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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **3GPP TSG-RAN4 Meeting #116 *R4-2512590***  Bangalore, India, 25 Aug - 29 Aug, 2025   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | *CR-Form-v12.3* | | | | | | | | | **CHANGE REQUEST** | | | | | | | | |  | | | | | | | | |  | **38.870** | **CR** | draft | **rev** | **-** | **Current version:** | 19.1.0 |  | |  | | | | | | | | | *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)*.* | | | | | | | | | |  | | | | | | | | |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **Proposed change affects:** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  | | | | | | | | | | | | | ***Title:*** | Draft CR to 38.870 on NTN OTA test method and MU | | | | | | | | | | |  |  | | | | | | | | | | | ***Source to WG:*** | vivo | | | | | | | | | | | ***Source to TSG:*** | R4 | | | | | | | | | | |  |  | | | | | | | | | | | ***Work item code:*** | TRP\_TRS\_MIMO\_OTA\_Ph3-Core | | | | |  | ***Date:*** | | | 2025-08-05 | |  |  | | | |  | |  | | |  | | ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-19 | |  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19) Rel-20 (Release 20)* | | |  |  | | | | | | | | | | | | ***Reason for change:*** | | This CR introduce NTN test method, UE use scenarios and MU. | | | | | | | | | |  | |  | | | | | | | | | | ***Summary of change:*** | | Add sub-clause for NR-NTN and IoT-NTN test procedure, scenario applicability, and MU assessment. | | | | | | | | | |  | |  | | | | | | | | | | ***Consequences if not approved:*** | | The spec is not appicable for NTN UE testing. | | | | | | | | | |  | |  | | | | | | | | | | | ***Clauses affected:*** | | 3.1, 4.2.1, 4.3.3, 7.4.1, 7.4.5, 7.4.6, 7.5.1, 7.5.5, 7.5.6, B.4.1, B.5.1 | | | | | | | | | |  | |  | | | | | | | | | |  | | **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:*** | | This is revision of R4-2510290 | | | | | | | | | |

**<<< START OF CHANGES >>>**

## 3.1 Terms

For the purposes of the present document, the terms given in 3GPP TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1].

**Browsing mode usage:** This mode corresponds to “data” mode, the device is tested via hand-only phantoms.

**eRedCap UE**: The UE with enhanced reduced capabilities as defined in clause 4.2.22.1 from TS38.306 [28].

**Head-mounted mode usage:** This mode corresponds to wearable device for head-mounted mode, the device (e.g., XR glass and head mounted display) is tested via specific Head phantoms for head-mounted devices.

**Free Space mode:** This mode is not specifically limited to “data” mode or “talk” mode, the device is tested via free space mode without phantoms.

**Partial Radiated Power:** The radiated power in a partial sphere by a device, integrated over partial directions of entire sphere surrounding the device. Partial Radiated Power integrated within different range of sphere will generate different metrics.

**Partial Radiated Sensitivity:** The minimum received radiated power level required by a device to maintain a specified communication quality (e.g., 95% maximum throughput), averaged over a partial sphere surrounding the device. Partial Radiated snesitivity integrated within different range of sphere will generate different metrics.

**Primary mechanical mode:** The mode that is most often used for a specific user scenario. Every terminal has at least one primary mechanical mode, if multiple modes are supported, different primary mechanical modes may be applicable for different user scenarios, e.g., different primary mechanical modes for Browsing mode usage and Talk mode usage for the same UE.

**RedCap UE**: The UE with reduced capabilities as defined in clause 4.2.21.1 from TS38.306 [28].

**Talk mode usage:** This mode corresponds to “talk” mode, the device is tested via head&hand phantoms.

**Total Radiated Power:** The total power radiated by a device, integrated over all directions and over the entire sphere surrounding the device.

**Total Radiated Sensitivity:** The minimum received radiated power level required by a device to maintain a specified communication quality (e.g., 95% maximum throughput), averaged over all spatial directions in a 3D sphere.

**Two Rx antenna port XR UE:** A non-(e)RedCap XR UE that is equipped with only two Rx antenna ports in frequency band(s) where 4 Rx antenna ports are required. The UE is intended to be worn on human head. When in use, is intended to be supported only by/behind the ears and by a nose-bridge resulting in a constrained form factor with limited volume available for Rx chains.

**Wrist-worn mode usage:** This mode corresponds to wearable device for wrist-worn mode, the device is tested via forearm phantoms.

<<< Skip Unchanged Sections >>>

### 4.2.1 UE use scenarios for TRP TRS test

The following use scenarios are considered for TRP TRS test:

- Talk mode using head & hand phantom for narrow phones between 56 mm and 72 mm and for wide phones with a width >72 mm and <92 mm.

- Browsing mode using hand phantom for narrow and wide phones

- Using forearm phantom for wrist-worn devices

- Using XR Head phantom for headworn XR devices. FFS details

- Free Space is used for devices not used in above-mentioned scenarios, other phantoms are not precluded for wearable devices

For TN testing of smartphones, both browsing mode and talk mode shall be covered. Free space (FS) testing for smartphone is low priority.

For NTN testing of smartphones, the use scenarios are categorized as following which are based on UE declaration:

* Usage scenario 1: both head+hand mode and hand only mode
* Usage scenario 2: hand only mode targeted for specific UE orientation usage
* Usage scenario 3: hand only mode targeted for arbitrary UE orientation usage

Note: For each supported NR NTN band, declare only one supported scenario. The declaration of scenario applicability shall be consistent with product manual usage scenario. The declared scenario shall be clearly stated in the test report.

For wrist-worn (e)Redcap devices, forearm phantom is the first priority. FFS other (e)Redcap form factor devices.

For other device types, free space (FS) testing configuration is the first priority.

Note: the UE positioning guideline described in Clause 6 and phantom definition described in Annex D are RATs agnostic.

<<< Skip Unchanged Sections >>>

### 4.3.3 Test parameters for each band

The detailed test parameters for each NR band are defined in Table 4.3.3-1 and Table 4.3.3-2, which is general for different NR UE types, e.g., smartphone, Tablet, and head-mounted devices.

Table 4.3.3-1: NR FR1 TRP measurement parameters

| NR Band | CBW [MHz] | SCS (kHz) | UL modulation | Range | UL Carrier centre  [ARFCN] | UL Carrier Center (MHz) | DL Carrier centre  [ARFCN] | DL Carrier Center (MHz) | UL RB Allocation  (LCRB @ RBstart) | DL configuration |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| n1 | 15 | 15 | DFT-s-OFDM  QPSK | Low | 385500 | 1927.5 | 423500 | 2117.5 | 36@18 | N/A |
| Mid | 390000 | 1950 | 428000 | 2140 |
| High | 394500 | 1972.5 | 432500 | 2162.5 |
| n2 | 15 | 15 | DFT-s-OFDM  QPSK | Low | 371500 | 1857.5 | 387500 | 1937.5 | 36@18 | N/A |
| Mid | 376000 | 1880 | 392000 | 1960 |
| High | 380500 | 1902.5 | 396500 | 1982.5 |
| n3 | 20 | 15 | DFT-s-OFDM  QPSK | Low | 344000 | 1720 | 363000 | 1815 | 50@25 | N/A |
| Mid | 349500 | 1747.5 | 368500 | 1842.5 |
| High | 355000 | 1775 | 374000 | 1870 |
| n5 | 15 | 15 | DFT-s-OFDM  QPSK | Low | 166300 | 831.5 | 175300 | 876.5 | 36@18 | N/A |
| Mid | 167300 | 836.5 | 176300 | 881.5 |
| High | 168300 | 841.5 | 177300 | 886.5 |
| n7 | 15 | 15 | DFT-s-OFDM  QPSK | Low | 501500 | 2507.5 | 525500 | 2627.5 | 36@18 | N/A |
| Mid | 507000 | 2535 | 531000 | 2655 |
| High | 512500 | 2562.5 | 536500 | 2682.5 |
| n8 | 15 | 15 | DFT-s-OFDM  QPSK | Low | 177500 | 887.5 | 186500 | 932.5 | 36@18 | N/A |
| Mid | 179500 | 897.5 | 188500 | 942.5 |
| High | 181500 | 907.5 | 190500 | 952.5 |
| n12 | 10 | 15 | DFT-s-OFDM  QPSK | Low | 140800 | 704 | 146800 | 734 | 25@12 | N/A |
| Mid | 141500 | 707.5 | 147500 | 737.5 |
| High | 142200 | 711 | 148200 | 741 |
| n14 | 10 | 15 | DFT-s-OFDM  QPSK | Low | 158600 | 793 | 152600 | 763 | 25@12 | N/A |
| Mid |
| High |
| n20 | 15 | 15 | DFT-s-OFDM  QPSK | Low | 167900 | 839.5 | 159700 | 798.5 | 36@18 | N/A |
| Mid | 169400 | 847 | 161200 | 806 |
| High | 170900 | 854.5 | 162700 | 813.5 |
| n25 | 15 | 15 | DFT-s-OFDM  QPSK | Low | 371500 | 1857.5 | 387500 | 1937.5 | 36@18 | N/A |
| Mid | 376500 | 1882.5 | 392500 | 1962.5 |
| High | 381500 | 1907.5 | 397500 | 1987.5 |
| n26 | 10 | 15 | DFT-s-OFDM  QPSK | Low | 163800 | 819 | 172800 | 864 | 25@12 | N/A |
| Mid | 166300 | 831.5 | 175300 | 876.5 |
| High | 168800 | 844 | 177800 | 889 |
| n28 | 20 | 15 | DFT-s-OFDM  QPSK | Low | 142600 | 713 | 153600 | 768 | 50@25 | N/A |
| Mid | 145600 | 728 | 156600 | 783 |
| High | 147600 | 738 | 158600 | 793 |
| n30 | 10 | 15 | DFT-s-OFDM  QPSK | Low | 462000 | 2310 | 471000 | 2355 | 25@12 | N/A |
| Mid |
| High |
| n34 | 10 | 15 | DFT-s-OFDM  QPSK | Low | 403000 | 2015 | 403000 | 2015 | 25@12 | N/A |
| Mid | 403500 | 2017.5 | 403500 | 2017.5 |
| High | 404000 | 2020 | 404000 | 2020 |
| n38 | 15 | 15 | DFT-s-OFDM  QPSK | Low | 515500 | 2577.5 | 515500 | 2577.5 | 36@18 | N/A |
| Mid | 519000 | 2595 | 519000 | 2595 |
| High | 522500 | 2612.5 | 522500 | 2612.5 |
| n39 | 20 | 15 | DFT-s-OFDM  QPSK | Low | 378000 | 1890 | 378000 | 1890 | 50@25 | N/A |
| Mid | 380000 | 1900 | 380000 | 1900 |
| High | 382000 | 1910 | 382000 | 1910 |
| n40 | 30 | 15 | DFT-s-OFDM  QPSK | Low | 463000 | 2315 | 463000 | 2315 | 80@40 | N/A |
| Mid | 470000 | 2350 | 470000 | 2350 |
| High | 477000 | 2385 | 477000 | 2385 |
| n41 | 100 | 30 | DFT-s-OFDM  QPSK | Low | 509202 | 2546.01 | 509202 | 2546.01 | 135@67 | N/A |
| Mid | 518598 | 2592.99 | 518598 | 2592.99 |
| High | 528000 | 2640 | 528000 | 2640 |
| n48 | 20 | 15 | DFT-s-OFDM  QPSK | Low | 637334 | 3560.01 | 637334 | 3560.01 | 50@25 | N/A |
| Mid | 641666 | 3624.99 | 641666 | 3624.99 |
| High | 646000 | 3690 | 646000 | 3690 |
| n50 | 20 | 15 | DFT-s-OFDM  QPSK | Low | 288400 | 1442 | 288400 | 1442 | 50@25 | N/A |
| Mid | 294900 | 1474.5 | 294900 | 1474.5 |
| High | 301400 | 1507 | 301400 | 1507 |
| n51 | 5 | 15 | DFT-s-OFDM  QPSK | Low | 285900 | 1429.5 | 285900 | 1429.5 | 12@6 | N/A |
| Mid |
| High |
| n53 | 10 | 15 | DFT-s-OFDM  QPSK | Low | 497700 | 2488.5 | 497700 | 2488.5 | 25@12 | N/A |
| Mid | 497860 | 2489.3 | 497860 | 2489.3 |
| High | 498000 | 2490 | 498000 | 2490 |
| n65 | 15 | 15 | DFT-s-OFDM  QPSK | Low | 423500 | 2117.5 | 423500 | 2117.5 | 36@18 | N/A |
| Mid | 431000 | 2155 | 431000 | 2155 |
| High | 438500 | 2192.5 | 438500 | 2192.5 |
| n66 | 20 (20+20) | 15 | DFT-s-OFDM  QPSK | Low | 344000 | 1720 | 424000 | 2120 | 50@25 | N/A |
| Mid | 349000 | 1745 | 429000 | 2145 |
| High | 354000 | 1770 | 434000 | 2170 |
| n70 | 15 (15+15) | 15 | DFT-s-OFDM  QPSK | Low | 340500 | 1702.5 | 400500 | 2002.5 | 36@18 | N/A |
| Mid |
| High |
| n71 | 10 | 15 | DFT-s-OFDM  QPSK | Low | 133600 | 668 | 124400 | 622 | 25@12 | N/A |
| Mid | 136100 | 680.5 | 126900 | 634.5 |
| High | 138600 | 693 | 129400 | 647 |
| n74 | 15 | 15 | DFT-s-OFDM  QPSK | Low | 286900 | 1434.5 | 296500 | 1482.5 | 36@18 | N/A |
| Mid | 289700 | 1448.5 | 299300 | 1496.5 |
| High | 292500 | 1462.5 | 302100 | 1510.5 |
| n77 | 100 | 30 | DFT-s-OFDM  QPSK | Low | 623334 | 3350.01 | 623334 | 3350.01 | 135@67 | N/A |
| Mid | 650000 | 3750 | 650000 | 3750 |
| High | 676666 | 4149.99 | 676666 | 4149.99 |
| n78 | 100 | 30 | DFT-s-OFDM  QPSK | Low | 623334 | 3350.01 | 623334 | 3350.01 | 135@67 | N/A |
| Mid | 636666 | 3549.99 | 636666 | 3549.99 |
| High | 650000 | 3750 | 650000 | 3750 |
| n79 | 100 | 30 | DFT-s-OFDM  QPSK | Low | 696668 | 4450.02 | 696668 | 4450.02 | 135@67 | N/A |
| Mid | 713334 | 4700.01 | 713334 | 4700.01 |
| High | 730000 | 4950 | 730000 | 4950 |
| n80 | 20 | 15 | DFT-s-OFDM  QPSK | Low | 344000 | 1720 | N/A | N/A | 50@25 | N/A |
| Mid | 349500 | 1747.5 | N/A | N/A |
| High | 355000 | 1775 | N/A | N/A |
| n81 | 15 | 15 | DFT-s-OFDM  QPSK | Low | 177500 | 887.5 | N/A | N/A | 36@18 | N/A |
| Mid | 179500 | 897.5 | N/A | N/A |
| High | 181500 | 907.5 | N/A | N/A |
| n82 | 15 | 15 | DFT-s-OFDM  QPSK | Low | 167900 | 839.5 | N/A | N/A | 36@18 | N/A |
| Mid | 169400 | 847 | N/A | N/A |
| High | 170900 | 854.5 | N/A | N/A |
| n83 | 15 | 15 | DFT-s-OFDM  QPSK | Low | 142100 | 710.5 | N/A | N/A | 36@18 | N/A |
| Mid | 145100 | 725.5 | N/A | N/A |
| High | 148100 | 740.5 | N/A | N/A |
| n84 | 15 | 15 | DFT-s-OFDM  QPSK | Low | 385500 | 1927.5 | N/A | N/A | 36@18 | N/A |
| Mid | 390000 | 1950 | N/A | N/A |
| High | 394500 | 1972.5 | N/A | N/A |
| n86 | 20 | 15 | DFT-s-OFDM  QPSK | Low | 344000 | 1720 | N/A | N/A | 50@25 | N/A |
| Mid | 349000 | 1745 | N/A | N/A |
| High | 354000 | 1770 | N/A | N/A |
| n95 | 10 | 15 | DFT-s-OFDM  QPSK | Low | 403000 | 2015 | N/A | N/A | 25@12 | N/A |
| Mid | 403500 | 2017.5 | N/A | N/A |
| High | 404000 | 2020 | N/A | N/A |

Table 4.3.3-2: NR FR1 TRS measurement parameters

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR Band | CBW (MHz) | SCS (kHz) | DL modulation | UL modulation | Range | UL Carrier centre  [ARFCN] | UL Carrier Center (MHz) | DL Carrier centre  [ARFCN] | DL Carrier Center (MHz) | UL RB Allocation  (LCRB @ RBstart) | DL Configuration (FULL RB, LCRB @ RBstart) |
| n1 | 15 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 385500 | 1927.5 | 423500 | 2117.5 | 75@4 | 79@0 |
| Mid | 390000 | 1950 | 428000 | 2140 |
| High | 394500 | 1972.5 | 432500 | 2162.5 |
| n2 | 15 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 371500 | 1857.5 | 387500 | 1937.5 | 50@29 | 79@0 |
| Mid | 376000 | 1880 | 392000 | 1960 |
| High | 380500 | 1902.5 | 396500 | 1982.5 |
| n3 | 20 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 344000 | 1720 | 363000 | 1815 | 50@56 | 106@0 |
| Mid | 349500 | 1747.5 | 368500 | 1842.5 |
| High | 355000 | 1775 | 374000 | 1870 |
| n5 | 15 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 166300 | 831.5 | 175300 | 876.5 | 25@54 | 79@0 |
| Mid | 167300 | 836.5 | 176300 | 881.5 |
| High | 168300 | 841.5 | 177300 | 886.5 |
| n7 | 15 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 501500 | 2507.5 | 525500 | 2627.5 | 75@4 | 79@0 |
| Mid | 507000 | 2535 | 531000 | 2655 |
| High | 512500 | 2562.5 | 536500 | 2682.5 |
| n8 | 15 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 177500 | 887.5 | 186500 | 932.5 | 25@54 | 79@0 |
| Mid | 179500 | 897.5 | 188500 | 942.5 |
| High | 181500 | 907.5 | 190500 | 952.5 |
| n12 | 10 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 140800 | 704 | 146800 | 734 | 20@32 | 52@0 |
| Mid | 141500 | 707.5 | 147500 | 737.5 |
| High | 142200 | 711 | 148200 | 741 |
| n14 | 10 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 158600 | 793 | 152600 | 763 | 20@32 | 52@0 |
| Mid |
| High |
| n20 | 15 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 167900 | 839.5 | 159700 | 798.5 | 20@11 | 79@0 |
| Mid | 169400 | 847 | 161200 | 806 |
| High | 170900 | 854.5 | 162700 | 813.5 |
| n25 | 15 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 371500 | 1857.5 | 387500 | 1937.5 | 50@29 | 79@0 |
| Mid | 376500 | 1882.5 | 392500 | 1962.5 |
| High | 381500 | 1907.5 | 397500 | 1987.5 |
| n26 | 10 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 163800 | 819 | 172800 | 864 | 25@27 | 52@0 |
| Mid | 166300 | 831.5 | 175300 | 876.5 |
| High | 168800 | 844 | 177800 | 889 |
| n28 | 20 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 142600 | 713 | 153600 | 768 | 25@81 | 106@0 |
| Mid | 145600 | 728 | 156600 | 783 |
| High | 147600 | 738 | 158600 | 793 |
| n30 | 10 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 462000 | 2310 | 471000 | 2355 | 20@32 | 52@0 |
| Mid |
| High |
| n34 | 10 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 403000 | 2015 | 403000 | 2015 | 50@0 | 52@0 |
| Mid | 403500 | 2017.5 | 403500 | 2017.5 |
| High | 404000 | 2020 | 404000 | 2020 |
| n38 | 15 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 515500 | 2577.5 | 515500 | 2577.5 | 75@0 | 79@0 |
| Mid | 519000 | 2595 | 519000 | 2595 |
| High | 522500 | 2612.5 | 522500 | 2612.5 |
| n39 | 20 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 378000 | 1890 | 378000 | 1890 | 100@0 | 106@0 |
| Mid | 380000 | 1900 | 380000 | 1900 |
| High | 382000 | 1910 | 382000 | 1910 |
| n40 | 30 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 463000 | 2315 | 463000 | 2315 | 160@0 | 160@0 |
| Mid | 470000 | 2350 | 470000 | 2350 |
| High | 477000 | 2385 | 477000 | 2385 |
| n41 | 100 | 30 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 509202 | 2546.01 | 509202 | 2546.01 | 270@0 | 273@0 |
| Mid | 518598 | 2592.99 | 518598 | 2592.99 |
| High | 528000 | 2640 | 528000 | 2640 |
| n48 | 20 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 637334 | 3560.01 | 637334 | 3560.01 | 100@0 | 106@0 |
| Mid | 641666 | 3624.99 | 641666 | 3624.99 |
| High | 646000 | 3690 | 646000 | 3690 |
| n50 | 20 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 288400 | 1442 | 288400 | 1442 | 100@0 | 106@0 |
| Mid | 294900 | 1474.5 | 294900 | 1474.5 |
| High | 301400 | 1507 | 301400 | 1507 |
| n51 | 5 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 285900 | 1429.5 | 285900 | 1429.5 | 25@0 | 25@0 |
| Mid |
| High |
| n53 | 10 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 497700 | 2488.5 | 497700 | 2488.5 | 50@0 | 52@0 |
| Mid | 497860 | 2489.3 | 497860 | 2489.3 |
| High | 498000 | 2490 | 498000 | 2490 |
| n65 | 15 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 423500 | 2117.5 | 423500 | 2117.5 | 75@4 | 79@0 |
| Mid | 431000 | 2155 | 431000 | 2155 |
| High | 438500 | 2192.5 | 438500 | 2192.5 |
| n66 | 20 (20+20) | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 344000 | 1720 | 424000 | 2120 | 100@6 | 106@0 |
| Mid | 349000 | 1745 | 429000 | 2145 |
| High | 354000 | 1770 | 434000 | 2170 |
| n70 | 15 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 340500 | 1702.5 | 400500 | 2002.5 | 75@4 | 79@0 |
| Mid |
| High |
| n71 | 10 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 133600 | 668 | 124400 | 622 | 25@0 | 52@0 |
| Mid | 136100 | 680.5 | 126900 | 634.5 |
| High | 138600 | 693 | 129400 | 647 |
| n74 | 15 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 286900 | 1434.5 | 296500 | 1482.5 | 25@54 | 79@0 |
| Mid | 289700 | 1448.5 | 299300 | 1496.5 |
| High | 292500 | 1462.5 | 302100 | 1510.5 |
| n75 SDL | 15 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | N/A | N/A | 287900 | 1439.5 | NA | 79@0 |
| Mid | N/A | N/A | 294900 | 1474.5 |
| High | N/A | N/A | 301900 | 1509.5 |
| n76 SDL | 5 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | N/A | N/A | 285900 | 1429.5 | NA | 25@0 |
| Mid |
| High |
| n77 | 100 | 30 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 623334 | 3350.01 | 623334 | 3350.01 | 270@0 | 273@0 |
| Mid | 650000 | 3750 | 650000 | 3750 |
| High | 676666 | 4149.99 | 676666 | 4149.99 |
| n78 | 100 | 30 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 623334 | 3350.01 | 623334 | 3350.01 | 270@0 | 273@0 |
| Mid | 636666 | 3549.99 | 636666 | 3549.99 |
| High | 650000 | 3750 | 650000 | 3750 |
| n79 | 100 | 30 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 696668 | 4450.02 | 696668 | 4450.02 | 270@0 | 273@0 |
| Mid | 713334 | 4700.01 | 713334 | 4700.01 |
| High | 730000 | 4950 | 730000 | 4950 |

The detailed testing parameters for each band for RedCap UE is defined in Table 4.3.3-3 and Table 4.3.3-4.

Table 4.3.3-3: NR FR1 TRP measurement parameters for RedCap UE

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR Band | CBW [MHz] | SCS (kHz) | UL modulation | Range | UL Carrier centre  [ARFCN] | UL Carrier Center (MHz) | DL Carrier centre  [ARFCN] | DL Carrier Center (MHz) | UL RB Allocation  (LCRB @ RBstart) | DL configuration |
| n1 | 15 | 15 | DFT-s-OFDM  QPSK | Low | 385500 | 1927.5 | 423500 | 2117.5 | 36@18 | N/A |
| Mid | 390000 | 1950 | 428000 | 2140 |
| High | 394500 | 1972.5 | 432500 | 2162.5 |
| n2 | 15 | 15 | DFT-s-OFDM  QPSK | Low | 371500 | 1857.5 | 387500 | 1937.5 | 36@18 | N/A |
| Mid | 376000 | 1880 | 392000 | 1960 |
| High | 380500 | 1902.5 | 396500 | 1982.5 |
| n3 | 15 | 15 | DFT-s-OFDM  QPSK | Low | 343500 | 1717.5 | 362500 | 1812.5 | 36@18 | N/A |
| Mid | 349500 | 1747.5 | 368500 | 1842.5 |
| High | 355500 | 1777.5 | 374500 | 1872.5 |
| n5 | 15 | 15 | DFT-s-OFDM  QPSK | Low | 166300 | 831.5 | 175300 | 876.5 | 36@18 | N/A |
| Mid | 167300 | 836.5 | 176300 | 881.5 |
| High | 168300 | 841.5 | 177300 | 886.5 |
| n7 | 15 | 15 | DFT-s-OFDM  QPSK | Low | 501500 | 2507.5 | 525500 | 2627.5 | 36@18 | N/A |
| Mid | 507000 | 2535 | 531000 | 2655 |
| High | 512500 | 2562.5 | 536500 | 2682.5 |
| n8 | 15 | 15 | DFT-s-OFDM  QPSK | Low | 177500 | 887.5 | 186500 | 932.5 | 36@18 | N/A |
| Mid | 179500 | 897.5 | 188500 | 942.5 |
| High | 181500 | 907.5 | 190500 | 952.5 |
| n12 | 10 | 15 | DFT-s-OFDM  QPSK | Low | 140800 | 704 | 146800 | 734 | 25@12 | N/A |
| Mid | 141500 | 707.5 | 147500 | 737.5 |
| High | 142200 | 711 | 148200 | 741 |
| n14 | 10 | 15 | DFT-s-OFDM  QPSK | Low | 158600 | 793 | 152600 | 763 | 25@12 | N/A |
| Mid |
| High |
| n20 | 15 | 15 | DFT-s-OFDM  QPSK | Low | 167900 | 839.5 | 159700 | 798.5 | 36@18 | N/A |
| Mid | 169400 | 847 | 161200 | 806 |
| High | 170900 | 854.5 | 162700 | 813.5 |
| n25 | 15 | 15 | DFT-s-OFDM  QPSK | Low | 371500 | 1857.5 | 387500 | 1937.5 | 36@18 | N/A |
| Mid | 376500 | 1882.5 | 392500 | 1962.5 |
| High | 381500 | 1907.5 | 397500 | 1987.5 |
| n26 | 15 | 15 | DFT-s-OFDM  QPSK | Low | 164300 | 821.5 | 173300 | 866.5 | 36@18 | N/A |
| Mid | 166300 | 831.5 | 175300 | 876.5 |
| High | 168300 | 841.5 | 177300 | 886.5 |
| n28 | 15 | 15 | DFT-s-OFDM  QPSK | Low | 142100 | 710.5 | 153100 | 765.5 | 36@18 | N/A |
| Mid | 145100 | 725.5 | 156100 | 780.5 |
| High | 148100 | 740.5 | 159100 | 795.5 |
| n30 | 10 | 15 | DFT-s-OFDM  QPSK | Low | 462000 | 2310 | 471000 | 2355 | 25@12 | N/A |
| Mid |
| High |
| n34 | 10 | 15 | DFT-s-OFDM  QPSK | Low | 403000 | 2015 | 403000 | 2015 | 25@12 | N/A |
| Mid | 403500 | 2017.5 | 403500 | 2017.5 |
| High | 404000 | 2020 | 404000 | 2020 |
| n38 | 15 | 15 | DFT-s-OFDM  QPSK | Low | 515500 | 2577.5 | 515500 | 2577.5 | 36@18 | N/A |
| Mid | 519000 | 2595 | 519000 | 2595 |
| High | 522500 | 2612.5 | 522500 | 2612.5 |
| n39 | 15 | 15 | DFT-s-OFDM  QPSK | Low | 377500 | 1887.5 | 377500 | 1887.5 | 36@18 | N/A |
| Mid | 380000 | 1900 | 380000 | 1900 |
| High | 382500 | 1912.5 | 382500 | 1912.5 |
| n40 | 15 | 15 | DFT-s-OFDM  QPSK | Low | 461500 | 2307.5 | 461500 | 2307.5 | 36@18 | N/A |
| Mid | 470000 | 2350 | 470000 | 2350 |
| High | 478500 | 2392.5 | 478500 | 2392.5 |
| n41 | 15 | 15 | DFT-s-OFDM  QPSK | Low | 500700 | 2503.5 | 500700 | 2503.5 | 36@18 | N/A |
| Mid | 518601 | 2593.005 | 518601 | 2593.005 |
| High | 536499 | 2682.495 | 536499 | 2682.495 |
| n48 | 15 | 15 | DFT-s-OFDM  QPSK | Low | 637168 | 3557.52 | 637168 | 3557.52 | 36@18 | N/A |
| Mid | 641666 | 3624.99 | 641666 | 3624.99 |
| High | 646166 | 3692.49 | 646166 | 3692.49 |
| n50 | 15 | 15 | DFT-s-OFDM  QPSK | Low | 287900 | 1439.5 | 287900 | 1439.5 | 36@18 | N/A |
| Mid | 294900 | 1474.5 | 294900 | 1474.5 |
| High | 301900 | 1509.5 | 301900 | 1509.5 |
| n51 | 5 | 15 | DFT-s-OFDM  QPSK | Low | 285900 | 1429.5 | 285900 | 1429.5 | 12@6 | N/A |
| Mid |
| High |
| n53 | 10 | 15 | DFT-s-OFDM  QPSK | Low | 497700 | 2488.5 | 497700 | 2488.5 | 25@12 | N/A |
| Mid | 497860 | 2489.3 | 497860 | 2489.3 |
| High | 498000 | 2490 | 498000 | 2490 |
| n65 | 15 | 15 | DFT-s-OFDM  QPSK | Low | 423500 | 2117.5 | 423500 | 2117.5 | 36@18 | N/A |
| Mid | 431000 | 2155 | 431000 | 2155 |
| High | 438500 | 2192.5 | 438500 | 2192.5 |
| n71 | 10 | 15 | DFT-s-OFDM  QPSK | Low | 133600 | 668 | 124400 | 622 | 25@12 | N/A |
| Mid | 136100 | 680.5 | 126900 | 634.5 |
| High | 138600 | 693 | 129400 | 647 |
| n74 | 15 | 15 | DFT-s-OFDM  QPSK | Low | 286900 | 1434.5 | 296500 | 1482.5 | 36@18 | N/A |
| Mid | 289700 | 1448.5 | 299300 | 1496.5 |
| High | 292500 | 1462.5 | 302100 | 1510.5 |
| n77 | 15 | 15 | DFT-s-OFDM  QPSK | Low | 620500 | 3307.5 | 620500 | 3307.5 | 36@18 | N/A |
| Mid | 650000 | 3750 | 650000 | 3750 |
| High | 679500 | 4192.5 | 679500 | 4192.5 |
| n78 | 15 | 15 | DFT-s-OFDM  QPSK | Low | 620500 | 3307.5 | 620500 | 3307.5 | 36@18 | N/A |
| Mid | 636666 | 3549.99 | 636666 | 3549.99 |
| High | 652832 | 3792.48 | 652832 | 3792.48 |
| n79 | 20 | 15 | DFT-s-OFDM  QPSK | Low | 694000 | 4410 | 694000 | 4410 | 50@25 | N/A |
| Mid | 713333 | 4699.995 | 713333 | 4699.995 |
| High | 732667 | 4990.005 | 732667 | 4990.005 |

Table 4.3.3-4: NR FR1 TRS measurement parameters for RedCap UE

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR Band | CBW (MHz) | SCS (kHz) | DL modulation | UL modulation | Range | UL Carrier centre  [ARFCN] | UL Carrier Center (MHz) | DL Carrier centre  [ARFCN] | DL Carrier Center (MHz) | UL RB Allocation  (LCRB @ RBstart) | DL Configuration (FULL RB, LCRB @ RBstart) |
| n1 | 15 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 385500 | 1927.5 | 423500 | 2117.5 | 75@4 | 79@0 |
| Mid | 390000 | 1950 | 428000 | 2140 |
| High | 394500 | 1972.5 | 432500 | 2162.5 |
| n2 | 15 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 371500 | 1857.5 | 387500 | 1937.5 | 50@29 | 79@0 |
| Mid | 376000 | 1880 | 392000 | 1960 |
| High | 380500 | 1902.5 | 396500 | 1982.5 |
| n3 | 15 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 343500 | 1717.5 | 362500 | 1812.5 | 50@29 | 79@0 |
| Mid | 349500 | 1747.5 | 368500 | 1842.5 |
| High | 355500 | 1777.5 | 374500 | 1872.5 |
| n5 | 15 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 166300 | 831.5 | 175300 | 876.5 | 25@54 | 79@0 |
| Mid | 167300 | 836.5 | 176300 | 881.5 |
| High | 168300 | 841.5 | 177300 | 886.5 |
| n7 | 15 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 501500 | 2507.5 | 525500 | 2627.5 | 75@4 | 79@0 |
| Mid | 507000 | 2535 | 531000 | 2655 |
| High | 512500 | 2562.5 | 536500 | 2682.5 |
| n8 | 15 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 177500 | 887.5 | 186500 | 932.5 | 25@54 | 79@0 |
| Mid | 179500 | 897.5 | 188500 | 942.5 |
| High | 181500 | 907.5 | 190500 | 952.5 |
| n12 | 10 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 140800 | 704 | 146800 | 734 | 20@32 | 52@0 |
| Mid | 141500 | 707.5 | 147500 | 737.5 |
| High | 142200 | 711 | 148200 | 741 |
| n14 | 10 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 158600 | 793 | 152600 | 763 | 20@32 | 52@0 |
| Mid |
| High |
| n20 | 15 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 167900 | 839.5 | 159700 | 798.5 | 20@11 | 79@0 |
| Mid | 169400 | 847 | 161200 | 806 |
| High | 170900 | 854.5 | 162700 | 813.5 |
| n25 | 15 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 371500 | 1857.5 | 387500 | 1937.5 | 50@29 | 79@0 |
| Mid | 376500 | 1882.5 | 392500 | 1962.5 |
| High | 381500 | 1907.5 | 397500 | 1987.5 |
| n26 | 15 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 164300 | 821.5 | 173300 | 866.5 | 25@54 | 79@0 |
| Mid | 166300 | 831.5 | 175300 | 876.5 |
| High | 168300 | 841.5 | 177300 | 886.5 |
| n28 | 15 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 142100 | 710.5 | 153100 | 765.5 | 25@54 | 79@0 |
| Mid | 145100 | 725.5 | 156100 | 780.5 |
| High | 148100 | 740.5 | 159100 | 795.5 |
| n30 | 10 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 462000 | 2310 | 471000 | 2355 | 20@32 | 52@0 |
| Mid |
| High |
| n34 | 10 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 403000 | 2015 | 403000 | 2015 | 50@0 | 52@0 |
| Mid | 403500 | 2017.5 | 403500 | 2017.5 |
| High | 404000 | 2020 | 404000 | 2020 |
| n38 | 15 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 515500 | 2577.5 | 515500 | 2577.5 | 75@0 | 79@0 |
| Mid | 519000 | 2595 | 519000 | 2595 |
| High | 522500 | 2612.5 | 522500 | 2612.5 |
| n39 | 15 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 377500 | 1887.5 | 377500 | 1887.5 | 75@0 | 79@0 |
| Mid | 380000 | 1900 | 380000 | 1900 |
| High | 382500 | 1912.5 | 382500 | 1912.5 |
| n40 | 15 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 461500 | 2307.5 | 461500 | 2307.5 | 75@0 | 79@0 |
| Mid | 470000 | 2350 | 470000 | 2350 |
| High | 478500 | 2392.5 | 478500 | 2392.5 |
| n41 | 15 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 500700 | 2503.5 | 500700 | 2503.5 | 75@0 | 79@0 |
| Mid | 518601 | 2593.005 | 518601 | 2593.005 |
| High | 536499 | 2682.495 | 536499 | 2682.495 |
| n48 | 15 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 637168 | 3557.52 | 637168 | 3557.52 | 75@0 | 79@0 |
| Mid | 641666 | 3624.99 | 641666 | 3624.99 |
| High | 646166 | 3692.49 | 646166 | 3692.49 |
| n50 | 15 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 287900 | 1439.5 | 287900 | 1439.5 | 75@0 | 79@0 |
| Mid | 294900 | 1474.5 | 294900 | 1474.5 |
| High | 301900 | 1509.5 | 301900 | 1509.5 |
| n51 | 5 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 285900 | 1429.5 | 285900 | 1429.5 | 25@0 | 25@0 |
| Mid |
| High |
| n53 | 10 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 497700 | 2488.5 | 497700 | 2488.5 | 50@0 | 52@0 |
| Mid | 497860 | 2489.3 | 497860 | 2489.3 |
| High | 498000 | 2490 | 498000 | 2490 |
| n65 | 15 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 423500 | 2117.5 | 423500 | 2117.5 | 75@4 | 79@0 |
| Mid | 431000 | 2155 | 431000 | 2155 |
| High | 438500 | 2192.5 | 438500 | 2192.5 |
| n70 | 15 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 340500 | 1702.5 | 400500 | 2002.5 | 75@4 | 79@0 |
| Mid |
| High |
| n71 | 10 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 133600 | 668 | 124400 | 622 | 25@0 | 52@0 |
| Mid | 136100 | 680.5 | 126900 | 634.5 |
| High | 138600 | 693 | 129400 | 647 |
| n74 | 15 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 286900 | 1434.5 | 296500 | 1482.5 | 25@54 | 79@0 |
| Mid | 289700 | 1448.5 | 299300 | 1496.5 |
| High | 292500 | 1462.5 | 302100 | 1510.5 |
| n77 | 15 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 620500 | 3307.5 | 620500 | 3307.5 | 75@0 | 79@0 |
| Mid | 650000 | 3750 | 650000 | 3750 |
| High | 679500 | 4192.5 | 679500 | 4192.5 |
| n78 | 15 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 620500 | 3307.5 | 620500 | 3307.5 | 75@0 | 79@0 |
| Mid | 636666 | 3549.99 | 636666 | 3549.99 |
| High | 652832 | 3792.48 | 652832 | 3792.48 |
| n79 | 20 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 694000 | 4410 | 694000 | 4410 | 100@0 | 106@0 |
| Mid | 713333 | 4699.995 | 713333 | 4699.995 |
| High | 732667 | 4990.005 | 732667 | 4990.005 |

The detailed test parameters for each band for NR-NTN UE are defined in Table 4.3.3-5 and Table 4.3.3-6.

Table 4.3.3-5: FR1 TRP measurement parameters for NR-NTN UE

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR-NTN Band | CBW (MHz) | SCS (kHz) | UL modulation | Range | UL Carrier centre  [ARFCN] | UL Carrier Center (MHz) | DL Carrier centre  [ARFCN] | DL Carrier Center (MHz) | UL RB Allocation  (LCRB @ RBstart) | DL configuration |
| n256 | 5 | 15 | DFT-s-OFDM  QPSK | Low | 396500 | 1982.5 | 434500 | 2172.5 | 12@6 | N/A |
| Mid | 399000 | 1995 | 437000 | 2185 |
| High | 401500 | 2007.5 | 439500 | 2197.5 |
| n255 | 5 | 15 | DFT-s-OFDM  QPSK | Low | 325800 | 1629 | 305500 | 1527.5 | 12@6 | N/A |
| Mid | 328700 | 1643.5 | 308400 | 1542 |
| High | 331600 | 1658 | 311300 | 1556.5 |
| n254 | 5 | 15 | DFT-s-OFDM  QPSK | Low | 322500 | 1612.5 | 497200 | 2486 | 12@6 | N/A |
| Mid | 323700 | 1618.5 | 498400 | 2492 |
| High | 324800 | 1624 | 499500 | 2497.5 |

Table 4.3.3-6: FR1 TRS measurement parameters for NR-NTN UE

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR-NTN Band | CBW (MHz) | SCS (kHz) | DL modulation | UL modulation | Range | UL Carrier centre  [ARFCN] | UL Carrier Center (MHz) | DL Carrier centre  [ARFCN] | DL Carrier Center (MHz) | UL RB Allocation  (LCRB @ RBstart) | DL Configuration (FULL RB, LCRB @ RBstart) |
| n256 | 5 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 396500 | 1982.5 | 434500 | 2172.5 | 25@0 | 25@0 |
| Mid | 399000 | 1995 | 437000 | 2185 |
| High | 401500 | 2007.5 | 439500 | 2197.5 |
| n255 | 5 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 325800 | 1629 | 305500 | 1527.5 | 25@0 | 25@0 |
| Mid | 328700 | 1643.5 | 308400 | 1542 |
| High | 331600 | 1658 | 311300 | 1556.5 |
| n254 | 5 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 322500 | 1612.5 | 497200 | 2486 | 25@0 | 25@0 |
| Mid | 323700 | 1618.5 | 498400 | 2492 |
| High | 324800 | 1624 | 499500 | 2497.5 |

The detailed test parameters for each band for UE category M1 NTN are defined in Table 4.3.3-7 and Table 4.3.3-8.

Table 4.3.3-7: TRP measurement parameters for UE category M1 NTN

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NTN Band | CBW (MHz) | UL modulation | Range | UL Carrier centre  [ARFCN] | UL Carrier Center (MHz) | DL Carrier centre  [ARFCN] | DL Carrier Center (MHz) | UL RB Allocation  HD-FDD (LCRB @ RBstart) | DL configuration |
| 256 | 1.4 | QPSK | Low | 261851 | 1980.7 | 229083 | 2170.7 | 1@0 | N/A |
| Mid | 261994 | 1995 | 229226 | 2185 |
| High | 262137 | 2009.3 | 229369 | 2199.3 |
| 255 | 1.4 | QPSK | Low | 261511 | 1627.2 | 228743 | 1525.7 | 1@0 | N/A |
| Mid | 261674 | 1643.5 | 228906 | 1542 |
| High | 261837 | 1659.8 | 229069 | 1558.3 |
| 254 | 1.4 | QPSK | Low | 261346 | 1610.7 | 228578 | 2484.2 | 1@0 | N/A |
| Mid | 261422 | 1618.3 | 228654 | 2491.8 |
| High | 261497 | 1625.8 | 228729 | 2499.3 |

Table 4.3.3-8: TRS measurement parameters for UE category M1 NTN

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NTN Band | CBW (MHz) | DL modulation | UL modulation | Range | UL Carrier centre  [ARFCN] | UL Carrier Center (MHz) | DL Carrier centre  [ARFCN] | DL Carrier Center (MHz) | UL RB Allocation  HD-FDD (LCRB @ RBstart) | DL Configuration FDD (LCRB @ RBstart) |
| 256 | 1.4 | QPSK | QPSK | Low | 261851 | 1980.7 | 229083 | 2170.7 | 6@0 | 4@0 |
| Mid | 261994 | 1995 | 229226 | 2185 |
| High | 262137 | 2009.3 | 229369 | 2199.3 |
| 255 | 1.4 | QPSK | QPSK | Low | 261511 | 1627.2 | 228743 | 1525.7 | 6@0 | 4@0 |
| Mid | 261674 | 1643.5 | 228906 | 1542 |
| High | 261837 | 1659.8 | 229069 | 1558.3 |
| 254 | 1.4 | QPSK | QPSK | Low | 261346 | 1610.7 | 228578 | 2484.2 | 6@0 | 4@0 |
| Mid | 261422 | 1618.3 | 228654 | 2491.8 |
| High | 261497 | 1625.8 | 228729 | 2499.3 |

The detailed test parameters for each band for NB-IoT NTN are defined in Table 4.3.3-9 and Table 4.3.3-10.

Table 4.3.3-9: TRP measurement parameters for NB-IoT NTN UE

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NTN Band | CBW (MHz) | UL modulation | Range | UL Carrier centre  [ARFCN] | UL Carrier Center (MHz) | DL Carrier centre  [ARFCN] | DL Carrier Center (MHz) | MUL/  MDL | UL Configuration Ntones | DL Configuration |
| 256 | 0.2 | QPSK | Low | 261845 | 1980.1 | 229077 | 2170.1 | 0 | 1@0 | N/A |
| Mid | N/A | N/A | N/A | N/A | N/A | N/A |
| High | 262143 | 2009.9 | 229375 | 2199.9 | 0 | 1@11 |
| 255 | 0.2 | QPSK | Low | 261505 | 1626.6 | 228737 | 1525.1 | 0 | 1@0 | N/A |
| Mid | N/A | N/A | N/A | N/A | N/A | N/A |
| High | 261843 | 1660.4 | 229075 | 1558.9 | 0 | 1@11 |
| 254 | 0.2 | QPSK | Low | 261340 | 1610.1 | 228572 | 2483.6 | 0 | 1@0 | N/A |
| Mid | N/A | N/A | N/A | N/A | N/A | N/A |
| High | 261503 | 1626.4 | 228735 | 2499.9 | 0 | 1@11 |

Table 4.3.3-10: TRS measurement parameters for NB-IoT NTN UE

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NTN Band | CBW (MHz) | DL modulation | UL modulation | Range | UL Carrier centre  [ARFCN] | UL Carrier Center (MHz) | DL Carrier centre  [ARFCN] | DL Carrier Center (MHz) | MUL/  MDL | UL Configuration Ntones | DL Configuration Subcarriers |
| 256 | 0.2 | QPSK | BPSK | Low | 261845 | 1980.1 | 229077 | 2170.1 | 0 | 1@0 | 12 |
| Mid | N/A | N/A | N/A | N/A | N/A |
| High | 262143 | 2009.9 | 229375 | 2199.9 | 0 |
| 255 | 0.2 | QPSK | BPSK | Low | 261505 | 1626.6 | 228737 | 1525.1 | 0 | 1@0 | 12 |
| Mid | N/A | N/A | N/A | N/A | N/A |
| High | 261843 | 1660.4 | 229075 | 1558.9 | 0 |
| 254 | 0.2 | QPSK | BPSK | Low | 261340 | 1610.1 | 228572 | 2483.6 | 0 | 1@0 | 12 |
| Mid | N/A | N/A | N/A | N/A | N/A |
| High | 261503 | 1626.4 | 228735 | 2499.9 | 0 |

<<< Skip Unchanged Sections >>>

### 7.4.1 General

For TRP and TRS testing in SA or EN-DC mode, measurements should be only performed at NR carrier. The LTE link antenna in EN-DC mode is used to provide a stable LTE link to the DUT without precise path loss or polarization control.

The TRP of the DUT is measured by sampling the radiated transmit power of the DUT with three-dimensional scan at various locations surrounding the device. The measurement is performed with the sampling step for theta () and phi () axes defined in Table B.2.12-1, Annex B.2.12. For some test system that can not measure 180º EIRP, then the extrapolation approach can be adopted when generating the 3D antenna pattern. All of the measured power values will be integrated to TRP, as defined in Clause 5.1.1.2.

The Partial Radiated Power (PRP) of the DUT is measured by sampling the radiated transmit power of the DUT with partial sphere of three-dimensional scan at various locations surrounding the device, which is defined in Clause 5.3.1. The measurement is performed with the sampling step for theta () and phi () axes defined in Table B.2.12-1, Annex B.2.12. All of the measured power values will be integrated to PRP, as defined in Clause 5.3.1. The applicability of different PRP metric is specified in Table 5.3.1.1-1.

For TRP and PRP measurement, the evaluations shall be performed at maximum transmit power of DUT.

The applicability of NTN usage scenarios and corresponding test procedure is summarized in Table 7.4.1-1.

Table 7.4.1-1: Applicability of NTN usage scenarios and corresponding test procedure

|  |  |  |  |
| --- | --- | --- | --- |
| NTN Scenario / description | OTA performance metric for NTN | Applicability of mechanical modes for NTN | Additional parameters declared by the OEM for NTN testing |
| Scenario 1 in Clause 4.2.1  both head+hand mode and hand only mode | Full sphere  TRP/TRS | Talk mode (head+hand phantom) and browsing mode (hand phantom) | None |
| Scenario 2 in Clause 4.2.1  hand only mode targeted for specific UE orientation usage | Partial Sphere  UHRP or UPRP, depending on additional parameters declared by the OEM | Browsing mode (hand phantom) | DUT tilt for initial positioning is declared as one of the following values:  θT ∈ [-90, -75, -60, -45, -30, -15, 0, 15, 30, 45, 60, 75, 90]o |
| Elevation range: θ ∈ [-θR, θR] o,  Option1: θR =90 is the only metric  Option 2: θR can be declared as one of the following values:  θR ∈ [90, 60]o |
| Scenario 3 in Clause 4.2.1  hand only mode targeted for arbitrary UE orientation usage | Full sphere  TRP/TRS | Browsing mode (hand phantom) | None |

<<< Skip Unchanged Sections >>>

### 7.4.5 TRP and PRP test procedure for NR NTN

#### 7.4.5.1 UE configuration

NR-NTN TRP and PRP radiated conformance testing shall be performed with the UE consistently operating at maximum power level, e.g., Time-Averaged Algorithm (TAA) and other power back-off functions should be disabled. The above functions OFF should be based on manufacturer declaration, if declared, then the manufacturer is required to provide a mechanism for the test lab to enable/disable the function.

For NTN OTA testing, the Doppler conditions should be set to zero and delay conditions are set to constant for all types of satellites.

The NR NTN SS should send continuous uplink power control “up” commands in every uplink scheduling information to the DUT to ensure the DUT’s transmitter is at maximum output power during the TRP and PRP test.

For NR NTN, the NTN System Simulator (SS) and DUT shall be configured per TS 38.521-5 [31], section 6.2.1 (UE maximum output power) using the default settings specified in TS 38.521-5 [31] and TS 38.508-1 [7] as applicable. The measurement should be carried out based on the detailed test parameters of each band, as defined in Table 4.3.3-5 Clause 4.3.

7.4.5.2 Test procedureIt is note that the test procedure and performance metric is same for a handheld UE support GSO and/or NGSO.

For NR-NTN UE support usage scenario 1 or usage scenario 3 defined in Clause 4.2.1, the measurement procedure includes the following steps:

1) Place the DUT inside the QZ following the corresponding positioning guideline defined in Clause 6.

2) Connect the SS with the DUT through the link antenna following steps 1 and 2 in section 6.2.1.4.2 of TS 38.521-5 [31] and ensure the DUT transmits with its maximum power.

3) Measure the power at each measurement point, and calculate by adding the composite loss of the entire transmission path.

4) Calculate the TRP performance metric using the TRP integration approaches outlined in Clause 5.1.1.2.

For NR-NTN UE declaring support of usage scenario 2 defined in Clause 4.2.1, the measurement procedure includes the following steps:

1) Place the DUT inside the QZ following the hand only positioning guideline defined in Clause 6.

2) Connect the SS with the DUT through the link antenna following steps 1 and 2 in section 6.2.1.4.2 of TS 38.521-5 [31] and ensure the DUT transmits with its maximum power.

3) Measure the power at each measurement point of upper Hemisphere and calculate by adding the composite loss of the entire transmission path.

4) Calculate the partial sphere performance metric using the approaches outlined in Clause 5.3.1.4.

### 7.4.6 TRP and PRP test procedure for IoT-NTN

#### 7.4.6.1 UE configuration

IoT-NTN TRP and PRP radiated conformance testing shall be performed with the UE consistently operating at maximum power level, e.g., Time-Averaged Algorithm (TAA) and other power back-off functions should be disabled. The above functions OFF should be based on manufacturer declaration, if declared, then the manufacturer is required to provide a mechanism for the test lab to enable/disable the function.

The IoT-NTN SS should send continuous uplink power control “up” commands in every uplink scheduling information to the DUT to ensure the DUT’s transmitter is at maximum output power during the TRP and TRS test. For NTN OTA testing, the Doppler conditions should be set to zero and delay conditions are set to constant for all types of satellites.

For cat M1 NTN, the NTN System Simulator (SS) and DUT shall be configured per TS 36.521-4 [32], section 6.2.A.1 (UE maximum output power for category M1) using the default settings specified in TS 36.521-4 [32] and TS 36.508 [33] as applicable. The measurement should be carried out based on the detailed test parameters of each band, as defined in Table 4.3.3-7 Clause 4.3.

For NB-IoT NTN, the NTN System Simulator (SS) and DUT shall be configured per TS 36.521-4 [32], section 6.2.B.1 (UE maximum output power for category NB1 and NB2) using the default settings specified in TS 36.521-4 [32] and TS 36.508 [33] as applicable. The measurement should be carried out based on the detailed test parameters of each band, as defined in Table 4.3.3-9 Clause 4.3.

#### 7.4.6.2 Test procedure for cat M1 NTN

It is note that the test procedure and performance metric is same for a handheld UE support GSO and/or NGSO.

For cat M1 NTN UE support usage scenario 1 or usage scenario 3 defined in Clause 4.2.1, the measurement procedure includes the following steps:

1) Place the DUT inside the QZ following the corresponding positioning guideline defined in Clause 6.

2) Connect the SS with the DUT through the link antenna following steps 1 and 2 in section 6.2A.1.4.2 of TS 36.521-4 [32] and ensure the DUT transmits with its maximum power.

3) Measure the power at each measurement point, and calculate by adding the composite loss of the entire transmission path.

4) Calculate the TRP performance metric using the TRP integration approaches outlined in Clause 5.1.1.2.

For cat M1 NTN UE declaring support of usage scenario 2 defined in Clause 4.2.1, the measurement procedure includes the following steps:

1) Place the DUT inside the QZ following the hand only positioning guideline defined in Clause 6.

2) Connect the SS with the DUT through the link antenna following steps 1 and 2 in section 6.2A.1.4.2 of TS 36.521-4 [32] and ensure the DUT transmits with its maximum power.

3) Measure the power at each measurement point of upper hemisphere and calculate by adding the composite loss of the entire transmission path.

4) Calculate the partial sphere performance metric using the approaches outlined in Clause 5.3.1.4.

#### 7.4.6.3 Test procedure for NB-IoT NTN

It is note that the test procedure and performance metric is same for a handheld UE support GSO and/or NGSO.

For NB-IoT NTN UE support usage scenario 1 or usage scenario 3 defined in Clause 4.2.1, the measurement procedure includes the following steps:

1) Place the DUT inside the QZ following the corresponding positioning guideline defined in Clause 6.

2) Connect the SS with the DUT through the link antenna following steps 1 and 2 in section 6.2B.1.4.2 of TS 36.521-4 [32] and ensure the DUT transmits with its maximum power.

3) Measure the power at each measurement point, and calculate by adding the composite loss of the entire transmission path.

4) Calculate the TRP performance metric using the TRP integration approaches outlined in Clause 5.1.1.2.

For NB-IoT NTN UE declaring support of usage scenario 2 defined in Clause 4.2.1, the measurement procedure includes the following steps:

1) Place the DUT inside the QZ following the hand only positioning guideline defined in Clause 6.

2) Connect the SS with the DUT through the link antenna following steps 1 and 2 in section 6.2B.1.4.2 of TS 36.521-4 [32] and ensure the DUT transmits with its maximum power.

3) Measure the power at each measurement point of upper hemisphere and calculate by adding the composite loss of the entire transmission path.

4) Calculate the partial sphere performance metric using the approaches outlined in Clause 5.3.1.4.

<<< Skip Unchanged Sections >>>

### 7.5.1 General

For SA and EN-DC, the TRS of the DUT is measured by sampling effective isotropic sensitivity (EIS) of the DUT with three-dimensional scan at various locations surrounding the device. The measurement is performed with the sampling step for theta () and phi () axes defined in Table B.2.12-1, Annex B.2.12, for TRS measurement.

EIS, or receiver sensitivity measurements, is defined as the minimum downlink signal power received at the UE antenna input required to provide a data throughput rate greater than or equal to 95% of the maximum throughput of the reference measurement channel (RMC) (the maximum throughput is per Appendix A of TS 38.521-1 [5]).

The Partial Radiated Sensitivity (PRS) of the DUT is measured by sampling the radiated sensitivity power of the DUT with partial sphere of three-dimensional scan at various locations surrounding the device, which is defined in Clause 5.3.1. The measurement is performed with the sampling step for theta () and phi () axes defined in Table B.2.12-1, Annex B.2.12. All of the measured sensitivity power values will be integrated to PRS, as defined in Clause 5.3.1. The applicability of different PRS metric is specified in Table 5.3.1.1-1.

For TRS and PRS measurement, the evaluations shall be performed at maximum transmit power.

For TRS and PRS measurement, no specific setting is needed for Rx antennas. By default, the maximum number of Rx antennas supported at each band should be enabled during the TRS and PRS test.

The applicability of NTN usage scenarios and corresponding test procedure is summarized in Table 7.4.1-1 Clause 7.4.1.

<<< Skip Unchanged Sections >>>

### 7.5.5 TRS and PRS test procedure for NR NTN

#### 7.5.5.1 UE configuration

NR-NTN TRS and PRS radiated conformance testing shall be performed with the UE consistently operating at maximum power level, e.g., Time-Averaged Algorithm (TAA) and other power back-off functions should be disabled. The above functions OFF should be based on manufacturer declaration, if declared, then the manufacturer is required to provide a mechanism for the test lab to enable/disable the function.

For NTN OTA testing, the Doppler conditions should be set to zero and delay conditions are set to constant for all types of satellites.

The NR NTN SS should send continuous uplink power control “up” commands in every uplink scheduling information to the DUT to ensure the DUT’s transmitter is at maximum output power during the OTA test.

For NR NTN, the NTN System Simulator (SS) and DUT shall be configured per TS 38.521-5 [31], section 7.3 (Reference sensitivity) using the default settings specified in TS 38.521-5 [31] and TS 38.508-1 [7] as applicable. The measurement should be carried out based on the detailed test parameters of each band, as defined in Table 4.3.3-6 Clause 4.3.

#### 7.5.5.2 Test procedure

It is note that the test procedure and performance metric is same for a handheld UE support GSO and/or NGSO.

For NR-NTN UE support usage scenario 1 or usage scenario 3 defined in Clause 4.2.1, the measurement procedure includes the following steps:

1) Place the DUT inside the QZ following the corresponding positioning guideline defined in Clause 6.

2) Connect the SS with the DUT through the measurement antenna.

3) Follow steps 1 through 7 in section 7.3.2.4.2, TS 38.521-5 [31], with the following exception: determine each EIS, i.e., by adjusting the downlink signal level until the minimum power level at which the throughput exceeds or equal to 95% of the maximum throughput of the specified RMC, at each sampling point. The downlink power step size shall be no more than 0.5 dB when the RF power level is near the NR NTN sensitivity level.

4) Calculate the TRS performance metric using the TRS integration approaches outlined in Clause 5.2.1.

For NR-NTN UE declaring support of usage scenario 2 defined in Clause 4.2.1, the measurement procedure includes the following steps:

1) Place the DUT inside the QZ following the corresponding positioning guideline defined in Clause 6.

2) Connect the SS with the DUT through the measurement antenna.

3) Follow steps 1 through 7 in section 7.3.2.4.2, TS 38.521-5 [31], with the following exception: determine each EIS at each measurement point of upper hemisphere, i.e., by adjusting the downlink signal level until the minimum power level at which the throughput exceeds or equal to 95% of the maximum throughput of the specified RMC, at each sampling point. The downlink power step size shall be no more than 0.5 dB when the RF power level is near the NR NTN sensitivity level.

4) Calculate the partial sphere performance metric using the integration approaches outlined in Clause 5.3.1.7.

### 7.5.6 TRS and PRS test procedure for IoT-NTN

#### 7.5.6.1 UE configuration

IoT-NTN TRS and PRS radiated conformance testing shall be performed with the UE consistently operating at maximum power level, e.g., Time-Averaged Algorithm (TAA) and other power back-off functions should be disabled. The above functions OFF should be based on manufacturer declaration, if declared, then the manufacturer is required to provide a mechanism for the test lab to enable/disable the function.

The IoT-NTN SS should send continuous uplink power control “up” commands in every uplink scheduling information to the DUT to ensure the DUT’s transmitter is at maximum output power during the TRS and PRS test. For NTN OTA testing, the Doppler conditions should be set to zero and delay conditions are set to constant for all types of satellites.

For cat M1 NTN, the NTN System Simulator (SS) and DUT shall be configured per TS 36.521-4 [32], section 7.3.A (Reference sensitivity power level for UE category M1) using the default settings specified in TS 36.521-4 [32] and TS 36.508 [33] as applicable. The measurement should be carried out based on the detailed test parameters of each band, as defined in Table 4.3.3-8 Clause 4.3.

For NB-IoT NTN, the NTN System Simulator (SS) and DUT shall be configured per TS 36.521-4 [32], section 7.3.B (Reference sensitivity power level for UE category NB1 and NB2) using the default settings specified in TS 36.521-4 [32] and TS 36.508 [33] as applicable. The measurement should be carried out based on the detailed test parameters of each band, as defined in Table 4.3.3-10 Clause 4.3.

#### 7.5.6.2 Test procedure for cat M1 NTN

It is note that the test procedure and performance metric is same for a handheld UE support GSO and/or NGSO.

For cat M1 NTN UE support usage scenario 1 or usage scenario 3 defined in Clause 4.2.1, the measurement procedure includes the following steps:

1) Place the DUT inside the QZ following the corresponding positioning guideline defined in Clause 6.

2) Connect the SS with the DUT through the measurement antenna.

3) Follow steps 1 through 4 in section 7.3A.4.2, TS 36.521-4 [32], with the following exception: determine each EIS, i.e., by adjusting the downlink signal level until the minimum power level at which the throughput exceeds or equal to 95% of the maximum throughput of the specified RMC, at each sampling point. The downlink power step size shall be no more than 0.5 dB when the RF power level is near the M1 NTN sensitivity level.

4) Calculate the TRS performance metric using the TRS integration approaches outlined in Clause 5.2.1.

For cat M1 NTN UE declaring support of usage scenario 2 defined in Clause 4.2.1, the measurement procedure includes the following steps:

1) Place the DUT inside the QZ following the corresponding positioning guideline defined in Clause 6.

2) Connect the SS with the DUT through the measurement antenna.

3) Follow steps 1 through 4 in section 7.3A.4.2, TS 36.521-4 [32], with the following exception: determine each EIS at each measurement point of upper hemisphere, i.e., by adjusting the downlink signal level until the minimum power level at which the throughput exceeds or equal to 95% of the maximum throughput of the specified RMC, at each sampling point. The downlink power step size shall be no more than 0.5 dB when the RF power level is near the M1 NTN sensitivity level.

4) Calculate the partial sphere performance metric using the integration approaches outlined in Clause 5.4.1.7.

#### 7.5.6.3 Test procedure for NB-IoT NTN

It is note that the test procedure and performance metric is same for a handheld UE support GSO and/or NGSO.

For NB-IoT NTN UE support usage scenario 1 or usage scenario 3 defined in Clause 4.2.1, the measurement procedure includes the following steps:

1) Place the DUT inside the QZ following the corresponding positioning guideline defined in Clause 6.

2) Connect the SS with the DUT through the measurement antenna.

3) Follow steps 1 through 3 in section 7.3B.4.2, TS 36.521-4 [32], with the following exception: determine each EIS, i.e., by adjusting the downlink signal level until the minimum power level at which the throughput exceeds or equal to 95% of the maximum throughput of the specified RMC, at each sampling point. The downlink power step size shall be no more than 0.5 dB when the RF power level is near the NB-IoT NTN sensitivity level.

4) Calculate the TRS performance metric using the TRS integration approaches outlined in Clause 5.2.1.

For NB-IoT NTN UE declaring support of usage scenario 2 defined in Clause 4.2.1, the measurement procedure includes the following steps:

1) Place the DUT inside the QZ following the corresponding positioning guideline defined in Clause 6.

2) Connect the SS with the DUT through the measurement antenna.

3) Follow steps 1 through 3 in section 7.3B.4.2, TS 36.521-4 [32], with the following exception: determine each EIS at each measurement point of upper hemisphere, i.e., by adjusting the downlink signal level until the minimum power level at which the throughput exceeds or equal to 95% of the maximum throughput of the specified RMC, at each sampling point. The downlink power step size shall be no more than 0.5 dB when the RF power level is near the NB-IoT NTN sensitivity level.

4) Calculate the partial sphere performance metric using the integration approaches outlined in Clause 5.4.1.7.

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## B.4.1 MU Assessment for TRP in Anechoic Chamber

<Editor’s note: The MU assessment for XR device will be further added. >

The uncertainty contributions related to TRP are listed in Table B.4.1-1.

The preliminary example uncertainty budgets for TRP are presented in this clause, and the corresponding applicability are summarized as following:

- Hand only TRP MU is presented in Table B.4.1-2, which can be applied to at least handheld UE and NTN UE under scenario 1 and 3. FFS other UE types.

- Head and hand TRP MU is presented in Table B.4.1-3, which can be applied to at least handheld UE and NTN UE under scenario 3. FFS other UE types.

- Hand only TRP MU for Wrist-Worn device is presented in Table B.4.1-4.

- Head and hand TRP MU for Wrist-Worn device is presented in Table B.4.1-5.

<<< Skip Unchanged Sections >>>

## B.5.1 MU Assessment for TRS in Anechoic Chamber

<Editor’s note: The MU assessment for XR device will be further added. >

The uncertainty contributions related to TRS are listed in Table B.5.1-1.

The preliminary example uncertainty budgets for TRS are presented in this clause, and the corresponding applicability are summarized as following:

- Hand only TRS MU is presented in Table B.5.1-2, which can be applied to at least handheld UE and NTN UE under scenario 1 and 3. FFS other UE types.

- Head and hand TRS MU is presented in Table B.5.1-3, which can be applied to at least handheld UE and NTN UE under scenario 3. FFS other UE types.

- Hand only TRS MU for Wrist-Worn device is presented in Table B.5.1-4.

- Head and hand TRS MU for Wrist-Worn device is presented in Table B.5.1-5.

**<<< END OF CHANGES >>>**