**3GPP TSG-RAN4 Meeting #100-e *R4-2115330***

**Electronic Meeting, August 16-27, 2021**

|  |
| --- |
| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  |  | **CR** | **DraftCR** | **rev** | **1** | **Current version:** |  |  |
|  |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
|  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME | **x** | Radio Access Network |  | Core Network |  |

|  |
| --- |
|  |
| ***Title:***  | RRM requirements for FR2 FWA for band n259 in 38.133 |
|  |  |
| ***Source to WG:*** | Ericsson |
| ***Source to TSG:*** | R4 |
|  |  |
| ***Work item code:*** | NR\_FR2\_FWA\_Bn259-Core, NR\_FR2\_FWA\_Bn259-Perf |  | ***Date:*** | 2021-08-25 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** | Rel-17 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
|  |  |
| ***Reason for change:*** | To introduce core and RRM performance requirements for UE power class5 for band n259  |
|  |  |
| ***Summary of change:*** | The following requirements are specified:* Band group for n259 UE PC5
* Minimum SSB\_RP at RX beam peak and spherical coverage
* Minimum CSI-RS\_RP at RX beam peak and spherical coverage
 |
|  |  |
| ***Consequences if not approved:*** | UE supporting band n259 for UE PC5 may not fulfil RRM core and performance requirements and its RRM performance cannot be guanranteed. |
|  |  |
| ***Clauses affected:*** | 3.5.3, B.2.8.1, B.2.8.2, B.2.8.3, B.2.12, B.2.13, B.2.14 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ... |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

**----------------------START OF CHANGE----------------------------**

3.5.3 NR operating bands in FR2

NR frequency bands grouping for FR2 is specified in Table 3.5.3-1.

**Table 3.5.3-1: NR frequency band groups for FR2**

|  |  |  |
| --- | --- | --- |
| **Group** | **Band group notation** | **Operating bands** |
| A | NR\_TDD\_FR2\_A | n2571, n2581, n2611 |
| B | NR\_TDD\_FR2\_B | n2574, n2584, n2614 |
| C | NR\_TDD\_FR2\_C |  |
| D | NR\_TDD\_FR2\_D |  |
| E | NR\_TDD\_FR2\_E |  |
| F | NR\_TDD\_FR2\_F | n2604 |
| G | NR\_TDD\_FR2\_G | n2601  |
| H | NR\_TDD\_FR2\_H |  |
| I | NR\_TDD\_FR2\_I |  |
| J | NR\_TDD\_FR2\_J |  |
| K | NR\_TDD\_FR2\_K | n2575, n2585 n2621 |
| L | NR\_TDD\_FR2\_L | n2572, n2582, n2612 |
| M | NR\_TDD\_FR2\_M |  |
| N | NR\_TDD\_FR2\_N | n2624 |
| O | NR\_TDD\_FR2\_O |  |
| P | NR\_TDD\_FR2\_P |  |
| Q | NR\_TDD\_FR2\_Q | n2595 |
| R | NR\_TDD\_FR2\_R |  |
| S | NR\_TDD\_FR2\_S |  |
| T | NR\_TDD\_FR2\_T | n2573, n2583, n2613 |
| U | NR\_TDD\_FR2\_U |  |
| V | NR\_TDD\_FR2\_V |  |
| W | NR\_TDD\_FR2\_W | n2622 |
| X | NR\_TDD\_FR2\_X |  |
| Y | NR\_TDD\_FR2\_Y | n2603 |
| Z | NR\_TDD\_FR2\_Z |  |
| AA | NR\_TDD\_FR2\_AA | n2593 |
| AB | NR\_TDD\_FR2\_AB |  |
| AC | NR\_TDD\_FR2\_AC |  |
| AD | NR\_TDD\_FR2\_AD |  |
| AE | NR\_TDD\_FR2\_AE | n2623 |
| NOTE 1: UE power class 1.NOTE 2: UE power class 2.NOTE 3: UE power class 3.NOTE 4: UE power class 4.NOTE 5: UE power class 5. |

**----------------------NEXT CHANGE----------------------------**

B.2.8.1 Conditions for L1-SINR reporting with CSI-RS based CMR and no dedicated IMR configured

This clause defines the following conditions for NR L1-SINR measurement reporting and corresponding procedures performed based on CSI-RSs: CSI-RS\_RP and CSI-RS Ês/Iot, applicable for a corresponding operating band.

The conditions defined in Table B.2.8.1-1 for FR1 NR cells.

The conditions defined in Table B.2.8.1-2 for FR2 NR cells.

**Table B.2.8.1-1: Conditions for L1-SINR measurements with CSI-RS based CMR only in FR1**

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **NR operating band groups Note1** | **Minimum CSI-RS\_RP** | **CSI-RS CMR Ês/Iot** |
| **dBm / SCSCSI-RS** | **dB** |
| **SCSCSI-RS = 15 kHz** | **SCSCSI-RS = 30 kHz** | **SCSCSI-RS = 60 kHz** |
| **Conditions** | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A, NR\_SDL\_FR1\_A | -124 | -121 | -118 | ≥ -3 |
| NR\_FDD\_FR1\_B | -123.5 | -120.5 | -117.5 |
| NR\_TDD\_FR1\_C | -123 | -120 | -117 |
| NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | -122.5 | -119.5 | -116.5 |
| NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | -122 | -119 | -116 |
| NR\_FDD\_FR1\_F | -121.5 | -118.5 | -115.5 |
| NR\_FDD\_FR1\_G | -121 | -118 | -115 |
| NR\_FDD\_FR1\_H | -120.5 | -117.5 | -114.5 |
| NOTE 1: NR operating band groups are defined in clause 3.5.2. |

**Table B.2.8.1-2: Conditions for L1-SINR measurements with CSI-RS based CMR only in FR2**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Angle of arrival** | **NR operating bands** | **Minimum CSI-RS\_RP Note 2, Note 3** | **CSI-RS CMR Ês/Iot** |
| **dBm / SCSCSI-RS** | **dB** |
| **SCSCSI-RS = 60 kHz** | **SCSCSI-RS = 120 kHz** |
| **UE Power class** | **UE Power class** |
| **1** | **2** | **3** | **4** | **5** | **1, 2, 3, 4, 5** |
| Conditions | Rx Beam Peak | n257 | -128.3+Y1 | -113.8 | -112.1 | -127.8+Y4 | -123.4+Y5 | (Value for SCSCSI-RS = 60 kHz) +3dB | ≥-3 |
| n258 | -128.3+Y1 | -113.8 | -112.1 | -127.8+Y4 | -123.6+Y5 |
| n259 |  |  | -108.5 |  | -120.5+Y5 |
| n260 | -125.3+Y1 |  | -109.5 | -125.8+Y4 |  |
| n261 | -128.3+Y1 | -113.8 | -112.1 | -127.8+Y4 |  |
| Spherical coverage Note 1 | n257 | -120.3+Z1 | -102.8 | -101.2 | -118.8+Z4 | -115.4+Z5 | (Value for SCSCSI-RS = 60 kHz) +3dB | ≥-3 |
| n258 | -120.3+Z1 | -102.8 | -101.2 | -118.8+Z4 | -115.6+Z5 |
| n259 |  |  | -95.7 |  | -112.5+Z5 |
| n260 | -117.3+Z1 |  | -96.9 | -113.8+Z4 |  |
| n261 | -120.3+Z1 | -102.8 | -101.2 | -118.8+Z4 |  |
| NOTE 1: Values based on EIS spherical coverage as defined in clause 7.3.4 of TS 38.101-2 [19]. Side condition applies for directions in which EIS spherical coverage requirement is met.NOTE 2: Values specified at the Reference point to give minimum CSI-RS Ês/Iot, with no applied noise.NOTE 3: For UEs that support multiple FR2 bands, Rx Beam Peak values are increased by ∆MBP,n and Spherical coverage values are increased by ∆MBS,n, the UE multi-band relaxation factor in dB specified in clause 6.2.1 of TS 38.101-2 [19]. |

B.2.8.2 Conditions for L1-SINR reporting with SSB based CMR and dedicated IMR configured

B.2.8.2.1 L1-SINR reporting with SSB based CMR and dedicated ZP-IMR configured

This clause defines the following conditions for NR L1-SINR measurement reporting and corresponding procedures performed based on SSBs and ZP-IMRs: SSB\_RP and SSB Ês/Iot, applicable for a corresponding operating band.

The conditions defined in Table B.2.8.2.1-1 for FR1 NR cells.

The conditions defined in Table B.2.8.2.1-2 for FR2 NR cells.

**Table B.2.8.2.1-1: Conditions for L1-SINR measurements with SSB based CMR and ZP-IMR in FR1**

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **NR operating band groups Note1** | **Minimum SSB\_RP** | **SSB Ês/Iot** |
| **dBm / SCSSSB** | **dB** |
| **SCSSSB = 15 kHz** | **SCSSSB = 30 kHz** |
| **Conditions** | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A, NR\_SDL\_FR1\_A | -124 | -121 | ≥ -3 |
| NR\_FDD\_FR1\_B | -123.5 | -120.5 |
| NR\_TDD\_FR1\_C | -123 | -120 |
| NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | -122.5 | -119.5 |
| NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | -122 | -119 |
| NR\_FDD\_FR1\_F | -121.5 | -118.5 |
| NR\_FDD\_FR1\_G | -121 | -118 |
| NR\_FDD\_FR1\_H | -120.5 | -117.5 |
| NOTE 1: NR operating band groups are defined in clause 3.5.2. |

**Table B.2.8.2.1-2: Conditions for L1-SINR measurements with SSB based CMR and ZP-IMR in FR2**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Angle of arrival** | **NR operating bands** | **Minimum SSB\_RP Note 2, Note 3** | **SSB Ês/Iot** |
| **dBm / SCSSSB** | **dB** |
| **SCSSSB = 120 kHz** | **SCSSSB = 240 kHz** |
| **UE Power class** | **UE Power class** |
| **1** | **2** | **3** | **4** | **5** | **1, 2, 3, 4, 5** |
| Conditions | Rx Beam Peak | n257 | -125.3+Y1 | -110.8 | -109.1 | -124.8+Y4 | -120.4+Y5 | (Value for SCSSSB = 120 kHz) +3dB | ≥-3 |
| n258 | -125.3+Y1 | -110.8 | -109.1 | -124.8+Y4 | -120.6+Y5 |
| n259 |  |  | -105.5 |  | -117.5+Y5 |
| n260 | -122.3+Y1 |  | -106.5 | -122.8+Y4 |  |
| n261 | -125.3+Y1 | -110.8 | -109.1 | -124.8+Y4 |  |
| Spherical coverage Note 1 | n257 | -117.3+Z1 | -99.8 | -98.2 | -115.8+Z4 | -112.4+Z5 | (Value for SCSSSB = 120 kHz) +3dB | ≥-3 |
| n258 | -117.3+Z1 | -99.8 | -98.2 | -115.8+Z4 | -112.6+Z5 |
| n259 |  |  | -92.7 |  | -109.5+Z5 |
| n260 | -114.3+Z1 |  | -93.9 | -110.8+Z4 |  |
| n261 | -117.3+Z1 | -99.8 | -98.2 | -115.8+Z4 |  |
| NOTE 1: Values based on EIS spherical coverage as defined in clause 7.3.4 of TS 38.101-2 [19]. Side condition applies for directions in which EIS spherical coverage requirement is met.NOTE 2: Values specified at the Reference point to give minimum SSB Ês/Iot, with no applied noise.NOTE 3: For UEs that support multiple FR2 bands, Rx Beam Peak values are increased by ∆MBP,n and Spherical coverage values are increased by ∆MBS,n, the UE multi-band relaxation factor in dB specified in clause 6.2.1 of TS 38.101-2 [19]. |

B.2.8.2.2 L1-SINR reporting with SSB based CMR and dedicated NZP-IMR configured

This clause defines the following conditions for NR L1-SINR measurement reporting and corresponding procedures performed based on SSBs and NZP-IMRs: SSB\_RP, SSB Ês/Iot and NZP-IMR Ês/Iot, applicable for a corresponding operating band.

The conditions are defined in Table B.2.8.2.2-1 for FR1 NR cells.

The conditions are defined in Table B.2.8.2.2-2 for FR2 NR cells.

**Table B.2.8.2.2-1: Conditions for L1-SINR measurements with SSB based CMR and NZP-IMR in FR1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **NR operating band groups Note1** | **Minimum SSB\_RP** | **SSB Ês/Iot** | **NZP-IMR Ês/Iot** |
| **dBm / SCSSSB** | **dB** | **dB** |
| **SCSSSB = 15 kHz** | **SCSSSB = 30 kHz** |
| **Conditions** | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A, NR\_SDL\_FR1\_A | -121 | -118 | ≥ 0 | ≥ 0 |
| NR\_FDD\_FR1\_B | -120.5 | -117.5 |
| NR\_TDD\_FR1\_C | -120 | -117 |
| NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | -119.5 | -116.5 |
| NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | -119 | -116 |
| NR\_FDD\_FR1\_F | -118.5 | -115.5 |
| NR\_FDD\_FR1\_G | -118 | -115 |
| NR\_FDD\_FR1\_H | -117.5 | -114.5 |
| NOTE 1: NR operating band groups are defined in clause 3.5.2. |

**Table B.2.8.2.2-2: Conditions for L1-SINR measurements with SSB based CMR and NZP-IMR in FR2**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | **Angle of arrival** | **NR operating bands** | **Minimum SSB\_RP Note 2, Note 3** | **SSB Ês/Iot** | **NZP-IMR Ês/Iot** |
| **dBm / SCSSSB** | **dB** | **dB** |
| **SCSSSB = 120 kHz** | **SCSSSB = 240 kHz** |
| **UE Power class** | **UE Power class** |
| **1** | **2** | **3** | **4** | **5** | **1, 2, 3, 4, 5** |
| Conditions | Rx Beam Peak | n257 | -122.3+Y1 | -107.8 | -106.1 | -121.8+Y4 | -117.4+Y5 | (Value for SCSSSB = 120 kHz) +3dB | ≥0 | ≥0 |
| n258 | -122.3+Y1 | -107.8 | -106.1 | -121.8+Y4 | -117.6+Y5 |
| n259 |  |  | -102.5 |  | -114.5+Y5 |
| n260 | -119.3+Y1 |  | -103.5 | -119.8+Y4 |  |
| n261 | -122.3+Y1 | -107.8 | -106.1 | -121.8+Y4 |  |
| Spherical coverage Note 1 | n257 | -114.3+Z1 | -96.8 | -95.2 | -112.8+Z4 | -109.4+Z5 | (Value for SCSSSB = 120 kHz) +3dB | ≥0 | ≥0 |
| n258 | -114.3+Z1 | -96.8 | -95.2 | -112.8+Z4 | -109.6+Z5 |
| n259 |  |  | -88.7 |  | -106.5+Z5 |
| n260 | -111.3+Z1 |  | -90.9 | -107.8+Z4 |  |
| n261 | -114.3+Z1 | -96.8 | -95.2 | -112.8+Z4 |  |
| NOTE 1: Values based on EIS spherical coverage as defined in clause 7.3.4 of TS 38.101-2 [19]. Side condition applies for directions in which EIS spherical coverage requirement is met.NOTE 2: Values specified at the Reference point to give minimum SSB Ês/Iot, with no applied noise.NOTE 3: For UEs that support multiple FR2 bands, Rx Beam Peak values are increased by ∆MBP,n and Spherical coverage values are increased by ∆MBS,n, the UE multi-band relaxation factor in dB specified in clause 6.2.1 of TS 38.101-2 [19]. |

*Editor’s notes for Table B.2.8.2.2-2:*

*- The value of Y for power classes 1, 4 and 5 is FFS, where Y1, Y4 and Y5 are the rough/fine beam gain differences in Rx beam peak direction for power classes 1, 4 and 5 respectively*

*- The value of Z for power classes 1, and 4 and 5 is FFS, where Z1, Z4 and Z5 are the rough/fine beam gain differences in spherical coverage directions for power classes 1, 4 and 5 respectively*

B.2.8.3 Conditions for L1-SINR reporting with CSI-RS based CMR and dedicated IMR configured

B.2.8.3.1 L1-SINR reporting with CSI-RS based CMR and dedicated ZP-IMR configured

This clause defines the following conditions for NR L1-SINR measurement reporting and corresponding procedures performed based on CSI-RSs and ZP-IMRs: CSI-RS\_RP and CSI-RS Ês/Iot, applicable for a corresponding operating band.

The conditions defined in Table B.2.8.3.1-1 for FR1 NR cells.

The conditions defined in Table B.2.8.3.1-2 for FR2 NR cells.

**Table B.2.8.3.1-1: Conditions for L1-SINR measurements with CSI-RS based CMR and ZP-IMR in FR1**

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **NR operating band groups Note1** | **Minimum CSI-RS\_RP** | **CSI-RS Ês/Iot** |
| **dBm / SCSCSI-RS** | **dB** |
| **SCSCSI-RS = 15 kHz** | **SCSCSI-RS = 30 kHz** | **SCSCSI-RS = 60 kHz** |
| **Conditions** | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A, NR\_SDL\_FR1\_A | -124 | -121 | -118 | ≥ -3 |
| NR\_FDD\_FR1\_B | -123.5 | -120.5 | -117.5 |
| NR\_TDD\_FR1\_C | -123 | -120 | -117 |
| NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | -122.5 | -119.5 | -116.5 |
| NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | -122 | -119 | -116 |
| NR\_FDD\_FR1\_F | -121.5 | -118.5 | -115.5 |
| NR\_FDD\_FR1\_G | -121 | -118 | -115 |
| NR\_FDD\_FR1\_H | -120.5 | -117.5 | -114.5 |
| NOTE 1: NR operating band groups are defined in clause 3.5.2. |

**Table B.2.8.3.1-2: Conditions for L1-SINR measurements with CSI-RS based CMR and ZP-IMR in FR2**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Angle of arrival** | **NR operating bands** | **Minimum CSI-RS\_RP Note 2, Note 3** | **CSI-RS Ês/Iot** |
| **dBm / SCSCSI-RS** | **dB** |
| **SCSCSI-RS = 60 kHz** | **SCSCSI-RS = 120 kHz** |
| **UE Power class** | **UE Power class** |
| **1** | **2** | **3** | **4** | **5** | **1, 2, 3, 4, 5** |
| **Conditions** | Rx Beam Peak | n257 | -128.3+Y1 | -113.8 | -112.1 | -127.8+Y4 | -123.4+Y5 | (Value for SCSCSI-RS = 60 kHz) +3dB | ≥-3 |
| n258 | -128.3+Y1 | -113.8 | -112.1 | -127.8+Y4 | -123.6+Y5 |
| n259 |  |  | -108.5 |  | -120.5+Y5 |
| n260 | -125.3+Y1 |  | -109.5 | -125.8+Y4 |  |
| n261 | -128.3+Y1 | -113.8 | -112.1 | -127.8+Y4 |  |
| Spherical coverage Note 1 | n257 | -120.3+Z1 | -102.8 | -101.2 | -118.8+Z4 | -115.4+Z5 | (Value for SCSCSI-RS = 60 kHz) +3dB | ≥-3 |
| n258 | -120.3+Z1 | -102.8 | -101.2 | -118.8+Z4 | -115.6+Z5 |
| n259 |  |  | -95.7 |  | -112.5+Z5 |
| n260 | -117.3+Z1 |  | -96.9 | -113.8+Z4 |  |
| n261 | -120.3+Z1 | -102.8 | -101.2 | -118.8+Z4 |  |
| NOTE 1: Values based on EIS spherical coverage as defined in clause 7.3.4 of TS 38.101-2 [19]. Side condition applies for directions in which EIS spherical coverage requirement is met.NOTE 2: Values specified at the Reference point to give minimum CSI-RS Ês/Iot, with no applied noise.NOTE 3: For UEs that support multiple FR2 bands, Rx Beam Peak values are increased by ∆MBP,n and Spherical coverage values are increased by ∆MBS,n, the UE multi-band relaxation factor in dB specified in clause 6.2.1 of TS 38.101-2 [19]. |

B.2.8.3.2 L1-SINR reporting with CSI-RS based CMR and dedicated NZP-IMR configured

This clause defines the following conditions for NR L1-SINR measurement reporting and corresponding procedures performed based on CSI-RSs and NZP-IMRs: CSI-RS\_RP, CSI-RS Ês/Iot and NZP-IMR Ês/Iot, applicable for a corresponding operating band.

The conditions are defined in Table B.2.8.3.2-1 for FR1 NR cells.

The conditions are defined in Table B.2.8.3.2-2 for FR2 NR cells.

**Table B.2.8.3.2-1: Conditions for L1-SINR measurements with CSI-RS based CMR and NZP-IMR in FR1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **NR operating band groups Note1** | **Minimum CSI-RS\_RP** | **CSI-RS Ês/Iot** | **NZP-IMR Ês/Iot** |
| **dBm / SCSSSB** | **dB** | **dB** |
| **SCSCSI-RS = 15 kHz** | **SCSCSI-RS = 30 kHz** | **SCSCSI-RS = 60 kHz** |
| **Conditions** | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A, NR\_SDL\_FR1\_A | -121 | -118 | -115 | ≥ 0 | ≥ 0 |
| NR\_FDD\_FR1\_B | -120.5 | -117.5 | -114.5 |
| NR\_TDD\_FR1\_C | -120 | -117 | -114 |
| NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | -119.5 | -116.5 | -113.5 |
| NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | -119 | -116 | -113 |
| NR\_FDD\_FR1\_F | -118.5 | -115.5 | -112.5 |
| NR\_FDD\_FR1\_G | -118 | -115 | -112 |
| NR\_FDD\_FR1\_H | -117.5 | -114.5 | -111.5 |
| NOTE 1: NR operating band groups are defined in clause 3.5.2. |

**Table B.2.8.3.2-2: Conditions for L1-SINR measurements with CSI-RS based CMR and NZP-IMR in FR2**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | **Angle of arrival** | **NR operating bands** | **Minimum CSI-RS\_RP Note 2, Note 3** | **CSI-RS Ês/Iot** | **NZP-IMR Ês/Iot** |
| **dBm / SCSCSI-RS** | **dB** | **dB** |
| **SCSCSI-RS = 60 kHz** | **SCSCSI-RS = 120 kHz** |
| **UE Power class** | **UE Power class** |
| **1** | **2** | **3** | **4** | **5** | **1, 2, 3, 4, 5** |
| Conditions | Rx Beam Peak | n257 | -125.3+Y1 | -110.8 | -109.1 | -124.8+Y4 | -120.4+Y5 | (Value for SCSCSI-RS = 60 kHz) +3dB | ≥0 | ≥0 |
| n258 | -125.3+Y1 | -110.8 | -109.1 | -124.8+Y4 | -120.6+Y5 |
| n259 |  |  | -105.5 |  | -117.5+Y5 |
| n260 | -122.3+Y1 |  | -106.5 | -122.8+Y4 |  |
| n261 | -125.3+Y1 | -110.8 | -109.1 | -124.8+Y4 |  |
| Spherical coverage Note 1 | n257 | -117.3+Z1 | -99.8 | -98.2 | -115.8+Z4 | -112.4+Z5 | (Value for SCSCSI-RS = 60 kHz) +3dB | ≥0 | ≥0 |
| n258 | -117.3+Z1 | -99.8 | -98.2 | -115.8+Z4 | -112.6+Z5 |
| n259 |  |  | -92.7 |  | -109.5+Z5 |
| n260 | -114.3+Z1 |  | -93.9 | -110.8+Z4 |  |
| n261 | -117.3+Z1 | -99.8 | -98.2 | -115.8+Z4 |  |
| NOTE 1: Values based on EIS spherical coverage as defined in clause 7.3.4 of TS 38.101-2 [19]. Side condition applies for directions in which EIS spherical coverage requirement is met.NOTE 2: Values specified at the Reference point to give minimum CSI-RS Ês/Iot, with no applied noise.NOTE 3: For UEs that support multiple FR2 bands, Rx Beam Peak values are increased by ∆MBP,n and Spherical coverage values are increased by ∆MBS,n, the UE multi-band relaxation factor in dB specified in clause 6.2.1 of TS 38.101-2 [19]. |

*Editor’s notes for Table B.2.8.3.2-2:*

*- The value of Y for power classes 1, 4 and 5 is FFS, where Y1, Y4 and Y5 are the rough/fine beam gain differences in Rx beam peak direction for power classes 1, 4 and 5 respectively*

*- The value of Z for power classes 1, 4 and 5 is FFS, where Z1, Z4 and Z5 are the rough/fine beam gain differences in spherical coverage directions for power classes 1, 4 and 5 respectively*

**----------------------NEXT CHANGES----------------------------**

## B.2.12 Conditions for NR CSI-RS based intra-frequency measurements

This clause defines the following conditions for NR CSI-RS based intra-frequency measurements and corresponding procedures performed based on CSI-RS: CSI\_RP and CSI-RS Ês/Iot, applicable for a corresponding operating band.

The conditions are defined in Table B.2.12-1 for FR1 NR cells.

The conditions are defined in Table B.2.12-2 for FR2 NR cells.

Table B.2.12-1: Conditions for CSI-RS based intra-frequency measurements in FR1

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | NR operating band groups Note1 | Minimum CSI\_RP | CSI-RS Ês/Iot |
| dBm / SCSCSI-RS | dB |
| SCSCSI-RS = 15 kHz | SCSCSI-RS = 30 kHz | SCSCSI-RS = 60 kHz |
| Conditions | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A, NR\_SDL\_FR1\_A | -127 | -124 | -121 | ≥ -6 |
| NR\_FDD\_FR1\_B | -126.5 | -123.5 | -120.5 |
| NR\_TDD\_FR1\_C | -126 | -123 | -120 |
| NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | -125.5 | -122.5 | -119.5 |
| NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | -125 | -122 | -119 |
| NR\_FDD\_FR1\_F | -124.5 | -121.5 | -118.5 |
| NR\_FDD\_FR1\_G | -124 | -121 | -118 |
| NR\_FDD\_FR1\_H | -123.5 | -120.5 | -117.5 |
| NOTE 1: NR operating band groups are defined in clause 3.5.2. |

Table B.2.12-2: Conditions for CSI-RS based intra-frequency measurements in FR2

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Angle of arrival | NR operating bands | Minimum CSI\_RP Note 2, Note 3 | CSI-RS Ês/Iot |
| dBm / SCSCSI-RS | dB |
| SCSCSI-RS = 120 kHz | SCSCSI-RS = 60 kHz |
| UE power class | UE power class |
| 1 | 2 | 3 | 4 | 1, 2, 3, 4 |
| Conditions | Rx Beam Peak | n257 | -128.3+Y1 | -113.8 | -112.1 | -127.8+Y4 | (Value for SCSCSI-RS = 120 kHz) - 3dB  | ≥-6 |
| n258 | -128.3+Y1 | -113.8 | -112.1 | -127.8+Y4 |
| n259 |  |  | -108.5 | -124.7+Y4 |
| n260 | -125.3+Y1 |  | -109.5 | -125.8+Y4 |
| n261 | -128.3+Y1 | -113.8 | -112.1 | -127.8+Y4 |
| Spherical coverage Note 1 | n257 | -120.3+Z1 | -102.8 | -101.2 | -118.8+Z4 | (Value for SCSCSI-RS = 120 kHz) - 3dB  | ≥-6 |
| n258 | -120.3+Z1 | -102.8 | -101.2 | -118.8+Z4 |
| n259 |  |  | -95.7 | -115.7+Z4 |
| n260 | -117.3+Z1 |  | -96.9 | -113.8+Z4 |
| n261 | -120.3+Z1 | -102.8 | -101.2 | -118.8+Z4 |
| Note 1: Values based on EIS spherical coverage as defined in clause 7.3.4 of TS 38.101-2 [19]. Side condition applies for directions in which EIS spherical coverage requirement is met.Note 2: Values specified at the Reference point to give minimum CSI-RS Ês/Iot, with no applied noise.Note 3: For UEs that support multiple FR2 bands, Rx Beam Peak values are increased by ∆MBP,n and spherical coverage values are increased by ∆MBS,n, the UE multi-band relaxation factor in dB specified in clause 6.2.1 of TS 38.101-2 [19]. |

*Editor’s notes for Table B.2.12-2:*

*- The value of Y for power classes 1 and 4 is FFS, where Y1 and Y4 are the rough/fine beam gain differences in Rx beam peak direction for power classes 1 and 4 respectively*

*- The value of Z for power classes 1 and 4 is FFS, where Z1 and Z4 are the rough/fine beam gain differences in spherical coverage directions for power classes 1 and 4 respectively*

## B.2.13 Conditions for NR CSI-RS based inter-frequency measurements

This clause defines the following conditions for NR CSI-RS based inter-frequency measurements and corresponding procedures performed based on CSI-RS: CSI\_RP and CSI-RS Ês/Iot, applicable for a corresponding operating band.

The conditions are defined in Table B.2.13-1 for FR1 NR cells.

The conditions are defined in Table B.2.13-2 for FR2 NR cells.

Table B.2.13-1: Conditions for CSI-RS based inter-frequency measurements in FR1

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | NR operating band groups Note1 | Minimum CSI\_RP | CSI-RS Ês/Iot |
| dBm / SCSCSI-RS | dB |
| SCSCSI-RS = 15 kHz | SCSCSI-RS = 30 kHz | SCSCSI-RS = 60 kHz |
| Conditions | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A, NR\_SDL\_FR1\_A | -125 | -122 | -119 | ≥ -6 |
| NR\_FDD\_FR1\_B | -124.5 | -121.5 | -118.5 |
| NR\_TDD\_FR1\_C | -124 | -121 | -118 |
| NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | -124.5 | -120.5 | -117.5 |
| NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | -123 | -120 | -117 |
| NR\_FDD\_FR1\_F | -122.5 | -119.5 | -116.5 |
| NR\_FDD\_FR1\_G | -122 | -119 | -116 |
| NR\_FDD\_FR1\_H | -121.5 | -118.5 | -115.5 |
| NOTE 1: NR operating band groups are defined in clause 3.5.2. |

**Table B.2.13-2: Conditions for CSI-RS based inter-frequency measurements in FR2**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Angle of arrival | NR operating bands | Minimum CSI\_RP Note 2, Note 3 | CSI-RS Ês/Iot |
| dBm / SCSCSI-RS | dB |
| SCSCSI-RS = 120 kHz | SCSCSI-RS = 60 kHz |
| UE power class | UE power class |
| 1 | 2 | 3 | 4 | 1, 2, 3, 4 |
| Conditions | Rx Beam Peak | n257 | -126.3+Y1 | -111.8 | -110.1 | -125.8+Y4 | (Value for SCSCSI-RS = 120 kHz) - 3dB  | ≥-4 |
| n258 | -126.3+Y1 | -111.8 | -110.1 | -125.8+Y4 |
| n259 |  |  | -106.5 | -122.7+Y4 |
| n260 | -123.3+Y1 |  | -107.5 | -123.8+Y4 |
| n261 | -126.3+Y1 | -111.8 | -110.1 | -125.8+Y4 |
| Spherical coverage Note 1 | n257 | -118.3+Z1 | -100.8 | -99.2 | -116.8+Z4 | (Value for SCSCSI-RS = 120 kHz) - 3dB  | ≥-4 |
| n258 | -118.3+Z1 | -100.8 | -99.2 | -116.8+Z4 |
| n259 |  |  | -93.7 | -113.7+Z4 |
| n260 | -115.3+Z1 |  | -94.9 | -111.8+Z4 |
| n261 | -118.3+Z1 | -100.8 | -99.2 | -116.8+Z4 |
| NOTE 1: Values based on EIS spherical coverage as defined in clause 7.3.4 of TS 38.101-2 [19]. Side condition applies for directions in which EIS spherical coverage requirement is met.NOTE 2: Values specified at the Reference point to give minimum CSI-RS Ês/Iot, with no applied noise.NOTE 3: For UEs that support multiple FR2 bands, Rx Beam Peak values are increased by ∆MBP,n and Spherical coverage values are increased by ∆MBS,n, the UE multi-band relaxation factor in dB specified in clause 6.2.1 of TS 38.101-2 [19]. |

*Editor’s notes for Table B.2.13-2:*

*- The value of Y for power classes 1 and 4 is FFS, where Y1 and Y4 are the rough/fine beam gain differences in Rx beam peak direction for power classes 1 and 4 respectively*

*- The value of Z for power classes 1 and 4 is FFS, where Z1, and Z4 are the rough/fine beam gain differences in spherical coverage directions for power classes 1 and 4 respectively.*

## B.2.14 Conditions for NR PRS-based measurements

This clause defines the following conditions for NR PRS-based measurements and corresponding procedures performed based on PRS: PRP and PRS Ês/Iot, applicable for a corresponding operating band.

The conditions are defined in Table B.2.14-1 for FR1 NR cells.

The conditions are defined in Table B.2.14-2 for FR2 NR cells.

Table B.2.14-1: Conditions for NR PRS-based measurements in FR1

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | NR operating band groups Note1 | Minimum PRP1,2 | PRS Ês/Iot |
| dBm / SCSPRS | dB |
| SCSPRS = 15 kHz | SCSPRS = 30 kHz | SCSPRS = 60 kHz |
| Conditions | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A, NR\_SDL\_FR1\_A | -127 | -124 | -121 | ≥ -6 Note2≥ -13 Note3 |
| NR\_FDD\_FR1\_B | -126.5 | -123.5 | -120.5 |
| NR\_TDD\_FR1\_C | -126 | -123 | -120 |
| NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | -125.5 | -122.5 | -119.5 |
| NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | -125 | -122 | -119 |
| NR\_FDD\_FR1\_F | -124.5 | -121.5 | -118.5 |
| NR\_FDD\_FR1\_G | -124 | -121 | -118 |
| NR\_FDD\_FR1\_H | -123.5 | -120.5 | -117.5 |
| NOTE 1: NR operating band groups are defined in clause 3.5.2.NOTE 2: PRS Ês/Iot for RSTD measurement reference cell PRS resource, FFS for PRS-RSRP and UE Rx-Tx. NOTE 3: PRS Ês/Iot for RSTD measurement neighbor cell PRS resource, FFS for PRS-RSRP and UE Rx-Tx. |

Table B.2.14-2: Conditions for NR PRS-based measurements in FR2

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Angle of arrival | NR operating bands | Minimum PRP1,2 Note 2, Note 3 | PRS Ês/Iot |
| dBm / SCSPRS | dB |
| SCSPRS = 120 kHz | SCSPRS = 60 kHz |
| UE power class | UE power class |
| 1 | 2 | 3 | 4 | 1, 2, 3, 4 |
| **Conditions** | Rx Beam Peak | n257 | -128.3+Y1 | -113.8 | -112.1 | -127.8+Y4 | (Value for SCSPRS = 120 kHz) - 3dB  | ≥ -6 Note4≥ -13 Note5 |
| n258 | -128.3+Y1 | -113.8 | -112.1 | -127.8+Y4 |
| n259 |  |  | -108.5 | -124.7+Y4 |
| n260 | -125.3+Y1 |  | -109.5 | -125.8+Y4 |
| n261 | -128.3+Y1 | -113.8 | -112.1 | -127.8+Y4 |
| Spherical coverage Note 1 | n257 | -120.3+Z1 | -102.8 | -101.2 | -118.8+Z4 | (Value for SCSPRS = 120 kHz) - 3dB  | ≥ -6 Note4≥ -13 Note5 |
| n258 | -120.3+Z1 | -102.8 | -101.2 | -118.8+Z4 |
| n259 |  |  | -95.7 | -115.7+Z4 |
| n260 | -117.3+Z1 |  | -96.9 | -113.8+Z4 |
| n261 | -120.3+Z1 | -102.8 | -101.2 | -118.8+Z4 |
| NOTE 1: Values based on EIS spherical coverage as defined in clause 7.3.4 of TS 38.101-2 [19]. Side condition applies for directions in which EIS spherical coverage requirement is met.NOTE 2: Values specified at the Reference point to give minimum PRS Ês/Iot, with no applied noise.NOTE 3: For UEs that support multiple FR2 bands, Rx Beam Peak values are increased by ∆MBP,n and spherical coverage values are increased by ∆MBS,n, the UE multi-band relaxation factor in dB specified in clause 6.2.1 of TS 38.101-2 [19].NOTE 4: PRS Ês/Iot for RSTD measurement reference cell PRS resource, FFS for PRS-RSRP and UE Rx-Tx.NOTE 5: PRS Ês/Iot for RSTD measurement neighbor cell PRS resource, FFS for PRS-RSRP and UE Rx-Tx. |

*Editor’s notes for Table B.2.14-2:*

*- The value of Y for power classes 1 and 4 is FFS, where Y1 and Y4 are the rough/fine beam gain differences in Rx beam peak direction for power classes 1 and 4 respectively*

*- The value of Z for power classes 1 and 4 is FFS, where Z1 and Z4 are the rough/fine beam gain differences in spherical coverage directions for power classes 1 and 4 respectively*

**----------------------END OF CHANGES----------------------------**