-9 (FR2)

Table 6.2.3.1-1: Test frequencies for NR FDD FR1 bands using 5 MHz channel bandwidth

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR  Band | SCS  [kHz] | CBW [MHz] | *carrierBandwidth*  [PRBs] | Range | | Carrier centre  [MHz] | Carrier centre  [ARFCN] | point A [MHz] | *absoluteFrequencyPointA*[ARFCN] | *offsetToCarrier* [Carrier PRBs] | SS block SCS  [kHz] | GSCN | *absoluteFrequencySSB*  [ARFCN] |  | Offset Carrier CORESET#0 [RBs] | CORESET#0 Index (Offset  [RBs])  Note 1 | offsetToPointA (SIB1)  [PRBs]  Note 1 |
| n5 | 15 | 5 | 25 | Downlink | Low, High | Same values as for Low and High range in clause 4.3.1.1.15 for bandwidth=5 MHz and SCS=15 kHz. | | | | | | | | | | | |
|  |  |  |  |  | Mid-Low | 878.2 | 175640 | 873.79 | 174758 | 12 | 15 | 2197 | 175730 | 0 | 1 | 2 (4) | 17 |
|  |  |  |  |  | Mid-High | 884.8 | 176960 | 878.23 | 175646 | 24 |  | 2212 | 176930 | 8 | 1 | 0 (0) | 25 |
|  |  |  |  | Uplink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.5 for bandwidth=5 MHz and SCS=15 kHz. | | | | | | | | | | | |
|  |  |  |  |  | Mid-Low | 833.2 | 166640 | 824.47 | 164894 | 36 | - | - | - | - | - | - | - |
|  |  |  |  |  | Mid-High | 839.8 | 167960 | 817.03 | 163406 | 114 | - | - | - | - | - | - | - |
| n8 | 15 | 5 | 25 | Downlink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.8 for bandwidth=5 MHz and SCS=15 kHz. | | | | | | | | | | | |
|  |  |  |  |  | Mid-Low | 937.5 | 187500 | 933.09 | 186618 | 12 | 15 | 2343 | 187470 | 8 | 1 | 0 (0) | 13 |
|  |  |  |  |  | Mid-High | 947.5 | 189500 | 940.93 | 188186 | 24 |  | 2368 | 189410 | 0 | 0 | 0 (0) | 24 |
|  |  |  |  | Uplink | Low, High | Same values as for Low and High range in clause 4.3.1.8 for bandwidth=5 MHz and SCS=15 kHz. | | | | | | | | | | | |
|  |  |  |  |  | Mid-Low | 892.5 | 178500 | 883.77 | 176754 | 36 | - | - | - | - | - | - | - |
|  |  |  |  |  | Mid-High | 902.5 | 180500 | 879.73 | 175946 | 114 | - | - | - | - | - | - | - |
| n12 | 15 | 5 | 25 | Downlink | Low, Mid, High | Same values as for Low, Mid and High range in clause 4.3.1.1.1.12 for bandwidth=5 MHz and SCS=15 kHz. | | | | | | | | | | | |
|  |  |  |  | Uplink | Low, Mid, High | Same values as for Low, Mid and High range in clause 4.3.1.1.1.12 for bandwidth=5 MHz and SCS=15 kHz. | | | | | | | | | | | |
| n13 | 15 | 5 | 25 | Downlink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.13 for bandwidth=5 MHz and SCS=15 kHz. | | | | | | | | | | | |
|  |  |  |  | Uplink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.13 for bandwidth=5 MHz and SCS=15 kHz. | | | | | | | | | | | |
| n14 | 15 | 5 | 25 | Downlink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.14 for bandwidth=5 MHz and SCS=15 kHz. | | | | | | | | | | | |
|  |  |  |  | Uplink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.14 for bandwidth=5 MHz and SCS=15 kHz. | | | | | | | | | | | |
| n20 | 15 | 5 | 25 | Downlink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.20 for bandwidth=5 MHz and SCS=15 kHz. | | | | | | | | | | | |
|  |  |  |  |  | Mid-Low | 801.8 | 160360 | 797.39 | 159478 | 12 | 15 | 2003 | 160330 | 8 | 1 | 0 (0) | 13 |
|  |  |  |  |  | Mid-High | 810.2 | 162040 | 803.63 | 160726 | 24 |  | 2024 | 162010 | 8 | 1 | 0 (0) | 25 |
|  |  |  |  | Uplink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.20 for bandwidth=5 MHz and SCS=15 kHz. | | | | | | | | | | | |
|  |  |  |  |  | Mid-Low | 842.8 | 168560 | 834.07 | 166814 | 36 | - | - | - | - | - | - | - |
|  |  |  |  |  | Mid-High | 851.2 | 170240 | 828.43 | 165686 | 114 | - | - | - | - | - | - | - |
| n24 | 15 | 5 | 25 | Downlink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.24 for DL bandwidth=5 MHz, UL bandwidth=5 MHz and SCS=15 kHz | | | | | | | | | | | |
|  |  |  |  | Uplink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.24 for DL bandwidth=5 MHz, UL bandwidth=5 MHz and SCS=15 kHz | | | | | | | | | | | |
| n26 | 15 | 5 | 25 | Downlink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.26 for bandwidth=5 MHz and SCS=15 kHz. | | | | | | | | | | | |
|  |  |  |  |  | Mid-Low | 871.5 | 174300 | 867.09 | 173418 | 12 | 15 | 2178 | 174270 | 8 | 1 | 0 (0) | 13 |
|  |  |  |  |  | Mid-High | 881.5 | 176300 | 874.93 | 174986 | 24 |  | 2203 | 176210 | 0 | 0 | 0 (0) | 24 |
|  |  |  |  | Uplink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.26 for bandwidth=5 MHz and SCS=15 kHz. | | | | | | | | | | | |
|  |  |  |  |  | Mid-Low | 826.5 | 165300 | 817.77 | 163554 | 36 | - | - | - | - | - | - | - |
|  |  |  |  |  | Mid-High | 836.5 | 167300 | 813.73 | 162746 | 114 |  | - | - | - | - | - | - |
| n29 | 15 | 5 | 25 | Downlink (SDL) | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.29 for bandwidth=5 MHz and SCS=15 kHz. | | | | | | | | | | | |
| n30 | 15 | 5 | 25 | Downlink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.30 for bandwidth=5 MHz and SCS=15 kHz. | | | | | | | | | | | |
|  |  |  |  | Uplink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.30 for bandwidth=5 MHz and SCS=15 kHz. | | | | | | | | | | | |
| n70 | 15 | 5 | 25 | Downlink | Low, Mid, High | Same values as for Low, Mid and High range in clause 4.3.1.1.1.70 for DL bandwidth=5 MHz, UL bandwidth=5 MHz and SCS=15 kHz. | | | | | | | | | | | |
|  |  |  |  | Uplink | Low, Mid, High | Same values as for Low, Mid and High range in clause 4.3.1.1.1.70 for DL bandwidth=5 MHz, UL bandwidth=5 MHz and SCS=15 kHz. | | | | | | | | | | | |
| n71 | 15 | 5 | 25 | Downlink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.71 for bandwidth=5 MHz and SCS=15 kHz. | | | | | | | | | | | |
|  |  |  |  |  | Mid-Low | 629.5 | 125900 | 625.09 | 125018 | 12 | 15 | 1573 | 125810 | 0 | 0 | 0 (0) | 12 |
|  |  |  |  |  | Mid-High | 639.5 | 127900 | 632.93 | 126586 | 24 |  | 1598 | 127930 | 4 | 1 | 1 (2) | 27 |
|  |  |  |  | Uplink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.71 for bandwidth=5 MHz and SCS=15 kHz. | | | | | | | | | | | |
|  |  |  |  |  | Mid-Low | 675.5 | 135100 | 666.77 | 133354 | 36 | - | - | - | - | - | - | - |
|  |  |  |  |  | Mid-High | 685.5 | 137100 | 662.73 | 132546 | 114 | - | - | - | - | - | - | - |
| n76 | 15 | 5 | 25 | Downlink (SDL) | Low | Same values as for Low range in clause 4.3.1.1.1.76 for bandwidth=5 MHz and SCS=15 kHz. | | | | | | | | | | | |
| n91 | 15 | 5 | 25 | Downlink | Low | Same values as for Low range in clause 4.3.1.1.1.91 for bandwidth=5 MHz and SCS=15 kHz. | | | | | | | | | | | |
|  |  |  |  | Uplink | Low | Same values as for Low range in clause 4.3.1.1.1.91 for bandwidth=5 MHz and SCS=15 kHz. | | | | | | | | | | | |
| n92 | 15 | 5 | 25 | Downlink | Low, Mid, High | Same values as for Low, Mid and High range in clause 4.3.1.1.1.92 for bandwidth=5 MHz and SCS=15 kHz. | | | | | | | | | | | |
|  |  |  |  | Uplink | Low, Mid, High | Same values as for Low, Mid and High range in clause 4.3.1.1.1.92 for bandwidth=5 MHz and SCS=15 kHz. | | | | | | | | | | | |
| n93 | 15 | 5 | 25 | Downlink | Low | Same values as for Low range in clause 4.3.1.1.1.93 for bandwidth=5 MHz and SCS=15 kHz. | | | | | | | | | | | |
|  |  |  |  | Uplink | Low | Same values as for Low range in clause 4.3.1.1.1.93 for bandwidth=5 MHz and SCS=15 kHz. | | | | | | | | | | | |
| n100 | 15 | 5 | 25 | Downlink | Low, Mid, High | Same values as for Low, Mid and High range in clause 4.3.1.1.1.100 for bandwidth=5 MHz and SCS=15 kHz. | | | | | | | | | | | |
| Uplink | Low, Mid, High | Same values as for Low, Mid and High range in clause 4.3.1.1.1.100 for bandwidth=5 MHz and SCS=15 kHz. | | | | | | | | | | | |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-1 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2. | | | | | | | | | | | | | | | | | |

Table 6.2.3.1-2: Test frequencies for NR FDD FR1 bands using 10 MHz channel bandwidth

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR  Band | SCS  [kHz] | CBW [MHz] | *carrierBandwidth*  [PRBs] | Range | | Carrier centre  [MHz] | Carrier centre  [ARFCN] | | point A [MHz] | | *absoluteFrequencyPointA*[ARFCN] | | *offsetToCarrier* [Carrier PRBs] | SS block SCS  [kHz] | GSCN | *absoluteFrequencySSB*  [ARFCN] |  | Offset Carrier CORESET#0 [RBs] | CORESET#0 Index (Offset  [RBs])  Note 1 | offsetToPointA (SIB1)  [PRBs]  Note 1 |
| n1 | 15 | 10 | 52 | Downlink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.1 for bandwidth=10 MHz and SCS=15 kHz. | | | | | | | | | | | | | | |
|  |  |  |  |  | Mid-Low | 2131.7 | 426340 | | 2124.86 | | 424972 | | 12 | 15 | 5321 | 425770 | 2 | 0 | 0 (0) | 12 |
|  |  |  |  |  | Mid-High | 2148.3 | 429660 | | 2139.3 | | 427860 | | 24 |  | 5364 | 429150 | 10 | 1 | 0 (0) | 25 |
|  |  |  |  | Uplink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.1 for bandwidth=10 MHz and SCS=15 kHz. | | | | | | | | | | | | | | |
|  |  |  |  |  | Mid-Low | 1941.7 | 388340 | | 1930.54 | | 386108 | | 36 | - | - | - | - | - | - | - |
|  |  |  |  |  | Mid-High | 1958.3 | 391660 | | 1933.1 | | 386620 | | 114 | - | - | - | - | - | - | - |
| n2 | 15 | 10 | 52 | Downlink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.2 for bandwidth=10 MHz and SCS=15 kHz. | | | | | | | | | | | | | | |
|  |  |  |  |  | Mid-Low | 1951.7 | 390340 | | 1944.86 | | 388972 | | 12 | 15 | 4871 | 389770 | 2 | 0 | 0 (0) | 12 |
|  |  |  |  |  | Mid-High | 1968.3 | 393660 | | 1959.3 | | 391860 | | 24 |  | 4914 | 393150 | 10 | 1 | 0 (0) | 25 |
|  |  |  |  | Uplink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.2 for bandwidth=10 MHz and SCS=15 kHz. | | | | | | | | | | | | | | |
|  |  |  |  |  | Mid-Low | 1871.7 | 374340 | | 1860.54 | | 372108 | | 36 | - | - | - | - | - | - | - |
|  |  |  |  |  | Mid-High | 1888.3 | 377660 | | 1863.1 | | 372620 | | 114 | - | - | - | - | - | - | - |
| n3 | 15 | 10 | 52 | Downlink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.3 for bandwidth=10 MHz and SCS=15 kHz. | | | | | | | | | | | | | | |
|  |  |  |  |  | Mid-Low | 1831.7 | 366340 | | 1824.86 | | 364972 | | 12 | 15 | 4571 | 365770 | 2 | 0 | 0 (0) | 12 |
|  |  |  |  |  | Mid-High | 1853.3 | 370660 | | 1844.3 | | 368860 | | 24 |  | 4625 | 370090 | 2 | 0 | 0 (0) | 24 |
|  |  |  |  | Uplink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.3 for bandwidth=10 MHz and SCS=15 kHz. | | | | | | | | | | | | | | |
|  |  |  |  |  | Mid-Low | 1736.7 | 347340 | | 1725.54 | | 345108 | | 36 | - | - | - | - | - | - | - |
|  |  |  |  |  | Mid-High | 1758.3 | 351660 | | 1733.1 | | 346620 | | 114 | - | - | - | - | - | - | - |
| n7 | 15 | 10 | 52 | Downlink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.7 for bandwidth=10 MHz and SCS=15 kHz. | | | | | | | | | | | | | | |
|  |  |  |  |  | Mid-Low | 2645 | 529000 | | 2638.16 | | 527632 | | 12 | 15 | 6605 | 528490 | 10 | 1 | 0 (0) | 13 |
|  |  |  |  |  | Mid-High | 2665 | 533000 | | 2656 | | 531200 | | 24 |  | 6658 | 532610 | 2 | 1 | 2 (4) | 29 |
|  |  |  |  | Uplink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.7 for bandwidth=10 MHz and SCS=15 kHz. | | | | | | | | | | | | | | |
|  |  |  |  |  | Mid-Low | 2525 | 505000 | | 2513.84 | | 502768 | | 36 | - | - | - | - | - | - | - |
|  |  |  |  |  | Mid-High | 2545 | 509000 | | 2519.8 | | 503960 | | 114 | - | - | - | - | - | - | - |
| n25 | 15 | 10 | 52 | Downlink | Low, High | Same values as for Low and High range in clause 4.3.1.25 for bandwidth=10 MHz and SCS=15 kHz. | | | | | | | | | | | | | | |
|  |  |  |  |  | Mid-Low | 1953.3 | 390660 | | 1946.46 | | 389292 | | 12 | 15 | 4878 | 390270 | 2 | 1 | 2 (4) | 17 |
|  |  |  |  |  | Mid-High | 1971.7 | 394340 | | 1962.7 | | 392540 | | 24 |  | 4924 | 393890 | 6 | 1 | 1 (2) | 27 |
|  |  |  |  | Uplink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.25 for bandwidth=10 MHz and SCS=15 kHz. | | | | | | | | | | | | | | |
|  |  |  |  |  | Mid-Low | 1873.3 | 374660 | | 1862.14 | | 372428 | | 36 | - | - | - | - | - | - | - |
|  |  |  |  |  | Mid-High | 1891.7 | 378340 | | 1866.5 | | 373300 | | 114 | - | - | - | - | - | - | - |
| n28  (Note 3) | 15 | 10 | 52 | Downlink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.28 for bandwidth=10 MHz and SCS=15 kHz. | | | | | | | | | | | | | | |
|  |  |  |  |  | Mid-Low | 774.7 | 154940 | | 767.86 | | 153572 | | 12 | 15 | 1930 | 154370 | 2 | 0 | 0 (0) | 12 |
|  |  |  |  |  | Mid-High | 786.3 | 157260 | | 777.3 | | 155460 | | 24 |  | 1959 | 156750 | 10 | 1 | 0 (0) | 25 |
|  |  |  |  | Uplink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.28 for bandwidth=10 MHz and SCS=15 kHz. | | | | | | | | | | | | | | |
|  |  |  |  |  | Mid-Low | 719.7 | 143940 | | 708.54 | | 141708 | | 36 | - | - | - | - | - | - | - |
|  |  |  |  |  | Mid-High | 731.3 | 146260 | | 706.1 | | 141220 | | 114 | - | - | - | - | - | - | - |
| n65 | 15 | 10 | 52 | Downlink | Low, High | Same values as for Low and High range in clause 4.3.1.65 for bandwidth=10 MHz and SCS=15 kHz. | | | | | | | | | | | | | | |
|  |  |  |  |  | Mid-Low | 2141.7 | 428340 | | 2134.86 | | 426972 | | 12 | 15 | 5349 | 427950 | 2 | 1 | 2 (4) | 17 |
|  |  |  |  |  | Mid-High | 2168.3 | 433660 | | 2159.3 | | 431860 | | 24 |  | 5414 | 433210 | 6 | 1 | 1 (2) | 27 |
|  |  |  |  | Uplink | Low, High | Same values as for Low and High range in clause 4.3.1.65 for bandwidth=10 MHz and SCS=15 kHz. | | | | | | | | | | | | | | |
|  |  |  |  |  | Mid-Low | 1951.7 | 390340 | | 1940.54 | | 388108 | | 36 | - | - | - | - | - | - | - |
|  |  |  |  |  | Mid-High | 1978.3 | 395660 | | 1953.1 | | 390620 | | 114 | - | - | - | - | - | - | - |
| n66 | 15 | 10 | 52 | Downlink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.66 for DL bandwidth=10 MHz, UL bandwidth=10 MHz and SCS=15 kHz. | | | | | | | | | | | | | | |
|  |  |  |  |  | Mid-Low | 2141.7 | 428340 | | 2134.86 | | 426972 | | 12 | 15 | 5349 | 427950 | 2 | 1 | 2 (4) | 17 |
|  |  |  |  |  | Mid-High | 2168.3 | 433660 | | 2159.3 | | 431860 | | 24 |  | 5414 | 433210 | 6 | 1 | 1 (2) | 27 |
|  |  |  |  | Uplink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.66 for DL bandwidth=10 MHz, UL bandwidth=10 MHz and SCS=15 kHz. | | | | | | | | | | | | | | |
|  |  |  |  |  | Mid-Low | 1741.7 | 348340 | | 1730.54 | | 346108 | | 36 | - | - | - | - | - | - | - |
|  |  |  |  |  | Mid-High | 1768.3 | 353660 | | 1743.1 | | 348620 | | 114 | - | - | - | - | - | - | - |
| n74 | 15 | 10 | 52 | Downlink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.74 for bandwidth=5 MHz and SCS=15 kHz. | | | | | | | | | | | | | | |
|  |  |  |  |  | Mid-Low | 1491 | 298200 | 1484.16 | | 296832 | | 12 | | 15 | 3720 | 297630 | 2 | 0 | 0 (0) | 12 |
|  |  |  |  |  | Mid-High | 1502 | 300400 | 1493 | | 298600 | | 24 | |  | 3749 | 300010 | 2 | 1 | 2 (4) | 29 |
|  |  |  |  | Uplink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.74 for bandwidth=5 MHz and SCS=15 kHz. | | | | | | | | | | | | | | |
|  |  |  |  |  | Mid-Low | 1443 | 288600 | 1431.84 | | 286368 | | 36 | | - | - | - | - | - | - | - |
|  |  |  |  |  | Mid-High | 1454 | 290800 | 1428.8 | | 285760 | | 114 | | - | - | - | - | - | - | - |
| n75 | 15 | 10 | 52 | Downlink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.75 for bandwidth=10 MHz and SCS=15 kHz. | | | | | | | | | | | | | | |
|  |  |  |  | (SDL) | Mid-Low | 1462 | 292400 | | 1455.16 | | 291032 | | 12 | 15 | - | 291824 | 31 | - | 0 | - |
|  |  |  |  | Note 2 | Mid-High | 1487 | 297400 | | 1478 | | 295600 | | 24 |  | - | 296824 | 31 | - | 0 | - |
| n94 | 15 | 10 | 52 | Downlink | Low, Mid, High | Same values as for Low, Mid and High range in clause 4.3.1.1.1.94 for bandwidth=10 MHz and SCS=15 kHz. | | | | | | | | | | | | | | |
|  |  |  |  | Uplink | Low, Mid, High | Same values as for Low, Mid and High range in clause 4.3.1.1.1.94 for bandwidth=10 MHz and SCS=15 kHz. | | | | | | | | | | | | | | |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-1 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: FR1 carrier without any coreset is indicated in the MIB by setting =31, *controlResourceSetZero*=0 and *searchSpaceZero = 0* (TS 38.213 [22], clause 13).  Note 3: For the case of EN-DC configuration DC\_21A\_n28A the test frequencies in band n28 is restricted to 728 - 738 MHz for the UL and 783 - 793 MHz for the DL (Reference: TS 38.101-3 [9], Table 5.5B.4.1-1 for DC\_21A\_n28 and Note 17). Thus is only Low range as specified in Table 4.3.1.1.1.28-1A applicable for n28 when used with DC\_21A\_n28A. | | | | | | | | | | | | | | | | | | | | |

Table 6.2.3.1-3: Test frequencies for NR TDD FR1 bands using 5 MHz channel bandwidth

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR  Band | SCS  [kHz] | CBW [MHz] | *carrierBandwidth*  [PRBs] | Range | | Carrier centre  [MHz] | Carrier centre  [ARFCN] | point A [MHz] | *absoluteFrequencyPointA*[ARFCN] | *offsetToCarrier* [Carrier PRBs] | SS block SCS  [kHz] | GSCN | *absoluteFrequencySSB*  [ARFCN] |  | Offset Carrier CORESET#0 [RBs] | CORESET#0 Index (Offset  [RBs])  Note 1 | offsetToPointA (SIB1)  [PRBs]  Note 1 |
| n34 | 15 | 5 | 25 | Downlink & Uplink | Low, Mid, High | Same values as for Low, Mid and High range in clause 4.3.1.1.1.34 for bandwidth=5 MHz and SCS=15 kHz. | | | | | | | | | | | |
| n51 | 15 | 5 | 25 | Downlink & Uplink | Low | Same values as for Low range in clause 4.3.1.1.1.51 for bandwidth=5 MHz and SCS=15 kHz. | | | | | | | | | | | |
| n53 | 15 | 5 | 25 | Downlink & Uplink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.53 for bandwidth=5 MHz and SCS=15 kHz. | | | | | | | | | | | |
| n101 | 15 | 5 | 25 | Downlink & Uplink | Low, Mid, High | Same values as for Low, Mid and High range in clause 4.3.1.1.1.101 for bandwidth=5 MHz and SCS=15 kHz. | | | | | | | | | | | |
| Note 1: For TDD FR1 bands typically the default SCS=30kHz is chosen. For n34 and n53 where SCS=30kHz would limit test coverage to one cell scenarios, SCS=15kHz and 5MHz CBW have been chosen to enable testing of scenarios with up to two cells. | | | | | | | | | | | | | | | | | |

Table 6.2.3.1-4: Test frequencies for NR TDD FR1 bands using 10 MHz channel bandwidth

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR  Band | SCS  [kHz] | CBW [MHz] | *carrierBandwidth*  [PRBs] | Range | | Carrier centre  [MHz] | Carrier centre  [ARFCN] | point A [MHz] | *absoluteFrequencyPointA*[ARFCN] | *offsetToCarrier* [Carrier PRBs] | SS block SCS  [kHz] | GSCN | *absoluteFrequencySSB*  [ARFCN] |  | Offset Carrier CORESET#0 [RBs] | CORESET#0 Index (Offset  [RBs])  Note 1 | offsetToPointA (SIB1)  [PRBs]  Note 1 |
| n38 | 30 | 10 | 24 | Downlink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.38 for bandwidth=10 MHz and SCS=30 kHz. | | | | | | | | | | | |
|  |  |  |  | & | Mid-Low | 2588.3 | 517660 | 2579.66 | 515932 | 12 | 30 | 6470 | 517690 | 10 | 0 | 2 (2) | 28 |
|  |  |  |  | Uplink | Mid-High | 2601.7 | 520340 | 2588.74 | 517748 | 24 |  | 6505 | 520370 | 10 | 0 | 2 (2) | 52 |
| n39 | 30 | 10 | 24 | Downlink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.39 for bandwidth=10 MHz and SCS=30 kHz. | | | | | | | | | | | |
|  |  |  |  | & | Mid-Low | 1895 | 379000 | 1886.36 | 377272 | 12 | 30 | 4736 | 378970 | 14 | 0 | 1 (1) | 26 |
|  |  |  |  | Uplink | Mid-High | 1905 | 381000 | 1892.04 | 378408 | 24 |  | 4761 | 380910 | 18 | 0 | 0 (0) | 48 |
| n40 | 30 | 10 | 24 | Downlink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.40 for bandwidth=10 MHz and SCS=30 kHz. | | | | | | | | | | | |
|  |  |  |  | & | Mid-Low | 2335 | 467000 | 2326.36 | 465272 | 12 | 30 | 5839 | 467090 | 6 | 0 | 3 (3) | 30 |
|  |  |  |  | Uplink | Mid-High | 2365 | 473000 | 2352.04 | 470408 | 24 |  | 5914 | 473090 | 6 | 0 | 3 (3) | 54 |
| n48 | 30 | 10 | 24 | Downlink | Low, High | Same values as for Low and High range in clause 4.3.1.48 for bandwidth=10 MHz and SCS=30 kHz. | | | | | | | | | | | |
|  |  |  |  | & | Mid-Low | 3601.65 | 640110 | 3593.01 | 639534 | 12 | 30 | 7917 | 640128 | 18 | 0 | 2 (2) | 28 |
|  |  |  |  | Uplink | Mid-High | 3648.33 | 643222 | 3635.37 | 642358 | 24 |  | 7949 | 643200 | 2 | 0 | 1 (1) | 50 |
| n50 | 30 | 10 | 24 | Downlink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.50 for bandwidth=10 MHz and SCS=30 kHz. | | | | | | | | | | | |
|  |  |  |  | & | Mid-Low | 1462 | 292400 | 1453.36 | 290672 | 12 | 30 | 3655 | 292370 | 14 | 0 | 1 (1) | 26 |
|  |  |  |  | Uplink | Mid-High | 1487 | 297400 | 1474.04 | 294808 | 24 |  | 3716 | 297370 | 14 | 0 | 1 (1) | 50 |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-4 in TS 38.213 [22] for all bands in the table. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2. | | | | | | | | | | | | | | | | | |

Table 6.2.3.1-4A: Test frequencies for NR TDD FR1 bands using 60 MHz channel bandwidth for non-RedCap UE

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR  Band | SCS  [kHz] | CBW [MHz] | *carrierBandwidth*  [PRBs] | Range | | Carrier centre  [MHz] | Carrier centre  [ARFCN] | point A [MHz] | *absoluteFrequencyPointA*[ARFCN] | *offsetToCarrier* [Carrier PRBs] | SS block SCS  [kHz] | GSCN | *absoluteFrequencySSB*  [ARFCN] |  | Offset Carrier CORESET#0 [RBs] | CORESET#0 Index (Offset  [RBs])  Note 1 | offsetToPointA (SIB1)  [PRBs]  Note 1 |
| n41 | 30 | 60 | 162 | Downlink & Uplink | Low, Mid, High | Same values as for Low, Mid and High range in clause 4.3.1.1.1.41 for bandwidth=60 MHz and SCS=30 kHz. | | | | | | | | | | | |

Table 6.2.3.1-4B: Test frequencies for NR TDD FR1 bands using 20 MHz channel bandwidth for RedCap UE

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR  Band | SCS  [kHz] | CBW [MHz] | *carrierBandwidth*  [PRBs] | Range | | Carrier centre  [MHz] | Carrier centre  [ARFCN] | point A [MHz] | *absoluteFrequencyPointA*[ARFCN] | *offsetToCarrier* [Carrier PRBs] | SS block SCS  [kHz] | GSCN | *absoluteFrequencySSB*  [ARFCN] |  | Offset Carrier CORESET#0 [RBs] | CORESET#0 Index (Offset  [RBs])  Note 1 | offsetToPointA (SIB1)  [PRBs]  Note 1 |
| n41 | 30 | 20 | 51 | Downlink & Uplink | Low, Mid, High | Same values as for Low, Mid and High range in clause 4.3.1.1.1.41 for bandwidth=20 MHz and SCS=30 kHz. | | | | | | | | | | | |

**Table 6.2.3.1-4C: Test frequencies for NR TDD FR1 bands using 20 MHz channel bandwidth for non-RedCap UE**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **NR**  **Band** | **SCS**  **[kHz]** | **CBW [MHz]** | ***carrierBandwidth***  **[PRBs]** | **Range** | | **Carrier centre**  **[MHz]** | **Carrier centre**  **[ARFCN]** | | **point A [MHz]** | ***absoluteFrequencyPointA*[ARFCN]** | | ***offsetToCarrier* [Carrier PRBs]** | | **SS block SCS**  **[kHz]** | **GSCN** | ***absoluteFrequencySSB***  **[ARFCN]** |  | Offset Carrier CORESET#0 **[RBs]** | **CORESET#0 Index (Offset**  **[RBs])**  **Note 1** | **offsetToPointA (SIB1)**  **[PRBs]**  **Note 1** |
| n46 | 30 | 20 | 51 | Downlink  & | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.46 for bandwidth=20 MHz and SCS=30 kHz. | | | | | | | | | | | | | | |
|  |  |  |  | Uplink | Mid-Low | 5340 | | 756000 | 5326.5 | | 755100 | | 12 | 30 | 9121 | 755712 | 12 | 0 | 3 (3) | 30 |
|  |  |  |  |  | Mid-High | 5659.98 | | 777332 | 5642.16 | | 776144 | | 24 |  | 9343 | 777024 | 16 | 0 | 2 (2) | 52 |
| n96 | 30 | 20 | 51 | Downlink  & | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.96 for bandwidth=20 MHz and SCS=30 kHz. | | | | | | | | | | | | | | |
|  |  |  |  | Uplink | Mid-Low | 5340 | | 756000 | 5326.5 | | 755100 | | 12 | 30 | 9121 | 755712 | 22 | 0 | 0 (0) | 24 |
|  |  |  |  |  | Mid-High | 5659.98 | | 777332 | 5642.16 | | 776144 | | 24 |  | 9343 | 777024 | 22 | 0 | 0 (0) | 48 |

Table 6.2.3.1-5: Test frequencies for NR TDD FR1 bands using 100 MHz channel bandwidth for non-RedCap UE

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR  Band | SCS  [kHz] | CBW [MHz] | *carrierBandwidth*  [PRBs] | Range | | Carrier centre  [MHz] | Carrier centre  [ARFCN] | point A [MHz] | *absoluteFrequencyPointA*[ARFCN] | *offsetToCarrier* [Carrier PRBs] | SS block SCS  [kHz] | GSCN | *absoluteFrequencySSB*  [ARFCN] |  | Offset Carrier CORESET#0 [RBs] | CORESET#0 Index (Offset  [RBs])  Note 1 | offsetToPointA (SIB1)  [PRBs]  Note 1 |
| n77 | 30 | 100 | 273 | Downlink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.77 for bandwidth=100 MHz and SCS=30 kHz. | | | | | | | | | | | |
|  |  |  |  | & | Mid-Low | 3616.68 | 641112 | 3563.22 | 637548 | 12 | 30 | 7896 | 638112 | 12 | 0 | 1 (1) | 26 |
|  |  |  |  | Uplink | Mid-High | 3883.32 | 658888 | 3825.54 | 655036 | 24 |  | 8081 | 655872 | 20 | 0 | 0 (0) | 48 |
| n78 | 30 | 100 | 273 | Downlink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.78 for bandwidth=100 MHz and SCS=30 kHz. | | | | | | | | | | | |
|  |  |  |  | & | Mid-Low | 3483.33 | 632222 | 3429.87 | 628658 | 12 | 30 | 7804 | 629280 | 22 | 0 | 3 (3) | 30 |
|  |  |  |  | Uplink | Mid-High | 3616.68 | 641112 | 3558.9 | 637260 | 24 |  | 7896 | 638112 | 12 | 0 | 1 (1) | 50 |
| n79 | 30 | 100 | 273 | Downlink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.79 for bandwidth=100 MHz and SCS=30 kHz. | | | | | | | | | | | |
|  |  |  |  | & | Mid-Low | 4616.67 | 707778 | 4563.21 | 704214 | 12 | 30 | 8592 | 704928 | 18 | 6 | 1 (4) | 38 |
|  |  |  |  | Uplink | Mid-High | 4783.35 | 718890 | 4725.57 | 715038 | 24 |  | 8720 | 717216 | 18 | 54 | 1 (4) | 160 |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-4 in TS 38.213 [22] for all bands in the table except for band n79 where Table 13-6 apply. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2. | | | | | | | | | | | | | | | | | |

Table 6.2.3.1-5A: Test frequencies for NR TDD FR1 bands using 20 MHz channel bandwidth for RedCap UE

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR  Band | SCS  [kHz] | CBW [MHz] | *carrierBandwidth*  [PRBs] | Range | | Carrier centre  [MHz] | Carrier centre  [ARFCN] | point A [MHz] | *absoluteFrequencyPointA*[ARFCN] | *offsetToCarrier* [Carrier PRBs] | SS block SCS  [kHz] | GSCN | *absoluteFrequencySSB*  [ARFCN] |  | Offset Carrier CORESET#0 [RBs] | CORESET#0 Index (Offset  [RBs])  Note 1 | offsetToPointA (SIB1)  [PRBs]  Note 1 |
| n77 | 30 | 20 | 51 | Downlink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.77 for bandwidth=20 MHz and SCS=30 kHz. | | | | | | | | | | | |
|  |  |  |  | & | Mid-Low | 3603.33 | 640222 | 3589.83 | 639322 | 12 | 30 | 7915 | 639936 | 14 | 0 | 3 (3) | 30 |
|  |  |  |  | Uplink | Mid-High | 3896.67 | 659778 | 3878.85 | 658590 | 24 |  | 8118 | 659424 | 18 | 0 | 0 (0) | 48 |
| n78 | 30 | 20 | 51 | Downlink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.78 for bandwidth=20 MHz and SCS=30 kHz. | | | | | | | | | | | |
|  |  |  |  | & | Mid-Low | 3470.01 | 631334 | 3456.51 | 630434 | 12 | 30 | 7822 | 631008 | 22 | 0 | 1 (1) | 26 |
|  |  |  |  | Uplink | Mid-High | 3630 | 642000 | 3612.18 | 640812 | 24 |  | 7933 | 641664 | 12 | 0 | 1 (1) | 50 |
| n79 | 30 | 20 | 51 | Downlink | Low, High | Same values as for Low and High range in clause 4.3.1.1.1.79 for bandwidth=20 MHz and SCS=30 kHz. | | | | | | | | | | | |
|  |  |  |  | & | Mid-Low | 4603.35 | 706890 | 4589.85 | 705990 | 12 | 30 | 8609 | 706560 | 18 | 1 | 0 (0) | 26 |
|  |  |  |  | Uplink | Mid-High | 4796.67 | 719778 | 4778.85 | 718590 | 24 |  | 8743 | 719424 | 18 | 0 | 0 (0) | 48 |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-4 in TS 38.213 [22] for all bands in the table except for band n79 where Table 13-6 apply. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2. | | | | | | | | | | | | | | | | | |

Table 6.2.3.1-6: Test frequencies for NR TDD FR2 bands using 100 MHz channel bandwidth

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR  Band | SCS  [kHz] | CBW [MHz] | *carrierBandwidth*  [PRBs] | Range | | Carrier centre  [MHz] | Carrier centre  [ARFCN] | point A [MHz] | *absoluteFrequencyPointA*[ARFCN] | *offsetToCarrier* [Carrier PRBs] | SS block SCS  [kHz] | GSCN | *absoluteFrequencySSB*  [ARFCN] |  | Offset Carrier CORESET#0 [RBs] | CORESET#0 Index (Offset  [RBs])  Note 1 | offsetToPointA (SIB1)  [PRBs]  Note 1 |
| n257 | 120 | 100 | 66 | Downlink | Low, High | Same values as for Low and High range in clause 4.3.1.2.1.1 for bandwidth=100 MHz and SCS=120 kHz. | | | | | | | | | | | |
|  |  |  |  | & | Mid-Low | 27516.6 | 2071109 | 27451.8 | 2070029 | 12 | 120 | 22444 | 2070811 | 7 | 6 | 1 (4) | 44 |
|  |  |  |  | Uplink | Mid-High | 28483.32 | 2087221 | 28401.24 | 2085853 | 24 |  | 22500 | 2086939 | 3 | 7 | 1 (4) | 70 |
| n258 | 120 | 100 | 66 | Downlink | Low, High | Same values as for Low and High range in clause 4.3.1.2.1.2 for bandwidth=100 MHz and SCS=120 kHz. | | | | | | | | | | | |
|  |  |  |  | & | Mid-Low | 25350 | 2034999 | 25285.2 | 2033919 | 12 | 120 | 22318 | 2034523 | 2 | 3 | 0 (0) | 30 |
|  |  |  |  | Uplink | Mid-High | 26400 | 2052499 | 26317.92 | 2051131 | 24 |  | 22379 | 2052091 | 0 | 2 | 1 (4) | 60 |
| n259 | 120 | 100 | 66 | Downlink | Low, High | Same values as for Low and High range in clause 4.3.1.2.1.3 for bandwidth=100 MHz and SCS=120 kHz. | | | | | | | | | | | |
|  |  |  |  | & | Mid-Low | 40850.04 | 2293333 | 40785.24 | 2292253 | 12 | 120 | 23215 | 2292859 | 3 | 3 | 0 (0) | 30 |
|  |  |  |  | Uplink | Mid-High | 42150 | 2314999 | 42067.92 | 2313631 | 24 |  | 23290 | 2314459 | 6 | 0 | 0 (0) | 48 |
| n260 | 120 | 100 | 66 | Downlink | Low, High | Same values as for Low and High range in clause 4.3.1.2.1.4 for bandwidth=100 MHz and SCS=120 kHz. | | | | | | | | | | | |
|  |  |  |  | & | Mid-Low | 38016.6 | 2246109 | 37951.8 | 2245029 | 12 | 120 | 23051 | 2245627 | 11 | 2 | 0 (0) | 28 |
|  |  |  |  | Uplink | Mid-High | 38983.32 | 2262221 | 38901.24 | 2260853 | 24 |  | 23107 | 2261755 | 7 | 3 | 0 (0) | 54 |
| n261 | 120 | 100 | 66 | Downlink | Low, High | Same values as for Low and High range in clause 4.3.1.2.1.5 for bandwidth=100 MHz and SCS=120 kHz. | | | | | | | | | | | |
|  |  |  |  | & | Mid-Low | 27800.04 | 2075833 | 27735.24 | 2074753 | 12 | 120 | 22460 | 2075419 | 9 | 1 | 1 (4) | 34 |
|  |  |  |  | Uplink | Mid-High | 28050 | 2079999 | 27967.92 | 2078631 | 24 |  | 22474 | 2079451 | 2 | 0 | 0 (0) | 48 |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-8 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2. | | | | | | | | | | | | | | | | | |

Table 6.2.3.1-7: Test frequencies for NR FDD FR1 SUL bands

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR  Band | SCS  [kHz] | CBW [MHz] | *carrierBandwidth*  [PRBs] | Range | | Carrier centre  [MHz] | Carrier centre  [ARFCN] | point A [MHz] | *AbsoluteFrequencyPointA*  [ARFCN] | *offsetToCarrier* [Carrier PRBs] |
| n80 | 15 | 10 | 52 | Uplink | Low, Mid, High | Same values as for Low, Mid and High range in table 4.3.1.1.1.80-1 for bandwidth=10 MHz and SCS=15 kHz. | | | | |
| n81 | 15 | 10 | 52 | Uplink | Low, Mid, High | Same values as for Low, Mid and High range in table 4.3.1.1.1.81-1 for bandwidth=10 MHz and SCS=15 kHz. | | | | |
| n82 | 15 | 10 | 52 | Uplink | Low, Mid, High | Same values as for Low, Mid and High range in table 4.3.1.1.1.82-1 for bandwidth=10 MHz and SCS=15 kHz. | | | | |
| n83 | 15 | 10 | 52 | Uplink | Low, Mid, High | Same values as for Low, Mid and High range in table 4.3.1.1.1.83-1 for bandwidth=10 MHz and SCS=15 kHz. | | | | |
| n84 | 15 | 10 | 52 | Uplink | Low, Mid, High | Same values as for Low, Mid and High range in table 4.3.1.1.1.84-1 for bandwidth=10 MHz and SCS=15 kHz. | | | | |
| n86 | 15 | 10 | 52 | Uplink | Low, Mid, High | Same values as for Low, Mid and High range in table 4.3.1.1.1.86-1 for bandwidth=10 MHz and SCS=15 kHz. | | | | |
| n97 | 15 | 10 | 52 | Uplink | Low, Mid, High | Same values as for Low, Mid and High range in table 4.3.1.1.1.97-1 for bandwidth=10 MHz and SCS=15 kHz. | | | | |
| n99 | 15 | 10 | 52 | Uplink | Low,  High | Same values as for Low and High range in clause 4.3.1.1.1.99-1 for bandwidth=10 MHz and SCS=15 kHz. | | | | |

Table 6.2.3.1-8: Test frequencies for NR FR1 bands configuring a BWP without CORESET#0

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR  Band | SCS  [kHz]  Note2 | CBW [MHz]  Note3 | *carrierBandwidth*  [PRBs] | Range | | Carrier centre  [MHz] | point A [MHz] | *offsetToCarrier* [Carrier PRBs] | SS block SCS  [kHz]  Note 4 | *absoluteFrequencySSB*  [ARFCN]  Note 5 |  | CORESET#0 Index (Offset  [RBs])  Note 1 | offsetToPointA (SIB1)  [PRBs]  Note 1 | absoluteFrequencySSB for NCD-SSB [ARFCN] | Rbstart of  BWP | LRB of  BWP | locationAndBandwidth  of BWP |
| n5 | 15 | 20 | 106 | Downlink | Low | Same values as for Low range in clause 4.3.1.1.1.5 for bandwidth=20 MHz and SCS=15 kHz. | | | | | | | | 177312 | 80 | 25 | 6680 |
|  |  |  |  | Uplink | Low | Same values as for Low range in clause 4.3.1.1.1.5 for bandwidth=20 MHz and SCS=15 kHz | | | | | | | | - | 80 | 25 | 6680 |
| n8 | 15 | 20 | 106 | Downlink | Low | Same values as for Low range in clause 4.3.1.1.1.8 for bandwidth=20 MHz and SCS=15 kHz. | | | | | | | | 188512 | 80 | 25 | 6680 |
|  |  |  |  | Uplink | Low | Same values as for Low range in clause 4.3.1.1.1.8 for bandwidth=20 MHz and SCS=15 kHz. | | | | | | | | - | 80 | 25 | 6680 |
| n12 | 15 | 15 | 79 | Downlink | Low | Same values as for Low range in clause 4.3.1.1.1.12 for bandwidth=15 MHz and SCS=15 kHz. | | | | | | | | 148362 | 54 | 25 | 6654 |
|  |  |  |  | Uplink | Low | Same values as for Low range in clause 4.3.1.1.1.12 for bandwidth=15 MHz and SCS=15 kHz. | | | | | | | | - | 54 | 25 | 6654 |
| n13 | 15 | 10 | 52 | Downlink | Low | Same values as for Low range in clause 4.3.1.1.1.13 for bandwidth=10 MHz and SCS=15 kHz. | | | | | | | | 151668 | 24 | 25 | 6624 |
|  |  |  |  | Uplink | Low | Same values as for Low range in clause 4.3.1.1.1.13 for bandwidth=10 MHz and SCS=15 kHz. | | | | | | | | - | 24 | 25 | 6624 |
| n14 | 15 | 10 | 52 | Downlink | Low | Same values as for Low range in clause 4.3.1.1.1.14 for bandwidth=10 MHz and SCS=15 kHz. | | | | | | | | 153068 | 24 | 25 | 6624 |
|  |  |  |  | Uplink | Low | Same values as for Low range in clause 4.3.1.1.1.14 for bandwidth=10 MHz and SCS=15 kHz. | | | | | | | | - | 24 | 25 | 6624 |
| n20 | 15 | 20 | 106 | Downlink | Low | Same values as for Low range in clause 4.3.1.1.1.20 for bandwidth=20 MHz and SCS=15 kHz. | | | | | | | | 161712 | 80 | 25 | 6680 |
|  |  |  |  | Uplink | Low | Same values as for Low range in clause 4.3.1.1.1.20 for bandwidth=20 MHz and SCS=15 kHz. | | | | | | | | - | 80 | 25 | 6680 |
| n24 | 15 | 10 | 52 | Downlink | Low | Same values as for Low range in clause 4.3.1.1.1.24 for bandwidth=10 MHz and SCS=15 kHz. | | | | | | | | 306668 | 24 | 25 | 6624 |
|  |  |  |  | Uplink | Low | Same values as for Low range in clause 4.3.1.1.1.24 for bandwidth=10 MHz and SCS=15 kHz. | | | | | | | | - | 24 | 25 | 6624 |
| n26 | 15 | 20 | 106 | Downlink | Low | Same values as for Low range in clause 4.3.1.1.1.26 for bandwidth=20 MHz and SCS=15 kHz. | | | | | | | | 175312 | 80 | 25 | 6680 |
|  |  |  |  | Uplink | Low | Same values as for Low range in clause 4.3.1.1.1.26 for bandwidth=20 MHz and SCS=15 kHz. | | | | | | | | - | 80 | 25 | 6680 |
| n29 | NA | NA | NA | NA | NA | NA | | | | | | | | NA | NA | NA | NA |
| n30 | 15 | 10 | 52 | Downlink | Low | Same values as for Low range in clause 4.3.1.1.1.30 for bandwidth=10 MHz and SCS=15 kHz. | | | | | | | | 471468 | 24 | 25 | 6624 |
|  |  |  |  | Uplink | Low | Same values as for Low range in clause 4.3.1.1.1.30 for bandwidth=10 MHz and SCS=15 kHz. | | | | | | | | - | 24 | 25 | 6624 |
| n70 | 15 | 15 | 79 | Downlink | Low | Same values as for Low range in clause 4.3.1.1.1.70 for bandwidth=15 MHz and SCS=15 kHz. | | | | | | | | 401562 | 54 | 25 | 6654 |
|  |  |  |  | Uplink | Low | Same values as for Low range in clause 4.3.1.1.1.70 for bandwidth=15 MHz and SCS=15 kHz. | | | | | | | | - | 54 | 25 | 6654 |
| n71 | 15 | 20 | 106 | Downlink | Low | Same values as for Low range in clause 4.3.1.1.1.71 for bandwidth=20 MHz and SCS=15 kHz. | | | | | | | | 126912 | 80 | 25 | 6680 |
|  |  |  |  | Uplink | Low | Same values as for Low range in clause 4.3.1.1.1.71 for bandwidth=20 MHz and SCS=15 kHz. | | | | | | | | - | 80 | 25 | 6680 |
| n76 | NA | NA | NA | NA | NA | NA | | | | | | | | NA | NA | NA | NA |
| n91 | NA | NA | NA | NA | NA | NA | | | | | | | | NA | NA | NA | NA |
| n92 | 15 | 20 | 106 | Downlink | Low | Same values as for Low range in clause 4.3.1.1.1.92 for bandwidth=20 MHz and SCS=15 kHz. | | | | | | | | 289912 | 80 | 25 | 6680 |
|  |  |  |  | Uplink | Low | Same values as for Low range in clause 4.3.1.1.1.92 for bandwidth=20 MHz and SCS=15 kHz. | | | | | | | | - | 80 | 25 | 6680 |
| n93 | NA | NA | NA | NA | NA | NA | | | | | | | | NA | NA | NA | NA |
| n100 | NA | NA | NA | NA | NA | NA | | | | | | | | NA | NA | NA | NA |
| n1 | 15 | 50 | 270 | Downlink | Low | Same values as for Low range in clause 4.3.1.1.1.1 for bandwidth=50 MHz and SCS=15 kHz. | | | | | | | | 431500 | 218 | 52 | 14243 |
|  |  |  |  | Uplink | Low | Same values as for Low range in clause 4.3.1.1.1.1 for bandwidth=50 MHz and SCS=15 kHz. | | | | | | | | - | 218 | 52 | 14243 |
| n2 | 15 | 40 | 216 | Downlink | Low | Same values as for Low range in clause 4.3.1.1.1.2 for bandwidth=40 MHz and SCS=15 kHz. | | | | | | | | 393456 | 162 | 52 | 14187 |
|  |  |  |  | Uplink | Low | Same values as for Low range in clause 4.3.1.1.1.2 for bandwidth=40 MHz and SCS=15 kHz. | | | | | | | | - | 162 | 52 | 14187 |
| n3 | 15 | 50 | 270 | Downlink | Low | Same values as for Low range in clause 4.3.1.1.1.3 for bandwidth=50 MHz and SCS=15 kHz. | | | | | | | | 370500 | 218 | 52 | 14243 |
|  |  |  |  | Uplink | Low | Same values as for Low range in clause 4.3.1.1.1.3 for bandwidth=50 MHz and SCS=15 kHz. | | | | | | | | - | 218 | 52 | 14243 |
| n7 | 15 | 50 | 270 | Downlink | Low | Same values as for Low range in clause 4.3.1.1.1.7 for bandwidth=50 MHz and SCS=15 kHz. | | | | | | | | 533500 | 218 | 52 | 14243 |
|  |  |  |  | Uplink | Low | Same values as for Low range in clause 4.3.1.1.1.7 for bandwidth=50 MHz and SCS=15 kHz. | | | | | | | | - | 218 | 52 | 14243 |
| n25 | 15 | 40 | 216 | Downlink | Low | Same values as for Low range in clause 4.3.1.1.1.25 for bandwidth=40 MHz and SCS=15 kHz. | | | | | | | | 393456 | 162 | 52 | 14187 |
|  |  |  |  | Uplink | Low | Same values as for Low range in clause 4.3.1.1.1.25 for bandwidth=40 MHz and SCS=15 kHz. | | | | | | | | - | 162 | 52 | 14187 |
| n28 | 15 | 30 | 160 | Downlink | Low | Same values as for Low range in clause 4.3.1.1.1.28 for bandwidth=30 MHz and SCS=15 kHz. | | | | | | | | 157120 | 108 | 52 | 14133 |
|  |  |  |  | Uplink | Low | Same values as for Low range in clause 4.3.1.1.1.28 for bandwidth=30 MHz and SCS=15 kHz. | | | | | | | | - | 108 | 52 | 14133 |
| n65 | 15 | 20 | 106 | Downlink | Low | Same values as for Low range in clause 4.3.1.1.1.65 for bandwidth=20 MHz and SCS=15 kHz. | | | | | | | | 425548 | 54 | 52 | 14079 |
|  |  |  |  | Uplink | Low | Same values as for Low range in clause 4.3.1.1.1.65 for bandwidth=20 MHz and SCS=15 kHz. | | | | | | | | - | 54 | 52 | 14079 |
| n66 | 15 | 40 | 216 | Downlink | Low | Same values as for Low range in clause 4.3.1.1.1.66 for bandwidth=40 MHz and SCS=15 kHz. | | | | | | | | 429456 | 162 | 52 | 14187 |
|  |  |  |  | Uplink | Low | Same values as for Low range in clause 4.3.1.1.1.66 for bandwidth=40 MHz and SCS=15 kHz. | | | | | | | | - | 162 | 52 | 14187 |
| n74 | 15 | 20 | 106 | Downlink | Low | Same values as for Low range in clause 4.3.1.1.1.74 for bandwidth=20 MHz and SCS=15 kHz. | | | | | | | | 298548 | 54 | 52 | 14079 |
|  |  |  |  | Uplink | Low | Same values as for Low range in clause 4.3.1.1.1.74 for bandwidth=20 MHz and SCS=15 kHz. | | | | | | | | - | 54 | 52 | 14079 |
| n75 | NA | NA | NA | NA | NA | NA | | | | | | | | NA | NA | NA | NA |
| n94 | 15 | 20 | 106 | Downlink | Low | Same values as for Low range in clause 4.3.1.1.1.94 for bandwidth=20 MHz and SCS=15 kHz. | | | | | | | | 289948 | 54 | 52 | 14079 |
|  |  |  |  | Uplink | Low | Same values as for Low range in clause 4.3.1.1.1.94 for bandwidth=20 MHz and SCS=15 kHz. | | | | | | | | - | 54 | 52 | 14079 |
| n34 | 15 | 15 | 79 | Downlink& Uplink | Low | Same values as for Low range in clause 4.3.1.1.1.34 for bandwidth=15 MHz and SCS=15 kHz. | | | | | | | | 404562 | 54 | 25 | 6654 |
| n51 | NA | NA | NA | NA | NA | NA | | | | | | | | NA | NA | NA | NA |
| n53 | 15 | 10 | 52 | Downlink& Uplink | Low | Same values as for Low range in clause 4.3.1.1.1.53 for bandwidth=10 MHz and SCS=15 kHz. | | | | | | | | 498168 | 24 | 25 | 6624 |
| n101 | NA | NA | NA | NA | NA | NA | | | | | | | | NA | NA | NA | NA |
| n38 | 30 | 40 | 106 | Downlink& Uplink | Low | Same values as for Low range in clause 4.3.1.1.1.38 for bandwidth=40 MHz and SCS=15 kHz. | | | | | | | | 520952 | 80 | 24 | 6405 |
| n39 | 30 | 40 | 106 | Downlink& Uplink | Low | Same values as for Low range in clause 4.3.1.1.1.39 for bandwidth=40 MHz and SCS=15 kHz. | | | | | | | | 382952 | 80 | 24 | 6405 |
| n40 | 30 | 80 | 217 | Downlink& Uplink | Low | Same values as for Low range in clause 4.3.1.1.1.40 for bandwidth=80 MHz and SCS=15 kHz. | | | | | | | | 475020 | 192 | 24 | 6517 |
| n48 | 30 | 40 | 106 | Downlink& Uplink | Low | Same values as for Low range in clause 4.3.1.1.1.48 for bandwidth=40 MHz and SCS=15 kHz. | | | | | | | | 638984 | 80 | 24 | 6405 |
| n50 | 30 | 60 | 162 | Downlink& Uplink | Low | Same values as for Low range in clause 4.3.1.1.1.50 for bandwidth=60 MHz and SCS=15 kHz. | | | | | | | | 297512 | 138 | 24 | 6463 |
| n41 | 30 | 100 | 273 | Downlink& Uplink | Low | Same values as for Low range in clause 4.3.1.1.1.41 for bandwidth=100 MHz and SCS=15 kHz. | | | | | | | | 518310 | 222 | 51 | 13972 |
| n77 | 30 | 100 | 273 | Downlink& Uplink | Low | Same values as for Low range in clause 4.3.1.1.1.77 for bandwidth=100 MHz and SCS=15 kHz. | | | | | | | | 626370 | 222 | 51 | 13972 |
| n78 | 30 | 100 | 273 | Downlink& Uplink | Low | Same values as for Low range in clause 4.3.1.1.1.78 for bandwidth=100 MHz and SCS=15 kHz. | | | | | | | | 626370 | 222 | 51 | 13972 |
| n79 | 30 | 100 | 273 | Downlink& Uplink | Low | Same values as for Low range in clause 4.3.1.1.1.79 for bandwidth=100 MHz and SCS=15 kHz. | | | | | | | | 699704 | 222 | 51 | 13972 |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-1 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: Subcarrier spacing is configured according to Table 6.2.3.1-1 to 6.2.3.1-5.  Note 3: Channel bandwidth is configured according to highest mandatory UL and DL channel bandwidth in clause 4.3.1.  Note 4: SS block SCS for both CD-SSB and NCD-SSB.  Note 5: AbsoluteFrequencySSB for CD-SSB  Note 6: n29,n75,n76 are SDL band  Note 7: The maximum carrierBandwidth for n91,n93,n100,n51 and n101 with signalling test SCS in 6.2.3.1-1 to 6.2.3.1-5 are no more than 25RB | | | | | | | | | | | | | | | | | |

Table 6.2.3.1-9: Test frequencies for NR FR2 bands configuring a BWP without CORESET#0

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR  Band | SCS  [kHz]  Note 2 | CBW [MHz]  Note 3 | *carrierBandwidth*  [PRBs] | Range | | Carrier centre  [MHz] | point A [MHz] | *offsetToCarrier* [Carrier PRBs] | SS block SCS  [kHz]  Note 4 | *absoluteFrequencySSB*  [ARFCN]  Note 5 |  | CORESET#0 Index (Offset  [RBs])  Note 1 | offsetToPointA (SIB1)  [PRBs]  Note 1 | absoluteFrequencySSB for NCD-SSB [ARFCN] | Rbstart of  BWP | LRB of  BWP | locationAndBandwidth  of BWP |
| n257 | 120 | 200 | 264 | Downlink & Uplink | Low | Same values as for Low range in clause 4.3.1.2.1.1 for bandwidth=200 MHz and SCS=120 kHz. | | | | | | | | 2178712 | 66 | 66 | 17941 |
| n258 | 120 | 200 | 264 | Downlink & Uplink | Low | Same values as for Low range in clause 4.3.1.2.1.2 for bandwidth=200 MHz and SCS=120 kHz. | | | | | | | | 2028712 | 66 | 66 | 17941 |
| n259 | 120 | 200 | 264 | Downlink & Uplink | Low | Same values as for Low range in clause 4.3.1.2.1.3 for bandwidth=200 MHz and SCS=120 kHz. | | | | | | | | 3045376 | 66 | 66 | 17941 |
| n260 | 120 | 200 | 264 | Downlink & Uplink | Low | Same values as for Low range in clause 4.3.1.2.1.4 for bandwidth=200 MHz and SCS=120 kHz. | | | | | | | | 2878712 | 66 | 66 | 17941 |
| n261 | 120 | 200 | 264 | Downlink & Uplink | Low | Same values as for Low range in clause 4.3.1.2.1.5 for bandwidth=200 MHz and SCS=120 kHz. | | | | | | | | 2245376 | 66 | 66 | 17941 |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-1 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: Subcarrier spacing is configured according to Table 6.2.3.1-6.  Note 3: Channel bandwidth is configured according to highest mandatory UL and DL channel bandwidth in clause 4.3.1.  Note 4: SS block SCS for both CD-SSB and NCD-SSB.  Note 5: AbsoluteFrequencySSB for CD-SSB | | | | | | | | | | | | | | | | | |

#### 6.2.3.2 Test frequencies for EN-DC band combinations for signalling testing

##### 6.2.3.2.1 General

The default channel bandwidths for EN-DC signalling test are specified per NR and E-UTRA band. The test frequencies are defined so that no frequency overlapping takes place, in order to avoid unnecessary inter-frequency interference.

##### 6.2.3.2.2 E-UTRA 1CC and NR 1CC

For EN-DC Inter-band case with E-UTRA 1CC and NR 1CC (one E-UTRA band and one NR band) the EN-DC configurations are specified in clause 4.3.1.4.1.2 for EN-DC with NR FR1 and 4.3.1.5.1.2 for EN-DC with NR FR2.

The E-UTRA and NR test frequencies are specified in TS 36.508 [2], clause 6.2.3.1 for the E-UTRA band (E-UTRA f1, f2, f3 and f4); and in clause 6.2.3.1 for the NR band (NRf1, NRf2, NRf3, NRf4) and for the secondary NR band (NRf5, NRf6, NRf7) of the secondary EN-DC inter-band configuration.

For EN-DC Intra-band Contiguous case with E-UTRA 1CC and NR 1CC the EN-DC configurations and the test frequencies are specified in Table 6.2.3.2-1.

For EN-DC Intra-band Non-Contiguous with E-UTRA 1CC and NR 1CC case the EN-DC configurations and test frequencies are specified in Table 6.2.3.2-2.

For EN-DC Intra-Band Contiguous and EN-DC Intra-Band Non-Contiguous cases with E-UTRA 1CC and NR 1CC the mapping of frequency ranges to NR test frequencies NRf1, NRf2, NRf3, and NRf4 to PSCell; and to E-UTRA test frequencies f1, f2, f3, and f4 for PCell are as follows:

- for band combinations with only one test frequency: Low Range (NRf1, f1);

- for band combinations with up to two frequencies: Low Range (NRf1, f1), High Range (NRf2, f2);

- for band combinations with up to three frequencies: Mid Range (NRf3, f3), Low Range (NRf1, f1) and High Range (NRf2, f2);

- for band combinations with up to four frequencies: Mid-Low Range (NRf3, f3), High Range (NRf2, f2), Low Range (NRf1, f1) and Mid-High Range (NRf4, f4).

Table 6.2.3.2.2-1: Test frequencies for EN-DC Intra-band Contiguous configurations with E-UTRA 1CC and NR 1CC

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **EN-DC channel bandwidth combination** | **CC** | **Bandwidth [MHz]** | ***carrierBandwidth***  **[PRBs]** | **Range** | | **Carrier centre**  **[MHz]**  **Note 2** | **Carrier centre**  **[ARFCN]** | **point A [MHz]** | ***absoluteFrequencyPointA* [ARFCN]** | ***offsetToCarrier* [Carrier PRBs]** | **SS block SCS**  **[kHz]** | **GSCN** | ***absoluteFrequencySSB***  **[ARFCN]** |  | **Offset Carrier CORESET#0 [RBs]** | **CORESET#0 Index**  **(Offset**  **[RBs])** | **offsetToPointA (SIB1)**  **[PRBs]** |
| DC\_(n)41AA | E-UTRA  CC1 | 20 | 100 | Downlink & Uplink | Low, High | Same values as for Low and High range values in Table 4.3.1.4.2.41.1-2 (SCS 30 kHz, 30 kHz NR raster and NR CC at the band edges) and EN-DC channel bandwidth combination “E-UTRA: 20MHz + NR: 60MHz”. | | | | | | | | | | | |
| NR  CC1 | 60 | 162 | Downlink & Uplink | Low, High |
| DC\_(n)71AA | E-UTRA | 5 | 25 | Downlink | Low, Mid, High | Same values as for Low, Mid and High range values in Table 4.3.1.4.2.71.1-1 (SCS 15 kHz, 100 kHz NR raster and NR CC at the band edges) and EN-DC channel bandwidth combination “E-UTRA: 5MHz + NR: 5MHz”. | | | | | | | | | | | |
| CC1 |  |  | Uplink | Low, Mid, High |  | | | | | | | | | | | |
| NR | 5 | 25 | Downlink | Low, Mid, High |  | | | | | | | | | | | |
| CC1 |  |  | Uplink | Low, Mid, High |  | | | | | | | | | | | |

Table 6.2.3.2.2-2: Test frequencies for EN-DC Intra-Band Non-Contiguous configurations with E-UTRA 1CC and NR 1CC

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **EN-DC channel bandwidth combination** | **CC** | **Bandwidth [MHz]** | ***carrierBandwidth***  **[PRBs]** | **Range** | | **Carrier centre**  **[MHz]**  **Note 2** | **Carrier centre**  **[ARFCN]** | **point A [MHz]** | ***absoluteFrequencyPointA* [ARFCN]** | ***offsetToCarrier* [Carrier PRBs]** | **SS block SCS**  **[kHz]** | **GSCN** | ***absoluteFrequencySSB***  **[ARFCN]** |  | **Offset Carrier CORESET#0 [RBs]** | **CORESET#0 Index**  **(Offset**  **[RBs])** | **offsetToPointA (SIB1)**  **[PRBs]** |
| DC\_2A\_n2A | E-UTRA  CC1 | 20 | 100 | Downlink | Low | Same values as for Test Frequency ID = ”Low with maxWgap (NR – E-UTRA)” in Table 4.3.1.4.3.2.1-1 with NR SCS=15 kHz and CBW=10MHz; and E-UTRA CBW=20 MHz. | | | | | | | | | | | |
| Uplink | Low |
| NR  CC1 | 10 | 52 | Downlink | Low |
| Uplink | Low |
| DC\_41A\_n41A | E-UTRA  CC1 | 20 | 100 | Downlink & Uplink | Low | Same values as for Test Frequency ID = ”Low with maxWgap (NR – E-UTRA)” in Table 4.3.1.4.41.1-1 with NR SCS=30 kHz and CBW=60MHz; and E-UTRA CBW=20 MHz. | | | | | | | | | | | |
| NR  CC1 | 60 | 162 | Downlink & Uplink | Low |
| DC\_66A\_n66A | E-UTRA  CC1 | 20 | 100 | Downlink | Low | Same values as for Test Frequency ID = ”Low with maxWgap (NR – E-UTRA)” in Table 4.3.1.4.3.66.1-1 with NR SCS=15 kHz and CBW=10MHz; and E-UTRA CBW=20 MHz using paired high. | | | | | | | | | | | |
| Uplink | Low |
| NR  CC1 | 10 | 52 | Downlink | Low |
| Uplink | Low |

##### 6.2.3.2.3 E-UTRA 1CC and NR CA 2CC

For EN-DC Inter-band case with E-UTRA 1CC and NR CA 2CC the EN-DC configurations are specified in clauses 4.3.1.4.1.2 (two bands) and 4.3.1.4.1.3 (three bands) for EN-DC and NR CA 2CC with FR1 bands, 4.3.1.5.1.2 (two bands) and 4.3.1.5.1.3 (three bands) for EN-DC with NR CA 2CC with FR2 bands and 4.3.1.6.1.2 for EN-DC and NR CA 2CC´with FR1 and FR2 bands.

For EN-DC Inter-band case (3 bands), the E-UTRA test frequencies are specified in TS 36.508 [2], clause 6.2.3.1 for the E-UTRA band (E-UTRA f1) and the NR test frequencies are specified in clause 6.2.3.1 for the NR band used as PSCell (NRf1, NRf2, NRf3, NRf4) and for the NR band used as SCell (NRf5, NRf6, NRf7).

For EN-DC Inter-band case (2 bands) with NR Intra-band contiguous CA 2CC and NR Intra-band non-contiguous CA 2CC, the E-UTRA test frequencies are specified in TS 36.508 [2], clause 6.2.3.1 for the E-UTRA band (E-UTRA f1) and the NR test frequencies are specified in clause 6.2.3.4 for the NR CA CC1 used as PSCell (NRf1, NRf3) and for the NR CA CC2 used as SCell (NRf2, NRf4,).

For EN-DC Intra-band Contiguous case with E-UTRA 1CC and NR CA 2CC the EN-DC configurations and the test frequencies are specified in Table 6.2.3.2.3-1.

For EN-DC Intra-band Non-Contiguous case with E-UTRA 1CC and NR 2CC the EN-DC configurations and test frequencies are specified in Table 6.2.3.2.3-2.

For EN-DC Intra-Band Contiguous and EN-DC Intra-Band Non-Contiguous cases with E-UTRA 1CC and NR CA 2CC the mapping of frequency ranges to NR test frequencies NRf1 for PSCell (CC1) and NRf2 for SCell (CC2); and to E-UTRA test frequency f1 for PCell is:

- for band combinations with only one test frequency: Low Range (NRf1=CC1, NRf2=CC2, f1); and

- for band combinations with up to two frequencies: Low Range (NRf1=CC1, NRf2=CC2, f1), High Range (NRf3=CC1, NRf4=CC2, f2).

Editor’s note: No EN-DC Intra-band Contiguous configurations with NR CA 2CC have yet been introduced in TS 38.101-3.

Table 6.2.3.2.3-1: Test frequencies for EN-DC Intra-band Contiguous configurations with E-UTRA 1CC and NR CA 2CC

FFS

Editor’s note: No EN-DC Intra-band Non-Contiguous configurations with NR CA 2CC have yet been introduced in TS 38.101-3.

Table 6.2.3.2.3-2: Test frequencies for EN-DC Intra-Band Non-Contiguous configurations with E-UTRA 1CC and NR CA 2CC

FFS

#### 6.2.3.2a Test frequencies for NE-DC band combinations for signalling testing

##### 6.2.3.2a.1 General

The default channel bandwidths for NE-DC signalling test are specified per NR and E-UTRA band. The test frequencies are defined so that no frequency overlapping takes place, in order to avoid unnecessary inter-frequency interference.

##### 6.2.3.2a.2 NR 1CC and E-UTRA 1CC

For NE-DC Inter-band case with NR 1CC and E-UTRA 1CC (one NR band and one E-UTRA band) the NE-DC configurations are specified in clause 4.3.1.4a.1.2 for NE-DC with NR FR1.

The NR and E-UTRA test frequencies are specified in clause 6.2.3.1 for the NR band (NRf1, NRf2, NRf3, NRf4) and for the secondary NR band (NRf5, NRf6, NRf7) of the secondary NE-DC inter-band configuration; and in TS 36.508 [2], clause 6.2.3.1 for the E-UTRA band (E-UTRA f1, f2, f3 and f4).

#### 6.2.3.3 Test frequencies for NR and E-UTRA Inter-RAT signalling testing

For NR and E-UTRA Inter-RAT testing, it is assumed that the NR and E-UTRA bands under test are different in order to avoid unnecessary interferences:

- for NR bands, the frequencies NRf1, NRf2, NRf3 and NRf4 are mapped as per clause 6.2.3.1

- for E-UTRA bands, the signalling test frequencies E-UTRA f1, E-UTRA f2, E-UTRA f3 and E-UTRA f4 are mapped respectively on f1, f2, f3 and f4 as per TS 36.508 [2] clause 6.2.3.1.

#### 6.2.3.4 Test frequencies for NR CA configurations for signalling testing

The default channel bandwidths for NR CA signalling test are specified per NR band. The test frequencies are defined so that no frequency overlapping takes place, in order to avoid unnecessary inter-frequency interference.

For NR CA Inter-band case (2 bands) the NR CA configurations are specified in clause 4.3.1.1.2 for NR CA within FR1, in clause 4.3.1.2.2 for NR CA within FR2 and in clause 4.3.1.3.1 for NR CA between FR1and FR2. NR test frequencies are specified in clause 6.2.3.1 for the NR band used as PCell (NRf1, NRf2, NRf3, NRf4) and for the NR band used as Scell (NRf5, NRf6, NRf7).

For NR CA Intra-band Contiguous case (2 CCs) the NR CA configurations and the test frequencies are specified in Table 6.2.3.4-1 for FR1 and in Table 6.2.3.4-2 for FR2. For NR CA Intra-band Non-Contiguous (2 CCs) case the NR CA configurations and test frequencies are specified in Table 6.2.3.4-3 for FR1 and in Table 6.2.3.4-4 for FR2.

For NR CA Intra-Band Contiguous case (2 CCs) and NR CA Intra-Band Non-Contiguous case (2 CCs) the mapping of frequency ranges to NR test frequencies NRf1, NRf2, NRf3, and NRf4 and PCell (CC1) and SCell (CC2) are as follows:

- for Intra-band configurations with only one test frequency: Low Range (NRf1=CC1 and NRf2=CC2); and

- for Intra-band configurations with up to two frequencies: Low Range (NRf1=CC1 and NRf2=CC2), High Range (NRf3=CC1 and NRf4=CC2)

For NR CA Intra-band Contiguous case (3 CCs) the NR CA configurations and the test frequencies are specified in Table 6.2.3.4-2a for FR2.

For NR CA Intra-Band Contiguous case (3CCs) the mapping of frequency ranges to NR test frequencies NRf1, NRf2, and NRf3 and PCell (CC1) and SCell (CC2, CC3) are as follows:

- For Intra-band configurations with up to three frequencies: Low Range (NRf1=CC1, NRf2=CC2, NRf3=CC3)

Table 6.2.3.4-1: Test frequencies for NR CA Intra-band Contiguous configurations with FR1

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **NR CA configuration** | **CC** | **CBW [MHz]** | ***carrierBandwidth***  **[PRBs]** | **Range** | | **Carrier centre**  **[MHz]**  **Note 2** | **Carrier centre**  **[ARFCN]** | **point A [MHz]** | ***absoluteFrequencyPointA* [ARFCN]** | ***offsetToCarrier* [Carrier PRBs]** | **SS block SCS**  **[kHz]** | **GSCN** | ***absoluteFrequencySSB***  **[ARFCN]** |  | **Offset Carrier CORESET#0 [RBs]** | CORESET#0 Index (Offset  [RBs]) | **offsetToPointA (SIB1)**  **[PRBs]** |
| CA\_n41C | CC1 | 60 | 162+162 | Downlink | Low | Same values as for Low range in Table 4.3.1.1.3.41.1-1 for CBW combination 60+60 and SCS=30 kHz. | | | | | | | | | | | |
| CC2 | 60 | 162 | & Uplink |  |
| CA\_n48B | CC1 | 10 | 24 | Downlink | Low | Same values as for Low and High ranges in Table 4.3.1.1.3.48.1-2 for CBW combination 10+10 and SCS=30 kHz. | | | | | | | | | | | |
|  | CC2 | 10 | 24 | & Uplink | High |  | | | | | | | | | | | |
| CA\_n66B | CC1 | 10 | 52 | Downlink | Low | Same values as for Low and High ranges in Table 4.3.1.1.3.66.1-1 for CBW combination 10+15 and SCS=15 kHz. | | | | | | | | | | | |
|  | CC2 | 15 | 79 | & Uplink | High |  | | | | | | | | | | | |
| CA\_n77C | CC1 | 60 | 162 | Downlink | Low | Same values as for Low and High ranges in Table 4.3.1.1.3.77.1-1 for CBW combination 60+60 and SCS=30 kHz. | | | | | | | | | | | |
|  | CC2 | 60 | 162 | & Uplink | High |  | | | | | | | | | | | |
| CA\_n78C | CC1 | 60 | 162 | Downlink | Low | Same values as for Low and High ranges in Table 4.3.1.1.3.78.1-1 for CBW combination 60+60 and SCS=30 kHz. | | | | | | | | | | | |
|  | CC2 | 60 | 162 | & Uplink | High |  | | | | | | | | | | | |

Table 6.2.3.4-2: Test frequencies for NR CA Intra-band Contiguous configurations with FR2

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **NR CA configuration** | **CC** | **CBW [MHz]** | ***carrierBandwidth***  **[PRBs]** | **Range** | | **Carrier centre**  **[MHz]**  **Note 2** | **Carrier centre**  **[ARFCN]** | **point A [MHz]** | ***absoluteFrequencyPointA* [ARFCN]** | ***offsetToCarrier* [Carrier PRBs]** | **SS block SCS**  **[kHz]** | **GSCN** | ***absoluteFrequencySSB***  **[ARFCN]** |  | **Offset Carrier CORESET#0 [RBs]** | CORESET#0 Index (Offset  [RBs]) | **offsetToPointA (SIB1)**  **[PRBs]** |
| CA\_n257G | CC1, | 100+100 | 66+66 | Downlink | Low | Same values as for Low and High ranges in Table 4.3.1.2.3.1.6-4 for CBW combination 100+100 and SCS=120 kHz. | | | | | | | | | | | |
|  | CC2 |  |  | & Uplink | High |  | | | | | | | | | | | |
| CA\_n258G | CC1, | 100+100 | 66+66 | Downlink | Low | Same values as for Low and High ranges in Table 4.3.1.2.3.2.6-2 for CBW combination 100+100 and SCS=120 kHz. | | | | | | | | | | | |
|  | CC2 |  |  | & Uplink | High |  | | | | | | | | | | | |
| CA\_n260G | CC1, | 100+100 | 66+66 | Downlink | Low | Same values as for Low and High ranges in Table 4.3.1.2.3.4.6-2 for CBW combination 100+100 and SCS=120 kHz. | | | | | | | | | | | |
|  | CC2 |  |  | & Uplink | High |  | | | | | | | | | | | |
| CA\_n261G | CC1, | 100+100 | 66+66 | Downlink | Low | Same values as for Low and High ranges in Table 4.3.1.2.3.5.6-2 for CBW combination 100+100 and SCS=120 kHz. | | | | | | | | | | | |
|  | CC2 |  |  | & Uplink | High |  | | | | | | | | | | | |

Table 6.2.3.4-2a: Test frequencies for NR CA Intra-band Contiguous configurations with FR2 (3CC)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **NR CA configuration** | **CC** | **CBW [MHz]** | ***carrierBandwidth***  **[PRBs]** | **Range** | | **Carrier centre**  **[MHz]**  **Note 2** | **Carrier centre**  **[ARFCN]** | **point A [MHz]** | ***absoluteFrequencyPointA* [ARFCN]** | ***offsetToCarrier* [Carrier PRBs]** | **SS block SCS**  **[kHz]** | **GSCN** | ***absoluteFrequencySSB***  **[ARFCN]** |  | **Offset Carrier CORESET#0 [RBs]** | CORESET#0 Index (Offset  [RBs]) | **offsetToPointA (SIB1)**  **[PRBs]** |
| CA\_n257H | CC1,  CC2,CC3 | 100+100+100 | 66+66+66 | Downlink  & Uplink | Low | Same values as for Low range in Table 4.3.1.2.3.1.7-4 for CBW combination 100+100+100 and SCS=120 kHz. | | | | | | | | | | | |
|  | | | | | | | | | | | |
| CA\_n258H | CC1,  CC2,CC3 | 100+100+100 | 66+66+66 | Downlink  & Uplink | Low | Same values as for Low range in Table 4.3.1.2.3.2.7-2 for CBW combination 100+100+100 and SCS=120 kHz. | | | | | | | | | | | |
|  | | | | | | | | | | | |
| CA\_n260H | CC1,  CC2,CC3 | 100+100+100 | 66+66+66 | Downlink  & Uplink | Low | Same values as for Low range in Table 4.3.1.2.3.4.7-1 for CBW combination 100+100+100 and SCS=120 kHz. | | | | | | | | | | | |
|  | | | | | | | | | | | |
| CA\_n261H | CC1,  CC2,CC3 | 100+100+100 | 66+66+66 | Downlink  & Uplink | Low | Same values as for Low range in Table 4.3.1.2.3.5.7-2 for CBW combination 100+100+100 and SCS=120 kHz. | | | | | | | | | | | |
|  | | | | | | | | | | | |

Table 6.2.3.4-3: Test frequencies for NR CA Intra-Band Non-Contiguous configurations with FR1

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **NR CA configuration** | **SB** | **CBW [MHz]** | ***carrierBandwidth***  **[PRBs]** | **Range** | | **Carrier centre**  **[MHz]**  **Note 2** | **Carrier centre**  **[ARFCN]** | **point A [MHz]** | ***absoluteFrequencyPointA* [ARFCN]** | ***offsetToCarrier* [Carrier PRBs]** | **SS block SCS**  **[kHz]** | **GSCN** | ***absoluteFrequencySSB***  **[ARFCN]** |  | **Offset Carrier CORESET#0 [RBs]** | **CORESET#0 Index (Offset**  **[RBs])** | **offsetToPointA (SIB1)**  **[PRBs]** |
| CA\_n48(2A) | SB1 | 10+10 | 24+24 | Downlink | Low | Same values as for Low and High ranges in Table 4.3.1.1.5.48-2 for CBW combination 10+10 and SCS=30 kHz. | | | | | | | | | | | |
|  | SB2 |  |  | & Uplink | High |  | | | | | | | | | | | |
| CA\_n66(2A) | SB1 | 10+10 | 52+52 | Downlink | Low | Same values as for Low and High ranges in Table 4.3.1.1.5.66.1-1 for CBW combination 10+10 and SCS=15 kHz. | | | | | | | | | | | |
|  | SB2 |  |  | & Uplink | High |  | | | | | | | | | | | |
| CA\_n71(2A) | SB1, | 10+10 | 52+52 | Downlink | Low | Same values as for Low and High ranges in Table 4.3.1.1.5.71-1 for CBW combination 10+10 and SCS=15 kHz. | | | | | | | | | | | |
|  | SB2 |  |  | & Uplink | High |  | | | | | | | | | | | |
| CA\_n77(2A) | SB1, | 20+20 | 106+106 | Downlink | Low | Same values as for Low and High ranges in Table 4.3.1.1.5.77-1 for CBW combination 20+20 and SCS=15 kHz. | | | | | | | | | | | |
|  | SB2 |  |  | & Uplink | High |  | | | | | | | | | | | |
| CA\_n78(2A) | SB1 | 50+50 | 133+ | Downlink | Low | Same values as for Low and High ranges in Table 4.3.1.1.5.78-2 for CBW combination 50+50 and SCS=30 kHz. | | | | | | | | | | | |
|  | SB2 |  | 133 | & Uplink | High |  | | | | | | | | | | | |

Table 6.2.3.4-4: Test frequencies for NR CA Intra-Band Non-Contiguous configurations with FR2

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **NR CA configuration** | **CC** | **CBW [MHz]** | ***carrierBandwidth***  **[PRBs]** | **Range** | | **Carrier centre**  **[MHz]**  **Note 2** | **Carrier centre**  **[ARFCN]** | **point A [MHz]** | ***absoluteFrequencyPointA* [ARFCN]** | ***offsetToCarrier* [Carrier PRBs]** | **SS block SCS**  **[kHz]** | **GSCN** | ***absoluteFrequencySSB***  **[ARFCN]** |  | **Offset Carrier CORESET#0 [RBs]** | CORESET#0 Index (Offset  [RBs]) | **offsetToPointA (SIB1)**  **[PRBs]** |
| CA\_n261(2A) | CC1 | 100 | 66 | Downlink | Low | Same values as for Low and High ranges in Table 4.3.1.2.4.5.1-1 for CBW combination 100+100 and SCS=120 kHz. | | | | | | | | | | | |
|  | CC2 | 100 | 66 | & Uplink | High |  | | | | | | | | | | | |

#### 6.2.3.5 Test frequencies for MFBI signalling testing

For signalling test cases, the mapping of MFBI frequency ranges to NR test frequencies are as follows: Low Range (NRf1), Mid Range (NRf2) and High Range (NRf3).

The test frequencies, subcarrier spacing, default channel bandwidth, SS/PBCH block and CORESET#0 parameters for signalling are specified in Table 6.2.3.5-1 and Table 6.2.3.5-1A(for RedCap UE).

Table 6.2.3.5-1: Test frequencies for MFBI NR bands in FR1 for non-RedCap UE

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR  Band | MFBI overlapping NR Band | SCS  [kHz] | Bandwidth [MHz] | carrierBandwidth  [PRBs] | Range | | Carrier centre  [MHz] | Carrier centre  [ARFCN] | point A [MHz] | *absoluteFrequencyPointA*[ARFCN] | *offsetToCarrier* [Carrier PRBs] | SS block SCS  [kHz] | GSCN | *absoluteFrequencySSB*  [ARFCN] |  | Offset Carrier CORESET#0 [RBs] | CORESET#0 Index  **(Offset**  [RBs]) | offsetToPointA (SIB1)  [PRBs] |
| n2 | n25 | 15 | 10 | 52 | Downlink | Low,  Mid,  High | Same values as for Low, Mid and High range in clause 4.3.1.1.1.2 for bandwidth=10 MHz and SCS=15 kHz. | | | | | | | | | | | |
| Uplink | Low,  Mid,  High | Same values as for Low, Mid and High range in clause 4.3.1.1.1.2 for bandwidth=10 MHz and SCS=15 kHz. | | | | | | | | | | | |
| n25 | n2 | 15 | 10 | 52 | Downlink | Low,  Mid,  High | Same values as for Low, Mid and High range in clause 4.3.1.1.1.2 for bandwidth=10 MHz and SCS=15 kHz. | | | | | | | | | | | |
| Uplink | Low,  Mid,  High | Same values as for Low, Mid and High range in clause 4.3.1.1.1.2 for bandwidth=10 MHz and SCS=15 kHz. | | | | | | | | | | | |
| n38 | n41 | 15 | 10 | 52 | Downlink  &  Uplink | Low,  Mid,  High | Same values as for Low, Mid and High range in clause 4.3.1.1.1.38 for bandwidth=10 MHz and SCS=15 kHz. | | | | | | | | | | | |
| n41 | n38 | 15 | 10 | 52 | Downlink  &  Uplink | Low,  Mid,  High | Same values as for Low, Mid and High range in clause 4.3.1.1.1.38 for bandwidth=10 MHz and SCS=15 kHz. | | | | | | | | | | | |
| n77 | n78 | 30 | 100 | 273 | Downlink  &  Uplink | Low,  Mid,  High | Same values as for Low, Mid and High range in clause 4.3.1.1.1.78 for bandwidth=100 MHz and SCS=30 kHz. | | | | | | | | | | | |
| n78 | n77 | 30 | 100 | 273 | Downlink  &  Uplink | Low,  Mid,  High | Same values as for Low, Mid and High range in clause 4.3.1.1.1.78 for bandwidth=100 MHz and SCS=30 kHz. | | | | | | | | | | | |

Table 6.2.3.5-1A: Test frequencies for MFBI NR bands in FR1 for RedCap UE

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR  Band | MFBI overlapping NR Band | SCS  [kHz] | Bandwidth [MHz] | carrierBandwidth  [PRBs] | Range | | Carrier centre  [MHz] | Carrier centre  [ARFCN] | point A [MHz] | *absoluteFrequencyPointA*[ARFCN] | *offsetToCarrier* [Carrier PRBs] | SS block SCS  [kHz] | GSCN | *absoluteFrequencySSB*  [ARFCN] |  | Offset Carrier CORESET#0 [RBs] | CORESET#0 Index  **(Offset**  [RBs]) | offsetToPointA (SIB1)  [PRBs] |
| n2 | n25 | Same values as in Table 6.2.3.5-1 | | | | | | | | | | | | | | | | |
| n25 | n2 | Same values as in Table 6.2.3.5-1 | | | | | | | | | | | | | | | | |
| n38 | n41 | Same values as in Table 6.2.3.5-1 | | | | | | | | | | | | | | | | |
| n41 | n38 | Same values as in Table 6.2.3.5-1 | | | | | | | | | | | | | | | | |
| n77 | n78 | 30 | 20 | 51 | Downlink  &  Uplink | Low,  Mid,  High | Same values as for Low, Mid and High range in clause 4.3.1.1.1.78 for bandwidth=20 MHz and SCS=30 kHz. | | | | | | | | | | | |
| n78 | n77 | 30 | 20 | 51 | Downlink  &  Uplink | Low,  Mid,  High | Same values as for Low, Mid and High range in clause 4.3.1.1.1.78 for bandwidth=20 MHz and SCS=30 kHz. | | | | | | | | | | | |

Table 6.2.3.5-2: Test frequencies for MFBI NR bands in FR2

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR  Band | MFBI overlapping NR Band | SCS  [kHz] | Bandwidth [MHz] | carrierBandwidth  [PRBs] | Range | | Carrier centre  [MHz] | Carrier centre  [ARFCN] | point A [MHz] | | *absoluteFrequencyPointA*[ARFCN] | | *offsetToCarrier* [Carrier PRBs] | | SS block SCS  [kHz] | GSCN | | *absoluteFrequencySSB*  [ARFCN] | |  | | Offset Carrier CORESET#0 [RBs]  Note 2 | CORESET#0 Index  **(Offset**  [RBs])  Note 1 | offsetToPointA (SIB1)  [PRBs]  Note 1 |
| n257 | n258 | 120 | 100 | 66 | Downlink  &  Uplink | Low | 26557.08 | 2055117 | | 26509.56 | | 2054325 | | 0 | 120 | | 22388 | | 2054683 | | 0 | 1 (4) | 1 | 8 |
| Mid | 27006.36 | 2062605 | | 26811.96 | | 2059365 | | 102 | 22414 | | 2062171 | | 0 | 1 (4) | 1 | 212 |
| High | 27438.36 | 2069805 | | 26665.08 | | 2056917 | | 504 | 22439 | | 2069371 | | 0 | 1 (4) | 1 | 1016 |
| n257 | n261 | 120 | 100 | 66 | Downlink  &  Uplink | Low,  Mid,  High | Same values as for Low, Mid and High range in clause 4.3.1.2.1.5 for bandwidth=100 MHz and SCS=120 kHz. | | | | | | | | | | | | | | | | | |
| n258 | n257 | 120 | 100 | 66 | Downlink  &  Uplink | Low | 26557.08 | 2055117 | | 26509.56 | | 2054325 | | 0 | 120 | | 22388 | | 2054683 | | 11 | 0 | 1 (4) | 8 |
| Mid | 27006.36 | 2062605 | | 26811.96 | | 2059365 | | 102 | 22414 | | 2062171 | | 11 | 0 | 1 (4) | 212 |
| High | 27438.36 | 2069805 | | 26665.08 | | 2056917 | | 504 | 22439 | | 2069371 | | 11 | 0 | 1 (4) | 1016 |
| n261 | n257 | 120 | 100 | 66 | Downlink  &  Uplink | Low,  Mid,  High | Same values as for Low, Mid and High range in clause 4.3.1.2.1.5 for bandwidth=100 MHz and SCS=120 kHz. | | | | | | | | | | | | | | | | | |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-1 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs. | | | | | | | | | | | | | | | | | | | | | | | | |

#### 6.2.3.6 Test frequencies for NR DC configurations for signalling testing

The default channel bandwidths for NR DC signalling test are specified per NR band. The test frequencies are defined so that no frequency overlapping takes place, in order to avoid unnecessary inter-frequency interference.

For NR DC in FR1 (2 bands, 2CC) the NR DC configurations are specified in clause 4.3.1.1.7.1 for 1CC FR1 and 1CC FR1. NR test frequencies are specified in clause 6.2.3.1 for the NR band used as PCell (NRf1, NRf2, NRf3, NRf4) and for the NR band used as PSCell (NRf5, NRf6, NRf7).

For NR DC between FR1 and FR2 (2 bands, 2CC) the NR DC configurations are specified in clause 4.3.1.3.2.1 for 1CC FR1 and 1CC FR2. NR test frequencies are specified in clause 6.2.3.1 for the NR band used as PCell (NRf1, NRf2, NRf3, NRf4) and for the NR band used as PSCell (NRf5, NRf6, NRf7).

For NR DC between FR1 and FR2 with NR intra-band contiguous CA (2 bands, 3CC) the NR DC configurations are specified in clause 4.3.1.3.2.1 for 1CC FR1 and 2CC FR2. NR test frequencies are specified in clause 6.2.3.1 for the NR FR1 band used as PCell (NRf1) and in Table 6.2.3.4-2 for NR intra-band contiguous CA as PSCell (CC1, NRf5) and SCell (CC2, NRf6).

#### 6.2.3.7 Test frequencies for NR sidelink configurations for signalling testing

The default channel bandwidths for NR sidelink signalling test are specified per NR sidelink operation band. The test frequencies are defined so that no frequency overlapping takes place, in order to avoid unnecessary inter-frequency interference.

For signalling test cases, the mapping of frequency ranges to NR sidelink test frequencies are as follows:

- for band with only one test frequency: Low Range (NRf1);

- for band with up to two test frequencies: Low Range (NRf1) and High Range (NRf2);

- for band with up to three test frequencies: Low Range (NRf1), Mid Range (NRf2) and High Range (NRf3);

The test frequencies, subcarrier spacing, default channel bandwidth and S-SSBparameters for signalling is specified in Table 6.2.3.7-1 for PC5-only operations.

For concurrent operation case the operation configurations are specified in clause 4.3.1.8.2.1 for inter-band concurrent cases. The test frequencies for signalling are specified in Table 6.2.3.7-1 for PC5 carrier and in clause 6.2.3.1 for Uu carrier.

For tests which need NR PC5 carrier and NR Uu carrier but not concurrent operation case, the test frequencies for signalling are specified in Table 6.2.3.7-1 for PC5 carrier in clause 6.2.3.1 for Uu carrier.

Table 6.2.3.7-1: Test frequencies for NR Sidelink operating bands using 10 MHz channel bandwidth

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **NR**  **Band** | **SCS**  **[kHz]** | **CBW [MHz]** | ***carrierBandwidth***  **[PRBs]** | **Range** | **Carrier centre**  **[MHz]** | **Carrier centre**  **[ARFCN]** | **point A [MHz]** | ***sl-absoluteFrequencyPointA* [ARFCN]** | ***offsetToCarrier* [Carrier PRBs]** | ***frequencyInfoSL***  **[ARFCN]** | ***sl-absoluteFrequencySSB***  **[ARFCN]** |
| n47 | 30 | 10 | 24 | Low, Mid, High | Same values as for Low, Mid and High range in clause 4.3.1.8.1.2 for bandwidth=10 MHz and SCS=30 kHz. For *sl-absoluteFrequencySSB*, same value as for S-SSB Low in clause 4.3.1.8.1.2 for bandwidth=10 MHz and SCS=30 kHz is used. | | | | | | |

#### 6.2.3.8 Test frequencies for NR NTN configurations for signalling testing

The default channel bandwidths for NR NTN signalling test are specified per NR NTN operation band.

For signalling test cases, the mapping of frequency ranges to NR NTN test frequencies are as follows:

- for band with only one test frequency: Low Range (NRf1);

- for band with up to two test frequencies: Low Range (NRf1) and High Range (NRf2);

- for band with up to three test frequencies: Low Range (NRf1), Mid Range (NRf2) and High Range (NRf3);

The test frequencies, subcarrier spacing, default channel bandwidth and S-SSBparameters for signalling is specified in Table 6.2.3.8-1 for NR NTN operations.

Table 6.2.3.8-1: Test frequencies for NR NTN operating band using 5 MHz channel bandwidth

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **NR**  **Band** | **SCS**  **[kHz]** | **CBW [MHz]** | ***carrierBandwidth***  **[PRBs]** | **Range** | | **Carrier centre**  **[MHz]** | **Carrier centre**  **[ARFCN]** | **point A [MHz]** | ***absoluteFrequencyPointA*[ARFCN]** | ***offsetToCarrier* [Carrier PRBs]** | **SS block SCS**  **[kHz]** | **GSCN** | ***absoluteFrequencySSB***  **[ARFCN]** |  | ***Offset Carrier CORESET#0*** **[RBs]** | **CORESET#0 Index (Offset**  **[RBs])**  **Note 1** | **offsetToPointA (SIB1)**  **[PRBs]**  **Note 1** |
| n255 | 15 | 5 | 25 | Downlink | Low, Mid, High | Same values as for Low, Mid and High range in clause 4.3.1.9.1.2-1 for bandwidth=5 MHz and SCS=15 kHz. | | | | | | | | | | | |
|  |  |  |  | Uplink | Low, Mid, High | Same values as for Low, Mid and High range in clause 4.3.1.9.1.2-1 for bandwidth=5 MHz and SCS=15 kHz. | | | | | | | | | | | |
| n256 | 15 | 5 | 25 | Downlink | Low, Mid, High | Same values as for Low, Mid and High range in clause 4.3.1.9.1.1-1 for bandwidth=5 MHz and SCS=15 kHz. | | | | | | | | | | | |
|  |  |  |  | Uplink | Low, Mid, High | Same values as for Low, Mid and High range in clause 4.3.1.9.1.1-1 for bandwidth=5 MHz and SCS=15 kHz. | | | | | | | | | | | |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-1 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs. | | | | | | | | | | | | | | | | | |

## 6.3 Reference system configurations

### 6.3.1 Default System Information configurations

#### 6.3.1.1 Intra-frequency neighbouring cell list in SIB3 for NR cells

Intra-frequency neighbouring cell list for signalling test cases is defined in table 6.3.1.1-1. This table is referred to in the default contents of IE *intraFreqNeighCellList* in *SIB3* defined in table 4.6.2-2.

Table 6.3.1.1-1: Intra-frequency neighbouring cell lists for NR cells

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| cell ID | Test Frequency | intra-frequency neighbouring cell list | | | |
| number of entries | physCellId[*n*] | | |
| 1 | 1 | 3 |
| NR Cell 1 | NRf1 | 3 | NR Cell 2 | NR Cell 4 | NR Cell 11 |
| NR Cell 2 | NRf1 | 3 | NR Cell 1 | NR Cell 4 | NR Cell 11 |
| NR Cell 4 | NRf1 | 3 | NR Cell 1 | NR Cell 2 | NR Cell 11 |
| NR Cell 11 | NRf1 | 3 | NR Cell 1 | NR Cell 2 | NR Cell 4 |
| NR Cell 3 | NRf2 | 1 | NR Cell 23 | - | - |
| NR Cell 23 | NRf2 | 1 | NR Cell 3 | - | - |

Editor’s Note: The intra-frequency NR neighbouring cell list for signalling NAS test cases when cells are on same PLMN is FFS.

#### 6.3.1.2 Inter-frequency carrier frequency list in SIB4 for NR cells

Inter-frequency NR carrier frequency list for signalling test cases is defined in table 6.3.1.2-1. This table is referred to in the default contents of IE *interFreqCarrierFreqList* in *SIB4* defined in table 4.6.2-3.

Table 6.3.1.2-1: Inter-frequency carrier frequency lists for NR cells

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| cell ID | Test Frequency | interFreqCarrierFreqList | | | |
|  | | number of entries | dl-CarrierFreq[*n*] | | |
|  | | 1 | 2 | 3 |
| NR Cell 1  NR Cell 2  NR Cell 4  NR Cell 11 | NRf1  (Note 2) | 3 | NRf2 | NRf3 | NRf5 |
| NR Cell 3  NR Cell 23 | NRf2  (Note 2) | 3 | NRf1 | NRf3 | NRf5 |
| NR Cell 6 | NRf3  (Note 2) | 3 | NRf1 | NRf2 | NRf5 |
| NR Cell 10 | NRf5  (Note 3) | 3 | NRf1 | NRf2 | NRf3 |
| Note 1: Depending on the Band under test, NRf3 may not be applicable.  Note 2: In case of Test frequency NRf1, NRf2 and NRf3, dl-CarrierFreq NRf5 as part of inter-frequency list is applicable only in case of multi-band scenarios.  Note 3: Test frequency NRf5 is applicable only in case of multi-band scenarios. | | | | | |

Editor’s Note: The inter-frequency NR carrier frequency list for signalling NAS test cases when cells are on same PLMN is FFS.

#### 6.3.1.3 E-UTRA carrier frequency list in SIB5 for NR cells

The frequency mapping of E-UTRA cells are defined as per TS 36.508 [2] clause 4.4.2 and TS 36.508 [2] clause 6.3.2 for NGC NAS test cases, E-UTRA frequency mapping is according to clause 6.2.3.3. E-UTRA carrier frequency list for signalling test cases is defined in table 6.3.1.3-1. This table is referred to in the default contents of IE *carrierFreqListEUTRA* in *SIB5* defined in table 4.6.2-4.

Table 6.3.1.3-1: E-UTRA carrier frequency lists for NR cells

|  |  |
| --- | --- |
| interFreqCarrierFreqList | |
| number of entries | carrierFreq[*n*] |
| 1 |
| 1 | E-UTRA f1 |
| 2 | E-UTRA f2 |
| 3 | E-UTRA f3 |
| 4 | E-UTRA f4 |
| Note 1: E-UTRAf1, E-UTRAf2, E-UTRAf3, E-UTRAf4 are according to clause 6.2.3.3  Note 2: Depending on the Band under test, E-UTRA f2 or E-UTRA f3 or E-UTRA f4 may not be applicable. | |

Table 6.3.1.3-2: Void

### 6.3.2 Default configurations for NAS test cases

The default configurations specified in this subclause apply only to NAS test cases. They apply to all NAS test cases unless otherwise specified.

#### 6.3.2.1 Simulated network scenarios for NAS test cases

Simulated network scenarios for NAS test cases to be tested are specified in the pre-test conditions of each individual test case.

Any combination is allowed with the following restrictions:

- a maximum 3 cells on the same frequency can be used, i.e. only 3 cells out of NGC Cell A, NGC Cell B, NGC Cell C and NGC Cell D may be used simultaneously in each individual test case when cells in the test case are in different PLMNs (refer to Table 6.3.2.2-3).

#### 6.3.2.2 Simulated NAS cells

Simulated NAS cells and default NAS parameters are specified in Table 6.3.2.2-1. Unless otherwise specified in a test case, default radio parameters of the NAS cells are specified as per Table 6.3.2.2-2.

Unless otherwise specified, the default parameters specified in clause 4.4.2 will also apply to all NAS cells.

Table 6.3.2.2-1: Default NAS parameters for simulated NAS cells

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NAS cell ID | Tracking Area | | | | | TA# list  (Note 1) | 5G-GUTI (Note 2) | | | |
| TA# | PLMN | | | TAC | AMF Identifier | | | 5G-TMSI |
| MCC | | MNC | AMF Region ID | AMF Set ID | AMF Pointer |
| NGC Cell A | TAI-1 | (Note 3) | | | 1 | TAI-1 | 254 | 1 | 1 | Arbitrarily selected according to TS 23.003 subclause 2.10.1 [26]. |
| NGC Cell B | TAI-2 | (Note 3) | | | 2 | TAI-2 | 254 | 1 | 1 |
| NGC Cell C | TAI-3 | (Note 3) | | | 3 | TAI-3 | 252 | 1 | 1 |
| NGC Cell D | TAI-4 | (Note 3) | | | 4 | TAI-4 | 252 | 1 | 1 |
| NGC Cell E | TAI-12 | 002 | | 101 | 3 | TAI-12 | 244 | 1 | 1 |
| NGC Cell F | TAI-11 | 003 | 101 | | 2 | TAI-11 | 239 | 1 | 1 |
| NGC Cell G | TAI-7 | (Note 4) | | 02 | 1 | TAI-7 | 238 | 1 | 1 |
| NGC Cell H | TAI-8 | (Note 4) | | 02 | 2 | TAI-8 | 237 | 1 | 1 |
| NGC Cell I | TAI-9 | 002 | | 101 | 1 | TAI-9 | 244 | 1 | 1 |
| NGC Cell J | TAI-10 | 003 | | 101 | 1 | TAI-10 | 236 | 1 | 1 |
| Note 1: The value(s) in the column TA# list indicates TAI(s) included in the response messages of the registration procedure for initial access or mobility (REGISTRATION ACCEPT) when the UE performs the registration procedure on a corresponding cell.  Note 2: The value in the column 5G-GUTI indicates GUTI included in the response messages of the registration procedure (REGISTRATION ACCEPT) when the UE performs the registration procedure on a corresponding cell.  Note 3: Set to the same Mobile Country Code and Mobile Network Code stored in EFIMSI on the test USIM card (subclause 4.8.3).  Note 4: Set to the same Mobile Country Code stored in EFIMSI on the test USIM card (subclause 4.8.3). | | | | | | | | | | |

Table 6.3.2.2-2: Default radio parameters for simulated NAS cells when cells are in same PLMN and access stratum is NR

|  |  |  |
| --- | --- | --- |
| NAS cell ID | Frequency | NR cell ID  (Note 1) |
| NGC Cell A | NRf1 | NR Cell 1 |
| NGC Cell B | NRf1 | NR Cell 2 |
| NGC Cell C | NRf1 | NR Cell 4 |
| NGC Cell D | NRf1 | NR Cell 11 |
| NGC Cell E | NA | NA |
| NGC Cell F | NRf2 | NR Cell 3 |
| NGC Cell G | NA | NA |
| NGC Cell H | NA | NA |
| NGC Cell I | NA | NA |
| NGC Cell J | NRf2 | NR Cell 12 |
| Note 1: Default NR parameters for simulated NR cells are as specified in Table 4.4.2-2.  Note 2: Simultaneous co-existence of active NGC cells defined on the same frequency and same SSB-Index is not recommended (in line with Table 4.4.2-2 Note 3). | | |

Table 6.3.2.2-3: Default PLMN and radio parameters for simulated NAS cells when cells are in different PLMNs and access stratum is NR

|  |  |  |  |
| --- | --- | --- | --- |
| NAS cell ID | PLMN | Frequency | NR cell ID (Note 1) |
| NGC Cell A | MCC/MNC=MCC/MNC in USIM | NRf1 | NR Cell 1 |
| NGC Cell B | MCC/MNC=MCC/MNC in USIM | NRf1 | NR Cell 2 |
| NGC Cell C | MCC/MNC=MCC/MNC in USIM | NRf1 | NR Cell 4 |
| NGC Cell D | MCC/MNC=MCC/MNC in USIM | NRf1 | NR Cell 11 |
| NGC Cell E | MCC=002  MNC=101 | NRf2 | NR Cell 3 |
| NGC Cell F | MCC=003  MNC=101 | NRf4 | NR Cell 14 |
| NGC Cell G | MCC = MCC in USIM  MNC=02 | NRf2 | NR Cell 12 |
| NGC Cell H | MCC = MCC in USIM  MNC=02 | NRf2 | NR Cell 23 |
| NGC Cell I | MCC=002  MNC=101 | NRf3 | NR Cell 6 |
| NGC Cell J | MCC=002  MNC=101 | NRf3 | NR Cell 13 |
| Note 1: Default NR parameters for simulated NR cells are as specified in Table 4.4.2-2  Note 2: Simultaneous co-existence of active NGC cells defined on the same frequency and same SSB-Index is not recommended (in line with Table 4.4.2-2 Note 3). | | | |

### 6.3.3 Cell configuration types

#### 6.3.3.1 Introduction

For the purpose of test equipment resource management, different types of cell configurations are defined with different capabilities.

For E-UTRA cells, please refer to TS 36.508 [2] clauses 6.3.3 and 6.3.4.

The default NR cell configuration type is Full Cell: this NR cell configuration has, in minimum, all DL and UL physical channels and physical signals configured, as defined in subclause 4.2.2.

When not mentioned explicitly in a test case prose, an NR cell is of type Full Cell. The following subclauses define different NR cell types with lower capabilities than the Full Cell.

#### 6.3.3.2 SCell types

When testing NR CA, the following NR SCell types may be specifically mentioned in the test case prose:

- Active SCell: An NR cell that may become an SCell at any point of time during the test case and which, while being an SCell, may be activated.

- Inactive SCell: An NR cell that may become an SCell at any point of time during the test case but is never activated while being an SCell.

SCell activation is defined as SS sending an SCell Activation/Deactivation MAC CE to the UE to activate the SCell.

Note that an Active SCell will not become an Inactive SCell if the SCell is deactivated via an SCell Activation/Deactivation MAC CE or after the *sCellDeactivationTimer* timer expires.

### 6.3.4 Satellite ephemeris information for NTN

#### 6.3.4.1 GSO scenario

The satellite ephemeris information of GSO is defined in Table 4.6.3-56C for NTN with below assumption:

- Inclination: 0

- Eccentricity: 0

- Latitude: 0

- Longitude: 121.56076999

- Altitude: 35786 km

- Speed: 0 km/s

In case of multi-cell NTN GSO scenario, a maximum of 3 NTN cells can be used. The satellite ephemeris information is defined in Table 6.3.4.1-1 unless otherwise specified in a test case.

Table 6.3.4.1-1: Satellite ephemeris information in multi-cell NTN GSO scenario

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Cell type (Note 1)** | **positionX** | **positionY** | **positionZ** | **velocityVX/Y/Z** | **nta-Common** | **Koffset** |
| First | -16976014 | 27636499 | 0 | 0 | 8243100 | 550 |
| Second | -23550424 | 22301093 | 0 | 0 | 8248322 | 550 |
| Third | -14502736 | 29010891 | 0 | 0 | 8248322 | 550 |
| Note 1: First Cell is the cell defined as default serving cell in the test case at the end of the preamble. Second Cell and third Cell are used in multi-cell test cases with Second Cell being defined as the 1st neighbour cell and Third Cell being defined as the 2nd neighbour cell. For example, in TS 38.523-1[12] TC 9.4.1.1 running in GSO scenario, NGC Cell A is the serving cell in the preamble, so it uses the satellite ephemeris information of First Cell, while NGC Cell G uses the satellite ephemeris information of Second Cell | | | | | | |

#### 6.3.4.2 NGSO scenario

FFS

## 6.4 Signalling Test Case specific USIM Configurations

### 6.4.1 General

The default USIM fields are specified in section 4.8.3. Specific USIM fields are set according to the USIM configuration specified in the tables below. PLMN settings are defined in TS 36.523-1 [42] Table 6.0.1-1.

Note: Changes to any existing USIM configuration can be done only if the change WILL NOT HAVE IMPACT on any of the tests which are referring to the configuration! To establish whether this might be the case, the test case author needs to review all tests in all RAN5 test specifications, which refer to the particular USIM configuration e.g. all test cases in TS 38.523-1 [12].

Table 6.4.1-1: USIM Configuration 1

|  |  |  |  |
| --- | --- | --- | --- |
| USIM field | Priority | Value | Access Technology Identifier |
| EFIMSI |  | The HPLMN (MCC+MNC) of the IMSI is set to PLMN1. |  |
| EFPLMNwAcT | 1 | Default | Default |
| 2 | PLMN17 | All specified |
| 3 | PLMN16 | NG-RAN |
|  | Remaining mandatory entries use default values |  |
| EFOPLMNwACT | 1 | PLMN15 | All specified |
|  | Remaining defined entries use default values |  |
| EFHPLMNwAcT | 1 | PLMN1 | NG-RAN |
| EFUST |  | Services 20, 42, 43 and 74 are supported. Service 71 is not supported (there is no EHPLMN list). |  |
| EFHPPLMN |  | 1 (6 minutes) |  |

Table 6.4.1-2: USIM Configuration 2

|  |  |  |  |
| --- | --- | --- | --- |
| USIM field | Priority | Value | Access Technology Identifier |
| EF5GS3GPPLOCI |  | PLMN4 |  |
| EFPLMNwAcT |  | Empty |  |
| EFIMSI |  | The HPLMN (MCC+MNC) of the IMSI is set to PLMN1. |  |
| EFUST |  | Service n°71 and n°74 are "available" |  |
| EFEHPLMN | 1 | PLMN15 |  |
| 2 | PLMN1 |  |
| EFLRPLMNSI |  | 01 |  |

Table 6.4.1-3: USIM Configuration 3

|  |  |  |  |
| --- | --- | --- | --- |
| USIM field | Priority | Value | Access Technology Identifier |
| EF5GS3GPPLOCI |  | PLMN4 |  |
| EFPLMNwAcT |  | Empty |  |
| EFIMSI |  | The HPLMN (MCC+MNC) of the IMSI is set to PLMN1. |  |
| EFUST |  | Service n°74 is "available" |  |
| EFEHPLMN |  | Empty |  |
| EFLRPLMNSI |  | 01 |  |

Table 6.4.1-4: USIM configuration 4

|  |  |  |  |
| --- | --- | --- | --- |
| USIM field | Priority | Value | Access Technology Identifier |
| EFEHPLMN | 1 | PLMN1 |  |
|  |  | Remaining mandatory entries use default values |  |
| EFPLMNwAcT | 1 | PLMN2 | NG-RAN |
|  | Remaining mandatory entries use default values |  |
| EFOPLMNwACT | 1 | PLMN3 | NG-RAN |
|  | Remaining mandatory entries use default values |  |
| EFUST |  | Services 20, 42 and 71 are supported. |  |
| EF5GS3GPPLOCI |  | FF FF…FF FE 01 (20 Bytes) |  |
| EFEPSLOCI |  | FF FF…FF FE 01 (18 Bytes) |  |
| EFPSLOCI |  | FF FF…FE FF 01 (14 Bytes) |  |
| EFLOCI |  | FF FF…FE FF 01 (11 Bytes) |  |
| Note: LOCI fields of this USIM configuration may get overwritten upon execution of test cases using a UICC loaded with this USIM configuration. The test operator shall ensure that USIM contents are as per this table before each execution of a test case that requires this USIM configuration. | | | |

Table 6.4.1-5: USIM configuration 5

|  |  |  |  |
| --- | --- | --- | --- |
| USIM field | Priority | Value | Access Technology Identifier |
| EF5GS3GPPLOCI |  | PLMN4 (See preamble) |  |
| EFPLMNwAcT |  | Empty |  |
| EFIMSI |  | The HPLMN (MCC+MNC) of the IMSI is set to PLMN1. |  |
| EFUST |  | Service 71 is not supported |  |
|  | Service 74 is supported. |  |
| EFLRPLMNSI |  | 00 |  |
| EFEHPLMN |  | 0xFF..FF |  |

Table 6.4.1-6: USIM configuration 6

|  |  |  |  |
| --- | --- | --- | --- |
| USIM field | Priority | Value | Access Technology Identifier |
| EF5GS3GPPLOCI |  | PLMN1 (See preamble) |  |
| EFIMSI |  | The HPLMN (MCC+MNC) of the IMSI is set to PLMN3. |  |
| EFPLMNwAcT | 1 | PLMN1 | NG-RAN |
|  | Remaining mandatory entries use default values |  |
| EFOPLMNwACT | 1 | PLMN2 | NG-RAN |
| 2 | PLMN4 | NG-RAN |
|  | Remaining defined entries use default values |  |
| EFUST |  | Service 71 is not supported |  |

Table 6.4.1-7: USIM configuration 7

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| USIM field | Priority | Value | Access technology | Comment |
| E.FPLMNwAcT | 1 | PLMN13 | NG-RAN |  |
| 2 | PLMN13 | E-UTRAN |  |
| EFOPLMNwAcT | 1 | PLMN2 | All |  |
| 2 | PLMN14 | E-UTRAN |  |
| 3 | PLMN13 | NG-RAN |  |
| EF5GS3GPPLOCI |  | FF FF…FF FE 01 (20 Bytes) |  |  |
| EFEPSLOCI |  | FF FF…FF FE 01 (18 Bytes) |  |  |
| EFPSLOCI |  | FF FF…FE FF 01 (14 Bytes) |  |  |
| EFLOCI |  | FF FF…FE FF 01 (11 Bytes) |  |  |
| Note: LOCI fields of this USIM configuration may get overwritten upon execution of test cases using a UICC loaded with this USIM configuration. The test operator shall ensure that USIM contents are as per this table before each execution of a test case that requires this USIM configuration. | | | | |

Table 6.4.1-8: USIM configuration 8

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| USIM field | Priority | Value | Access technology | Comment |
| EFOPLMNwAcT | 1 | PLMN15 | NG-RAN |  |
| 2 | PLMN15 | E-UTRAN |  |
| 3 | PLMN17 | E-UTRAN |  |
| 4 | PLMN16 | NG-RAN |  |
| EF5GS3GPPLOCI |  | FF FF…FF FE 01 (20 Bytes) |  |  |
| EFEPSLOCI |  | FF FF…FF FE 01 (18 Bytes) |  |  |
| EFPSLOCI |  | FF FF…FE FF 01 (14 Bytes) |  |  |
| EFLOCI |  | FF FF…FE FF 01 (11 Bytes) |  |  |
| EFUST |  | Service n°127 is not"available" |  |  |
| Note: LOCI fields of this USIM configuration may get overwritten upon execution of test cases using a UICC loaded with this USIM configuration. The test operator shall ensure that USIM contents are as per this table before each execution of a test case that requires this USIM configuration. | | | | |

Table 6.4.1-9: USIM configuration 9

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| USIM field | Priority | Value | Access technology | Comment |
| EFPLMNwAcT | 1 | PLMN1 | NG-RAN |  |
| 2 | PLMN15 | E-UTRAN |  |
| EFHPPLMN |  | 1(=6 min) |  | The HPLMN Search Period on the USIM shall be set to 6 minutes. |

Table 6.4.1-10: USIM configuration 10

|  |  |  |  |
| --- | --- | --- | --- |
| USIM field | Priority | Value | Access Technology Identifier |
| EFOPLMNwACT | 1 | PLMN14 | NG-RAN |
| 2 | PLMN13 | NG-RAN |
| 3 | PLMN2 | NG-RAN |
|  | Remaining defined entries use default values |  |
| EFUST |  | Service n°127 is "available" |  |
| EFHPPLMN |  | 1(=6 min) |  |
| EF5GS3GPPLOCI |  | FF FF…FF FE 01 (20 Bytes) |  |
| EFEPSLOCI |  | FF FF…FF FE 01 (18 Bytes) |  |
| EFPSLOCI |  | FF FF…FE FF 01 (14 Bytes) |  |
| EFLOCI |  | FF FF…FE FF 01 (11 Bytes) |  |
| Note: LOCI fields of this USIM configuration may get overwritten upon execution of test cases using a UICC loaded with this USIM configuration. The test operator shall ensure that USIM contents are as per this table before each execution of a test case that requires this USIM configuration. | | | |

Table 6.4.1-11: USIM configuration 11

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| USIM field | | Priority | | Value | | Access Technology Identifier | |
| EF5GS3GPPLOCI | |  | | PLMN15 (See preamble) | |  | |
| EFIMSI | |  | | The HPLMN (MCC+MNC) of the IMSI is set to PLMN1 | |  | |
| EFPLMNwAcT | | 1 | | Default | | Default | |
| 2 | | PLMN16 | | NG-RAN | |
|  | |  | | Remaining defined entries use default values | | Default | |
| EFOPLMNwACT | | 1 | | PLMN15 | | NG-RAN | |
|  | | Remaining defined entries use default values | | Default | |
| EFHPLMNwAcT | | 1 | | PLMN1 | | NG-RAN | |
| EFUST | |  | | Services 20, 42, 43, 74 and 96 are supported. Service 71 is not supported (there is no EHPLMN list) | |  | |
| EFHPPLMN | |  | | 1 (6 minutes) | |  | |
| EFNASCONFIG | |  | | MinimumPeriodicSearchTimer set to 7 minutes | |  | |

Table 6.4.1-12: USIM configuration 12

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| USIM field | Priority | Value | Access technology | Comment |
| EFPLMNwAcT |  | 3GPP TS 31.102, Annex E |  | The EF is empty. |
| EFOPLMNwAcT | 1 | PLMN2 | NG-RAN |  |
| 2 | PLMN13 | E-UTRAN |  |
| 3 | PLMN13 | NG-RAN |  |
| EFUST |  | Service n°127 is not"available" |  |  |
| EF5GS3GPPLOCI |  | FF FF…FF FE 01 (20 Bytes) |  |  |
| EFEPSLOCI |  | FF FF…FF FE 01 (18 Bytes) |  |  |
| EFPSLOCI |  | FF FF…FE FF 01 (14 Bytes) |  |  |
| EFLOCI |  | FF FF…FE FF 01 (11 Bytes) |  |  |
| Note: LOCI fields of this USIM configuration may get overwritten upon execution of test cases using a UICC loaded with this USIM configuration. The test operator shall ensure that USIM contents are as per this table before each execution of a test case that requires this USIM configuration. | | | | |

Table 6.4.1-13: USIM configuration 13

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| USIM field | Priority | Value | Access technology | Comment |
| EFOPLMNwAcT | 1 | PLMN2 | NG-RAN |  |
| 2 | PLMN2 | E-UTRAN |  |
| 3 | PLMN13 | NG-RAN |  |

Table 6.4.1-14: Void

Table 6.4.1-15: USIM Configuration 15

|  |  |  |  |
| --- | --- | --- | --- |
| USIM field | Priority | Value | Access Technology Identifier |
| EFIMSI |  | The HPLMN (MCC+MNC) of the IMSI is set to PLMN1. |  |
| EFFPLMN |  | PLMN2 |  |

Table 6.4.1-16: Void

Table 6.4.1-17: USIM Configuration 17

|  |  |  |  |
| --- | --- | --- | --- |
| USIM field | Priority | Value | Access Technology Identifier |
| EFIMSI |  | The HPLMN (MCC+MNC) of the IMSI is set to PLMN1. |  |
| EFPLMNwAcT | 1 | PLMN1 | NG-RAN |
| EFUST |  | Service n°126 is "available". |  |
| EFEHPLMN |  | PLMN1 |  |
| EFUAC\_AIC and EFACC |  | For Bits b4 and b8 in byte 1 of EFACC (defined in TS 31.102 clause 4.2.15), only single bit is set to 1. Bits b1 and b2 in byte 1 of EFUAC\_AIC (defined in TS 31.102 clause 4.4.11.7), and all remaining bits of EFACC and EFUAC\_AIC are set to 0. |  |

Table 6.4.1-18: USIM Configuration 18

|  |  |  |  |
| --- | --- | --- | --- |
| **USIM field** | **Priority** | **Value** | **Access Technology Identifier** |
| EFIMSI |  | The HPLMN (MCC+MNC) of the IMSI is set to PLMN1. |  |
| EFPLMNwAcT | 1 | PLMN2 | NG-RAN |
| EFHPLMNwAcT | 1 | PLMN1 | NG-RAN |
| EFUST |  | Service n°126 (for UAC Access Identities Configuration) defined in TS 31.102 clause 4.2.8 is declared "available" |  |
| EFUAC\_AIC |  | Bit b1 in byte 1 defined in TS 31.102 clause 4.4.11.7 is set to 1 and bit b2 in byte 1 is set to 0. |  |

Table 6.4.1-19: USIM Configuration 19

|  |  |  |  |
| --- | --- | --- | --- |
| **USIM field** | **Priority** | **Value** | **Access Technology Identifier** |
| EFIMSI |  | The HPLMN (MCC+MNC) of the IMSI is set to PLMN1. |  |
| EFPLMNwAcT | 1 | PLMN2 | NG-RAN |
| EFHPLMNwAcT | 1 | PLMN1 | NG-RAN |
| EFUST |  | Service n°126 (for UAC Access Identities Configuration) defined in TS 31.102 clause 4.2.8 is declared "available" |  |
| EFUAC\_AIC |  | Bit b2 in byte 1 defined in TS 31.102 clause 4.4.11.7 is set to 1 and bit b1 in byte 1 is set to 0. |  |

Table 6.4.1-20: USIM Configuration 20

|  |  |  |  |
| --- | --- | --- | --- |
| **USIM field** | **Priority** | **Value** | **Access Technology Identifier** |
| EFECC |  | 144, 117 |  |

Table 6.4.1-21: USIM configuration 21

|  |  |  |  |
| --- | --- | --- | --- |
| **USIM field** | **Priority** | **Value** | **Access Technology Identifier** |
| EFOPLMNwACT | 1 | PLMN14 | NG-RAN |
| 2 | PLMN13 | NG-RAN |
| 3 | PLMN2 | NG-RAN |
|  | Remaining defined entries use default values |  |
| EFUST |  | Service n°127 is not "available" |  |
| EFHPPLMN |  | 1(=6 min) |  |
| EF5GS3GPPLOCI |  | FF FF…FF FE 01 (20 Bytes) |  |
| EFEPSLOCI |  | FF FF…FF FE 01 (18 Bytes) |  |
| EFPSLOCI |  | FF FF…FE FF 01 (14 Bytes) |  |
| EFLOCI |  | FF FF…FE FF 01 (11 Bytes) |  |
| Note: LOCI fields of this USIM configuration may get overwritten upon execution of test cases using a UICC loaded with this USIM configuration. The test operator shall ensure that USIM contents are as per this table before each execution of a test case that requires this USIM configuration. | | | |

Table 6.4.1-22: USIM Configuration 22

|  |  |  |  |
| --- | --- | --- | --- |
| **USIM field** | **Priority** | **Value** | **Access Technology Identifier** |
| EFUST |  | Service n°19 and n°51 defined in TS 31.102 clause 4.2.8 is declared "service not available" |  |

Table 6.4.1-23: USIM Configuration 23

|  |  |  |  |
| --- | --- | --- | --- |
| USIM field | Priority | Value | Access Technology Identifier |
| EFUST |  | Service n°4 Service Dialling  Numbers (SDN), Service n°99 URI support by UICC, Service n°89 eCall Data and Service n°112 eCall Data over IMS are available |  |
| EFEST |  | Services n°1 Fixed Dialling Numbers (FDN) is disabled |  |
| EFSDN |  | Two entries of SDNs, eCall Test Number (123456) and eCall reconfiguration number (345678) |  |
| EFSDNURI |  | Two entries of SDNs, eCall Test Number (tel:123456) and eCall reconfiguration number (tel:345678) |  |

Table 6.4.1-24: USIM Configuration 24

|  |  |  |  |
| --- | --- | --- | --- |
| USIM field | Priority | Value | Access Technology Identifier |
| EFUST |  | Service n°2 Fixed Dialling  Numbers (FDN), Service n°99 URI support by UICC, Service n°89 eCall Data and Service n°112 eCall Data over IMS are available |  |
| EFEST |  | Service n°1 Fixed Dialling  Numbers (FDN) is enabled |  |
| EFFDN |  | Two entries of FDNs, eCall Test Number (123456) and eCall reconfiguration number (345678) |  |
| EFFDNURI |  | Two entries of FDNs, eCall Test Number (tel:123456) and eCall reconfiguration number (tel:345678) |  |

Table 6.4.1-25: USIM Configuration 25

|  |  |  |  |
| --- | --- | --- | --- |
| **USIM field** | **Priority** | **Value** | **Access Technology Identifier** |
| EFIMSI |  | The HPLMN (MCC+MNC) of the IMSI is set to PLMN15. |  |

Table 6.4.1-26: USIM Configuration 26

|  |  |  |  |
| --- | --- | --- | --- |
| USIM field | Priority | Value | Access Technology Identifier |
| EFUST |  | Service n°2 Fixed Dialling  Numbers (FDN), Service n°99 URI support by UICC, Service n°89 eCall Data and Service n°112 eCall Data over IMS are available |  |
| EFEST |  | Service n°1 Fixed Dialling  Numbers (FDN) is enabled |  |
| EFFDN |  | Two entries of FDNs, eCall Test Number (123456) and eCall reconfiguration number (345678) |  |
| EFFDNURI |  | Two entries of FDNs, eCall Test Number (tel:123456) and eCall reconfiguration number (tel:345678) |  |
| EFFPLMN |  | 004-31 |  |

Table 6.4.1-27: USIM Configuration 27

|  |  |  |  |
| --- | --- | --- | --- |
| USIM field | Priority | Value | Access Technology Identifier |
| EFIMSI |  | The HPLMN (MCC+MNC) of the IMSI is set to 001-01. |  |
| EFFPLMN |  | 001-02 |  |

Table 6.4.1-28: USIM Configuration 28

|  |  |  |  |
| --- | --- | --- | --- |
| USIM field | Priority | Value | Access Technology Identifier |
| EFIMSI |  | The HPLMN (MCC+MNC) of the IMSI is set to 001-02. |  |
| EFFPLMN |  | 001-01 |  |

# 7 Test environments for RRM tests

## 7.0 General

### 7.0.1 Single PDU configuration for RRM testing

For RRM test case execution on 5G SA UEs defined in TS 38.533 [18]7.1 Requirements, IMS shall not be considered and UE's shall be able use RRC (IDLE, CONNECTED) preambles defined in TS 38.508-1 Section 4.5. Before entering RRC\_CONNECTED or RRC\_IDLE state during initial conditions or test procedure, it is recommended that UE is pre-configured with 0 or 1 PDU (non-IMS).

For EN-DC settings the corresponding requirement holds that IMS shall not be considered and it is recommended that UE is pre-configured with 0PDU/0PDN or 1PDU/1 PDN.

## 7.1 Test equipment requirements

### 7.1.1 Void

### 7.1.2 Void

### 7.1.3 Requirements for OTA test method

#### 7.1.3.1 General

Editor’s Note:

- The UE pre-configuration mentioned below to disable UL Tx diversity schemes shall be voided once a test methodology solution to minimize spectral flatness artefacts between TE and UE over all test points is defined.

For conformance testing using the OTA test environment, the UE under test shall be pre-configured with UL Tx diversity schemes disabled to account for single polarization System Simulator (SS) in the test environment. The UE under test may transmit with dual polarization.

#### 7.1.3.2 RRM baseline setup

The RRM baseline setup shall fulfil the capabilities detailed in this section.

The following permitted test setups are considered for OTA RRM testing:

- DFF test setup as described in Clause B.2.2.

- Simplified DFF test setup as described in Clause B.2.3.

- IFF test setup as described in Clause B.2.4.

- Enhanced IFF test setup based in the IFF test setup described in Clause B.2.6, with the enhancements described in this clause.

- IFF+DFF Hybrid test setup as described in Clause B.7.2, with the enhancements described in this clause.

##### 7.1.3.2.1 General description

TRxPs and Cells:

- Up to 2 NR transmission reception points TRxPs are emulated.

Support of interworking scenarios

- For test scenarios involving both, LTE and NR FR2 carriers, the test setup shall be capable to provide LTE link to the DUT. The emulated LTE cell provides a stable LTE signal without precise propagation modelling or path loss control between it and the DUT. No performance verification for and relative to LTE carriers is supported.

- For test scenarios involving both, NR FR1 and NR FR2 carriers, the test setup shall be capable to provide NR FR1 link to the DUT. The NR FR1 link has a stable and noise-free signal without precise path loss or polarization control. No performance verification for and relative to NR FR1 carriers is supported.

Antennas, polarization, simultaneously active AoAs:

- N dual-polarized antennas transmitting the signals from the emulated gNB sources to the DUT.

- The antennas transmit into the test zone in such a way that signal polarization does not prevent the DUT receiving a consistent, predictable power level.

- N ≥ NMAX\_AoAs, where NMAX\_AoAs is the maximum number of simultaneously active (emulating signal) angles of arrival AoAs. The NMAX\_AoAs for the different permitted test methods is:

- For UE RRM baseline measurement setup based on DFF, the supported NMAX\_AoAs = 2.

- For UE RRM baseline measurement setup based on simplified DFF, the supported NMAX\_AoAs = 1.

- For UE RRM baseline measurement setup based on IFF, the supported NMAX\_AoAs = 1.

- For UE RRM baseline measurement setup based on enhanced IFF, the supported NMAX\_AoAs = 2.

- For UE RRM baseline measurement setup based on IFF+DFF, the supported NMAX\_AoAs = 2.

Angular Relationship:

- A positioning system such that an angular relationship with two axes of freedom is provided between the DUT and the test system antennas (or the setup should provide equivalent functionality).

- For NMAX\_AoAs = 2 the setup shall enable following relative angular relationships between the NMAX\_AoAs simultaneously active AoAs: 30°, 60°, 90°, 120° and 150°.

- For single active probe scenarios, in case that step change of AoA is required, the setup shall enable following relative angular change between initial and target AoA: 30°, 60°, 90°, 120° and 150°.

Wanted and noise (AWGN) signals can be transmitted from one or both active probes. Test description will define the exact signal/noise/SNR/SINR level per TRxP at the reference point.

Multiple DL transmission antenna ports:

- In case of multiple DL transmission antenna ports are required for RRM testing, the different antenna ports are mapped to different polarizations.

Measurement Uncertainty:

- The threshold MU for the equivalence framework for RRM will be based on direct far field (DFF) test method for D ≤ 5 cm and on indirect far field (IFF) test method for D > 5 cm. If the MTSU for the IFF test method for D ≤ 5 cm is finalized before DFF, the IFF MTSU shall be used as provisional threshold MU until DFF is completed.

##### 7.1.3.2.2 Applicability criteria

The applicability criteria for the RRM measurement setup based on DFF is described in B.2.2.1.

The applicability criteria for the RRM measurement setup based on simplified DFF is described in B.2.3.1.

The applicability criteria for the RRM measurement setup based on IFF is described in B.2.4.1.

The applicability criteria for the RRM measurement setup based on enhanced IFF is described in B.2.6.1:

The applicability criteria for the RRM measurement setup based on IFF+DFF follows DFF as described in B.2.7.1:

##### 7.1.3.2.3 Measurement distance and quiet zone

For RRM baseline measurement setup based on DFF:

- The measurement distance defined for the DFF UE RF test method described in B.2.2.4 applies.

- A DFF measurement setup has the centre of the Quiet Zone (QZ) located at the centre of the rotational axes (of DUT and measurement antenna). For the RRM measurement baseline setup based on DFF, the vertices of the N probes have to be aligned to the resulting centre of the QZ. The centre of the QZ is taken as the reference point for MU definition for each probe. The same QZ size as for DFF UE RF test method described in B.2.2.2 applies.

For RRM baseline measurement setup based on simplified DFF:

- The measurement distance defined for the simplified DFF UE RF test method described in B.2.3.4 applies.

- The same QZ size and definition as for simplified DFF UE RF test method described in B.2.3.2 applies.

For RRM baseline measurement setup based on IFF:

- The measurement distance defined for the IFF UE RF test method described in B.2.4.4 applies.

- The Quiet Zone definition for the IFF UE RF test method described in B.2.4.2 applies.

For RRM baseline measurement setup based on enhanced IFF:

- The measurement distance defined for the IFF UE RF test method described in B.2.6.4 applies.

- An IFF measurement setup has the centre of the Quiet Zone (QZ) located at the centre of the rotational axes (of DUT). For the RRM measurement baseline setup based on IFF, the reflectors have to be aligned to transmit a plane wave to the resulting centre of the QZ. The centre of the QZ is taken as the reference point for MU definition for each reflector. The QZ is a sphere of radius R. The size of the QZ defined in B.2.6.2 applies.

For RRM baseline measurement setup based on IFF+DFF:

- For IFF TRxPs, the measurement distance defined for the IFF UE RF test method described in B.2.4.4 applies.

- For DFF TRxPs, the measurement distance defined for the DFF UE RF test method described in B.2.2.4 applies.

- An IFF+DFF measurement setup has the centre of the Quiet Zone (QZ) located at the centre of the rotational axes (of DUT). For the RRM measurement baseline setup based on IFF+DFF, IFF reflectors have to be aligned to transmit a plane wave to the resulting centre of the QZ, and the vertices of the DFF probes have to be aligned to the resulting centre of the QZ. The centre of the QZ is taken as the reference point for MU definition for each reflector or probe. The QZ is a sphere of radius R. The size of the QZ is defined in B.2.7.2.

##### 7.1.3.2.4 Quality of the quiet zone

For RRM, the quality of the quiet zone validation defined in Annex O of TS 38.521-2 [15] needs to assess only the single-directional EIRP and EIS metrics. For measurement setups with multiple probes, the QoQZ procedure needs to be performed with all probes present and in the conditions used for RRM testing.

The quality of the quiet zone for the RRM measurement setup based on DFF is described in B.2.2.3. The QoQZ validation needs to be performed only with the reference probe P0.

The quality of the quiet zone for the RRM measurement setup based on simplified DFF is described in B.2.3.3.

The quality of the quiet zone for the RRM measurement setup based on IFF is described in B.2.4.3.

The quality of the quiet zone for the RRM measurement setup based on enhanced IFF is described in B.2.6.3. The QoQZ validation needs to be performed only with the reference reflector, P0, if same sized IFF reflectors are used..

The quality of the quiet zone for the RRM measurement setup based on IFF+DFF is described in B.2.7.3. The QoQZ validation needs to be performed only with the one probe among all DFF probes and one probe among all IFF probes.

## 7.2 Reference test conditions

### 7.2.1 Signal levels

#### 7.2.1.1 Void

#### 7.2.1.2 Void

### 7.2.2 Physical layer parameters

#### 7.2.2.1 Downlink physical layer parameters

As defined in clause 4.3.6 with the following exceptions:

Table 7.2.2.1-1: Physical layer parameters for DCI format 1\_1

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.3.6.1.2.2-1 | | | |
| Parameter | Value | Value in binary | Condition |
| PUCCH resource indicator | *PUCCH-ResourceId[1]* = 0 in pucch-ResourceSetID[1] as defined in Table 4.6.3-112 (Mapping as per Table 9.2.3-2 in TS 38.213 [22]) | “000” |  |
| PDSCH-to-HARQ\_feedback timing indicator | corresponding to K1 slots as per Table 9.2.3-1 in TS 38.213 [22] and dl-DataToUL-ACK in Table 4.6.3-112  For 120KHz SCS  K1 = 4 if mod(i,5) = 0 K1 = 3 if mod(i,5) = 1 K1 = 7 if mod(i,5) = 2 where i is slot index per frame; i = {0,…,79} | - | FR2 |
| PDSCH-to-HARQ\_feedback timing indicator | corresponding to K1 slots as per Table 9.2.3-1 in TS 38.213 [22] and dl-DataToUL-ACK in Table 4.6.3-112  K1 = 6 if mod(i,10) = 8 K1 = 5 if mod(i,10) = 0  K1 = 5 if mod(i,10) = 1  K1 = 5 if mod(i,10) = 2  K1 = 5 if mod(i,10) = 9  where i is slot index per frame; i = {0,…,19} |  | TDDConf.2.1 |
| PDSCH-to-HARQ\_feedback timing indicator | corresponding to K1 slots as per Table 9.2.3-1 in TS 38.213 [22] and dl-DataToUL-ACK in Table 4.6.3-112  For FDD  K1 = 2 |  | FDD |

|  |  |
| --- | --- |
| Condition | Explanation |
| TDDConf.2.1 | TDD UL/DL configuration for SCS=30kHz |

Table 7.2.2.1-2: Physical layer parameters for DCI format 1\_0

|  |  |  |
| --- | --- | --- |
| Parameter | Value | Value in binary |
| PDSCH-to-HARQ\_feedback timing indicator | corresponding to K1 slots as per Table 9.2.3-1 in TS 38.213 [22] and dl-DataToUL-ACK in Table 4.6.3-112  For FDD  K1 = 2 |  |

### 7.2.3 Default test frequencies

#### 7.2.3.1 Default test frequencies FR1 NR operating bands

For FR1 NR operating bands the test frequencies for RRM testing are specified in clause 4.3.1.1.

#### 7.2.3.2 Default test frequencies FR2 operating bands

7.2.3.2.1 Reference test frequencies for NR operating band n257

Table 7.2.3.2.1-1: Test frequencies for NR operating band n257 (SCS 120 kHz, ΔFRaster 120 kHz, SSB SCS=120kHz, kSSB=0 and Offset(RBs)=0)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CBW [MHz]** | ***carrierBandwidth***  **[PRBs]** | **Range** | | **Carrier centre**  **[MHz]** | **Carrier centre**  **[ARFCN]** | **point A [MHz]** | ***absoluteFrequencyPointA* [ARFCN]** | ***offsetToCarrier* [Carrier PRBs]** | **SS block SCS**  **[kHz]** | **GSCN** | ***absoluteFrequencySSB***  **[ARFCN]** |  | **Offset Carrier CORESET#0**  **[RBs]**  **Note 2** | **CORESET#0 Index (Offset**  **[RBs])**  **Note 1** | **offsetToPointA (SIB1)**  **[PRBs]**  **Note 1** |
| 100 | 66 | Downlink  &  Uplink | Mid | 28015.68 | 2079427 | 27968.16 | 2078635 | 0 | 120 | 22472 | 2078875 | 0 | 0 | 0 (0) | 0 |
| 100 | 66 | Downlink  &  Uplink | Adjacent inter-frequency cell | 28119.36 | 2081155 | 28071.84 | 2080363 | 0 | 120 | 22478 | 2080603 | 0 | 0 | 0 (0) | 0 |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-8 in TS 38.213 [22]. The value of CORESET#0 Index is signalled controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs. | | | | | | | | | | | | | | | |

Table 7.2.3.2.1-2: Test frequencies for NR operating band n257 (SCS 120 kHz, ΔFRaster 120 kHz, SSB SCS=240kHz, kSSB=0 and Offset(RBs)=0)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CBW [MHz]** | ***carrierBandwidth***  **[PRBs]** | **Range** | | **Carrier centre**  **[MHz]** | **Carrier centre**  **[ARFCN]** | **point A [MHz]** | ***absoluteFrequencyPointA* [ARFCN]** | ***offsetToCarrier* [Carrier PRBs]** | **SS block SCS**  **[kHz]** | **GSCN** | ***absoluteFrequencySSB***  **[ARFCN]** |  | **Offset Carrier CORESET#0**  **[RBs]**  **Note 2** | **CORESET#0 Index (Offset**  **[RBs])**  **Note 1** | **offsetToPointA (SIB1)**  **[PRBs]**  **Note 1** |
| 100 | 66 | Downlink  &  Uplink | Mid | 28001.28 | 2079187 | 27953.76 | 2078395 | 0 | 240 | 22472 | 2078875 | 0 | 0 | 2 (0) | 0 |
| 100 | 66 | Downlink  &  Uplink | Adjacent inter-frequency cell | 28104.96 | 2080915 | 28057.44 | 2080123 | 0 | 240 | 22478 | 2080603 | 0 | 0 | 0 (0) | 0 |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-10 in TS 38.213 [22]. The value of CORESET#0 Index is signalled controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs. | | | | | | | | | | | | | | | |

7.2.3.2.2 Reference test frequencies for NR operating band n258

Table 7.2.3.2.2-1: Test frequencies for NR operating band n258 (SCS 120 kHz, ΔFRaster 120 kHz SSB SCS=120kHz, kSSB=0 and Offset(RBs)=0)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CBW [MHz]** | ***carrierBandwidth***  **[PRBs]** | **Range** | | **Carrier centre**  **[MHz]** | **Carrier centre**  **[ARFCN]** | **point A [MHz]** | ***absoluteFrequencyPointA* [ARFCN]** | ***offsetToCarrier* [Carrier PRBs]** | **SS block SCS**  **[kHz]** | **GSCN** | ***absoluteFrequencySSB***  **[ARFCN]** |  | **Offset Carrier CORESET#0**  **[RBs]**  **Note 2** | **CORESET#0 Index (Offset**  **[RBs])**  **Note 1** | **offsetToPointA (SIB1)**  **[PRBs]**  **Note 1** |
| 100 | 66 | Downlink  &  Uplink | Mid | 25890.24 | 2044003 | 25842.72 | 2043211 | 0 | 120 | 22349 | 2043451 | 0 | 0 | 0 (0) | 0 |
| 100 | 66 | Downlink  &  Uplink | Adjacent inter-frequency cell | 25993.92 | 2045731 | 25946.4 | 2044939 | 0 | 120 | 22355 | 2045179 | 0 | 0 | 0 (0) | 0 |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-8 in TS 38.213 [22]. The value of CORESET#0 Index is signalled controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs. | | | | | | | | | | | | | | | |

Table 7.2.3.2.2-2: Test frequencies for NR operating band n258 (SCS 120 kHz, ΔFRaster 120 kHz, SSB SCS=240kHz, kSSB=0 and Offset(RBs)=0)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CBW [MHz]** | ***carrierBandwidth***  **[PRBs]** | **Range** | | **Carrier centre**  **[MHz]** | **Carrier centre**  **[ARFCN]** | **point A [MHz]** | ***absoluteFrequencyPointA* [ARFCN]** | ***offsetToCarrier* [Carrier PRBs]** | **SS block SCS**  **[kHz]** | **GSCN** | ***absoluteFrequencySSB***  **[ARFCN]** |  | **Offset Carrier CORESET#0**  **[RBs]**  **Note 2** | **CORESET#0 Index (Offset**  **[RBs])**  **Note 1** | **offsetToPointA (SIB1)**  **[PRBs]**  **Note 1** |
| 100 | 66 | Downlink  &  Uplink | Mid | 25893.12 | 2044051 | 25845.6 | 2043259 | 0 | 240 | 22350 | 2043739 | 0 | 0 | 2 (0) | 0 |
| 100 | 66 | Downlink  &  Uplink | Adjacent inter-frequency cell | 25996.8 | 2045779 | 25949.28 | 2044987 | 0 | 240 | 22356 | 2045467 | 0 | 0 | 0 (0) | 0 |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-10 in TS 38.213 [22]. The value of CORESET#0 Index is signalled controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs. | | | | | | | | | | | | | | | |

7.2.3.2.3 Reference test frequencies for NR operating band n259

Table 7.2.3.2.3-1: Test frequencies for NR operating band n259 (SCS 120 kHz, ΔFRaster 120 kHz SSB SCS=120kHz, kSSB=0 and Offset(RBs)=0)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CBW [MHz]** | ***carrierBandwidth***  **[PRBs]** | **Range** | | **Carrier centre**  **[MHz]** | **Carrier centre**  **[ARFCN]** | **point A [MHz]** | ***absoluteFrequencyPointA* [ARFCN]** | ***offsetToCarrier* [Carrier PRBs]** | **SS block SCS**  **[kHz]** | **GSCN** | ***absoluteFrequencySSB***  **[ARFCN]** |  | **Offset Carrier CORESET#0**  **[RBs]**  **Note 2** | **CORESET#0 Index (Offset**  **[RBs])**  **Note 1** | **offsetToPointA (SIB1)**  **[PRBs]**  **Note 1** |
| 100 | 66 | Downlink  &  Uplink | Mid | 41511.36 | 2304355 | 41463.84 | 2303563 | 0 | 120 | 23253 | 2303803 | 0 | 0 | 0 (0) | 0 |
| 100 | 66 | Downlink  &  Uplink | Adjacent inter-frequency cell | 41615.04 | 2306083 | 41567.52 | 2305291 | 0 | 120 | 23259 | 2305531 | 0 | 0 | 0 (0) | 0 |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-8 in TS 38.213 [22]. The value of CORESET#0 Index is signalled controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs. | | | | | | | | | | | | | | | |

Table 7.2.3.2.3-2: Test frequencies for NR operating band n259 (SCS 120 kHz, ΔFRaster 120 kHz, SSB SCS=240kHz, kSSB=0 and Offset(RBs)=0)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CBW [MHz]** | ***carrierBandwidth***  **[PRBs]** | **Range** | | **Carrier centre**  **[MHz]** | **Carrier centre**  **[ARFCN]** | **point A [MHz]** | ***absoluteFrequencyPointA* [ARFCN]** | ***offsetToCarrier* [Carrier PRBs]** | **SS block SCS**  **[kHz]** | **GSCN** | ***absoluteFrequencySSB***  **[ARFCN]** |  | **Offset Carrier CORESET#0**  **[RBs]**  **Note 2** | **CORESET#0 Index (Offset**  **[RBs])**  **Note 1** | **offsetToPointA (SIB1)**  **[PRBs]**  **Note 1** |
| 100 | 66 | Downlink  &  Uplink | Mid | 41514.24 | 2304403 | 41466.72 | 2303611 | 0 | 240 | 23254 | 2304091 | 0 | 0 | 2 (0) | 0 |
| 100 | 66 | Downlink  &  Uplink | Adjacent inter-frequency cell | 41617.92 | 2306131 | 41570.4 | 2305339 | 0 | 240 | 23260 | 2305819 | 0 | 0 | 0 (0) | 0 |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-10 in TS 38.213 [22]. The value of CORESET#0 Index is signalled controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs. | | | | | | | | | | | | | | | |

7.2.3.2.4 Reference test frequencies for NR operating band n260

Table 7.2.3.2.4-1: Test frequencies for NR operating band n260 (SCS 120 kHz, ΔFRaster 120 kHz SSB SCS=120kHz, kSSB=0 and Offset(RBs)=0)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CBW [MHz]** | ***carrierBandwidth***  **[PRBs]** | **Range** | | **Carrier centre**  **[MHz]** | **Carrier centre**  **[ARFCN]** | **point A [MHz]** | ***absoluteFrequencyPointA* [ARFCN]** | ***offsetToCarrier* [Carrier PRBs]** | **SS block SCS**  **[kHz]** | **GSCN** | ***absoluteFrequencySSB***  **[ARFCN]** |  | **Offset Carrier CORESET#0**  **[RBs]**  **Note 2** | **CORESET#0 Index (Offset**  **[RBs])**  **Note 1** | **offsetToPointA (SIB1)**  **[PRBs]**  **Note 1** |
| 100 | 66 | Downlink  &  Uplink | Mid | 38504.64 | 2254243 | 38457.12 | 2253451 | 0 | 120 | 23079 | 2253691 | 0 | 0 | 0 (0) | 0 |
| 100 | 66 | Downlink  &  Uplink | Adjacent inter-frequency cell | 38608.32 | 2255971 | 38560.8 | 2255179 | 0 | 120 | 23085 | 2255419 | 0 | 0 | 0 (0) | 0 |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-8 in TS 38.213 [22]. The value of CORESET#0 Index is signalled controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs. | | | | | | | | | | | | | | | |

Table 7.2.3.2.4-2: Test frequencies for NR operating band n260 (SCS 120 kHz, ΔFRaster 120 kHz, SSB SCS=240kHz, kSSB=0 and Offset(RBs)=0)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CBW [MHz]** | ***carrierBandwidth***  **[PRBs]** | **Range** | | **Carrier centre**  **[MHz]** | **Carrier centre**  **[ARFCN]** | **point A [MHz]** | ***absoluteFrequencyPointA* [ARFCN]** | ***offsetToCarrier* [Carrier PRBs]** | **SS block SCS**  **[kHz]** | **GSCN** | ***absoluteFrequencySSB***  **[ARFCN]** |  | **Offset Carrier CORESET#0**  **[RBs]**  **Note 2** | **CORESET#0 Index (Offset**  **[RBs])**  **Note 1** | **offsetToPointA (SIB1)**  **[PRBs]**  **Note 1** |
| 100 | 66 | Downlink  &  Uplink | Mid | 38507.52 | 2254291 | 38460 | 2253499 | 0 | 240 | 23080 | 2253979 | 0 | 0 | 2 (0) | 0 |
| 100 | 66 | Downlink  &  Uplink | Adjacent inter-frequency cell | 38611.2 | 2256019 | 38563.68 | 2255227 | 0 | 240 | 23086 | 2255707 | 0 | 0 | 0 (0) | 0 |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-10 in TS 38.213 [22]. The value of CORESET#0 Index is signalled controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs. | | | | | | | | | | | | | | | |

7.2.3.2.5 Reference test frequencies for NR operating band n261

Table 7.2.3.2.5-1: Test frequencies for NR operating band n261 (SCS 120 kHz, ΔFRaster 120 kHz SSB SCS=120kHz, kSSB=0 and Offset(RBs)=0)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CBW [MHz]** | ***carrierBandwidth***  **[PRBs]** | **Range** | | **Carrier centre**  **[MHz]** | **Carrier centre**  **[ARFCN]** | **point A [MHz]** | ***absoluteFrequencyPointA* [ARFCN]** | ***offsetToCarrier* [Carrier PRBs]** | **SS block SCS**  **[kHz]** | **GSCN** | ***absoluteFrequencySSB***  **[ARFCN]** |  | **Offset Carrier CORESET#0**  **[RBs]**  **Note 2** | **CORESET#0 Index (Offset**  **[RBs])**  **Note 1** | **offsetToPointA (SIB1)**  **[PRBs]**  **Note 1** |
| 100 | 66 | Downlink  &  Uplink | Mid | 27929.28 | 2077987 | 27881.76 | 2077195 | 0 | 120 | 22467 | 2077435 | 0 | 0 | 0 (0) | 0 |
| 100 | 66 | Downlink  &  Uplink | Adjacent inter-frequency cell | 28032.96 | 2079715 | 27985.44 | 2078923 | 0 | 120 | 22473 | 2079163 | 0 | 0 | 0 (0) | 0 |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-8 in TS 38.213 [22]. The value of CORESET#0 Index is signalled controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs. | | | | | | | | | | | | | | | |

Table 7.2.3.2.5-2: Test frequencies for NR operating band n261 (SCS 120 kHz, ΔFRaster 120 kHz, SSB SCS=240kHz, kSSB=0 and Offset(RBs)=0)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CBW [MHz]** | ***carrierBandwidth***  **[PRBs]** | **Range** | | **Carrier centre**  **[MHz]** | **Carrier centre**  **[ARFCN]** | **point A [MHz]** | ***absoluteFrequencyPointA* [ARFCN]** | ***offsetToCarrier* [Carrier PRBs]** | **SS block SCS**  **[kHz]** | **GSCN** | ***absoluteFrequencySSB***  **[ARFCN]** |  | **Offset Carrier CORESET#0**  **[RBs]**  **Note 2** | **CORESET#0 Index (Offset**  **[RBs])**  **Note 1** | **offsetToPointA (SIB1)**  **[PRBs]**  **Note 1** |
| 100 | 66 | Downlink  &  Uplink | Mid | 27932.16 | 2078035 | 27884.64 | 2077243 | 0 | 240 | 22468 | 2077723 | 0 | 0 | 2 (0) | 0 |
| 100 | 66 | Downlink  &  Uplink | Adjacent inter-frequency cell | 28035.84 | 2079763 | 27988.32 | 2078971 | 0 | 240 | 22474 | 2079451 | 0 | 0 | 0 (0) | 0 |
| Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-10 in TS 38.213 [22]. The value of CORESET#0 Index is signalled controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs. | | | | | | | | | | | | | | | |

#### 7.2.3.3 NR inter-band CA configurations in FR2

Editor’s note: further testability analysis for RRM inter-band CA configurations might be required.

For FR2 NR operating bands the test frequencies for RRM testing are specified in clause 4.3.1.2.2.

#### 7.2.3.4 NR intra-band contiguous CA configurations in FR2

For FR2 NR operating bands the test frequencies for RRM testing are specified in clause 4.3.1.2.3.

#### 7.2.3.5 NR intra-band non-contiguous CA configurations in FR2

Editor’s note: further testability analysis for RRM intra-band non-contiguous CA configurations might be required.

For FR2 NR operating bands the test frequencies for RRM testing are specified in clause 4.3.1.2.4.

## 7.3 Default NG-RAN RRC message and information elements contents for RRM

### 7.3.0 General definitions

This section defines general concepts and conditions used in the RRM message contents in clause 7.3:

- CSI-RS for Tracking, CSI reporting and beam management

Table 7.3.0-1: Definitions of CSI-RS for Tracking, CSI reporting and beam management

|  |  |  |
| --- | --- | --- |
| **Type** | **Short version** | **Explanation** |
| CSI-RS for tracking | TRS | Corresponds to TRS.X.Y FDD/TDD RMCs in TS 38.533 [18] |
| CSI-RS for BM | BM | Corresponds to CSI-RS.X.2 FDD/TDD RMCs in TS 38.533 [18] |
| CSI-RS for CSI reporting | CSI | Corresponds to CSI-RS.X.1 FDD/TDD RMCs in TS 38.533 [18] |
| CSI-RS for IM | CSI-IM | CSI-IM resources for CSI reporting. Needed when CSI-RS.X.1 FDD/TDD RMCs are configured. |

Editor's Note: The message contents for CSI-RS.X.3/4 FDD/TDD RMCs in TS 38.533 [18] are not yet defined.

### 7.3.1 Radio resource control information elements for RRM

As defined in clause 4.6.3 with the following exceptions:

– *TDD-UL-DL-ConfigCommon*

Table 7.3.1-1: TDD-UL-DL-ConfigCommon

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-192 | | | |
| Information Element | Value/remark | Comment | Condition |
| TDD-UL-DL-ConfigCommon ::= SEQUENCE { |  |  |  |
| referenceSubcarrierSpacing | SubcarrierSpacing |  |  |
| pattern1 SEQUENCE { |  |  |  |
| dl-UL-TransmissionPeriodicity | ms0p625 |  | TDDConf.3.1 |
| nrofDownlinkSlots | 3 |  | TDDConf.2.1, TDDConf.3.1 |
|  | 1 |  | TDDConf.1.1 |
| nrofDownlinkSymbols | 10 |  | TDDConf.1.1, TDDConf.3.1 |
|  | 6 |  | TDDConf.2.1 |
| nrofUplinkSlots | 2 |  | TDDConf.1.1 |
|  | 1 |  | TDDConf.3.1 |
|  | 4 |  | TDDConf.2.1 |
| nrofUplinkSymbols | 4 |  | TDDConf.2.1 |
|  | 2 |  | TDDConf.1.1, TDDConf.3.1 |
| dl-UL-TransmissionPeriodicity-v1530 | Not present |  |  |
| ms4 |  | TDDConf.1.1,  TDDConf.2.1 |
| } |  |  |  |
| pattern2 | Not present |  |  |
| pattern2 SEQUENCE { |  |  | TDDConf.1.1,  TDDConf.2.1 |
| dl-UL-TransmissionPeriodicity | ms1 |  | TDDConf.1.1,  TDDConf.2.1 |
| nrofDownlinkSlots | 1 |  | TDDConf.1.1 |
|  | 2 |  | TDDConf.2.1 |
| nrofDownlinkSymbols | 0 |  | TDDConf.1.1,  TDDConf.2.1 |
| nrofUplinkSlots | 0 |  | TDDConf.1.1,  TDDConf.2.1 |
| nrofUplinkSymbols | 0 |  | TDDConf.1.1,  TDDConf.2.1 |
| } |  |  |  |
| } |  |  |  |

|  |  |
| --- | --- |
| Condition | Explanation |
| TDDConf.1.1 | TDD UL/DL configuration for SCS=15kHz |
| TDDConf.2.1 | TDD UL/DL configuration for SCS=30kHz |
| TDDConf.3.1 | TDD UL/DL configuration for SCS=120kHz |

– *FilterCoefficient*

Table 7.3.1-2: FilterCoefficient

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-57 | | | |
| Information Element | Value/remark | Comment | Condition |
| FilterCoefficient | fc0 | L3 filtering is not used |  |

– *SSB-MTC*

Table 7.3.1-3: *SSB-MTC*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-185 | | | |
| Information Element | Value/remark | Comment | Condition |
| SSB-MTC ::= SEQUENCE { |  |  |  |
| periodicityAndOffset CHOICE { |  |  |  |
| sf10 | 0 |  | SMTC.8 |
| sf20 | 0 |  | SMTC.1, SMTC.2 |
| 5 |  | SMTC.7 |
| 10 |  | SMTC.4, SMTC.5 |
| 17 |  | SMTC.6 |
| 13 |  | SMTC.9 |
| sf40 | 0 |  | SMTC.1 RedCap |
|  | 20 |  | SMTC.3 RedCap |
| sf80 | 0 |  | SMTC.2 RedCap |
| SMTC.4 RedCap |
| sf160 | 0 |  | SMTC.3 |
| } |  |  |  |
| duration | sf1 |  | SMTC.1, SMTC.3,  SMTC.4,  SMTC.8,  SMTC.9,  SMTC.1 RedCap  SMTC.2 RedCap  SMTC.3 RedCap |
| sf5 |  | SMTC.2, SMTC.5  SMTC.6, SMTC.7  SMTC.4 RedCap |
| } |  |  |  |

|  |  |
| --- | --- |
| Condition | Explanation |
| SMTC.n | SMTC pattern n as defined in 38.533 Annex A.4 |
| SMTC.n RedCap | RedCap-specific SMTC pattern n as defined in 38.533 Annex A.4A |

– *SubcarrierSpacing*

Table 7.3.1-3a: *SubcarrierSpacing*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-188 | | | |
| Information Element | Value/remark | Comment | Condition |
| ssbSubcarrierSpacing | kHz15 |  | SSB.1 FR1  SSB.3 FR1  SSB.5 FR1  SSB.4 RedCap FR1  SSB.6 RedCap FR1 |
| kHz30 |  | SSB.2 FR1  SSB.4 FR1  SSB.6 FR1  SSB.1 RedCap FR1  SSB.2 RedCap FR1  SSB.3 RedCap FR1  SSB.5 RedCap FR1  SSB.7 RedCap FR1 |
| kHz120 |  | SSB.1 FR2  SSB.3 FR2  SSB.5 FR2  SSB.7 FR2  SSB.1 RedCap FR2  SSB.2 RedCap FR2  SSB.3 RedCap FR2 |
| kHz240 |  | SSB.2 FR2  SSB.4 FR2  SSB.6 FR2  SSB.8 FR2  SSB.4 RedCap FR2  SSB.5 RedCap FR2 |

|  |  |
| --- | --- |
| Condition | Explanation |
| SSB.n FR1 | SSB RMC n for FR1 as defined in 38.533 Annex A.3.1 |
| SSB.n FR2 | SSB RMC n for FR2 as defined in 38.533 Annex A.3.2 |
| SSB.n RedCap FR1 | RedCap specific SSB RMC n for FR1 as defined in 38.533 Annex A.3A.1 |
| SSB.n RedCap FR2 | RedCap specific SSB RMC n for FR2 as defined in 38.533 Annex A.3A.2 |

– *ServingCellConfigCommon*

Table 7.3.1-4: *ServingCellConfigCommon*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-168 | | | |
| Information Element | Value/remark | Comment | Condition |
| ServingCellConfigCommon ::= SEQUENCE { |  |  |  |
| ssb-PositionsInBurst CHOICE { |  |  |  |
| shortBitmap | 1100 | 2 SS Blocks in low FR1 frequencies | 2SSB AND ((SCS15 AND 1.88GHz<FREQ<=3GHz) OR FREQ<=1.88GHZ) |
| mediumBitmap | 11000000 | 2 SS Blocks in high FR1 frequencies | 2SSB AND ((SCS30 AND 1.88GHz<FREQ<=3GHz) OR FREQ>3GHZ) |
| longBitmap | 1100000000000000000000000000000000000000000000000000000000000000 | 2 SS Blocks in FR2 | 2SSB AND FR2 |
| } |  |  |  |
| ssbSubcarrierSpacing | kHz15 |  |  |
|  | kHz30 |  | SCS30 |
|  | kHz120 |  | FR2 |
| } | kHz240 |  | FR2 AND SCS240 |

|  |  |
| --- | --- |
| **Condition** | **Explanation** |
| FREQ<=1.88GHz | Frequency range <= 1.88GHz |
| 1.88GHz<FREQ<=3GHz | Frequency range > 1.88GHz and <= 3GHz |
| FREQ>3GHz | Frequency range > 3GHz |
| 2SSB | The SSB pattern as defined in TS 38.533 [18] Annex A.3.1 contain 2 SSBs within a burst |

– *ServingCellConfigCommonSIB*

Table 7.3.1-5: *ServingCellConfigCommonSIB-RRM*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-169 | | | |
| Information Element | Value/remark | Comment | Condition |
| ServingCellConfigCommonSIB ::= SEQUENCE { |  |  |  |
| ssb-PositionsInBurst SEQUENCE { |  |  |  |
| inOneGroup | ’1100 0000’B | When carrier frequency <= 3 GHz for FDD or <= 1.88 GHz for TDD, only the 4 leftmost bits are valid; | 2SSB |
| } |  |  |  |
| } |  |  |  |

|  |  |
| --- | --- |
| **Condition** | **Explanation** |
| 2SSB | For configuration with 2 SS Blocks |

#### - CSI-MeasConfig

Table 7.3.1-6: *CSI-MeasConfig for RRM*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-38 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-MeasConfig::= SEQUENCE { |  |  |  |
| nzp-CSI-RS-ResourceToAddModList SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-Resources)) OF NZP-CSI-RS-Resource { | n1+n2+n3+n4+n5 entries | n1=1 if CSI-RS for CSI is configured in test case, n1=0 otherwise;  n2=0 if CSI-RS for BM is not configured in the test case. If CSI-RS for BM is configured in the test case, n2 = 2 if 2SSB, n2 = 1 otherwise  n3=4 if TRS is configured in test case, n3=0 otherwise;  n4=4 if second resource set of TRS is configured in test case, n4=0 otherwise;  n5=2 if aperiodic CSI-RS for BM is configured in test case, n5=0 otherwise; |  |
| NZP-CSI-RS-Resource[k, k=1..n1] | NZP-CSI-RS-Resource for CSI | entry 1 | n1>0 |
| NZP-CSI-RS-Resource[k, k=n1+1.. n1+n2] | NZP-CSI-RS-Resource for BM (k-n1-1) | entry ... | n2>0 |
| NZP-CSI-RS-Resource[k, k= n1+n2+1.. n1+n2+n3] | NZP-CSI-RS-Resource for TRS (k-n1-n2) | entry ... | n3>0 |
| NZP-CSI-RS-Resource[k, k= n1+n2+n3+1.. n1+n2+n3+n4] | NZP-CSI-RS-Resource for TRS (k-n1-n2-n3) with condition SECOND\_SET | entry ... | n4>0 |
| NZP-CSI-RS-Resource[k, k= n1+n2+n3+n4+1.. n1+n2+n3+n4+n5] | NZP-CSI-RS-Resource for BM (k-n1-n2-n3-n4) with condition APERIODIC | entry ... | n5>0 |
| } |  |  |  |
| nzp-CSI-RS-ResourceSetToAddModList SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-ResourceSets)) OF NZP-CSI-RS-ResourceSet { | m1+m2+m3+m4+m5 entries | mi=1 if ni>0, mi=0 otherwise |  |
| NZP-CSI-RS-ResourceSet[k, k=1..m1] | NZP-CSI-RS-ResourceSet for CSI | entry 1 | n1>0 |
| NZP-CSI-RS-ResourceSet[k, k=m1+1.. m1+m2] | NZP-CSI-RS-ResourceSet for BM | entry ... | n2>0 |
| NZP-CSI-RS-ResourceSet[k, k= m1+m2+1.. m1+m2+m3] | NZP-CSI-RS-ResourceSet for TRS | entry ... | n3>0 |
| NZP-CSI-RS-ResourceSet[k, k= m1+m2+m3+1.. m1+m2+m3+m4] | NZP-CSI-RS-ResourceSet for TRS with condition SECOND\_SET | entry ... | n4>0 |
| NZP-CSI-RS-ResourceSet[k, k= m1+m2+m3+m4+1.. m1+m2+m3+m4+m5] | NZP-CSI-RS-ResourceSet for BM with condition APERIODIC | entry ... | n5>0 |
| } |  |  |  |
| csi-IM-ResourceToAddModList SEQUENCE (SIZE (1..maxNrofCSI-IM-Resources)) OF CSI-IM-Resource { | 1 entry |  | n1>0 |
| CSI-IM-Resource[1] | CSI-IM-Resource-RRM | entry 1 |  |
| } |  |  |  |
| csi-IM-ResourceToAddModList | Not present |  | n1=0 |
| csi-IM-ResourceSetToAddModList SEQUENCE (SIZE (1..maxNrofCSI-IM-ResourceSets)) OF CSI-IM-ResourceSet { | 1 entry |  | n1>0 |
| CSI-IM-ResourceSet[1] | CSI-IM-ResourceSet-RRM | entry 1 |  |
| } |  |  |  |
| csi-IM-ResourceSetToAddModList | Not present |  | n1=0 |
| csi-SSB-ResourceSetToAddModList | Not present |  |  |
| csi-ResourceConfigToAddModList SEQUENCE (SIZE (1..maxNrofCSI-ResourceConfigurations)) OF CSI-ResourceConfig { | p1+m2+m3+m4+m5 entries | p1=m1+1 if n1>0, p1=0 otherwise. |  |
| CSI-ResourceConfig[k, k=1..m1] | CSI-ResourceConfig for CSI | entry 1 | n1>0 |
| CSI-ResourceConfig[k, k=p1] | CSI-ResourceConfig for CSI-IM | entry ... | n1>0 |
| CSI-ResourceConfig[k, k=p1+1.. p1+m2] | CSI-ResourceConfig for BM | entry ... | n2>0 |
| CSI-ResourceConfig[k, k= p1+m2+1.. p1+m2+m3] | CSI-ResourceConfig for TRS | entry ... | n3>0 |
| CSI-ResourceConfig[k, k= p1+m2+m3+1.. p1+m2+m3+m4] | CSI-ResourceConfig for TRS with condition SECOND\_SET | entry ... | n4>0 |
| CSI-ResourceConfig[k, k= p1+m2+m3+m4+1.. p1+m2+m3+m4+m5] | CSI-ResourceConfig for BM with condition APERIODIC | entry ... | n5>0 |
| } |  |  |  |
| csi-ReportConfigToAddModList SEQUENCE (SIZE (1..maxNrofCSI-ReportConfigurations)) OF CSI-ReportConfig { | r1+r2+r5+s1 entries | r1 = 1 if CSI Reporting for CSI is configured in test case, r1 = 0 otherwise;  r2 = 1 if CSI Reporting for BM is configured in test case, r2 = 0 otherwise;  r5 = 1 if aperiodic CSI Reporting for BM is configured in test case, r5 = 0 otherwise;  s1 = 1 if:  - this CSI-MeasConfig is configured on NR SpCell, and,  - CSI-RS for CSI is configured on SCell in TC, and,  - SCell is not a PUCCH-SCell  Otherwise s1 = 0. |  |
| CSI-ReportConfig[k, k=1..r1] | CSI-ReportConfig for CSI | entry 1 | r1>0 |
| CSI-ReportConfig[k, k=r1+1.. r1+r2] | CSI-ReportConfig for BM | entry ... | r2>0 |
| CSI-ReportConfig[k, k=r1+r2+1.. r1+r2+r5] | CSI-ReportConfig for BM with condition APERIODIC | entry ... | r5>0 |
| CSI-ReportConfig[k, k=r1+r2+r5+1.. r1+r2+r5+s1+1] | CSI-ReportConfig for CSI with condition SCELL\_CSI\_ON\_SPCELL | entry ... | s1>0 |
| } |  |  |  |
| reportTriggerSize | Not present |  |  |
|  | 1 |  | n5>0 |
| aperiodicTriggerStateList CHOICE { | Not present |  |  |
| setup | CSI-AperiodicTriggerStateList |  | n5>0 |
| } |  |  |  |
| sCellActivationRS-ConfigToAddModList-r17 | Not present |  |  |
| sCellActivationRS-ConfigToAddModList-r17 SEQUENCE (SIZE (1.. maxNrofSCellActRS-r17)) OF SCellActivationRS-Config-r17 { | 1 entry |  | FastActivation\_SCell |
| SCellActivationRS-Config-r17 | SCellActivationRS-Config-r17 |  |  |
| } |  |  |  |
| sCellActivationRS-ConfigToReleaseList-r17 | Not present |  |  |
| } |  |  |  |

|  |  |
| --- | --- |
| **Condition** | **Explanation** |
| 2SSB | For configuration with 2 SS Blocks |
| FastActivation\_SCell | For fast activation of the SCell |

#### – SCellActivationRS-Config

Table 7.3.1-6A: SCellActivationRS-Config

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.331 [6], clause 6.3.2 | | | |
| Information Element | Value/remark | Comment | Condition |
| SCellActivationRS-Config-r17 ::= SEQUENCE { |  |  |  |
| scellActivationRS-Id-r17 | SCellActivationRS-Id-r17 |  |  |
| resourceSet-r17 | NZP-CSI-RS-ResourceSetId-AperiodicTRS |  |  |
|  | N NZP-CSI-RS-ResourceSetId-AperiodicTRS with condition SECOND\_SET |  | SECOND\_SET\_A |
| gapBetweenBursts-r17 | Not present |  |  |
| qcl-Info-r17 | TCI-StateId |  |  |
| } |  |  |  |
| } |  |  |  |

|  |  |
| --- | --- |
| **Condition** | **Explanation** |
| SECOND\_SET\_A | For the second resource set for Aperiodic TRS configured in test |

#### – SCellActivationRS-Id-r17

Table 7.3.1-6B: SCellActivationRS-Id-r17

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-42 | | | |
| Information Element | Value/remark | Comment | Condition |
| SCellActivationRS-Id-r17 | n | n is the SCellActivationRS-Id-r17 allocated for resource config of Aperiodic TRS.  Value of n is left to internal implementation |  |

#### – NZP-CSI-RS-Resource for TRS

Table 7.3.1-7: NZP-CSI-RS-Resource for TRS(Id)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-45 | | | |
| Information Element | Value/remark | Comment | Condition |
| NZP-CSI-RS-Resource ::= SEQUENCE { |  |  |  |
| NZP-CSI-RS-ResourceId | NZP-CSI-RS-ResourceId for TRS(Id) |  |  |
|  | NZP-CSI-RS-ResourceId for TRS(Id) with Condition SECOND\_SET |  | SECOND\_SET |
| CSI-RS-ResourceMapping | CSI-RS-ResourceMapping for TRS(Id) |  |  |
|  | CSI-RS-ResourceMapping for TRS(Id) with condition SECOND\_SET |  | SECOND\_SET |
| powerControlOffset | 0 |  |  |
| powerControlOffsetSS | db0 |  |  |
| scramblingID | PhysCellId | PCI of the cell sending the TRS |  |
| periodicityAndOffset | CSI-ResourcePeriodicityAndOffset for TRS(Id) |  |  |
| qcl-InfoPeriodicCSI-RS | TCI-StateId-RRM(0) |  |  |
|  | TCI-StateId-RRM(1) |  | SECOND\_SET |
| } |  |  |  |

|  |  |
| --- | --- |
| **Condition** | **Explanation** |
| SECOND\_SET | For resource belong to the second resource set for TRS, only applies to FR2 test |

#### – NZP-CSI-RS-Resource for Aperiodic TRS

Table 7.3.1-7AA: NZP-CSI-RS-Resource for AperiodicTRS(Id)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-45 | | | |
| Information Element | Value/remark | Comment | Condition |
| NZP-CSI-RS-Resource ::= SEQUENCE { |  |  |  |
| NZP-CSI-RS-ResourceId | NZP-CSI-RS-ResourceId for AperiodicTRS(Id) |  |  |
|  | NZP-CSI-RS-ResourceId for AperiodicTRS(Id) with Condition SECOND\_SET |  | SECOND\_SET\_A |
| CSI-RS-ResourceMapping | CSI-RS-ResourceMapping for TRS(Id) |  |  |
|  | CSI-RS-ResourceMapping for TRS(Id) with condition SECOND\_SET |  | SECOND\_SET\_A |
| powerControlOffset | 0 |  |  |
| powerControlOffsetSS | db0 |  |  |
| scramblingID | PhysCellId | PCI of the cell sending the Aperiodic TRS |  |
| } |  |  |  |

|  |  |
| --- | --- |
| **Condition** | **Explanation** |
| SECOND\_SET\_A | For the second resource set for Aperiodic TRS configured in test |

#### – NZP-CSI-RS-Resource for CSI

Table 7.3.1-7A: NZP-CSI-RS-Resource for CSI

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-45 | | | |
| Information Element | Value/remark | Comment | Condition |
| NZP-CSI-RS-Resource ::= SEQUENCE { |  |  |  |
| nzp-CSI-RS-ResourceId | NZP-CSI-RS-ResourceId for CSI |  |  |
| resourceMapping | CSI-RS-ResourceMapping for CSI |  |  |
| powerControlOffset | 0 |  |  |
| powerControlOffsetSS | db0 |  |  |
| scramblingID | 0 |  |  |
| periodicityAndOffset | CSI-ResourcePeriodicityAndOffset for CSI |  |  |
| qcl-InfoPeriodicCSI-RS | TCI-StateId-RRM(0) |  |  |
| } |  |  |  |

#### – NZP-CSI-RS-Resource for BM

Table 7.3.1-7B: NZP-CSI-RS-Resource for BM(Id)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-45 | | | |
| Information Element | Value/remark | Comment | Condition |
| NZP-CSI-RS-Resource ::= SEQUENCE { |  |  |  |
| nzp-CSI-RS-ResourceId | NZP-CSI-RS-ResourceId for BM (Id) |  |  |
|  | NZP-CSI-RS-ResourceId for BM (Id) with condition APERIODIC |  | APERIODIC |
| resourceMapping | CSI-RS-ResourceMapping for BM (Id) |  |  |
| powerControlOffset | 0 |  |  |
| powerControlOffsetSS | db0 |  |  |
| scramblingID | 0 |  |  |
| periodicityAndOffset | CSI-ResourcePeriodicityAndOffset for BM |  |  |
|  | Not present |  | APERIODIC |
| qcl-InfoPeriodicCSI-RS | TCI-StateId-RRM(Id) |  |  |
|  | Not present |  | APERIODIC |
| } |  |  |  |

|  |  |
| --- | --- |
| **Condition** | **Explanation** |
| APERIODIC | For apeiodic CSI-RS resources |

#### – NZP-CSI-RS-ResourceId for TRS

Table 7.3.1-7C: NZP-CSI-RS-ResourceId for TRS(Id)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-86 | | | |
| Information Element | Value/remark | Comment | Condition |
| NZP-CSI-RS-ResourceId | n+Id-1 | n is the first NZP-CSI-RS-ResourceId allocated for TRS resource set.  Value of n is left to internal implementation  Id = 1,2,3,4 |  |
|  | n+Id+3 |  | SECOND\_SET |

|  |  |
| --- | --- |
| Condition | Explanation |
| SECOND\_SET | For the second TRS resource set configured in test, only applies to FR2 test |

#### – *NZP-CSI-RS-ResourceId for Aperiodic TRS*

Table 7.3.1-7CA: NZP-CSI-RS-ResourceId for AperiodicTRS(Id)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-86 | | | |
| Information Element | Value/remark | Comment | Condition |
| NZP-CSI-RS-ResourceId | n+Id-1 | n is the first NZP-CSI-RS-ResourceId allocated for aperiodic TRS resource set.  Value of n is left to internal implementation  Id = 1,2,3,4 |  |
|  | n+Id+3 |  | SECOND\_SET\_A |

|  |  |
| --- | --- |
| **Condition** | **Explanation** |
| SECOND\_SET\_A | For the second resource set for Aperiodic TRS configured in test |

– *NZP-CSI-RS-ResourceId for CSI*

Table 7.3.1-7D: NZP-CSI-RS-ResourceId for CSI

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-86 | | | |
| Information Element | Value/remark | Comment | Condition |
| NZP-CSI-RS-ResourceId | n | n is the NZP-CSI-RS-ResourceId allocated for CSI-RS for CSI report.  Value of n is left to internal implementation |  |

– *NZP-CSI-RS-ResourceId for BM*

Table 7.3.1-7E: NZP-CSI-RS-ResourceId for BM(Id)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-86 | | | |
| Information Element | Value/remark | Comment | Condition |
| NZP-CSI-RS-ResourceId | n+Id | n is the first NZP-CSI-RS-ResourceId allocated for CSI-RS for BM.  Value of n is left to internal implementation  Id = 0,1 |  |
|  | m+Id | m is the first NZP-CSI-RS-ResourceId allocated for aperiodic CSI-RS for BM.  Value of m is left to internal implementation  Id = 0,1 | APERIODIC |

|  |  |
| --- | --- |
| **Condition** | **Explanation** |
| APERIODIC | For apeiodic CSI-RS resources |

– *CSI-RS-ResourceMapping for TRS*

Table 7.3.1-8: CSI-RS-ResourceMapping for TRS(Id)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-45 with condition TRS | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-RS-ResourceMapping ::= SEQUENCE { |  |  |  |
| frequencyDomainAllocation CHOICE { |  |  |  |
| row1 | 0001 | k0=0 for CSI-RS resource 1,2,3,4 |  |
| } |  |  |  |
| firstOFDMSymbolInTimeDomain | 5 | l0 = 5 for CSI-RS resource 1 and 3 | (Id = 1 or 3) AND FR1 |
|  | 9 | l0 = 9 for CSI-RS resource 2 and 4 | (Id = 2 or 4) AND FR1 |
|  | 1 |  | (Id = 1 or 3) AND FR2 |
|  | 2 |  | (Id = 1 or 3) AND FR2 AND SECOND\_SET |
|  | 5 |  | (Id = 2 or 4) AND FR2 |
|  | 6 |  | (Id = 1 or 3) AND FR2 AND SECOND\_SET |
| nrofPorts | p1 | 1 for CSI-RS resource 1,2,3,4 |  |
| freqBand | CSI-FrequencyOccupation-RRM |  |  |
| } |  |  |  |

|  |  |
| --- | --- |
| Condition | Explanation |
| SECOND\_SET | For the second resource set for TRS configured in test, only applies to FR2 test |

– *CSI-RS-ResourceMapping for CSI*

Table 7.3.1-8A: CSI-RS-ResourceMapping for CSI

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-45 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-RS-ResourceMapping ::= SEQUENCE { |  |  |  |
| frequencyDomainAllocation CHOICE { |  |  |  |
| other | 000001 |  |  |
| } |  |  |  |
| nrofPorts | p2 |  |  |
| firstOFDMSymbolInTimeDomain | 5 |  | NOT SCS15 |
|  | 4 |  | SCS15 |
| freqBand | CSI-FrequencyOccupation-RRM |  |  |
| } |  |  |  |

– *CSI-RS-ResourceMapping for BM*

Table 7.3.1-8B: CSI-RS-ResourceMapping for BM (Id)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-45 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-RS-ResourceMapping ::= SEQUENCE { |  |  |  |
| frequencyDomainAllocation CHOICE { |  |  |  |
| row1 | 0001 |  |  |
| } |  |  |  |
| nrofPorts | p1 |  |  |
| firstOFDMSymbolInTimeDomain | 6 |  | Id = 0 |
|  | 10 |  | Id = 1 |
| cdm-Type | noCDM |  |  |
| density CHOICE { |  |  |  |
| three | NULL |  |  |
| } |  |  |  |
| freqBand | CSI-FrequencyOccupation-RRM |  |  |
| } |  |  |  |

#### – *CSI-RS-ResourceMapping for ZP-CSI-RS*

Table 7.3.1-8C: CSI-RS-ResourceMapping-ZP-CSI-RS

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-45 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-RS-ResourceMapping ::= SEQUENCE { |  |  |  |
| frequencyDomainAllocation CHOICE { |  |  |  |
| row4 | 100 | k0 = 8 |  |
| } |  |  |  |
| nrofPorts | p4 |  |  |
| firstOFDMSymbolInTimeDomain | 4 |  |  |
| cdm-Type | fd-CDM2 |  |  |
| density CHOICE { |  |  |  |
| one | NULL |  |  |
| } |  |  |  |
| freqBand | CSI-FrequencyOccupation-RRM |  |  |
| } |  |  |  |

– *CSI-ResourcePeriodicityAndOffset for TRS*

Table 7.3.1-9: CSI-ResourcePeriodicityAndOffset for TRS(Id)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-43 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ResourcePeriodicityAndOffset ::= CHOICE { |  |  |  |
| slots80 | 40 |  | (Id = 1 or 2) AND SCS120 |
|  | 41 |  | (Id = 3 or 4) AND SCS120 |
| slots40 | 20 | Periodicity 40 slots and offset 20 for CSI-RS resource 1 and 2 | (Id = 1 or 2) AND SCS30 |
|  | 21 | Periodicity 40 slots and offset 21 for CSI-RS resource 3 and 4 | (Id = 3 or 4) AND SCS30 |
| slots20 | 10 | Periodicity 20 slots and offset 10 for CSI-RS resource 1 and 2 | (Id = 1 or 2) AND SCS15 |
|  | 11 | Periodicity 20 slots and offset 11 for CSI-RS resource 3 and 4 | (Id = 3 or 4) AND SCS15 |
| } |  |  |  |

– *CSI-ResourcePeriodicityAndOffset for CSI*

Table 7.3.1-9A: CSI-ResourcePeriodicityAndOffset for CSI

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-43 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ResourcePeriodicityAndOffset ::= CHOICE { |  |  |  |
| slots5 | 1 |  | SCS15 |
| slots10 | 2 |  | SCS30 |
| slots40 | 8 |  | SCS120 |
| } |  |  |  |

– *CSI-ResourcePeriodicityAndOffset for BM*

Table 7.3.1-9B: CSI-ResourcePeriodicityAndOffset for BM

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-43 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ResourcePeriodicityAndOffset ::= CHOICE { |  |  |  |
| slots10 | 1 |  | SCS15 |
| slots20 | 2 |  | SCS30 |
| slots80 | 16 |  | SCS120 |
| } |  |  |  |

– *CSI-FrequencyOccupation*

Table 7.3.1-10: CSI-FrequencyOccupation-RRM

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-33 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-FrequencyOccupation ::= SEQUENCE { |  |  |  |
| startingRB | 4\*floor(n/4) | n is the start RB of active BWP  floor() means rounding down to the nearest integer  startingRB can only be multiple of 4 |  |
| nrofRBs | max(4\*ceil(n/4-floor(n/4)+m/4),24) | m is the bandwidth of active BWP  ceil() means rounding up to the nearest integer  Bandwidth of CSI-RS used in RRM test is required to be same as active BWP according to 38.133.  nrofRBs shall be no less than 24 and shall be multiple of 4 |  |
| } |  |  |  |

#### – NZP-CSI-RS-ResourceSet for TRS

Table 7.3.1-11: NZP-CSI-RS-ResourceSet for TRS

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-87 with Condition TRS | | | |
| Information Element | Value/remark | Comment | Condition |
| NZP-CSI-RS-ResourceSet ::= SEQUENCE { |  |  |  |
| nzp-CSI-ResourceSetId | NZP-CSI-RS-ResourceSetId-TRS |  |  |
|  | NZP-CSI-RS-ResourceSetId-TRS with condition SECOND\_SET |  | SECOND\_SET |
| nzp-CSI-RS-Resources SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-ResourcesPerSet)) OF NZP-CSI-RS-ResourceId { | 4 entries |  |  |
| NZP-CSI-RS-ResourceId[1] | NZP-CSI-RS-ResourceId for TRS(1) | entry 1 |  |
| NZP-CSI-RS-ResourceId[2] | NZP-CSI-RS-ResourceId for TRS(2) | entry 2 |  |
| NZP-CSI-RS-ResourceId[3] | NZP-CSI-RS-ResourceId for TRS(3) | entry 3 |  |
| NZP-CSI-RS-ResourceId[4] | NZP-CSI-RS-ResourceId for TRS(4) | entry 4 |  |
| } |  |  |  |
| nzp-CSI-RS-Resources SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-ResourcesPerSet)) OF NZP-CSI-RS-ResourceId { | 4 entries |  | SECOND\_SET |
| NZP-CSI-RS-ResourceId[1] | NZP-CSI-RS-ResourceId for TRS(1) with condition SECOND\_SET | entry 1 |  |
| NZP-CSI-RS-ResourceId[2] | NZP-CSI-RS-ResourceId for TRS(2) with condition SECOND\_SET | entry 2 |  |
| NZP-CSI-RS-ResourceId[3] | NZP-CSI-RS-ResourceId for TRS(3) with condition SECOND\_SET | entry 3 |  |
| NZP-CSI-RS-ResourceId[4] | NZP-CSI-RS-ResourceId for TRS(4) with condition SECOND\_SET | entry 4 |  |
| } |  |  |  |
| } |  |  |  |

|  |  |
| --- | --- |
| Condition | Explanation |
| SECOND\_SET | For the second TRS resource set configured in test, only applies to FR2 test |

#### – NZP-CSI-RS-ResourceSet for Aperiodic TRS

Table 7.3.1-11AA: NZP-CSI-RS-ResourceSet for Aperiodic TRS

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-87 with Condition TRS | | | |
| Information Element | Value/remark | Comment | Condition |
| NZP-CSI-RS-ResourceSet ::= SEQUENCE { |  |  |  |
| nzp-CSI-ResourceSetId | NZP-CSI-RS-ResourceSetId-AperiodicTRS |  |  |
|  | NZP-CSI-RS-ResourceSetId-AperiodicTRS with condition SECOND\_SET |  | SECOND\_SET\_A |
| nzp-CSI-RS-Resources SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-ResourcesPerSet)) OF NZP-CSI-RS-ResourceId { | 4 entries |  |  |
| NZP-CSI-RS-ResourceId[1] | NZP-CSI-RS-ResourceId for AperiodicTRS(1) | entry 1 |  |
| NZP-CSI-RS-ResourceId[2] | NZP-CSI-RS-ResourceId for AperiodicTRS(2) | entry 2 |  |
| NZP-CSI-RS-ResourceId[3] | NZP-CSI-RS-ResourceId for AperiodicTRS(3) | entry 3 |  |
| NZP-CSI-RS-ResourceId[4] | NZP-CSI-RS-ResourceId for AperiodicTRS(4) | entry 4 |  |
| } |  |  |  |
| nzp-CSI-RS-Resources SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-ResourcesPerSet)) OF NZP-CSI-RS-ResourceId { | 4 entries |  | SECOND\_SET\_A |
| NZP-CSI-RS-ResourceId[1] | NZP-CSI-RS-ResourceId for AperiodicTRS(1) with condition SECOND\_SET | entry 1 |  |
| NZP-CSI-RS-ResourceId[2] | NZP-CSI-RS-ResourceId for AperiodicTRS(2) with condition SECOND\_SET | entry 2 |  |
| NZP-CSI-RS-ResourceId[3] | NZP-CSI-RS-ResourceId for AperiodicTRS(3) with condition SECOND\_SET | entry 3 |  |
| NZP-CSI-RS-ResourceId[4] | NZP-CSI-RS-ResourceId for AperiodicTRS(4) with condition SECOND\_SET | entry 4 |  |
| } |  |  |  |
| trs-Info | true |  |  |
| aperiodicTriggeringOffsetL2-r17 | 2 |  |  |
| } |  |  |  |

|  |  |
| --- | --- |
| **Condition** | **Explanation** |
| SECOND\_SET\_A | For the second resource set for Aperiodic TRS configured in test |

#### – NZP-CSI-RS-ResourceSet for CSI

Table 7.3.1-11A: NZP-CSI-RS-ResourceSet for CSI

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-87 | | | |
| Information Element | Value/remark | Comment | Condition |
| NZP-CSI-RS-Resource ::= SEQUENCE { |  |  |  |
| nzp\_CSI\_ResourceSetId | NZP-CSI-RS-ResourceSetId-CSI |  |  |
| nzp-CSI-RS-Resources SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-ResourcesPerSet)) OF NZP-CSI-RS-ResourceId { | 1 entry |  |  |
| NZP-CSI-RS-ResourceId[1] | NZP-CSI-RS-ResourceId for CSI | entry 1 |  |
| } |  |  |  |
| repetition | Not present |  |  |
| } |  |  |  |

#### – NZP-CSI-RS-ResourceSet for BM

Table 7.3.1-11B: NZP-CSI-RS-ResourceSet for BM

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-87 | | | |
| Information Element | Value/remark | Comment | Condition |
| NZP-CSI-RS-ResourceSet ::= SEQUENCE { |  |  |  |
| nzp-CSI-ResourceSetId | NZP-CSI-RS-ResourceSetId-BM |  |  |
|  | NZP-CSI-RS-ResourceSetId-BM with condition APERIODIC |  | APERIODIC |
| nzp-CSI-RS-Resources SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-ResourcesPerSet)) OF NZP-CSI-RS-ResourceId { | 2 entries |  |  |
| NZP-CSI-RS-ResourceId[1] | NZP-CSI-RS-ResourceId for BM (0) | entry 1 |  |
|  | NZP-CSI-RS-ResourceId for BM (0) with condition APERIODIC |  | APERIODIC |
| NZP-CSI-RS-ResourceId[2] | NZP-CSI-RS-ResourceId for BM (1) | entry 2 |  |
|  | NZP-CSI-RS-ResourceId for BM (1) with condition APERIODIC |  | APERIODIC |
| } |  |  |  |
| aperiodicTriggeringOffset | 4 |  | APERIODIC |
| 0 |  | APERIODIC AND FR1 |
| } |  |  |  |

|  |  |
| --- | --- |
| **Condition** | **Explanation** |
| APERIODIC | For apeiodic CSI-RS resources |

#### – NZP-CSI-RS-ResourceSetId for TRS

Table 7.3.1-11C: NZP-CSI-RS-ResourceSetId-TRS

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-88 | | | |
| Information Element | Value/remark | Comment | Condition |
| NZP-CSI-RS-ResourceSetId | n | n is the first NZP-CSI-RS-ResourceSetId allocated for TRS resource set.  Value of n is left to internal implementation |  |
|  | n+1 |  | SECOND\_SET |

|  |  |
| --- | --- |
| Condition | Explanation |
| SECOND\_SET | For the second TRS resource set configured in test, only applies to FR2 test |

#### – NZP-CSI-RS-ResourceSetId for Aperiodic TRS

Table 7.3.1-11CA: NZP-CSI-RS-ResourceSetId-AperiodicTRS

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-88 | | | |
| Information Element | Value/remark | Comment | Condition |
| NZP-CSI-RS-ResourceSetId | n | n is the first NZP-CSI-RS-ResourceSetId allocated for aperiodic TRS resource set.  Value of n is left to internal implementation |  |
|  | n+1 |  | SECOND\_SET\_A |

|  |  |
| --- | --- |
| **Condition** | **Explanation** |
| SECOND\_SET\_A | For the second resource set for Aperiodic TRS configured in test |

#### – NZP-CSI-RS-ResourceSetId for CSI

Table 7.3.1-11D: NZP-CSI-RS-ResourceSetId-CSI

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-88 | | | |
| Information Element | Value/remark | Comment | Condition |
| NZP-CSI-RS-ResourceSetId | n | n is the NZP-CSI-RS-ResourceSetId allocated for resource set of CSI-RS for CSI reporting.  Value of n is left to internal implementation |  |

#### – NZP-CSI-RS-ResourceSetId for BM

Table 7.3.1-11E: NZP-CSI-RS-ResourceSetId-BM

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-88 | | | |
| Information Element | Value/remark | Comment | Condition |
| NZP-CSI-RS-ResourceSetId | n | n is the NZP-CSI-RS-ResourceSetId allocated for resource set of CSI-RS for BM.  Value of n is left to internal implementation |  |
|  | m | m is the NZP-CSI-RS-ResourceSetId allocated for resource set of aperiodic CSI-RS for BM.  Value of m is left to internal implementation | APERIODIC |

|  |  |
| --- | --- |
| **Condition** | **Explanation** |
| APERIODIC | For apeiodic CSI-RS resources |

#### – CSI-ResourceConfig for TRS

Table 7.3.1-12: CSI-ResourceConfig for TRS

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 Table 4.6.3-41 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ResourceConfig ::= SEQUENCE { |  |  |  |
| csi-ResourceConfigId | CSI-ResourceConfigId-TRS |  |  |
| csi-RS-ResourceSetList CHOICE { |  |  |  |
| nzp-CSI-RS-SSB SEQUENCE { |  |  |  |
| nzp-CSI-RS-ResourceSetList SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-ResourceSetsPerConfig)) OF NZP-CSI-RS-ResourceSetId { | 1 entry |  |  |
| NZP-CSI-RS-ResourceSetId[1] | NZP-CSI-RS-ResourceSetId-TRS |  |  |
| NZP-CSI-RS-ResourceSetId-TRS with condition SECOND\_SET |  | SECOND\_SET |
| } |  |  |  |
| } |  |  |  |
| bwp-Id | BWP-Id of active BWP |  |  |
| } |  |  |  |
| } |  |  |  |

|  |  |
| --- | --- |
| **Condition** | **Explanation** |
| SECOND\_SET | For the second resource set for TRS configured in test, only applies to FR2 test |

#### – CSI-ResourceConfig for CSI

Table 7.3.1-12A: CSI-ResourceConfig for CSI

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 Table 4.6.3-41 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ResourceConfig ::= SEQUENCE { |  |  |  |
| csi-ResourceConfigId | CSI-ResourceConfigId-CSI |  |  |
| csi-RS-ResourceSetList CHOICE { |  |  |  |
| nzp-CSI-RS-SSB SEQUENCE { |  |  |  |
| nzp-CSI-RS-ResourceSetList SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-ResourceSetsPerConfig)) OF NZP-CSI-RS-ResourceSetId { | 1 entry |  |  |
| NZP-CSI-RS-ResourceSetId[1] | NZP-CSI-RS-ResourceSetId-CSI | entry 1 |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| bwp-Id | BWP-Id of active BWP |  |  |
| } |  |  |  |

#### – CSI-ResourceConfig for BM

Table 7.3.1-12B: CSI-ResourceConfig for BM

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-41 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ResourceConfig ::= SEQUENCE { |  |  |  |
| csi-ResourceConfigId | CSI-ResourceConfigId-BM |  |  |
|  | CSI-ResourceConfigId-BM with condition APERIODIC |  | APERIODIC |
| csi-RS-ResourceSetList CHOICE { |  |  |  |
| nzp-CSI-RS-SSB SEQUENCE { |  |  |  |
| nzp-CSI-RS-ResourceSetList SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-ResourceSetsPerConfig)) OF NZP-CSI-RS-ResourceSetId { | 1 entry |  |  |
| NZP-CSI-RS-ResourceSetId[1] | NZP-CSI-RS-ResourceSetId-BM |  |  |
|  | NZP-CSI-RS-ResourceSetId-BM with condition APERIODIC |  | APERIODIC |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| bwp-Id | BWP-Id of active BWP |  |  |
| resourceType | aperiodic |  | APERIODIC |
|  | periodic |  | PERIODIC |
| } |  |  |  |

|  |  |
| --- | --- |
| **Condition** | **Explanation** |
| APERIODIC | For apeiodic CSI-RS resources |
| PERIODIC | For periodic CSI-RS resources |

#### – CSI-ResourceConfig for CSI-IM

Table 7.3.1-12BA: CSI-ResourceConfig for CSI-IM

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-41 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ResourceConfig ::= SEQUENCE { |  |  |  |
| csi-ResourceConfigId | CSI-ResourceConfigId-CSI-IM |  |  |
| csi-RS-ResourceSetList CHOICE { |  |  |  |
| csi-IM-ResourceSetList SEQUENCE (SIZE (1..maxNrofCSI-IM-ResourceSetsPerConfig)) OF CSI-IM-ResourceSetId { | 1 entry |  |  |
| CSI-IM-ResourceSetId[1] | CSI-IM-ResourceSetId-RRM | entry 1 |  |
| } |  |  |  |
| } |  |  |  |
| bwp-Id | BWP-Id |  |  |
| resourceType | periodic |  |  |
| } |  |  |  |

#### – CSI-ResourceConfigId for TRS

Table 7.3.1-12C: CSI-ResourceConfigId-TRS

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-42 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ResourceConfigId | n | n is the CSI-ResourceConfigId allocated for resource config of TRS.  Value of n is left to internal implementation |  |

– *CSI-ResourceConfigId for CSI*

Table 7.3.1-12D: CSI-ResourceConfigId-CSI

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-42 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ResourceConfigId | n | n is the CSI-ResourceConfigId allocated for resource config of CSI-RS for CSI reporting.  Value of n is left to internal implementation |  |

– *CSI-ResourceConfigId for BM*

Table 7.3.1-12E: CSI-ResourceConfigId-BM

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-42 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ResourceConfigId | n | n is the CSI-ResourceConfigId allocated for resource config of CSI-RS for BM.  Value of n is left to internal implementation |  |
|  | m | m is the CSI-ResourceConfigId allocated for resource config of aperiodic CSI-RS for BM.  Value of m is left to internal implementation | APERIODIC |

|  |  |
| --- | --- |
| **Condition** | **Explanation** |
| APERIODIC | For apeiodic CSI-RS resources |

– *CSI-ResourceConfigId-CSI-IM*

Table 7.3.1-12EA: CSI-ResourceConfigId-CSI-IM

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-42 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ResourceConfigId | n | n is the first CSI-ResourceConfigId allocated for CSI-IM resource configuration  Value of n is left to internal implementation |  |

– *CSI-ReportConfig for CSI*

Table 7.3.1-12F: CSI-ReportConfig for CSI

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-39 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ReportConfig ::= SEQUENCE { |  |  |  |
| reportConfigId | CSI-ReportConfigId-CSI |  |  |
|  | CSI-ReportConfigId-CSI with condition SCELL\_CSI\_ON\_SPCELL |  | SCELL\_CSI\_ON\_SPCELL |
| carrier | Not present | indicates the same serving cell as this report configuration |  |
|  | ServCellIndex of the SCell |  | SCELL\_CSI\_ON\_SPCELL |
| resourcesForChannelMeasurement | CSI-ResourceConfigId-CSI |  |  |
| csi-IM-ResourcesForInterference | CSI-ResourceConfigId-CSI-IM |  |  |
| nzp-CSI-RS-ResourcesForInterference | Not present |  |  |
| reportConfigType CHOICE { |  |  |  |
| periodic SEQUENCE { |  |  |  |
| reportSlotConfig CHOICE { |  |  |  |
| slots5 | 2 |  | SCS15 |
| slots10 | 4 |  | SCS30 |
| slots40 | 4 |  | SCS120 |
| } |  |  |  |
| pucch-CSI-ResourceList SEQUENCE (SIZE (1..maxNrofBWPs)) OF PUCCH-CSI-Resource { | 1 entry |  |  |
| PUCCH-CSI-Resource [1] SEQUENCE { |  | entry 1 |  |
| uplinkBandwidthPartId | BWP-Id of active UL BWP |  |  |
| pucch-Resource | 8 | The first format 2 PUCCH resource configured in Table 4.6.3-112 is used |  |
|  | 8 | The first format 2 PUCCH resource configured in Table 4.6.3-112 is used | SCELL\_CSI\_ON\_SPCELL |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| reportQuantity CHOICE { |  |  |  |
| cri-RI-PMI-CQI | null |  |  |
| } |  |  |  |
| reportFreqConfiguration SEQUENCE { |  |  |  |
| csi-ReportingBand CHOICE { |  |  |  |
| subbands7 | '1111111'B |  | FR1 AND MORE\_THAN\_24\_PRBS |
| subbands9 | ‘111111111’B |  | FR2 AND MORE\_THAN\_24\_PRBS |
| } |  |  |  |
| } |  |  |  |
| codebookConfig | CodebookConfig-CSI |  |  |
| } |  |  |  |

|  |  |
| --- | --- |
| **Condition** | **Explanation** |
| SCELL\_CSI\_ON\_SPCELL | For SCell CSI reporting on NR SpCell |
| MORE\_THAN\_24\_PRBS | Total number of PRBs in the active BWP higher than 24 |

– *CSI-ReportConfig for BM*

Table 7.3.1-12G: CSI-ReportConfig for BM

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-39 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ReportConfig ::= SEQUENCE { |  |  |  |
| reportConfigId | CSI-ReportConfigId-BM |  |  |
|  | CSI-ReportConfigId-BM with condition APERIODIC |  | APERIODIC |
| carrier | Not present |  |  |
| resourcesForChannelMeasurement | CSI-ResourceConfigId-BM |  |  |
|  | CSI-ResourceConfigId-BM with condition APERIODIC |  | APERIODIC |
| csi-IM-ResourcesForInterference | Not present |  |  |
| nzp-CSI-RS-ResourcesForInterference | Not present |  |  |
| reportConfigType CHOICE { |  |  |  |
| periodic |  |  |  |
| reportSlotConfig ::= CHOICE { |  |  |  |
| slots80 | 2 |  | SCS15 |
| slots80 | 4 |  | SCS30 OR SCS120 |
| } |  |  |  |
| pucch-CSI-ResourceList SEQUENCE (SIZE (1..maxNrofBWPs)) OF{ |  |  |  |
| PUCCH\_CSI\_Resource[0] SEQUENCE { |  |  |  |
| uplinkBandwidthPartId | BWP-Id |  |  |
| pucch\_Resource | 9 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| aperiodic SEQUENCE { |  |  | APERIODIC |
| reportSlotOffsetList SEQUENCE (SIZE (1..maxNrofUL-Allocations)) OF { | 1 entry |  |  |
| INTEGER[1] | 8 |  |  |
| } |  |  |  |
| } |  |  |  |
| reportQuantity CHOICE { |  |  |  |
| cri-RSRP | NULL |  |  |
| } |  |  |  |
| reportFreqConfiguration SEQUENCE { |  |  |  |
| csi-ReportingBand CHOICE { |  |  |  |
| subbands7 | '1111111'B |  | FR1 AND MORE\_THAN\_24\_PRBS |
| subbands9 | ‘111111111’B |  | FR2 AND MORE\_THAN\_24\_PRBS |
| } |  |  |  |
| } |  |  |  |
| codebookConfig | Not present |  |  |
| } |  |  |  |

|  |  |
| --- | --- |
| **Condition** | **Explanation** |
| APERIODIC | For aperiodic CSI-RS resources |
| MORE\_THAN\_24\_PRBS | Total number of PRBs in the active BWP higher than 24 |

– *CSI-ReportConfigId for CSI*

Table 7.3.1-12H: CSI-ReportConfigId-CSI

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-40 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ReportConfigId | n | n is the CSI-ReportConfigId allocated for report config of CSI-RS for CSI.  Value of n is left to internal implementation |  |
|  | m | m is the CSI-ReportConfigId allocated for report config of SCell CSI on SpCell.  Value of m is left to internal implementation | SCELL\_CSI\_ON\_SPCELL |

|  |  |
| --- | --- |
| **Condition** | **Explanation** |
| SCELL\_CSI\_ON\_SPCELL | For SCell CSI reporting on NR SpCell |

– *CSI-ReportConfigId for BM*

Table 7.3.1-12I: CSI-ReportConfigId-BM

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-40 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-ReportConfigId | n | n is the CSI-ReportConfigId allocated for report config of CSI-RS for BM.  Value of n is left to internal implementation |  |
|  | m | m is the CSI-ReportConfigId allocated for report config of aperiodic CSI-RS for BM.  Value of m is left to internal implementation | APERIODIC |

|  |  |
| --- | --- |
| **Condition** | **Explanation** |
| APERIODIC | For apeiodic CSI-RS resources |

– *CSI-AperiodicTriggerStateList*

Table 7.3.1-12J: *CSI-AperiodicTriggerStateList*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-32 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-AperiodicTriggerStateList ::= SEQUENCE (SIZE (1..maxNrOfCSI-AperiodicTriggers)) OF SEQUENCE { | 1 entry |  |  |
| associatedReportConfigInfoList[1] SEQUENCE (SIZE(1..maxNrofReportConfigPerAperiodicTrigger)) OF SEQUENCE { | 1 entry |  |  |
| reportConfigId[1] | CSI-ReportConfigId-BM with condition APERIODIC |  |  |
| resourcesForChannel[1] CHOICE { |  |  |  |
| nzp-CSI-RS SEQUENCE { |  |  |  |
| resourceSet | NZP-CSI-RS-ResourceSetId-BM with condition APERIODIC |  |  |
| qcl-info SEQUENCE (SIZE(1..maxNrofAP-CSI-RS-ResourcesPerSet)) OF { | 2 entries |  |  |
| TCI-StateId[1] | TCI-StateId-RRM(0) | QCL Type C+D to SSB #0 |  |
| TCI-StateId[2] | TCI-StateId-RRM(1) | QCL Type C+D to SSB #1 |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| csi-IM-ResourcesForInterference[1] | Not present |  |  |
| nzp-CSI-RS-ResourcesForInterference[1] | Not present |  |  |
| } |  |  |  |
| } |  |  |  |

– *RACH-ConfigCommon*

Table 7.3.1-13: *RACH-ConfigCommon*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 Table 4.6.3-128 | | | |
| Information Element | Value/remark | Comment | Condition |
| RACH-ConfigCommon::= SEQUENCE { |  |  |  |
| rach-ConfigGeneric | RACH-ConfigGeneric |  |  |
| totalNumberOfRA-Preambles | 48 |  |  |
| ssb-perRACH-OccasionAndCB-PreamblesPerSSB CHOICE { |  |  |  |
| oneFourth | n48 |  |  |
| } |  |  |  |
| ra-ContentionResolutionTimer | sf48 |  |  |
| rsrp-ThresholdSSB | 51 |  |  |
| prach-RootSequenceIndex CHOICE { |  |  |  |
| l139 | 0 |  |  |
| } |  |  |  |
| } |  |  |  |

– *RACH-ConfigGeneric*

Table 7.3.1-14: *RACH-ConfigGeneric*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 Table 4.6.3-130 | | | |
| Information Element | Value/remark | Comment | Condition |
| RACH-ConfigGeneric ::= SEQUENCE { |  |  |  |
| prach-ConfigurationIndex | 102 |  | FR1 |
|  | 190 |  | FR2 |
| msg1-FDM | one |  |  |
| msg1-FrequencyStart | 0 |  |  |
| zeroCorrelationZoneConfig | 11 |  |  |
| preambleReceivedTargetPower | -120 |  |  |
| preambleTransMax | n6 |  |  |
|  | n200 |  | PRACH.4 FR1 or PRACH.4 FR2 |
| powerRampingStep | dB2 |  |  |
| ra-ResponseWindow | sl10 |  |  |
|  | sl1 |  | PRACH.4 FR1 or |
|  | sl40 |  | PRACH.4 FR2 |
| } |  |  |  |

|  |  |
| --- | --- |
| **Condition** | **Explanation** |
| PRACH.4 FR1 | When PRACH reference configuration PRACH.4 FR1 is used in test case |
| PRACH.4 FR2 | When PRACH reference configuration PRACH.4 FR2 is used in test case |

– ControlResourceSet

Table 7.3.1-15: ControlResourceSet

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-28 | | | |
| Information Element | Value/remark | Comment | Condition |
| ControlResourceSet ::= SEQUENCE { |  |  |  |
| controlResourceSetId | ControlResourceSetId |  |  |
| frequencyDomainResources | 11111111 00000000 00000000 00000000 00000000 00000 |  | CCR.3.7 OR SCS240 |
| duration | 1 |  | CCR.3.x |
| cce-REG-MappingType CHOICE { |  |  |  |
| interleaved ::= SEQUENCE { |  |  | CCR.X.Y |
| reg-BundleSize | n6 |  |  |
| interleaverSize | n2 |  |  |
| shiftIndex | 0 |  |  |
| } |  |  |  |
| tci-StatesPDCCH-ToAddList | Not present |  |  |
| tci-StatesPDCCH-ToAddList SEQUENCE(SIZE (1..maxNrofTCI-StatesPDCCH)) OF TCI-StateId { | 1 entry |  |  |
| TCI-StateId[1] | TCI-StateId-RRM(2) | TCI State #2, QCLed to TRS resource #4 in the first resource set  entry 1 | TRS |
| TCI-StateId[1] | TCI-StateId-RRM(3) | TCI State #3, QCLed to TRS resource #4 in the second resource set  entry 1 | SECOND\_SET |
| } |  |  |  |
| pdcch-DMRS-ScramblingID | 1008 | DMRS scrambling ID different from Physical Cell ID | SA AND FR1 |
| } |  |  |  |

|  |  |
| --- | --- |
| Condition | Explanation |
| CCR.x.y | Refers to CCR.x.y as defined in A.1.3 of TS 38.533 [18] |
| TRS | When at least one TRS resource set is configured. |
| SECOND\_SET | Two resource sets for TRS are configured in test, only applies to FR2. |
| SA | NR standalone RRM tests cases |

*- SchedulingRequestResourceConfig*

Table 7.3.1-16: *SchedulingRequestResourceConfig*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-157 | | | |
| Information Element | Value/remark | Comment | Condition |
| SchedulingRequestResourceConfig ::= SEQUENCE { |  |  |  |
| periodicityAndOffset CHOICE { |  |  |  |
| sl10 | 7 | With SCS = kHz15 results in repetition every 10 ms | SCS\_15kHz |
| sl20 | 7 | With SCS = kHz30 results in repetition every 10 ms | SCS\_30kHz |
| } |  |  |  |
| } |  |  |  |

|  |  |
| --- | --- |
| Condition | Explanation |
| SCS\_15kHz | SCS=15kHz for frequency of the cell according to clause 6.2.3 for signalling test cases and clause 4.3.1 otherwise |
| SCS\_30kHz | SCS=30kHz for frequency of the cell according to clause 6.2.3 for signalling test cases and clause 4.3.1 otherwise |

*- SearchSpace*

Table 7.3.1-17: *SearchSpace*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-162 | | | |
| Information Element | Value/remark | Comment | Condition |
| SearchSpace ::= SEQUENCE { |  |  |  |
| monitoringSlotPeriodicityAndOffset CHOICE { |  |  |  |
| sl10 | 1 |  | SISS |
| sl160 | 0 |  | (CCR.3.1 OR CCR.3.2 OR CCR.3.4 OR CCR.3.5 OR CCR.3.7) AND NOT\_CONT\_PDCCH |
| 80 |  | (CCR.3.3 OR CCR.3.6) AND NOT\_CONT\_PDCCH |
| } |  |  |  |
| monitoringSymbolsWithinSlot | 11000000000000 |  | (CCR.3.1 OR CCR.3.3 OR CCR.3.4 OR CCR.3.6 OR CCR.3.7) AND NOT\_CONT\_PDCCH |
| 00110000000000 |  | (CCR.3.2 OR CCR.3.5) AND NOT\_CONT\_PDCCH |
| } |  |  |  |

|  |  |
| --- | --- |
| Condition | Explanation |
| SISS | SearchSpace for SI |
| CCR.x.y | Refers to CCR.x.y as defined in A.1.3 of TS 38.533 [18] |
| NOT\_CONT\_PDCCH | The cell shall be configured with the default CCR.3.x settings and not transmit PDCCH continuously |

– PDSCH-Config

Table 7.3.1-18: PDSCH-Config

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-100 | | | |
| Information Element | Value/remark | Comment | Condition |
| PDSCH-Config ::= SEQUENCE { |  |  |  |
| tci-StatesToAddModList SEQUENCE(SIZE (1.. maxNrofTCI-States)) OF TCI-State { | 1+n1+n2+n3 entries | n1 = 1 if SSB configuration used in test case contains two SSBs in a burst, n1 = 0 otherwise  n2 = 1 if TRS is configured in test case, n1 = 0 otherwise  n3 = 1 if two resource sets of TRS are configured in test case, n3 = 0 otherwise |  |
| TCI-State[1] | TCI-State(0) | entry 1  QCLed to SSB index #0 |  |
| TCI-State[k, k=2..1+n1] | TCI-State(1) | entry ...  QCLed to SSB index #1 | SECOND\_SSB |
| TCI-State[k, k=2+n1..1+n1+n2] | TCI-State(2) | entry ...  QCLed to TRS resource #4 in the first resource set | TRS |
| TCI-State[k, k=2+n1+n2..1+n1+n2+n3] | TCI-State(3) | entry ...  QCLed to TRS resource #4 in the second resource set | SECOND\_SET |
| } |  |  |  |
| zp-CSI-RS-ResourceToAddModList SEQUENCE (SIZE (1..maxNrofZP-CSI-RS-Resources)) OF ZP-CSI-RS-Resource { | 1 entry |  |  |
| ZP-CSI-RS-Resource[1] | ZP-CSI-RS-Resource-RRM | entry 1 |  |
| } |  |  |  |
| p-ZP-CSI-RS-ResourceSet CHOICE { |  |  | CSI |
| setup | ZP-CSI-RS-ResourceSet-RRM |  |  |
| } |  |  |  |
| } |  |  |  |

|  |  |
| --- | --- |
| Condition | Explanation |
| SECOND\_SSB | SSB configuration used in test case contain two SSBs in a burst |
| TRS | One resource set for TRS is configured in test case |
| SECOND\_SET | Two resource sets for TRS are configured in test case, only applies to FR2. |
| CSI | CSI-RS for CSI reporting are configured in test case |

– *TCI-State*

Table 7.3.1-19: *TCI-State(Id)*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-190 | | | |
| Information Element | Value/remark | Comment | Condition |
| TCI-State ::= SEQUENCE { |  |  |  |
| tci-StateId | TCI-StateId-RRM(Id) |  |  |
| qcl-Type1 SEQUENCE { |  |  |  |
| bwp-Id | BWP-Id of the active BWP |  | Id = 2 or 3 |
| referenceSignal CHOICE { |  |  |  |
| ssb | SSB-Index of SSB #0 |  | Id = 0 |
|  | SSB-Index of SSB #1 |  | Id = 1 |
| csi-rs | NZP-CSI-RS-ResourceId for TRS (4) |  | Id = 2 |
|  | NZP-CSI-RS-ResourceId for TRS (4) with condition SECOND SET |  | Id = 3 |
| } |  |  |  |
| qcl-Type | typeC |  | Id = 0 or 1 |
|  | typeA |  | Id = 2 or 3 |
| } |  |  |  |
| qcl-Type2 | Not present |  |  |
| qcl-Type2 SEQUENCE { |  |  | FR2 |
| cell | Not present |  |  |
| bwp-Id | Not present |  | Id = 0 or 1 |
|  | BWP-Id of the active BWP |  | Id = 2 or 3 |
| referenceSignal CHOICE { |  |  |  |
| ssb | SSB-Index of SSB #0 |  | Id = 0 |
|  | SSB-Index of SSB #1 |  | Id = 1 |
| csi-rs | NZP-CSI-RS-ResourceId for TRS (4) |  | Id = 2 |
|  | NZP-CSI-RS-ResourceId for TRS (4) with condition SECOND SET |  | Id = 3 |
| } |  |  |  |
| qcl-Type | typeD |  |  |
| } |  |  |  |
| } |  |  |  |

– *TCI-StateId*

Table 7.3.1-20: *TCI-StateId(Id)*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-191 | | | |
| Information Element | Value/remark | Comment | Condition |
| TCI-StateId | n+Id | n is the first TCI-StateId allocated for TCI-State configured in RRM test. Value of n is left to internal implementation  Id = 0,1,2,3 |  |

– *PUSCH-Config*

Table 7.3.1-21: *PUSCH-Config*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-118 | | | |
| Information Element | Value/remark | Comment | Condition |
| PUSCH-Config ::= SEQUENCE { |  |  |  |
| pusch-TimeDomainAllocationList CHOICE { |  |  | APERIODIC |
| setup | PUSCH-TimeDomainResourceAllocationList-BM |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

|  |  |
| --- | --- |
| **Condition** | **Explanation** |
| APERIODIC | For apeiodic CSI-RS resources |

– *PUSCH-TimeDomainResourceAllocationList*

Table 7.3.1-22: *PUSCH-TimeDomainResourceAllocationList-BM*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-122 | | | |
| Information Element | Value/remark | Comment | Condition |
| PUSCH-TimeDomainResourceAllocationList ::= SEQUENCE (SIZE(1..maxNrofUL-Allocations)) OF PUSCH-TimeDomainResourceAllocation { | 1 entriy | same number of entries as reportSlotOffsetList in Table 7.3.1-12G |  |
| PUSCH-TimeDomainResourceAllocation[1] SEQUENCE { |  | entry 1 |  |
| k2 | 4 | Same with k2 configrued in reportSlotOffsetList in Table 7.3.1-12G | FR1 |
| } |  |  |  |
| } |  |  |  |

– ServingCellConfig

Table 7.3.1-23: *ServingCellConfig*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-167 | | | |
| Information Element | Value/remark | Comment | Condition |
| ServingCellConfig ::= SEQUENCE { |  |  |  |
| csi-MeasConfig CHOICE { |  |  |  |
| setup | csi-MeasConfig |  |  |
| } |  |  |  |

– *CSI-IM-Resource-RRM*

Table 7.3.1-24: CSI-IM-Resource-RRM

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-34 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-IM-Resource ::= SEQUENCE { |  |  |  |
| csi-IM-ResourceId | CSI-IM-ResourceId-RRM |  |  |
| csi-IM-ResourceElementPattern CHOICE { |  |  |  |
| pattern1 SEQUENCE { |  |  |  |
| subcarrierLocation-p1 | s8 |  |  |
| symbolLocation-p1 | 4 |  |  |
| } |  |  |  |
| } |  |  |  |
| freqBand | CSI-FrequencyOccupation-RRM |  |  |
| periodicityAndOffset | CSI-ResourcePeriodicityAndOffset for CSI |  |  |
| } |  |  |  |

– *CSI-IM-ResourceId-RRM*

Table 7.3.1-25: CSI-IM-ResourceId-RRM

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-35 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-IM-ResourceId | n | n is the first CSI-IM-ResourceId allocated for CSI-IM resource.  Value of n is left to internal implementation |  |

– *CSI-IM-ResourceSet-RRM*

Table 7.3.1-26: CSI-IM-ResourceSet-RRM

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-36 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-IM-ResourceSet ::= SEQUENCE { |  |  |  |
| csi-IM-ResourceSetId | CSI-IM-ResourceSetId-RRM |  |  |
| csi-IM-Resources SEQUENCE (SIZE (1..maxNrofCSI-IM-ResourcesPerSet)) OF CSI-IM-ResourceId { | 1 entry |  |  |
| CSI-IM-ResourceId[1] | CSI-IM-ResourceId-RRM | entry 1 |  |
| } |  |  |  |
| } |  |  |  |

– *CSI-IM-ResourceSetId-RRM*

Table 7.3.1-27: CSI-IM-ResourceSetId-RRM

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-37 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-IM-ResourceSetId | n | n is the first CSI-IM-ResourceSetId allocated for CSI-IM resource set.  Value of n is left to internal implementation |  |

– *SSB-Index*

Table 7.3.1-28: *SSB-Index*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.331 [6], clause 6.3.2 | | | |
| Information Element | Value/remark | Comment | Condition |
| SSB-Index | 0 |  |  |
|  | 1 |  | SECOND\_SSB |

|  |  |
| --- | --- |
| Condition | Explanation |
| SECOND\_SSB | SSB configuration used in test case contain two SSBs in a burst |

– *CSI-SSB-ResourceSet*

Table 7.3.1-29: *CSI-SSB-ResourceSet*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-47 | | | |
| Information Element | Value/remark | Comment | Condition |
| CSI-SSB-ResourceSet ::= SEQUENCE { |  |  |  |
| csi-SSB-ResourceSetId | CSI-SSB-ResourceSetId |  |  |
| csi-SSB-Resource SEQUENCE (SIZE (1..maxNrofCSI-SSB-ResourcePerSet)) OF SSB-Index { | 1 entry |  |  |
| SSB-Index[1] | SSB-Index | entry 1 |  |
| } |  |  |  |
| csi-SSB-Resource SEQUENCE (SIZE (1..maxNrofCSI-SSB-ResourcePerSet)) OF SSB-Index { | 2 entries |  | SECOND\_SSB |
| SSB-Index[1] | SSB-Index | entry 1 |  |
| SSB-Index[2] | SSB-Index with condition SECOND\_SSB | entry 2 |  |
| } |  |  |  |
| } |  |  |  |

|  |  |
| --- | --- |
| Condition | Explanation |
| SECOND\_SSB | SSB configuration used in test case contain two SSBs in a burst |

– *SCS-SpecificCarrier*

Table 7.3.1-30: *SCS-SpecificCarrier*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-160 | | | |
| Information Element | Value/remark | Comment | Condition |
| SCS-SpecificCarrier ::= SEQUENCE { |  |  |  |
| offsetToCarrier | offsetToCarrier as defined for the DL frequency of the cell | See 7.2.3.2 | FR2 and DL\_PointA |
|  | offsetToCarrier as defined for the UL frequency of the cell | See 7.2.3.2 | FR2 and UL\_PointA |
|  | offsetToCarrier as defined for the SL frequency | See 7.2.3.2 | FR2 and SL\_PointA |
| subcarrierSpacing | SubcarrierSpacing |  |  |
| carrierBandwidth | carrierBandwidth as defined for the frequency of the cell | See 7.2.3.2 | FR2 |
| 24 |  | Reduced\_BW and SCS120 (for SSB) |
| 48 |  | Reduced\_BW and SCS240 (for SSB) |
| } |  |  |  |

|  |  |
| --- | --- |
| Condition | Explanation |
| DL\_PointA | IE absoluteFrequencyPointA for downlink |
| UL\_PointA | IE absoluteFrequencyPointA for uplink |
| SL\_PointA | IE absoluteFrequencyPointA for sidelink |
| Reduced\_BW | Reduced RB allocation |

– *SSB-ToMeasure*

Table 7.3.1-31: *SSB-ToMeasure*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-187 | | | |
| Information Element | Value/remark | Comment | Condition |
| SSB-ToMeasure ::= CHOICE { |  |  |  |
| shortBitmap | 1000 |  | ((1.88GHz<FREQ<=3GHz AND SCS15) OR FREQ<=1.88GHZ) AND NOT SECOND\_SSB |
| mediumBitmap | 10000000 |  | (1.88GHz<FREQ<=3GHz AND (TDD AND SCS30) OR FREQ>3GHz) AND NOT SECOND\_SSB |
| longBitmap | 10000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 |  | FR2 AND NOT SECOND\_SSB |
| 01000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 |  | SSB.7 FR2 OR SSB.8 FR2 |
| } |  |  |  |

|  |  |
| --- | --- |
| Condition | Explanation |
| FREQ<=1.88GHz | Frequency range <= 1.88GHz |
| 1.88GHz<FREQ<=3GHz | Frequency range > 1.88GHz and <= 3GHz |
| FREQ>3GHz | Frequency range > 3GHz |
| SECOND\_SSB | SSB configuration used in test case contain two SSBs in a burst |

– *CodebookConfig-CSI*

Table 7.3.1-32: *CodebookConfig-CSI*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-25 | | | |
| Information Element | Value/remark | Comment | Condition |
| CodebookConfig ::= SEQUENCE { |  |  |  |
| codebookType CHOICE { |  |  |  |
| type1 SEQUENCE { |  |  |  |
| subType CHOICE { |  |  |  |
| typeI-SinglePanel SEQUENCE { |  |  |  |
| nrOfAntennaPorts CHOICE { |  |  |  |
| two SEQUENCE { |  |  |  |
| twoTX-CodebookSubsetRestriction | 111111 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

#### – *PRB-Id*

Table 7.3.1-33: *Void*

#### – *ZP-CSI-RS-Resource-RRM*

Table 7.3.1-34: *ZP-CSI-RS-Resource-RRM*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-204 | | | |
| Information Element | Value/remark | Comment | Condition |
| ZP-CSI-RS-Resource ::= SEQUENCE { |  |  |  |
| zp-CSI-RS-ResourceId | ZP-CSI-RS-ResourceId-RRM |  |  |
| resourceMapping | CSI-RS-ResourceMapping-ZP-CSI-RS |  |  |
| periodicityAndOffset | CSI-ResourcePeriodicityAndOffset for CSI |  |  |
| } |  |  |  |

Table 7.3.1-35: ZP-CSI-RS-ResourceId-RRM

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-204A | | | |
| Information Element | Value/remark | Comment | Condition |
| ZP-CSI-RS-ResourceId | n | n is the first ZP-CSI-RS-ResourceId allocated for ZP CSI-RS resource.  Value of n is left to internal implementation |  |

#### – *ZP-CSI-RS-ResourceSet-RRM*

Table 7.3.1-36: ZP-CSI-RS-ResourceSet-RRM

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-205 | | | |
| Information Element | Value/remark | Comment | Condition |
| ZP-CSI-RS-ResourceSet ::= SEQUENCE { |  |  |  |
| zp-CSI-RS-ResourceSetId | ZP-CSI-RS-ResourceSetId-RRM |  |  |
| zp-CSI-RS-ResourceIdList SEQUENCE (SIZE(1..maxNrofZP-CSI-RS-ResourcesPerSet)) OF ZP-CSI-RS-ResourceId { | 1 entry |  |  |
| ZP-CSI-RS-ResourceId[1] | ZP-CSI-RS-ResourceId-RRM | entry 1 |  |
| } |  |  |  |
| } |  |  |  |

#### – *ZP-CSI-RS-ResourceSetId-RRM*

Table 7.3.1-37: ZP-CSI-RS-ResourceSetId-RRM

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.3-206 | | | |
| Information Element | Value/remark | Comment | Condition |
| ZP-CSI-RS-ResourceSetId | n | n is the first ZP-CSI-RS-ResourceSetId allocated for ZP-CSI-RS resource set.  Value of n is left to internal implementation |  |

### 7.3.2 Sidelink information elements for RRM

As defined in clause 4.6.6 with the following exceptions:

#### – *SL-BWP-ConfigCommon*

Table 7.3.2-1: *SL-BWP-ConfigCommon*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.6-2 | | | |
| Information Element | | Value/remark | Comment | Condition |
| SL-BWP-ConfigCommon-r16 ::= SEQUENCE { | |  |  |  |
| sl-BWP-PoolConfigCommon-r16 | | SL-BWP-PoolConfigCommon-r16 | Table 7.3.2-2 |  |
| } | |  |  |  |

#### – *SL-BWP-PoolConfigCommon*

Table 7.3.2-2: *SL-BWP-PoolConfigCommon*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.6-4 with condition RXPOOL and SELECTED | | | |
| Information Element | | Value/remark | Comment | Condition |
| SL-BWP-PoolConfigCommon-r16 ::= SEQUENCE { | |  |  |  |
| sl-RxPool-r16 SEQUENCE (SIZE (1..maxNrofRXPool-r16)) OF SL-ResourcePool-r16 { | | 1 entry |  |  |
| SL-ResourcePool-r16[1] | | SL-ResourcePool-r16 | entry 1  Table 7.3.2-3 |  |
| } | |  |  |  |
| sl-TxPoolSelectedNormal-r16 SEQUENCE (SIZE (1..maxNrofTXPool-r16)) OF SL-ResourcePoolConfig-r16 { | | 1 entry |  |  |
| SL-ResourcePoolConfig-r16[1] SEQUENCE { | |  | entry 1 |  |
| sl-ResourcePool-r16 | | SL-ResourcePool-r16 | Table 7.3.2-3 |  |
| } | |  |  |  |
| } | |  |  |  |
| } | |  |  |  |

#### – *SL-ResourcePool*

Table 7.3.2-3: *SL-ResourcePool*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.6-25 | | | |
| Information Element | | Value/remark | Comment | Condition |
| SL-ResourcePool-r16 ::= SEQUENCE { | |  |  |  |
| sl-NumSubchannel-r16 | | 1 |  |  |
| sl-UE-SelectedConfigRP-r16 SEQUENCE { | |  |  |  |
| sl-ThresPSSCH-RSRP-List-r16 | | Set according to the configuration in specific test cases |  |  |
| sl-SelectionWindowList-r16 SEQUENCE (SIZE (8)) OF SL-SelectionWindowConfig-r16 { | | 8 entries |  |  |
| SL-SelectionWindowConfig-r16[k, k=1..8] SEQUENCE { | |  | entry k |  |
| sl-Priority-r16 | | k |  |  |
| sl-SelectionWindow-r16 | | n20 |  |  |
| } | |  |  |  |
| } | |  |  |  |
| } | |  |  |  |
| sl-PreemptionEnable-r16 | | enabled |  |  |
| sl-MinMaxMCS-List-r16 SEQUENCE (SIZE (1..3)) OF SL-MinMaxMCS-Config-r16 { | | 1 entry |  |  |
| SL-MinMaxMCS-Config-r16[1] SEQUENCE { | |  | entry 1 |  |
| sl-MCS-Table-r16 | | qam64 |  |  |
| sl-MinMCS-PSSCH-r16 | | 0 |  |  |
| sl-MaxMCS-PSSCH-r16 | | 28 |  |  |
| } | |  |  |  |
| sl-TimeResource-r16 | | 11111111111111111111 |  |  |
| } | |  |  |  |

#### – *SL-PSSCH-TxConfigList*

Table 7.3.2-4: *SL-PSSCH-TxConfigList*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Derivation Path: Table 4.6.6-19 | | | | |
| Information Element | | Value/remark | Comment | | Condition |
| SL-PSSCH-TxConfigList-r16 ::= SEQUENCE (SIZE (1..maxPSSCH-TxConfig-r16)) OF SL-PSSCH-TxConfig-r16 { | | 1 entry |  | |  |
| sl-ThresUE-Speed-r16 | | | kmph200 |  |  | |
| sl-ParametersAboveThres-r16 SEQUENCE { | | |  |  |  | |
| sl-MaxSubchannelNumPSSCH-r16 | | | 1 |  |  | |
| sl-MaxTxTransNumPSSCH-r16 | | | 1 |  |  | |
| } | | |  |  |  | |
| sl-ParametersBelowThres-r16 SEQUENCE { | | |  |  |  | |
| sl-MinMCS-PSSCH-r16 | | | 4 |  |  | |
| sl-MaxMCS-PSSCH-r16 | | | 25 |  |  | |
| sl-MaxSubchannelNumPSSCH-r16 | | | 1 |  |  | |
| sl-MaxTxTransNumPSSCH-r16 | | | 1 |  |  | |
| } | | |  |  |  | |
| } | |  |  | |  |

#### – *SL-UE-SelectedConfig*

Table 7.3.2-5: *SL-UE-SelectedConfig*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.6-35 | | | |
| Information Element | | Value/remark | Comment | Condition |
| SL-UE-SelectedConfig-r16 ::= SEQUENCE { | |  |  |  |
| sl-PSSCH-TxConfigList-r16 | | SL-PSSCH-TxConfigList-r16 | Table 7.3.2-4 |  |
| sl-ProbResourceKeep-r16 | | v0dot8 |  |  |
| sl-ReselectAfter-r16 | | n1 |  |  |
| } | |  |  |  |

## 7.4 FFS

Void.

## 7.5 Common procedures for RRM testing

### 7.5.1 Procedure to configure SCC(s) for NR RRM CA testing

Same procedure as described in clause 5.5.1.

### 7.5.2 Procedure to configure SCC(s) for EN-DC RRM CA testing

Same procedure as described in clause 5.5.1.

## 7.6 Test environment for NTN testing

This section defines the test environment which applies to all RRM test cases executed for NR NTN UEs, unless otherwise specified.

### 7.6.1 UE location

Same as in section 5.6.1.

### 7.6.2 Ephemeris Information

Ephemeris information in this section has been generated as described in clause FFS in TR38.905 [FFS].

#### 7.6.2.0 Assumptions for Ephemeris generation

Same as in section 5.6.2.0.

#### 7.6.2.1 Ephemeris for elevation angle 30º

All NR NTN test cases defined in in section 14 in TS 38.533 [18], unless otherwise stated, shall use ephemeris configuration in tables 7.6.2.1-1a to 7.6.2.1-3b, corresponding to an elevation angle of 30º for the type of satellite under test, keeping such information constant throughout the duration of the test:

- In case UE supports only NGSO satellites, ephemeris values in Table 7.6.2.1-3a or 7.6.2.1-3b shall be used.

Table 7.6.2.1-1a: SIB19- NR NTN serving cell Ephemeris information (stateVectors format) for GSO satellites (serving cell 30º elevation angle conditions)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 7.6.3.1-1 | | | |
| Information Element | Value/remark | Comment | Condition |
| SIB19-r17 ::= SEQUENCE { |  |  |  |
| ntn-Config-r17 SEQUENCE { |  |  |  |
| epochTime-r17 | Not present |  |  |
| ephemerisInfo-r17 CHOICE { |  |  |  |
| positionVelocity-r17 SEQUENCE { |  |  |  |
| positionX-r17 | -17129898 |  |  |
| positionY-r17 | 27505094 |  |  |
| positionZ-r17 | 1413939 |  |  |
| velocityVX-r17 | 116 |  |  |
| velocityVY-r17 | 378 |  |  |
| velocityVZ-r17 | -5944 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| NOTE 1: Satellite-UE elevation angle equal to 30 degrees, one-way delay equal to 128.77 ms and Doppler equal to -0.15 ppm.  NOTE 2: stateVectors ephemeris format shall be used in NR NTN RRM test cases listed in Table A.3.36.3-1 in TS38.133 [13]. | | | |

Table 7.6.2.1-1b: SIB19- NR NTN serving cell Ephemeris information (orbitalParameters format) for GSO satellites (serving cell 30º elevation angle conditions)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 7.6.3.1-1 | | | |
| Information Element | Value/remark | Comment | Condition |
| SIB19-r17 ::= SEQUENCE { |  |  |  |
| ntn-Config-r17 SEQUENCE { |  |  |  |
| epochTime-r17 | Not present |  |  |
| ephemerisInfo-r17 CHOICE { |  |  |  |
| orbital-r17 SEQUENCE { |  |  |  |
| semiMajorAxis-r17 | 8393544277 |  |  |
| eccentricity-r17 | 0 |  |  |
| periapsis-r17 | 266532360 |  |  |
| longitude-r17 | 224998499 |  |  |
| inclination-r17 | 69234262 |  |  |
| meanAnomaly-r17 | 118496066 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| NOTE 1: Satellite-UE elevation angle equal to 30 degrees, one-way delay equal to 128.77 ms and Doppler equal to -0.15 ppm.  NOTE 2: orbitalParameters ephemeris format shall be used in NR NTN RRM test cases listed in Table A.3.36.3-2 in TS38.133 [13]. | | | |

Table 7.6.2.1-1c: SIB19- NR NTN neighbour cells Ephemeris information (stateVectors format) for GSO satellites (serving cell 30º elevation angle conditions)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 7.6.3.1-1 | | | |
| **Information Element** | **Value/remark** | **Comment** | **Condition** |
| SIB19-r17 ::= SEQUENCE { |  |  |  |
| ntn-NeighCellConfig-r17 SEQUENCE { (SIZE(1..maxCellNTN-r17)) OF  NTN-NeighCellConfig-r17{ | 1 entry for test cases requiring only one neighbour cell  2 entries in test cases requiring two neighbour cells |  | 2CELLS OR 3CELLS |
| NTN-NeighCellConfig-r17 [1] SEQUENCE { |  | entry 1 | 2CELLS OR 3CELLS |
| epochTime-r17 | Not present |  |  |
| ephemerisInfo-r17 CHOICE { |  |  |  |
| positionVelocity-r17 SEQUENCE { |  |  |  |
| positionX-r17 | -25235934 |  |  |
| positionY-r17 | 20178903 |  |  |
| positionZ-r17 | 2814664 |  |  |
| velocityVX-r17 | 298 |  |  |
| velocityVY-r17 | -241 |  |  |
| velocityVZ-r17 | 4398 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| NTN-NeighCellConfig-r17 [2] SEQUENCE { |  | entry 2 | 3CELLS |
| epochTime-r17 | Not present |  |  |
| ephemerisInfo-r17 CHOICE { |  |  |  |
| positionVelocity-r17 SEQUENCE { |  |  |  |
| positionX-r17 | -6457459 |  |  |
| positionY-r17 | 31531426 |  |  |
| positionZ-r17 | 4004156 |  |  |
| velocityVX-r17 | -387 |  |  |
| velocityVY-r17 | -66 |  |  |
| velocityVZ-r17 | -104 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| NOTE 1: Neighbour cell 1 Satellite-UE elevation angle equal to 30 degrees, one-way delay equal to 128.77 ms and Doppler equal to +0.11 ppm. Neighbour cell 2 Satellite-UE elevation angle equal to 32.17 degrees, one-way delay equal to 128.14 ms and Doppler equal to 0 ppm.  NOTE 2: stateVectors ephemeris format shall be used in NR NTN RRM test cases listed in Table A.3.36.3-1 in TS38.133 [13]. | | | |

|  |  |
| --- | --- |
| **Condition** | **Explanation** |
| 2CELLS | Test cases where one serving cell and one neighbour cell are required |
| 3CELLS | Test cases where one serving cell and two neighbour cells are required |

**Table 7.6.2.1-1d: SIB19- NR NTN neighbour cells Ephemeris information (orbitalParameters format) for GSO satellites (serving cell 30º elevation angle conditions)**

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 7.6.3.1-1 | | | |
| **Information Element** | **Value/remark** | **Comment** | **Condition** |
| SIB19-r17 ::= SEQUENCE { |  |  |  |
| ntn-NeighCellConfig-r17 SEQUENCE { (SIZE(1..maxCellNTN-r17)) OF  NTN-NeighCellConfig-r17 { | 1 entry for test cases requiring only one neighbour cell  2 entries in test cases requiring two neighbour cells |  | 2CELLS OR 3CELLS |
| NTN-NeighCellConfig-r17 [1] SEQUENCE { |  | entry 1 | 2CELLS OR 3CELLS |
| epochTime-r17 | Not present |  |  |
| ephemerisInfo-r17 CHOICE { |  |  |  |
| orbital-r17 SEQUENCE { |  |  |  |
| semiMajorAxis-r17 | 8393544277 |  |  |
| eccentricity-r17 | 0 |  |  |
| periapsis-r17 | 137910436 |  |  |
| longitude-r17 | 105383807 |  |  |
| inclination-r17 | 67072560 |  |  |
| meanAnomaly-r17 | 32981819 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| NTN-NeighCellConfig-r17 [2] SEQUENCE { |  | entry 2 | 3CELLS |
| epochTime-r17 | Not present |  |  |
| ephemerisInfo-r17 CHOICE { |  |  |  |
| orbital-r17 SEQUENCE { |  |  |  |
| semiMajorAxis-r17 | 8393544277 |  |  |
| eccentricity-r17 | 0 |  |  |
| periapsis-r17 | 249232221 |  |  |
| longitude-r17 | 228396393 |  |  |
| inclination-r17 | 12328441 |  |  |
| meanAnomaly-r17 | 67231401 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| NOTE 1: Neighbour cell 1 Satellite-UE elevation angle equal to 30 degrees, one-way delay equal to 128.77 ms and Doppler equal to +0.11 ppm. Neighbour cell 2 Satellite-UE elevation angle equal to 32.17 degrees, one-way delay equal to 128.14 ms and Doppler equal to 0 ppm.  NOTE 2: orbitalParameters ephemeris format shall be used in NR NTN RRM test cases listed in Table A.3.36.3-2 in TS38.133 [13]. | | | |

|  |  |
| --- | --- |
| **Condition** | **Explanation** |
| 2CELLS | Test cases where one serving cell and one neighbour cell are required |
| 3CELLS | Test cases where one serving cell and two neighbour cells are required |

Table 7.6.2.1-2a: Void

Table 7.6.2.1-2b: Void

Table 7.6.2.1-3a: SIB19- NR NTN serving cell Ephemeris information (stateVectors format) for NGSO (LEO-1200) satellites (serving cell 30º elevation angle conditions)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 7.6.3.1-1 | | | |
| Information Element | Value/remark | Comment | Condition |
| SIB19-r17 ::= SEQUENCE { |  |  |  |
| ntn-Config-r17 SEQUENCE { |  |  |  |
| epochTime-r17 | Not present |  |  |
| ephemerisInfo-r17 CHOICE { |  |  |  |
| positionVelocity-r17 SEQUENCE { |  |  |  |
| positionX-r17 | -2935552 |  |  |
| positionY-r17 | 4895460 |  |  |
| positionZ-r17 | 1188458 |  |  |
| velocityVX-r17 | 8506 |  |  |
| velocityVY-r17 | -23314 |  |  |
| velocityVZ-r17 | 118253 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| NOTE 1: Satellite-UE elevation angle equal to 30.03 degrees, one-way delay equal to 6.67 ms and Doppler equal to 17.55 ppm.  NOTE 2: stateVectors ephemeris format shall be used in NR NTN RRM test cases listed in Table A.3.36.3-1 in TS38.133 [13]. | | | |

Table 7.6.2.1-3b: SIB19- NR NTN serving cell Ephemeris information (orbitalParameters format) for NGSO (LEO-1200) satellites (serving cell 30º elevation angle conditions)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 7.6.3.1-1 | | | |
| Information Element | Value/remark | Comment | Condition |
| SIB19-r17 ::= SEQUENCE { |  |  |  |
| ntn-Config-r17 SEQUENCE { |  |  |  |
| epochTime-r17 | Not present |  |  |
| ephemerisInfo-r17 CHOICE { |  |  |  |
| orbital-r17 SEQUENCE { |  |  |  |
| semiMajorAxis-r17 | 273626880 |  |  |
| eccentricity-r17 | 769300 |  |  |
| periapsis-r17 | 198830479 |  |  |
| longitude-r17 | 89834718 |  |  |
| inclination-r17 | 65473992 |  |  |
| meanAnomaly-r17 | 7822790 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| NOTE 1: Satellite-UE elevation angle equal to 30.03 degrees, one-way delay equal to 6.67 ms and Doppler equal to 17.55 ppm.  NOTE 2: orbitalParameters ephemeris format shall be used in NR NTN RRM test cases listed in Table A.3.36.3-2 in TS38.133 [13]. | | | |

Table 7.6.2.1-3c: SIB19- NR NTN neighbour cells Ephemeris information (stateVectors format) for NGSO (LEO-1200) satellites (serving cell 30º elevation angle conditions)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [12], table 4.6.2-18C | | | |
| **Information Element** | **Value/remark** | **Comment** | **Condition** |
| SIB19-r17 ::= SEQUENCE { |  |  |  |
| ntn-NeighCellConfig-r17 SEQUENCE { (SIZE(1..maxCellNTN-r17)) OF  NTN-NeighCellConfig-r17{ | 1 entry for test cases requiring only one neighbour cell  2 entries in test cases requiring two neighbour cells |  | 2CELLS OR 3CELLS |
| NTN-NeighCellConfig-r17 [1] SEQUENCE { |  | entry 1 | 2CELLS or 3CELLS |
| epochTime-r17 | Not present |  |  |
| ephemerisInfo-r17 CHOICE { |  |  |  |
| positionVelocity-r17 SEQUENCE { |  |  |  |
| positionX-r17 | -2470752 |  |  |
| positionY-r17 | 3858366 |  |  |
| positionZ-r17 | 3624634 |  |  |
| velocityVX-r17 | 31542 |  |  |
| velocityVY-r17 | -67516 |  |  |
| velocityVZ-r17 | 94597 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| NTN-NeighCellConfig-r17 [2] SEQUENCE { |  | entry 2 | 3CELLS |
| epochTime-r17 | Not present |  |  |
| ephemerisInfo-r17 CHOICE { |  |  |  |
| positionVelocity-r17 SEQUENCE { |  |  |  |
| positionX-r17 | -2771542 |  |  |
| positionY-r17 | 4509243 |  |  |
| positionZ-r17 | 2455572 |  |  |
| velocityVX-r17 | 20837 |  |  |
| velocityVY-r17 | -46176 |  |  |
| velocityVZ-r17 | 109528 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| NOTE 1: Neighbour cell 1 Satellite-UE elevation angle equal to 150.02 degrees, one-way delay equal to 6.79 ms and Doppler equal to -17.65 ppm. Neighbour cell 2 Satellite-UE elevation angle equal to 89.54 degrees, one-way delay equal to 4.04 ms and Doppler equal to 0 ppm.  NOTE 2: stateVectors ephemeris format shall be used in NR NTN RRM test cases listed in Table A.3.36.3-1 in TS38.133 [13]. | | | |

|  |  |
| --- | --- |
| **Condition** | **Explanation** |
| 2CELLS | Test cases where one serving cell and one neighbour cell are required |
| 3CELLS | Test cases where one serving cell and two neighbour cells are required |

Table 7.6.2.1-3d: SIB19- NR NTN neighbour cells Ephemeris information (orbitalParameters format) for NGSO (LEO-1200) satellites (serving cell 30º elevation angle conditions)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [12], table 4.6.2-18C | | | |
| **Information Element** | **Value/remark** | **Comment** | **Condition** |
| SIB19-r17 ::= SEQUENCE { |  |  |  |
| ntn-NeighCellConfig-r17 SEQUENCE { (SIZE(1..maxCellNTN-r17)) OF  NTN-NeighCellConfig-r17{ | 1 entry for test cases requiring only one neighbour cell  2 entries in test cases requiring two neighbour cells |  | 2CELLS OR 3CELLS |
| NTN-NeighCellConfig-r17 [1] SEQUENCE { |  | entry 1 | 2CELLS OR 3CELLS |
| epochTime-r17 | Not present |  |  |
| ephemerisInfo-r17 CHOICE { |  |  |  |
| orbital-r17 SEQUENCE { |  |  |  |
| semiMajorAxis-r17 | 272189533 |  |  |
| eccentricity-r17 | 715030 |  |  |
| periapsis-r17 | 199909097 |  |  |
| longitude-r17 | 89257064 |  |  |
| inclination-r17 | 64358188 |  |  |
| meanAnomaly-r17 | 27947120 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| NTN-NeighCellConfig-r17 [2] SEQUENCE { |  | entry 2 | 3CELLS |
| epochTime-r17 | Not present |  |  |
| ephemerisInfo-r17 ::= CHOICE { |  |  |  |
| orbital-r17 SEQUENCE { |  |  |  |
| semiMajorAxis-r17 | 273057241 |  |  |
| eccentricity-r17 | 744972 |  |  |
| periapsis-r17 | 197978669 |  |  |
| longitude-r17 | 89682433 |  |  |
| inclination-r17 | 65034798 |  |  |
| meanAnomaly-r17 | 17169725 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| NOTE 1: Neighbour cell 1 Satellite-UE elevation angle equal to 150.02 degrees, one-way delay equal to 6.79 ms and Doppler equal to -17.65 ppm. Neighbour cell 2 Satellite-UE elevation angle equal to 89.54 degrees, one-way delay equal to 4.04 ms and Doppler equal to 0 ppm.  NOTE 2: orbitalParameters ephemeris format shall be used in NR NTN RRM test cases listed in Table A.3.36.3-2 in TS38.133 [13]. | | | |

|  |  |
| --- | --- |
| **Condition** | **Explanation** |
| 2CELLS | Test cases where one serving cell and one neighbour cell are required |
| 3CELLS | Test cases where one serving cell and two neighbour cells are required |

#### 7.6.2.2 Ephemeris for NR NTN RRM UL timing accuracy test cases

**Table 7.6.2.2-1:** **SIB19- NR NTN serving cell Ephemeris information for GSO satellites (minimum Doppler)**

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 7.6.3.1-1 | | | |
| Information Element | Value/remark | Comment | Condition |
| SIB19-r17 ::= SEQUENCE { |  |  |  |
| ntn-Config-r17 SEQUENCE { |  |  |  |
| epochTime-r17 | Not present |  |  |
| ephemerisInfo-r17 CHOICE { |  |  |  |
| positionVelocity-r17 SEQUENCE { |  |  |  |
| positionX-r17 | -16944523 |  |  |
| positionY-r17 | 27362209 |  |  |
| positionZ-r17 | 4019393 |  |  |
| velocityVX-r17 | -336 |  |  |
| velocityVY-r17 | -208 |  |  |
| velocityVZ-r17 | 1 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| NOTE 1: Satellite-UE elevation angle equal to 35.04 degrees, one-way delay equal to 127.33 ms and Doppler equal to 4.89E-06 ppm | | | |

**Table 7.6.2.2-2:** **SIB19- NR NTN serving cell Ephemeris information for NGSO (LEO-1200) satellites (minimum Doppler)**

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 7.6.3.1-1 | | | |
| Information Element | Value/remark | Comment | Condition |
| SIB19-r17 ::= SEQUENCE { |  |  |  |
| ntn-Config-r17 SEQUENCE { |  |  |  |
| epochTime-r17 | Not present |  |  |
| ephemerisInfo-r17 CHOICE { |  |  |  |
| positionVelocity-r17 SEQUENCE { |  |  |  |
| positionX-r17 | -2771542 |  |  |
| positionY-r17 | 4509243 |  |  |
| positionZ-r17 | 2455572 |  |  |
| velocityVX-r17 | 20837 |  |  |
| velocityVY-r17 | -46176 |  |  |
| velocityVZ-r17 | 109528 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| NOTE 1: Satellite-UE elevation angle equal to 89.54 degrees, one-way delay equal to 4.04 ms and Doppler equal to 3.6E-3 ppm. | | | |

**Table 7.6.2.2-3:** **SIB19- NR NTN serving cell Ephemeris information for GSO satellites (maximum positive Doppler)**

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 7.6.3.1-1 | | | |
| Information Element | Value/remark | Comment | Condition | |
| SIB19-r17 ::= SEQUENCE { |  |  |  | |
| ntn-Config-r17 SEQUENCE { |  |  |  | |
| epochTime-r17 | Not present |  |  | |
| ephemerisInfo-r17 CHOICE { |  |  |  | |
| positionVelocity-r17 SEQUENCE { |  |  |  | |
| positionX-r17 | -16989970 |  |  | |
| positionY-r17 | 27591785 |  |  | |
| positionZ-r17 | 1413211 |  |  | |
| velocityVX-r17 | 390 |  |  | |
| velocityVY-r17 | -65 |  |  | |
| velocityVZ-r17 | 5945 |  |  | |
| } |  |  |  | |
| } |  |  |  | |
| } |  |  |  | |
| } |  |  |  | |
| NOTE 1: Satellite-UE elevation angle equal to 30 degrees, one-way delay equal to 128.77 ms and Doppler equal to 0.15 ppm | | | | |

**Table 7.6.2.2-4:** **SIB19- NR NTN serving cell Ephemeris information for NGSO (LEO-600) satellites (maximum positive Doppler)**

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 7.6.3.1-1 | | | |
| Information Element | Value/remark | Comment | Condition | |
| SIB19-r17 ::= SEQUENCE { |  |  |  | |
| ntn-Config-r17 SEQUENCE { |  |  |  | |
| epochTime-r17 | Not present |  |  | |
| ephemerisInfo-r17 CHOICE { |  |  |  | |
| positionVelocity-r17 SEQUENCE { |  |  |  | |
| positionX-r17 | -2654549 |  |  | |
| positionY-r17 | 4386991 |  |  | |
| positionZ-r17 | 1594205 |  |  | |
| velocityVX-r17 | 14581 |  |  | |
| velocityVY-r17 | -34487 |  |  | |
| velocityVZ-r17 | 120182 |  |  | |
| } |  |  |  | |
| } |  |  |  | |
| } |  |  |  | |
| } |  |  |  | |
| NOTE 1: Satellite-UE elevation angle equal to 30.11 degrees, one-way delay equal to 3.60 ms and Doppler equal to 19.83 ppm.  NOTE 2: This configuration can be skipped as it is the same as default 30º elevation angle | | | | |

**Table 7.6.2.2-5:** **SIB19- NR NTN serving cell Ephemeris information for GSO satellites (maximum negative Doppler)**

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 7.6.3.1-1 | | | |
| Information Element | Value/remark | Comment | Condition | |
| SIB19-r17 ::= SEQUENCE { |  |  |  | |
| ntn-Config-r17 SEQUENCE { |  |  |  | |
| epochTime-r17 | Not present |  |  | |
| ephemerisInfo-r17 CHOICE { |  |  |  | |
| positionVelocity-r17 SEQUENCE { |  |  |  | |
| positionX-r17 | -17129898 |  |  | |
| positionY-r17 | 27505094 |  |  | |
| positionZ-r17 | 1413939 |  |  | |
| velocityVX-r17 | 116 |  |  | |
| velocityVY-r17 | 378 |  |  | |
| velocityVZ-r17 | -5944 |  |  | |
| } |  |  |  | |
| } |  |  |  | |
| } |  |  |  | |
| } |  |  |  | |
| NOTE 1: Satellite-UE elevation angle equal to 30 degrees, one-way delay equal to 128.77 ms and Doppler equal to -0.15 ppm.  NOTE 2: This configuration can be skipped as it is the same as default 30º elevation angle. | | | | |

**Table 7.6.2.2-6:** **SIB19- NR NTN serving cell Ephemeris information for NGSO (LEO-600) satellites (maximum negative Doppler)**

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 7.6.3.1-1 | | | |
| Information Element | Value/remark | Comment | Condition | |
| SIB19-r17 ::= SEQUENCE { |  |  |  | |
| ntn-Config-r17 SEQUENCE { |  |  |  | |
| epochTime-r17 | Not present |  |  | |
| ephemerisInfo-r17 CHOICE { |  |  |  | |
| positionVelocity-r17 SEQUENCE { |  |  |  | |
| positionX-r17 | -2401021 |  |  | |
| positionY-r17 | 3830217 |  |  | |
| positionZ-r17 | 2907041 |  |  | |
| velocityVX-r17 | 28879 |  |  | |
| velocityVY-r17 | -61410 |  |  | |
| velocityVZ-r17 | 105774 |  |  | |
| } |  |  |  | |
| } |  |  |  | |
| } |  |  |  | |
| } |  |  |  | |
| NOTE 1: Satellite-UE elevation angle equal to 149.91 degrees, one-way delay equal to 3.66 ms and Doppler equal to -0-19.95 ppm | | | | |

### 7.6.3 NR NTN message contents for RRM tests

#### 7.6.3.1 SIB19 IE values

The ntn-config-r17 values including the EphemerisInfo-r17 values in SIB19 shall be periodically signalled to the UE during test based on the Ephemeris information in clause 7.6.2 (kept constant throughout the duration of each the test).

Table 7.6.3.1-1: SIB19 for RRM tests (single cell test cases)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table 4.6.2-18C | | | |
| **Information Element** | **Value/remark** | **Comment** | **Condition** |
| SIB19-r17 ::= SEQUENCE { |  |  |  |
| ntn-Config-r17::= SEQUENCE { |  |  |  |
| epochTime-r17 | Not present |  |  |
| ntn-UlSyncValidityDuration-r17 | s900 |  | GSO |
|  | s5 |  | NGSO |
| cellSpecificKoffset-r17 | 258 |  | GSO |
|  | 14 |  | NGSO |
| kmac-r17 | Not present |  |  |
| ta-Info-r17 SEQUENCE { |  |  |  |
| ta-Common-r17 | 0 |  |  |
| ta-CommonDrift-r17 | 0 |  |  |
| ta-CommonDriftVariant-r17 | 0 |  |  |
| } |  |  |  |
| ntn-PolarizationDL-r17 | Not present |  |  |
| ntn-PolarizationUL-r17 | Not present |  |  |
| ephemerisInfo-r17 CHOICE { |  |  |  |
| positionVelocity-r17 SEQUENCE { |  |  | [TC\_EF\_SV] |
| positionX-r17 | See cl. 7.6.2 |  |  |
| positionY-r17 | See cl. 7.6.2 |  |  |
| positionZ-r17 | See cl. 7.6.2 |  |  |
| velocityVX-r17 | See cl. 7.6.2 |  |  |
| velocityVY-r17 | See cl. 7.6.2 |  |  |
| velocityVZ-r17 | See cl. 7.6.2 |  |  |
| } |  |  |  |
| orbital-r17 SEQUENCE { |  |  | [TC\_EF\_OP] |
| semiMajorAxis-r17 | See cl. 7.6.2 |  |  |
| eccentricity-r17 | See cl. 7.6.2 |  |  |
| periapsis-r17 | See cl. 7.6.2 |  |  |
| longitude-r17 | See cl. 7.6.2 |  |  |
| inclination-r17 | See cl. 7.6.2 |  |  |
| meanAnomaly-r17 | See cl. 7.6.2 |  |  |
| } |  |  |  |
| } |  |  |  |
| ta-Report-r17 | Not present |  |  |
| } |  |  |  |
| ntn-NeighCellConfig-r17 | Not present |  | [1CELL] |
|  | See cl. 7.6.3.2 |  | [2CELLS] |
|  | See cl. 7.6.3.2 |  | [3CELLS] |
| } |  |  |  |

|  |  |
| --- | --- |
| **Condition** | **Explanation** |
| TC\_EF\_SV | Test cases using ephemeris with Position Velocity format according to section 7.6.2 |
| TC\_EF\_OP | Test cases using ephemeris with Orbital format according to section 7.6.2 |
| GSO | Geosynchronous Orbit scenario |
| NGSO | Non-geosynchronous Orbit scenario |
| 1CELL | Test cases where only one cell (serving cell) is required |
| 2CELLS | Test cases where one serving cell and one neighbour cell are required |
| 3CELLS | Test cases where one serving cell and two neighbour cells are required |

## 7.7 Test environment for ATG testing

This section defines the test environment which applies to all RRM test cases executed for NR ATG UEs, unless otherwise specified.

### 7.7.1 NR ATG message contents for RRM tests

#### 7.7.1.1 [*atg-Config-r18*] values in SIB22

The [*atg-Config-r18*] values including the atg gNB location information, cell Specific Koffset and TA Report indication values in SIB22 shall be periodically signalled to the UE during test (kept constant throughout the duration of each measurement in the test).