**3GPP TSG-RAN WG4 Meeting # 99-e *R4-2108416***

 **Electronic Meeting, 19 - 27 May 2021**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **38.133** | **CR** | **2128** | **rev** | **1** | **Current version:** | **16.7.0** |  |
|  |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network |  |

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|  |
| ***Title:***  | CR to TS 38.133: Adding conditions for L1-SINR reporting (Annex B.2) |
|  |  |
| ***Source to WG:*** | Nokia, Nokia Shanghai Bell |
| ***Source to TSG:*** | R4 |
|  |  |
| ***Work item code:*** | NR\_eMIMO-Perf |  | ***Date:*** | 2021-5-19 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | Rel-16 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
|  |  |
| ***Reason for change:*** | The L1-SINR accuracy requirements were agreed at the RAN4#98-e meeting. The requirements are valid under specified conditions. As such, the conditions for L1-SINR reporting need to be specified.  |
|  |  |
| ***Summary of change:*** | The CR provides the text proposal for the conditions for NR L1-SINR reporting, which are required by the L1-SINR accuracy requirements.  |
|  |  |
| ***Consequences if not approved:*** | The technical specification is incomplete because the conditions for NR L1-SINR reporting are missing from TS 38.133. Consequently, measurement accuracy of UE cannot be guaranteed.  |
|  |  |
| ***Clauses affected:*** | B.2.8 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** | **X** |  |  Test specifications | TS 38.533 |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

<Start of Change 1>

B.2.8 Conditions for NR L1-SINR reporting

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 are defined in Tables B.2.8.1-1 for FR1 NR cells.

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

**Table B.2.8.1-1: Conditions for CSI-RS based CMR only L1-SINR measurements 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 | -121 | -118 | -115 | ≥ -3 |
| 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.2.8.1-2: Conditions for CSI-RS based CMR only L1-SINR measurements 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** | **1, 2, 3, 4** |
| Conditions | Rx Beam Peak | n257 | -125.3+Y1 | -110.8 | -109.1 | -124.8+Y4 | (Value for SCSCSI-RS = 60 kHz) +3dB  | ≥-3 |
| n258 | -125.3+Y1 | -110.8 | -109.1 | -124.8+Y4 |
| n259 |  |  | -105.5 |  |
| 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 | (Value for SCSCSI-RS = 60 kHz) +3dB  | ≥-3 |
| n258 | -117.3+Z1 | -99.8 | -98.2 | -115.8+Z4 |
| n259 |  |  | -92.7 |  |
| 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]. |

### 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 are defined in Tables B.2.8.2.1-1 for FR1 NR cells.

The conditions are defined in Tables 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-CMR Ês/Iot** |
| **dBm / SCSSSB** | **dB** |
| **SCSSSB = 15 kHz** | **SCSSSB = 30 kHz** |
| **Conditions** | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A, NR\_SDL\_FR1\_A | -121 | -118 | ≥ -3 |
| 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.2.8.2.1-2: 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-CMR Ês/Iot** |
| **dBm / SCSSSB** | **dB** |
| **SCSSSB = 120 kHz** | **SCSSSB = 240 kHz** |
| **UE power class** | **UE power class** |
| **1** | **2** | **3** | **4** | **1, 2, 3, 4** |
| Conditions | Rx Beam Peak | n257 | -122.3+Y1 | -107.8 | -106.1 | -121.8+Y4 | (Value for SCSSSB = 120 kHz) +3dB  | ≥-3 |
| n258 | -122.3+Y1 | -107.8 | -106.1 | -121.8+Y4 |
| n259 |  |  | -102.5 |  |
| 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 | (Value for SCSSSB = 120 kHz) +3dB  | ≥-3 |
| n258 | -114.3+Z1 | -96.8 | -95.2 | -112.8+Z4 |
| n259 |  |  | -89.7 |  |
| 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]. |

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 Tables B.2.8.2.2-1 for FR1 NR cells.

The conditions are defined in Tables 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-CMR 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-CMR 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** | **1, 2, 3, 4** |
| Conditions | Rx Beam Peak | n257 | -122.3+Y1 | -107.8 | -106.1 | -121.8+Y4 | (Value for SCSSSB = 120 kHz) +3dB  | ≥0 | ≥0 |
| n258 | -122.3+Y1 | -107.8 | -106.1 | -121.8+Y4 |
| n259 |  |  | -102.5 |  |
| 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 | (Value for SCSSSB = 120 kHz) +3dB  | ≥0 | ≥0 |
| n258 | -114.3+Z1 | -96.8 | -95.2 | -112.8+Z4 |
| n259 |  |  | -89.7 |  |
| 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.2.8.2.2-1 and B.2.8.2.2-2:*

*- 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 Change 1>

<Start of Change 2>

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.2.8.1-1 for FR1 L1-SINR reporting with CSI-RS based CMR and no dedicated IMR configured shall also apply in this clause.

The conditions defined in Table B.2.8.1-2 for FR2 L1-SINR reporting with CSI-RS based CMR and no dedicated IMR configured shall also apply in this clause.

B.2.8.3.2 L1-SINR reporting with CSI-RS based CMR and dedicated NZP-IMR configuredThis 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 Tables B.2.8.3.2-1 for FR1 NR cells.The conditions are defined in Tables B.2.8.3.2-1 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 CMR Ês/Iot** | **NZP-IMR Ês/Iot** |
| **dBm / SCSCSI-RS** | **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 CMR 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** | **1, 2, 3, 4** |
| Conditions | Rx Beam Peak | n257 | -125.3+Y1 | -110.8 | -109.1 | -124.8+Y4 | (Value for SCSCSI-RS = 60 kHz) +3dB  | ≥0 | ≥0 |
| n258 | -125.3+Y1 | -110.8 | -109.1 | -124.8+Y4 |
| n259 |  |  | -105.5 |  |
| 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 | (Value for SCSCSI-RS = 60 kHz) +3dB  | ≥0 | ≥0 |
| n258 | -117.3+Z1 | -99.8 | -98.2 | -115.8+Z4 |
| n259 |  |  | -92.7 |  |
| 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 Tables B.2.8.3.2-1 and B.2.8.3.2-2:*

*- 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*

<End of Change 2>