

# FCC TEST REPORT

**Product Name:** Hybrid Full-Touch Handheld computer

**Trade Mark:** 

**Model No.:** X40

**Report Number:** 26051324500RFM-3

**Test Standards:** FCC 47 CFR Part 27

**FCC ID:** VTVX40

**Test Result:** PASS

**Date of Issue:** September 12, 2026

Prepared for:

**TSC Auto ID Technology Co., Ltd.**

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UTTR-RF-FCC4G-V1.1

## Version

| Version No. | Date               | Description |
|-------------|--------------------|-------------|
| V1.0        | September 12, 2026 | Original    |



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## CONTENTS

|                                                        |           |
|--------------------------------------------------------|-----------|
| <b>1. GENERAL INFORMATION</b>                          | <b>4</b>  |
| 1.1 CLIENT INFORMATION                                 | 4         |
| 1.2 EUT INFORMATION                                    | 4         |
| 1.2.1 GENERAL DESCRIPTION OF EUT                       | 4         |
| 1.2.2 DESCRIPTION OF ACCESSORIES                       | 4         |
| 1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD  | 5         |
| 1.4 DESCRIPTION OF SUPPORT UNITS                       | 6         |
| 1.5 TEST LOCATION                                      | 6         |
| 1.6 TEST FACILITY                                      | 7         |
| 1.7 DEVIATION FROM STANDARDS                           | 7         |
| 1.8 ABNORMALITIES FROM STANDARD CONDITIONS             | 7         |
| 1.9 OTHER INFORMATION REQUESTED BY THE CUSTOMER        | 7         |
| 1.10 MEASUREMENT UNCERTAINTY                           | 7         |
| <b>2. TEST SUMMARY</b>                                 | <b>8</b>  |
| <b>3. EQUIPMENT LIST</b>                               | <b>9</b>  |
| <b>4. TEST CONFIGURATION</b>                           | <b>10</b> |
| 4.1 ENVIRONMENTAL CONDITIONS FOR TESTING               | 10        |
| 4.2 TEST SETUP                                         | 11        |
| 4.2.1 FOR RADIATED EMISSIONS TEST SETUP                | 11        |
| 4.2.2 FOR CONDUCTED RF TEST SETUP                      | 12        |
| 4.3 SYSTEM TEST CONFIGURATION                          | 13        |
| 4.4 PRE-SCAN                                           | 14        |
| <b>5. RADIO TECHNICAL REQUIREMENTS SPECIFICATION</b>   | <b>15</b> |
| 5.1 REFERENCE DOCUMENTS FOR TESTING                    | 15        |
| 5.2 CONDUCTED OUTPUT POWER                             | 15        |
| 5.3 EIRP                                               | 21        |
| 5.4 PEAK-TO-AVERAGE RATIO                              | 22        |
| 5.5 99%&26DB BANDWIDTH                                 | 23        |
| 5.6 BAND EDGE AT ANTENNA TERMINALS                     | 24        |
| 5.7 SPURIOUS EMISSIONS AT ANTENNA TERMINALS            | 25        |
| 5.8 FIELD STRENGTH OF SPURIOUS RADIATION               | 26        |
| 5.9 FREQUENCY STABILITY                                | 29        |
| <b>APPENDIX 1 PHOTOS OF TEST SETUP</b>                 | <b>30</b> |
| <b>APPENDIX 2 PHOTOS OF EUT CONSTRUCTIONAL DETAILS</b> | <b>30</b> |

## 1. GENERAL INFORMATION

### 1.1 CLIENT INFORMATION

|                                 |                                                                 |
|---------------------------------|-----------------------------------------------------------------|
| <b>Applicant:</b>               | TSC Auto ID Technology Co., Ltd.                                |
| <b>Address of Applicant:</b>    | 9F., No. 95, Minquan Rd. Xindian Dist., New Taipei City, Taiwan |
| <b>Manufacturer:</b>            | TSC Auto ID Technology Co., Ltd.                                |
| <b>Address of Manufacturer:</b> | 9F., No. 95, Minquan Rd. Xindian Dist., New Taipei City, Taiwan |

### 1.2 EUT INFORMATION

#### 1.2.1 General Description of EUT

|                                                      |                                                                                                                                          |                                                                             |                            |
|------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|----------------------------|
| Product Name:                                        | Hybrid Full-Touch Handheld computer                                                                                                      |                                                                             |                            |
| Model No.:                                           | X40                                                                                                                                      |                                                                             |                            |
| Trade Mark:                                          |                                                         |                                                                             |                            |
| DUT Stage:                                           | Identical Prototype                                                                                                                      |                                                                             |                            |
| EUT Supports Function:<br>(Provided by the customer) | GSM Bands:                                                                                                                               | GSM 850/ PCS 1900                                                           |                            |
|                                                      | UTRA Bands:                                                                                                                              | Band II/ Band IV/ Band V                                                    |                            |
|                                                      | E-UTRA Bands:                                                                                                                            | FDD Band 2/ 4/ 5/ 7/ 12/ 13/ 14/ 17/ 25/ 26/ 66/ 71<br>TDD Band 38/ 41 / 48 |                            |
|                                                      | 5G NR Bands:                                                                                                                             | FDD n2/ 5/ 7/ 12/ 13/ 14/ 25/ 26/ 66/ 71<br>TDD n38/ 41/ 48/ 77/ 78         |                            |
|                                                      | 2.4 GHz ISM Band:                                                                                                                        | IEEE 802.11b/g/n/ax                                                         |                            |
|                                                      |                                                                                                                                          | Bluetooth V5.3                                                              |                            |
|                                                      |                                                                                                                                          | 2 <sup>nd</sup> BLE                                                         |                            |
|                                                      | U-NII 5 GHz Bands:                                                                                                                       | 5 150 - 5 250 MHz                                                           | IEEE 802.11a/n/ac/ax       |
|                                                      |                                                                                                                                          | 5 250 - 5 350 MHz                                                           | IEEE 802.11a/n/ac/ax       |
|                                                      |                                                                                                                                          | 5 470 - 5 725 MHz                                                           | IEEE 802.11a/n/ac/ax       |
|                                                      |                                                                                                                                          | 5 725 - 5 850 MHz                                                           | IEEE 802.11a/n/ac/ax       |
|                                                      | U-NII 6 GHz Bands:                                                                                                                       | 5 925 - 6 425 MHz                                                           | IEEE 802.11ax              |
|                                                      |                                                                                                                                          | 6 425 - 6 525 MHz                                                           | IEEE 802.11ax              |
|                                                      |                                                                                                                                          | 6 525 - 6 875 MHz                                                           | IEEE 802.11ax              |
|                                                      |                                                                                                                                          | 6 875 - 7 125 MHz                                                           | IEEE 802.11ax              |
|                                                      | RNSS Bands:                                                                                                                              | 1559 - 1610 MHz                                                             | GPS/ Galileo/ GLONASS/ BDS |
| 1164 - 1300 MHz                                      |                                                                                                                                          | GPS/ Galileo                                                                |                            |
| RFID:                                                | 902 - 928 MHz                                                                                                                            |                                                                             |                            |
| UWB:                                                 | 6.0-8.5GHz                                                                                                                               |                                                                             |                            |
| NFC:                                                 | 13.553 MHz to 13.567 MHz                                                                                                                 |                                                                             |                            |
| Software Version:                                    | R2.00 (Provided by the customer)                                                                                                         |                                                                             |                            |
| Hardware Version:                                    | REV0.3 (Provided by the customer)                                                                                                        |                                                                             |                            |
| Sample Received Date:                                | May 13, 2026                                                                                                                             |                                                                             |                            |
| Sample Tested Date:                                  | May 14, 2026 to June 28, 2026                                                                                                            |                                                                             |                            |
| Remark:                                              | The above EUT's information was provided by customer. Please refer to the specifications or user's manual for more detailed description. |                                                                             |                            |

#### 1.2.2 Description of Accessories

Refer to Report 26051324500EMC-1 for accessories.

### 1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

|                                                          |                                                                                                            |                                 |
|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------|
| <b>Support Networks:</b>                                 | 5G NR                                                                                                      | TDD n77/ 78                     |
| <b>Type of Modulation:</b>                               | <b>DFT-s-OFDM:</b> $\pi/2$ BPSK, QPSK, 16QAM, 64QAM, 256QAM;<br><b>CP-OFDM:</b> QPSK, 16QAM, 64QAM, 256QAM |                                 |
| <b>5G NR SCS:</b>                                        | 30 kHz                                                                                                     |                                 |
| <b>5G NR UE Channel Bandwidth</b>                        | n77:                                                                                                       | 20/30/40/60/80/100 MHz          |
|                                                          | n78:                                                                                                       | 20/30/40/50/60/70/80/90/100 MHz |
| <b>Antenna Type:</b><br>(Provided by the customer)       | LDS Antenna                                                                                                |                                 |
| <b>Antenna Gain (dBi):</b><br>(Provided by the customer) | NR n77:                                                                                                    | -1.44                           |
|                                                          | NR n78:                                                                                                    | -1.44                           |
| <b>Sample No.:</b>                                       | Radiated: S202605138612-ZJA03/26                                                                           |                                 |
|                                                          | Conducted: S202605138612-ZJA20/26, S202605138612-ZJA11/26                                                  |                                 |
| <b>Normal Test Voltage:</b>                              | 3.87 Vdc                                                                                                   |                                 |
| <b>Extreme Test Voltage:</b>                             | 3.4 Vdc to 4.38 Vdc                                                                                        |                                 |
| <b>Extreme Test Temperature:</b>                         | -30 °C to +50 °C                                                                                           |                                 |

| Summary of Results: |             |                    |                          |                   |        |                 |                        |
|---------------------|-------------|--------------------|--------------------------|-------------------|--------|-----------------|------------------------|
| Bands               | BW<br>(MHz) | Modulation         | Frequency Range<br>(MHz) | Max. Tune Up EIRP |        | 99% BW<br>(MHz) | Emission<br>Designator |
|                     |             |                    |                          | (dBm)             | (W)    |                 |                        |
| n77                 | 20          | PI/2 BPSK / QPSK   | 3460.02 - 3540.00        | 21.06             | 0.2673 | 17.867          | 17M9G7D                |
|                     |             | 16QAM/64QAM/256QAM |                          | 21.06             | 0.2673 | 17.902          | 17M9W7D                |
|                     | 30          | PI/2 BPSK / QPSK   | 3465.00 - 3534.99        | 21.06             | 0.2673 | 26.827          | 26M8G7D                |
|                     |             | 16QAM/64QAM/256QAM |                          | 21.06             | 0.2673 | 26.860          | 26M9W7D                |
|                     | 40          | PI/2 BPSK / QPSK   | 3470.01 - 3529.98        | 21.06             | 0.2673 | 35.710          | 35M7G7D                |
|                     |             | 16QAM/64QAM/256QAM |                          | 21.06             | 0.2673 | 35.743          | 35M7W7D                |
|                     | 60          | PI/2 BPSK / QPSK   | 3480.00 - 3519.99        | 21.06             | 0.2673 | 57.741          | 57M7G7D                |
|                     |             | 16QAM/64QAM/256QAM |                          | 21.06             | 0.2673 | 57.788          | 57M8W7D                |
|                     | 80          | PI/2 BPSK / QPSK   | 3490.02 - 3510.00        | 21.06             | 0.2673 | 77.015          | 77M0G7D                |
|                     |             | 16QAM/64QAM/256QAM |                          | 21.06             | 0.2673 | 77.068          | 77M1W7D                |
|                     | 100         | PI/2 BPSK / QPSK   | 3500.01 - 3500.01        | 21.06             | 0.2673 | 96.359          | 96M4G7D                |
|                     |             | 16QAM/64QAM/256QAM |                          | 21.06             | 0.2673 | 96.266          | 96M3W7D                |
| n78                 | 20          | PI/2 BPSK / QPSK   | 3460.02 - 3540.00        | 21.06             | 0.2673 | 17.820          | 17M8G7D                |
|                     |             | 16QAM/64QAM/256QAM |                          | 21.06             | 0.2673 | 17.917          | 17M9W7D                |
|                     | 30          | PI/2 BPSK / QPSK   | 3465.00 - 3534.99        | 21.06             | 0.2673 | 26.787          | 26M8G7D                |
|                     |             | 16QAM/64QAM/256QAM |                          | 21.06             | 0.2673 | 26.798          | 26M8W7D                |
|                     | 40          | PI/2 BPSK / QPSK   | 3470.01 - 3529.98        | 21.06             | 0.2673 | 35.693          | 35M7G7D                |
|                     |             | 16QAM/64QAM/256QAM |                          | 21.06             | 0.2673 | 35.755          | 35M8W7D                |
|                     | 50          | PI/2 BPSK / QPSK   | 3475.02 - 3525.00        | 21.06             | 0.2673 | 45.824          | 45M8G7D                |
|                     |             | 16QAM/64QAM/256QAM |                          | 21.06             | 0.2673 | 45.850          | 45M9W7D                |
|                     | 60          | PI/2 BPSK / QPSK   | 3480.00 - 3519.99        | 21.06             | 0.2673 | 57.778          | 57M8G7D                |
|                     |             | 16QAM/64QAM/256QAM |                          | 21.06             | 0.2673 | 57.712          | 57M7W7D                |
|                     | 70          | PI/2 BPSK / QPSK   | 3485.01 - 3514.98        | 21.06             | 0.2673 | 64.375          | 64M4G7D                |
|                     |             | 16QAM/64QAM/256QAM |                          | 21.06             | 0.2673 | 64.231          | 64M2W7D                |
|                     | 80          | PI/2 BPSK / QPSK   | 3490.02 - 3510.00        | 21.06             | 0.2673 | 76.942          | 76M9G7D                |
|                     |             | 16QAM/64QAM/256QAM |                          | 21.06             | 0.2673 | 77.166          | 77M2W7D                |
|                     | 90          | PI/2 BPSK / QPSK   | 3495.00 - 3504.99        | 21.06             | 0.2673 | 86.642          | 86M6G7D                |
|                     |             | 16QAM/64QAM/256QAM |                          | 21.06             | 0.2673 | 86.763          | 86M8W7D                |
|                     | 100         | PI/2 BPSK / QPSK   | 3500.01 - 3500.01        | 21.06             | 0.2673 | 96.325          | 96M3G7D                |
|                     |             | 16QAM/64QAM/256QAM |                          | 21.06             | 0.2673 | 96.268          | 96M3W7D                |

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| Summary of Results: |             |                    |                          |       |        |                 |                        |
|---------------------|-------------|--------------------|--------------------------|-------|--------|-----------------|------------------------|
| Bands               | BW<br>(MHz) | Modulation         | Frequency Range<br>(MHz) | EIRP  |        | 99% BW<br>(MHz) | Emission<br>Designator |
|                     |             |                    |                          | (dBm) | (W)    |                 |                        |
| n77                 | 20          | PI/2 BPSK / QPSK   | 3710.01 - 3969.99        | 21.06 | 0.2673 | 17.864          | 17M9G7D                |
|                     |             | 16QAM/64QAM/256QAM |                          | 21.06 | 0.2673 | 17.882          | 17M9W7D                |
|                     | 30          | PI/2 BPSK / QPSK   | 3715.02 - 3964.98        | 21.06 | 0.2673 | 26.815          | 26M8G7D                |
|                     |             | 16QAM/64QAM/256QAM |                          | 21.06 | 0.2673 | 26.838          | 26M8W7D                |
|                     | 40          | PI/2 BPSK / QPSK   | 3720.00 - 3960.00        | 21.06 | 0.2673 | 35.723          | 35M7G7D                |
|                     |             | 16QAM/64QAM/256QAM |                          | 21.06 | 0.2673 | 35.732          | 35M7W7D                |
|                     | 60          | PI/2 BPSK / QPSK   | 3730.02 - 3949.98        | 21.06 | 0.2673 | 57.784          | 57M8G7D                |
|                     |             | 16QAM/64QAM/256QAM |                          | 21.06 | 0.2673 | 57.899          | 57M9W7D                |
|                     | 80          | PI/2 BPSK / QPSK   | 3740.01 - 3939.99        | 21.06 | 0.2673 | 77.015          | 77M0G7D                |
|                     |             | 16QAM/64QAM/256QAM |                          | 21.06 | 0.2673 | 77.064          | 77M1W7D                |
|                     | 100         | PI/2 BPSK / QPSK   | 3750.00 - 3930.00        | 21.06 | 0.2673 | 96.486          | 96M5G7D                |
|                     |             | 16QAM/64QAM/256QAM |                          | 21.06 | 0.2673 | 96.227          | 96M2W7D                |
| n78                 | 20          | PI/2 BPSK / QPSK   | 3710.01 - 3789.99        | 21.06 | 0.2673 | 17.834          | 17M8G7D                |
|                     |             | 16QAM/64QAM/256QAM |                          | 21.06 | 0.2673 | 17.921          | 17M9W7D                |
|                     | 30          | PI/2 BPSK / QPSK   | 3715.02 - 3784.98        | 21.06 | 0.2673 | 26.821          | 26M8G7D                |
|                     |             | 16QAM/64QAM/256QAM |                          | 21.06 | 0.2673 | 26.852          | 26M9W7D                |
|                     | 40          | PI/2 BPSK / QPSK   | 3720.00 - 3780.00        | 21.06 | 0.2673 | 35.716          | 35M7G7D                |
|                     |             | 16QAM/64QAM/256QAM |                          | 21.06 | 0.2673 | 35.748          | 35M7W7D                |
|                     | 50          | PI/2 BPSK / QPSK   | 3725.01 - 3774.99        | 21.06 | 0.2673 | 45.758          | 45M8G7D                |
|                     |             | 16QAM/64QAM/256QAM |                          | 21.06 | 0.2673 | 45.805          | 45M8W7D                |
|                     | 60          | PI/2 BPSK / QPSK   | 3730.02 - 3769.98        | 21.06 | 0.2673 | 57.798          | 57M8G7D                |
|                     |             | 16QAM/64QAM/256QAM |                          | 21.06 | 0.2673 | 57.906          | 57M9W7D                |
|                     | 70          | PI/2 BPSK / QPSK   | 3735.00 - 3765.00        | 21.06 | 0.2673 | 64.299          | 64M3G7D                |
|                     |             | 16QAM/64QAM/256QAM |                          | 21.06 | 0.2673 | 64.222          | 64M2W7D                |
|                     | 80          | PI/2 BPSK / QPSK   | 3740.01 - 3759.99        | 21.06 | 0.2673 | 77.074          | 77M1G7D                |
|                     |             | 16QAM/64QAM/256QAM |                          | 21.06 | 0.2673 | 77.118          | 77M1W7D                |
|                     | 90          | PI/2 BPSK / QPSK   | 3745.02 - 3754.98        | 21.06 | 0.2673 | 86.651          | 86M7G7D                |
|                     |             | 16QAM/64QAM/256QAM |                          | 21.06 | 0.2673 | 86.743          | 86M7W7D                |
|                     | 100         | PI/2 BPSK / QPSK   | 3750.00 - 3750.00        | 21.06 | 0.2673 | 96.292          | 96M3G7D                |
|                     |             | 16QAM/64QAM/256QAM |                          | 21.06 | 0.2673 | 96.530          | 96M5W7D                |

## 1.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested with associated equipment below.

### 1) Support Equipment

| Description   | Manufacturer | Model No. | Serial Number           | Supplied by |
|---------------|--------------|-----------|-------------------------|-------------|
| Dummy battery | Bluebird     | N/A       | S202605138612-P<br>JA02 | Bluebird    |

### 2) Support Cable

| Cable No. | Description   | Connector | Length    | Supplied by |
|-----------|---------------|-----------|-----------|-------------|
| 1         | Antenna Cable | SMA       | 0.3 Meter | UnionTrust  |

## 1.5 TEST LOCATION

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 UTTR-RF-FCC4G-V1.1

## 1.6 TEST FACILITY

The test facility is recognized, certified, or accredited by the following organizations:

**CNAS-Lab Code: L9069**

The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

**A2LA-Lab Certificate No.: 4312.01**

Shenzhen UnionTrust Quality and Technology Co., Ltd. has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

**ISED Wireless Device Testing Laboratories**

CAB identifier: CN0032

**FCC Accredited Lab.**

Designation Number: CN1194

Test Firm Registration Number: 259480

## 1.7 DEVIATION FROM STANDARDS

None.

## 1.8 ABNORMALITIES FROM STANDARD CONDITIONS

None.

## 1.9 OTHER INFORMATION REQUESTED BY THE CUSTOMER

None.

## 1.10 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

| No. | Item                                    | Measurement Uncertainty                                                  |
|-----|-----------------------------------------|--------------------------------------------------------------------------|
| 1   | Conducted Output Power                  | ±0.7 dB                                                                  |
| 2   | 99%&26dB Bandwidth                      | ±1.86 %                                                                  |
| 3   | Emission Mask                           | ±2.7 dBm                                                                 |
| 4   | Spurious emissions at antenna terminals | ±2.7 dBm                                                                 |
| 5   | Field strength of spurious radiation    | 30 MHz-1 GHz: ±4.9 dB<br>1 GHz-18 GHz: ±4.8 dB<br>18 GHz-40 GHz: ±5.1 dB |
| 6   | Frequency stability                     | ±6.5 x 10 <sup>-8</sup>                                                  |
| 7   | Humidity                                | ±3.9 %                                                                   |
| 8   | Temperature                             | ±0.62 °C                                                                 |
| 9   | DC Voltages                             | ±0.68 %                                                                  |

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## 2. TEST SUMMARY

| FCC 47 CFR Part 27 Test Cases (3700 - 3800 MHz & 3700 - 3980 MHz) |                                                         |                                         |        |
|-------------------------------------------------------------------|---------------------------------------------------------|-----------------------------------------|--------|
| Test Item                                                         | Test Requirement                                        | Test Method                             | Result |
| Equivalent Isotropic Radiated Power (EIRP)                        | FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 27.50(j)(3) | ANSI C63.26-2015 & KDB 971168 D01v03r01 | PASS   |
| Conducted Output Power                                            | FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 27.50(j)(3) | ANSI C63.26-2015 & KDB 971168 D01v03r01 | PASS   |
| Peak-to-average ratio                                             | FCC 47 CFR Part 27.50(j)(4)                             | KDB 971168 D01v03r01                    | PASS   |
| 99%&26dB Bandwidth                                                | FCC 47 CFR Part 2.1049(h)                               | ANSI C63.26-2015 & KDB 971168 D01v03r01 | PASS   |
| Band Edge at antenna terminals                                    | FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 27.53(l)(2)    | ANSI C63.26-2015 & KDB 971168 D01v03r01 | PASS   |
| Spurious emissions at antenna terminals                           | FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 27.53(l)(2)    | ANSI C63.26-2015 & KDB 971168 D01v03r01 | PASS   |
| Field strength of spurious radiation                              | FCC 47 CFR Part 2.1053 & FCC 47 CFR Part 27.53(l)(2)    | ANSI C63.26-2015 & KDB 971168 D01v03r01 | PASS   |
| Frequency stability                                               | FCC 47 CFR Part 2.1055 & FCC 47 CFR Part 27.54          | ANSI C63.26-2015 & KDB 971168 D01v03r01 | PASS   |

| FCC 47 CFR Part 27 Test Cases (3450 - 3550 MHz) |                                                         |                                         |        |
|-------------------------------------------------|---------------------------------------------------------|-----------------------------------------|--------|
| Test Item                                       | Test Requirement                                        | Test Method                             | Result |
| Effective Radiated Power (ERP)                  | FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 27.50(k)(3) | ANSI C63.26-2015 & KDB 971168 D01v03r01 | PASS   |
| Conducted Output Power                          | FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 27.50(k)(3) | ANSI C63.26-2015 & KDB 971168 D01v03r01 | PASS   |
| Peak-to-average ratio                           | FCC 47 CFR Part 27.50(k)(4)                             | KDB 971168 D01v03r01                    | PASS   |
| 99%&26dB Bandwidth                              | FCC 47 CFR Part 2.1049(h)                               | ANSI C63.26-2015 & KDB 971168 D01v03r01 | PASS   |
| Band Edge at antenna terminals                  | FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 27.53(n)(2)    | ANSI C63.26-2015 & KDB 971168 D01v03r01 | PASS   |
| Spurious emissions at antenna terminals         | FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 27.53(n)(2)    | ANSI C63.26-2015 & KDB 971168 D01v03r01 | PASS   |
| Field strength of spurious radiation            | FCC 47 CFR Part 2.1053 & FCC 47 CFR Part 27.53(n)(2)    | ANSI C63.26-2015 & KDB 971168 D01v03r01 | PASS   |
| Frequency stability                             | FCC 47 CFR Part 2.1055 & FCC 47 CFR Part 27.54          | ANSI C63.26-2015 & KDB 971168 D01v03r01 | PASS   |

### Disclaimer and Explanations:

The declared of product specification and data (e.g. antenna gain, RF specification, etc) for EUT presented in the report are provided by the customer, and the customer takes all the responsibilities for the accuracy of product specification.

### 3. EQUIPMENT LIST

| Radiated Emission Test Equipment List |                                                     |                 |            |                            |             |               |
|---------------------------------------|-----------------------------------------------------|-----------------|------------|----------------------------|-------------|---------------|
| Used                                  | Equipment                                           | Manufacturer    | Model No.  | Serial Number              | Cal. date   | Cal. Due date |
| <input checked="" type="checkbox"/>   | 3 m SAC                                             | ETS-Lindgren    | 3 m        | Euroshiedpn-CT001270-1317  | 11-Nov-2023 | 10-Nov-2026   |
| <input checked="" type="checkbox"/>   | Loop Antenna                                        | ETS-Lindgren    | 6502       | 00202525                   | 26-Jan-2026 | 25-Jan-2027   |
| <input checked="" type="checkbox"/>   | Broadband Antenna                                   | ETS-Lindgren    | 3142E      | 00201566                   | 26-Oct-2025 | 25-Oct-2026   |
| <input checked="" type="checkbox"/>   | 6dB Attenuator                                      | Talent          | RA6A5-N-18 | 18103001                   | 26-Oct-2025 | 25-Oct-2026   |
| <input checked="" type="checkbox"/>   | Double-Ridged Waveguide Horn Antenna(Pre-amplifier) | ETS-Lindgren    | 3117-PA    | 00201541                   | 21-Mar-2026 | 20-Mar-2027   |
| <input checked="" type="checkbox"/>   | Pre-amplifier                                       | ETS-Lindgren    | 00118385   | 00201874                   | 21-Mar-2026 | 20-Mar-2027   |
| <input checked="" type="checkbox"/>   | Double-Ridged Waveguide Horn Antenna(Pre-amplifier) | ETS-Lindgren    | 3116C-PA   | 00202652                   | 30-Oct-2025 | 29-Oct-2026   |
| <input checked="" type="checkbox"/>   | Pre-amplifier                                       | ETS-Lindgren    | 00118384   | 00202652                   | 24-Oct-2025 | 23-Oct-2026   |
| <input checked="" type="checkbox"/>   | Receiver                                            | ROHDE & SCHWARZ | ESIB26     | 100114                     | 24-Oct-2025 | 23-Oct-2026   |
| <input checked="" type="checkbox"/>   | Spectrum analyzer                                   | ROHDE & SCHWARZ | FSV40-N    | 101653                     | 20-Mar-2026 | 19-Mar-2027   |
| <input checked="" type="checkbox"/>   | Pre-amplifier                                       | HP              | 8447F      | 2805A02960                 | 24-Oct-2025 | 23-Oct-2026   |
| <input checked="" type="checkbox"/>   | Multi device Controller                             | ETS-Lindgren    | 7006-001   | 160105.00                  | N/A         | N/A           |
| <input checked="" type="checkbox"/>   | Test Software                                       | Audix           | e3         | Software Version: 9.160323 |             |               |

| RF Conducted Test Equipment List    |                               |              |                |                              |             |               |
|-------------------------------------|-------------------------------|--------------|----------------|------------------------------|-------------|---------------|
| Used                                | Equipment                     | Manufacturer | Model No.      | Serial Number                | Cal. date   | Cal. Due date |
| <input checked="" type="checkbox"/> | EXA Signal Analyzer           | KEYSIGHT     | N9010B         | MY62060155                   | 20-Mar-2026 | 19-Mar-2027   |
| <input checked="" type="checkbox"/> | UXM 5G Wireless Test Platform | KEYSIGHT     | E7515B         | MY59020226                   | 20-Mar-2026 | 19-Mar-2027   |
| <input checked="" type="checkbox"/> | Shielding Room                | SAEMC        | 4(L)*3(W)*3(H) | N/A                          | 25-Oct-2024 | 24-Oct-2027   |
| <input checked="" type="checkbox"/> | Temp Humidity chamber         | Votisch      | VT4002         | 58566133290020               | 20-Mar-2026 | 19-Mar-2027   |
| <input checked="" type="checkbox"/> | Automatic control switch      | Tonscend     | JS0806-1       | 24E80610780                  | N/A         | N/A           |
| <input checked="" type="checkbox"/> | Notch filter control unit     | Tonscend     | JS0806-F       | 24G806F0807                  | N/A         | N/A           |
| <input checked="" type="checkbox"/> | DC Source                     | Agilent      | 66319B         | MY43000795                   | 24-Oct-2025 | 23-Oct-2026   |
| <input checked="" type="checkbox"/> | Test Software                 | Tonscend     | TS1120-5       | Software Version: 2.4.1 (5g) |             |               |

#### 4. TEST CONFIGURATION

##### 4.1 ENVIRONMENTAL CONDITIONS FOR TESTING

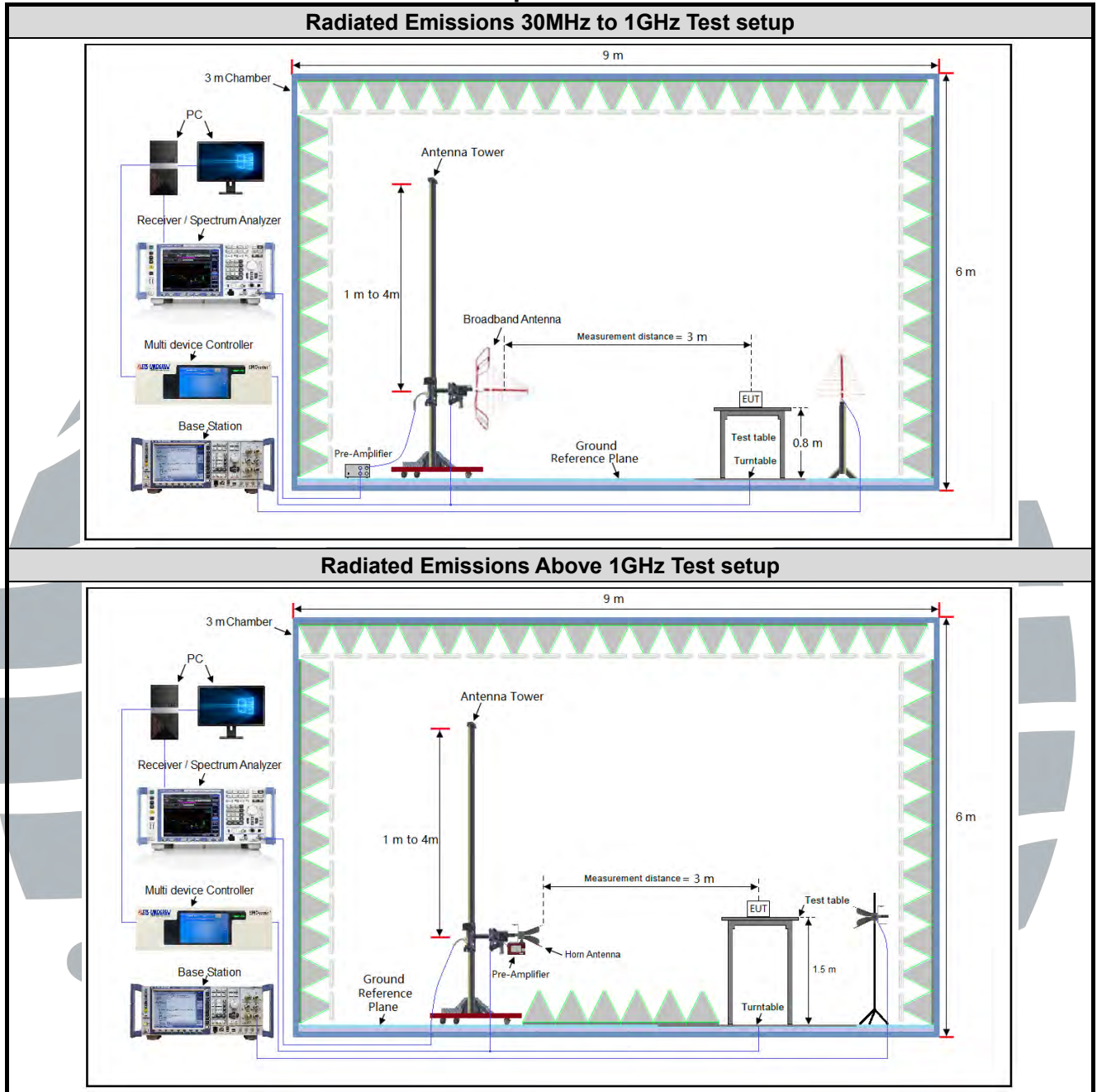
| Test Environment | Selected Values During Tests |             |                       |
|------------------|------------------------------|-------------|-----------------------|
| Test Condition   | Ambient                      |             |                       |
|                  | Temperature (°C)             | Voltage (V) | Relative Humidity (%) |
| TN/VN            | +15 to +35                   | 3.87        | 20 to 75              |
| TL/VL            | -30                          | 3.4         | 20 to 75              |
| TH/VL            | +50                          | 3.4         | 20 to 75              |
| TL/VH            | -30                          | 4.38        | 20 to 75              |
| TH/VH            | +50                          | 4.38        | 20 to 75              |

**Remark:**

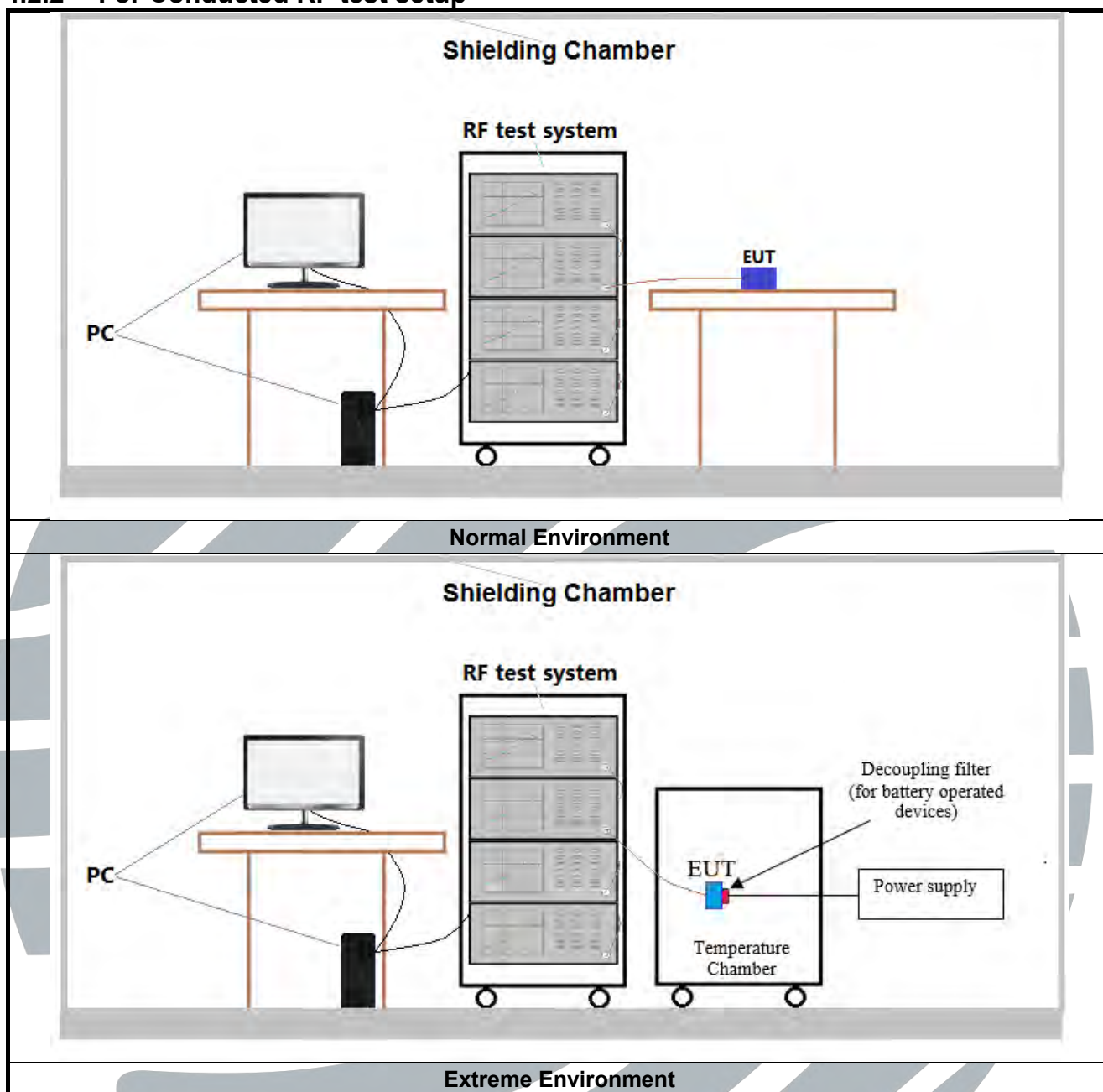
- 1) The EUT just work in such extreme temperature of -30 °C to +50 °C and the extreme voltage of 3.4 V to 4.38 V, so here the EUT is tested in the temperature of -30 °C to +50 °C and the voltage of 3.4 V to 4.38 V.
- 2) VN: Normal Voltage; TN: Normal Temperature;  
TL: Low Extreme Test Temperature; TH: High Extreme Test Temperature;  
VL: Low Extreme Test Voltage; VH: High Extreme Test Voltage.

## 4.2 TEST SETUP

### 4.2.1 For Radiated Emissions test setup



## 4.2.2 For Conducted RF test setup



### 4.3 SYSTEM TEST CONFIGURATION

For emissions testing, the equipment under test (EUT) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, radiated emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario. It was powered by a 3.87V battery. Only the worst case data were recorded in this test report.

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, X/Y/Z axis, and antenna ports.

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater for frequencies below 1000MHz. The resolution is 1 MHz or greater for frequencies above 1000MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

Radiated emission measurement were performed from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

#### 4.4 PRE-SCAN

Pre-scan all bandwidth, Configuration and Mode, find worse case mode are chosen to the report, the LTE and 5G NR worse case mode applicability and tested channel detail as below:

| Item                                             | Worst case Configuration and Mode                                                                                                                                                       |
|--------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>EIRP</b>                                      | The maximum Tune-up was adopted for the calculation.                                                                                                                                    |
| <b>Conducted output power</b> <sup>Note 1)</sup> | All bandwidth, All modulation, All RB configuration and Low/middle/high channel                                                                                                         |
| <b>99%&amp;26dB Bandwidth</b>                    | All bandwidth, 5G NR DFT-s-OFDM_QPSK/16QAM modulation, Full RB configuration and Low/middle/high channel                                                                                |
| <b>peak-to-average ratio</b>                     | Max. bandwidth, 5G NR DFT-s-OFDM modulation, Full RB configuration and Low/middle/high channel                                                                                          |
| <b>Band Edge at antenna terminals</b>            | All bandwidth, 5G NR DFT-s-OFDM_QPSK modulation, Full&1 RB configuration and Low/ high channel                                                                                          |
| <b>Spurious emissions at antenna terminals</b>   | For 5G NR, Conducted spurious emission tests were conducted on wider bandwidth with inner 5G NR DFT-s-OFDM_QPSK_1RB and since this is the worst bandwidth and the highest output power. |
| <b>Field strength of spurious radiation</b>      | For 5G NR, Conducted spurious emission tests were conducted on wider bandwidth with inner 5G NR DFT-s-OFDM_QPSK_1RB and since this is the worst bandwidth and the highest output power. |
| <b>Frequency stability</b>                       | Max. bandwidth, 5G NR_CP_QPSK modulation, Full RB configuration and middle channel                                                                                                      |

**Note:**

- 1) Since 5G NR n77 and 78 have most of the same bandwidths, and the power of frequency bands with a larger frequency range is equal to or greater than the subset, simplified tests were conducted for the following bandwidths.
  - 5G NR n78 (20/30/40/60/80/100 MHz BW) are covered by 5G NR n77 (20/30/40/60/80/100 MHz BW).
- 2) The EUT supports SA and NSA mode, according to the maximum power between SA and NSA mode, NSA covered SA mode.
- 3) The EN-DC combinations declared by the manufacturer are as follows:

| EN-DC Combinations |               |                   |
|--------------------|---------------|-------------------|
| DC_B2A+N78A        | DC_B66A+n5A   | DC_B2A+B7A+n78A   |
| DC_B4A+N78A        | DC_B5A+n66A   | DC_B2A+B66A+n78A  |
| DC_B2A+N12A        | DC_B2A+n71AA  | DC_B2A+B5A+n78A   |
| DC_B12A+N77A       | DC_B66A+n71AA | DC_B2A+B12A+n78A  |
| DC_B13A+N77A       | DC_B66A+N12A  | DC_B13A+B66A+n77A |
| DC_B38A+N78A       | DC_B12A+N66A  | DC_B2A+B13A+n77A  |
| DC_B12A+N78A       | DC_B71A+N66A  | DC_B2A+B5A+n77A   |
| DC_B25A+N78A       | DC_B2A+N71A   | DC_B2A+B66A+n77A  |
| DC_B25A+N77A       | DC_B66A+N71A  | DC_B5A+B66A+n77A  |
| DC_B2A+N5A         | DC_12A+n41A   | DC_B2A+B66A+n12A  |
| DC_B13A+N66A       | DC_B26A+N41A  | DC_B7A+B66A+n5A   |
| DC_B5A+N2A         | DC_B13A+N2A   | DC_B2A+B7A+n71A   |
| DC_B66A+n78A       | DC_B48A+N5A   | DC_B2A+B66A+n71A  |
| DC_B66A+n77A       | DC_B48A+N66A  | DC_B2A+B66A+n71AA |
|                    |               | DC_B2A+B66A+n5A   |

## 5. RADIO TECHNICAL REQUIREMENTS SPECIFICATION

### 5.1 REFERENCE DOCUMENTS FOR TESTING

| No. | Identity                                          | Document Title                                                                                                                     |
|-----|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| 1   | FCC 47 CFR Part 2                                 | Frequency allocations and radio treaty matters; general rules and regulations                                                      |
| 2   | FCC 47 CFR Part 27                                | Miscellaneous Wireless Communications Services                                                                                     |
| 3   | ANSI C63.26-2015                                  | American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services                                  |
| 4   | KDB 971168 D01                                    | KDB 971168 D01 Power Meas License Digital Systems v03r01                                                                           |
| 5   | KDB 412172 D01<br>Determining ERP and EIRP v01r01 | Guidelines for determining the effective radiated power (ERP) and isotropically radiated power (EIRP) of an RF transmitting system |

### 5.2 CONDUCTED OUTPUT POWER

**Test Requirement:** FCC 47 CFR Part 2.1046(a)  
FCC 47 CFR Part 27.50(j)(3)  
FCC 47 CFR Part 27.50(k)(3)  
**Test Method:** KDB 971168 D01v03r01 & ANSI C63.26-2015

**Limit:**

**FCC 47 CFR Part 27.50(j)(3): 3700-3980 MHz band**

Mobile and portable stations are limited to 1 Watt EIRP. Mobile and portable stations operating in these bands must employ a means for limiting power to the minimum necessary for successful communications.

**FCC 47 CFR Part 27.50(k)(3): 3450-3550 MHz band**

Mobile devices are limited to 1Watt (30 dBm) EIRP. Mobile devices operating in these bands must employ a means for limiting power to the minimum necessary for successful communications.

**Test Procedure:**

The EUT was set up for the maximum power with CMW500, and LTE link data modulation and link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

**Test Setup:** Refer to section 4.2.2 for details.

**Instruments Used:** Refer to section 3 for details

**Test Mode:** Link mode

**Test Results:** Pass

| 5G NR n77       |              | RB Size     | RB Offset | 20MHz BW<br>SCS = 30kHz |         |        | 30MHz BW<br>SCS = 30kHz |         |         | 40MHz BW<br>SCS = 30kHz |         |         | 60MHz BW<br>SCS = 30kHz |         |         |
|-----------------|--------------|-------------|-----------|-------------------------|---------|--------|-------------------------|---------|---------|-------------------------|---------|---------|-------------------------|---------|---------|
| Channel         |              |             |           | 630666                  | 633334  | 636000 | 631000                  | 633334  | 635666  | 631334                  | 633334  | 635334  | 632000                  | 633334  | 634666  |
| Frequency (MHz) |              |             |           | 3459.99                 | 3500.01 | 3540   | 3465                    | 3500.01 | 3534.99 | 3470.01                 | 3500.01 | 3530.01 | 3480                    | 3500.01 | 3519.99 |
| DFT-s-OFDM      | $\pi/2$ BPSK | 1           | Left      | 21.82                   | 22.03   | 21.95  | 21.84                   | 22.07   | 21.81   | 21.73                   | 22.05   | 22.06   | 21.45                   | 21.63   | 21.72   |
|                 | $\pi/2$ BPSK | 1           | Right     | 21.97                   | 22.02   | 22.10  | 21.92                   | 21.80   | 22.04   | 22.00                   | 21.98   | 21.99   | 21.72                   | 21.81   | 21.79   |
|                 | $\pi/2$ BPSK | Innter_Full | Mid       | 21.82                   | 22.05   | 22.01  | 21.89                   | 22.01   | 21.83   | 21.97                   | 22.03   | 21.97   | 21.69                   | 21.83   | 21.80   |
|                 | QPSK         | 1           | Left      | 21.85                   | 22.03   | 22.13  | 21.92                   | 22.17   | 22.05   | 21.89                   | 22.11   | 21.86   | 21.59                   | 21.81   | 21.75   |
|                 | QPSK         | 1           | Right     | 22.02                   | 22.00   | 21.98  | 21.85                   | 22.14   | 22.05   | 22.14                   | 22.05   | 21.87   | 21.78                   | 21.69   | 21.77   |
|                 | QPSK         | Innter_Full | Mid       | 21.92                   | 22.21   | 21.98  | 21.92                   | 22.07   | 21.92   | 21.83                   | 21.98   | 21.93   | 21.85                   | 21.91   | 21.85   |
|                 | 16QAM        | 1           | Left      | 21.97                   | 22.16   | 22.11  | 22.10                   | 21.84   | 22.06   | 21.98                   | 22.09   | 22.02   | 21.69                   | 21.58   | 21.89   |
|                 | 16QAM        | 1           | Right     | 22.12                   | 22.11   | 22.19  | 22.11                   | 21.96   | 22.16   | 22.13                   | 22.08   | 22.12   | 21.79                   | 21.81   | 21.82   |
|                 | 16QAM        | Innter_Full | Mid       | 21.91                   | 21.96   | 22.11  | 21.94                   | 21.96   | 21.98   | 21.94                   | 21.87   | 21.93   | 21.67                   | 21.69   | 21.85   |
|                 | 64QAM        | 1           | Left      | 20.70                   | 20.85   | 20.60  | 20.48                   | 20.67   | 20.61   | 20.65                   | 20.85   | 20.69   | 20.36                   | 20.53   | 20.58   |
|                 | 64QAM        | 1           | Right     | 20.76                   | 20.77   | 20.58  | 20.63                   | 20.62   | 20.81   | 20.88                   | 20.74   | 20.78   | 20.54                   | 20.46   | 20.58   |
|                 | 64QAM        | Innter_Full | Mid       | 20.41                   | 20.48   | 20.53  | 20.30                   | 20.54   | 20.25   | 20.45                   | 20.58   | 20.54   | 20.34                   | 20.35   | 20.33   |
| CP-OFDM         | 256QAM       | 1           | Left      | 18.40                   | 18.47   | 18.32  | 18.17                   | 18.37   | 18.32   | 18.19                   | 18.43   | 18.39   | 18.03                   | 18.24   | 18.20   |
|                 | 256QAM       | 1           | Right     | 18.48                   | 18.49   | 18.39  | 18.31                   | 18.36   | 18.45   | 18.54                   | 18.46   | 18.58   | 18.12                   | 18.12   | 18.22   |
|                 | 256QAM       | Innter_Full | Mid       | 18.34                   | 18.60   | 18.54  | 18.40                   | 18.33   | 18.53   | 18.20                   | 18.35   | 18.32   | 18.13                   | 18.40   | 18.25   |
|                 | QPSK         | 1           | Left      | 21.48                   | 21.76   | 21.70  | 21.38                   | 21.62   | 21.64   | 21.59                   | 21.54   | 21.44   | 21.26                   | 21.35   | 21.50   |
|                 | QPSK         | 1           | Right     | 21.44                   | 21.61   | 21.46  | 21.44                   | 21.46   | 21.74   | 21.75                   | 21.56   | 21.83   | 21.31                   | 21.20   | 21.60   |
|                 | QPSK         | Innter_Full | Mid       | 21.43                   | 21.57   | 21.44  | 21.44                   | 21.45   | 21.50   | 21.41                   | 21.40   | 21.53   | 21.32                   | 21.29   | 21.28   |
|                 | 16QAM        | 1           | Left      | 20.95                   | 21.17   | 21.00  | 20.79                   | 21.15   | 21.01   | 20.98                   | 21.07   | 21.11   | 20.70                   | 20.89   | 20.87   |
|                 | 16QAM        | 1           | Right     | 21.00                   | 21.08   | 20.99  | 20.88                   | 21.09   | 21.12   | 21.14                   | 21.04   | 21.21   | 20.74                   | 20.74   | 20.80   |
|                 | 16QAM        | Innter_Full | Mid       | 20.96                   | 21.07   | 21.09  | 20.97                   | 20.87   | 21.05   | 20.89                   | 21.05   | 21.00   | 20.89                   | 20.86   | 20.85   |
|                 | 64QAM        | 1           | Left      | 19.82                   | 19.40   | 19.41  | 19.28                   | 19.53   | 19.04   | 19.24                   | 19.36   | 19.38   | 18.88                   | 19.00   | 19.10   |
|                 | 64QAM        | 1           | Right     | 19.66                   | 19.38   | 19.49  | 19.31                   | 19.48   | 19.37   | 19.44                   | 19.35   | 19.50   | 19.10                   | 18.80   | 18.94   |
|                 | 64QAM        | Innter_Full | Mid       | 19.33                   | 19.51   | 19.54  | 19.42                   | 19.37   | 19.40   | 19.28                   | 19.54   | 19.47   | 19.38                   | 19.36   | 19.32   |

| 5G NR n77       |              | RB Size     | RB Offset | 80MHz BW<br>SCS = 30kHz |         |        | 100MHz BW<br>SCS = 30kHz |     |     |
|-----------------|--------------|-------------|-----------|-------------------------|---------|--------|--------------------------|-----|-----|
| Channel         |              |             |           | 632666                  | 633334  | 634000 | 633334                   |     |     |
| Frequency (MHz) |              |             |           | 3489.99                 | 3500.01 | 3510   | 3500.01                  |     |     |
| DFT-s-OFDM      | $\pi/2$ BPSK | 1           | Left      | 21.71                   | 21.65   | 21.82  | 21.99                    |     |     |
|                 | $\pi/2$ BPSK | 1           | Right     | 21.78                   | 21.92   | 21.92  | 22.03                    |     |     |
|                 | $\pi/2$ BPSK | Innter_Full | Mid       | 21.97                   | 21.98   | 21.94  | 22.21                    |     |     |
|                 | QPSK         | 1           | Left      | 21.57                   | 21.83   | 21.88  | 21.86                    |     |     |
|                 | QPSK         | 1           | Right     | 21.84                   | 21.80   | 21.85  | 22.23                    |     |     |
|                 | QPSK         | Innter_Full | Mid       | 21.94                   | 21.78   | 22.11  | 22.22                    |     |     |
|                 | 16QAM        | 1           | Left      | 21.95                   | 21.96   | 22.10  | 21.85                    |     |     |
|                 | 16QAM        | 1           | Right     | 22.03                   | 22.10   | 22.06  | 22.08                    |     |     |
|                 | 16QAM        | Innter_Full | Mid       | 21.93                   | 21.85   | 22.03  | 22.06                    |     |     |
|                 | 64QAM        | 1           | Left      | 20.26                   | 20.60   | 20.66  | 20.54                    |     |     |
|                 | 64QAM        | 1           | Right     | 20.34                   | 20.68   | 20.63  | 20.77                    |     |     |
|                 | 64QAM        | Innter_Full | Mid       | 20.31                   | 20.54   | 20.54  | 20.67                    |     |     |
| CP-OFDM         | 256QAM       | 1           | Left      | 18.16                   | 18.28   | 18.29  | 18.57                    | N/A | N/A |
|                 | 256QAM       | 1           | Right     | 18.28                   | 18.33   | 18.38  | 18.71                    |     |     |
|                 | 256QAM       | Innter_Full | Mid       | 18.45                   | 18.46   | 18.45  | 18.58                    |     |     |
|                 | QPSK         | 1           | Left      | 21.11                   | 21.15   | 21.52  | 21.31                    |     |     |
|                 | QPSK         | 1           | Right     | 21.41                   | 21.36   | 21.43  | 21.44                    |     |     |
|                 | QPSK         | Innter_Full | Mid       | 21.46                   | 21.47   | 21.30  | 21.65                    |     |     |
|                 | 16QAM        | 1           | Left      | 20.84                   | 20.86   | 21.00  | 20.69                    |     |     |
|                 | 16QAM        | 1           | Right     | 20.92                   | 20.96   | 20.99  | 20.79                    |     |     |
|                 | 16QAM        | Innter_Full | Mid       | 20.83                   | 21.03   | 21.02  | 21.19                    |     |     |
|                 | 64QAM        | 1           | Left      | 19.32                   | 19.11   | 19.26  | 19.71                    |     |     |
|                 | 64QAM        | 1           | Right     | 19.54                   | 19.30   | 19.33  | 19.85                    |     |     |
|                 | 64QAM        | Innter_Full | Mid       | 19.28                   | 19.49   | 19.50  | 19.66                    |     |     |

| 5G NR n77       |              | RB Size     | RB Offset | 20MHz BW<br>SCS = 30kHz |        |         | 30MHz BW<br>SCS = 30kHz |        |         | 40MHz BW<br>SCS = 30kHz |        |        | 60MHz BW<br>SCS = 30kHz |        |         |
|-----------------|--------------|-------------|-----------|-------------------------|--------|---------|-------------------------|--------|---------|-------------------------|--------|--------|-------------------------|--------|---------|
| Channel         |              |             |           | 647334                  | 656000 | 664666  | 647666                  | 656000 | 664332  | 648000                  | 656000 | 664000 | 648668                  | 656000 | 663334  |
| Frequency (MHz) |              |             |           | 3710.01                 | 3840   | 3969.99 | 3714.99                 | 3840   | 3964.98 | 3720                    | 3840   | 3960   | 3730.02                 | 3840   | 3950.01 |
| DFT-s-OFDM      | $\pi/2$ BPSK | 1           | Left      | 22.08                   | 22.00  | 21.73   | 21.86                   | 22.06  | 22.06   | 21.89                   | 21.99  | 21.92  | 21.98                   | 21.92  | 21.62   |
|                 | $\pi/2$ BPSK | 1           | Right     | 22.08                   | 22.08  | 21.95   | 22.12                   | 22.00  | 22.13   | 22.01                   | 21.92  | 22.02  | 22.08                   | 21.86  | 21.97   |
|                 | $\pi/2$ BPSK | Innter_Full | Mid       | 22.09                   | 22.11  | 21.99   | 22.01                   | 22.08  | 22.08   | 22.02                   | 22.00  | 21.96  | 22.11                   | 21.97  | 21.97   |
|                 | QPSK         | 1           | Left      | 22.13                   | 22.10  | 21.84   | 21.96                   | 22.10  | 22.10   | 21.95                   | 22.07  | 21.82  | 21.83                   | 21.98  | 21.62   |
|                 | QPSK         | 1           | Right     | 22.11                   | 22.11  | 22.06   | 22.14                   | 22.09  | 22.06   | 22.10                   | 21.94  | 21.94  | 22.14                   | 21.96  | 21.94   |
|                 | QPSK         | Innter_Full | Mid       | 22.14                   | 22.15  | 21.99   | 22.03                   | 22.13  | 22.05   | 21.93                   | 22.07  | 21.95  | 22.13                   | 22.02  | 21.98   |
|                 | 16QAM        | 1           | Left      | 22.10                   | 22.14  | 21.95   | 21.73                   | 22.09  | 21.98   | 22.04                   | 21.98  | 21.93  | 21.85                   | 22.13  | 22.08   |
|                 | 16QAM        | 1           | Right     | 22.10                   | 22.11  | 21.96   | 22.05                   | 22.13  | 22.13   | 22.08                   | 21.95  | 22.06  | 22.07                   | 22.09  | 22.11   |
|                 | 16QAM        | Innter_Full | Mid       | 22.01                   | 21.97  | 21.89   | 21.98                   | 22.03  | 22.05   | 22.07                   | 21.98  | 22.01  | 22.13                   | 22.05  | 21.96   |
|                 | 64QAM        | 1           | Left      | 21.01                   | 20.80  | 20.62   | 20.63                   | 20.75  | 20.74   | 20.47                   | 20.72  | 20.53  | 20.64                   | 20.50  | 20.18   |
|                 | 64QAM        | 1           | Right     | 21.04                   | 20.78  | 20.71   | 20.82                   | 20.96  | 20.81   | 20.75                   | 20.48  | 20.78  | 20.94                   | 20.63  | 20.63   |
|                 | 64QAM        | Innter_Full | Mid       | 20.74                   | 20.58  | 20.49   | 20.60                   | 20.65  | 20.80   | 20.50                   | 20.49  | 20.41  | 20.78                   | 20.51  | 20.48   |
|                 | 256QAM       | 1           | Left      | 18.75                   | 18.31  | 18.06   | 18.34                   | 18.84  | 18.76   | 18.18                   | 18.83  | 18.65  | 18.11                   | 18.23  | 17.91   |
|                 | 256QAM       | 1           | Right     | 18.78                   | 18.28  | 18.32   | 18.42                   | 18.66  | 18.77   | 18.28                   | 18.63  | 18.70  | 18.44                   | 18.22  | 18.23   |
|                 | 256QAM       | Innter_Full | Mid       | 18.74                   | 18.56  | 18.49   | 18.51                   | 18.62  | 18.71   | 18.48                   | 18.52  | 18.41  | 18.72                   | 18.48  | 18.41   |
| CP-OFDM         | QPSK         | 1           | Left      | 21.85                   | 21.53  | 21.39   | 21.18                   | 21.44  | 21.82   | 21.35                   | 21.46  | 21.39  | 21.43                   | 21.45  | 21.10   |
|                 | QPSK         | 1           | Right     | 21.69                   | 21.64  | 21.68   | 21.84                   | 21.53  | 21.88   | 21.61                   | 21.39  | 21.40  | 21.87                   | 21.38  | 21.39   |
|                 | QPSK         | Innter_Full | Mid       | 21.76                   | 21.61  | 21.50   | 21.60                   | 21.65  | 21.79   | 21.33                   | 21.50  | 21.50  | 21.77                   | 21.50  | 21.51   |
|                 | 16QAM        | 1           | Left      | 21.49                   | 21.12  | 20.87   | 21.05                   | 21.31  | 21.17   | 21.39                   | 21.22  | 21.03  | 21.26                   | 20.86  | 20.64   |
|                 | 16QAM        | 1           | Right     | 21.43                   | 21.11  | 21.27   | 21.42                   | 21.26  | 21.14   | 21.16                   | 20.98  | 21.32  | 21.62                   | 20.85  | 20.89   |
|                 | 16QAM        | Innter_Full | Mid       | 21.26                   | 21.11  | 21.14   | 21.02                   | 21.02  | 21.14   | 21.05                   | 21.04  | 20.95  | 21.21                   | 21.06  | 20.96   |
|                 | 64QAM        | 1           | Left      | 19.43                   | 19.39  | 19.56   | 19.52                   | 19.67  | 19.94   | 19.41                   | 19.50  | 19.48  | 19.45                   | 19.59  | 19.35   |
|                 | 64QAM        | 1           | Right     | 19.47                   | 19.46  | 19.93   | 19.85                   | 19.62  | 19.98   | 19.55                   | 19.43  | 19.72  | 19.75                   | 19.56  | 19.58   |
|                 | 64QAM        | Innter_Full | Mid       | 19.73                   | 19.61  | 19.58   | 19.73                   | 19.52  | 19.74   | 19.52                   | 19.40  | 19.46  | 19.75                   | 19.53  | 19.43   |
|                 | 256QAM       | 1           | Left      | 16.66                   | 16.54  | 16.72   | 16.70                   | 17.00  | 17.05   | 16.90                   | 16.83  | 16.70  | 16.99                   | 16.54  | 16.32   |
|                 | 256QAM       | 1           | Right     | 16.63                   | 16.58  | 16.93   | 17.14                   | 16.82  | 16.99   | 17.03                   | 16.53  | 16.83  | 17.28                   | 16.57  | 16.65   |
|                 | 256QAM       | Innter_Full | Mid       | 16.81                   | 16.62  | 16.49   | 16.41                   | 16.57  | 16.72   | 16.47                   | 16.42  | 16.24  | 16.60                   | 16.49  | 16.44   |

| 5G NR n77       |              | RB Size     | RB Offset | 80MHz BW<br>SCS = 30kHz |        |         | 100MHz BW<br>SCS = 30kHz |        |        |
|-----------------|--------------|-------------|-----------|-------------------------|--------|---------|--------------------------|--------|--------|
| Channel         |              |             |           | 649334                  | 656000 | 662666  | 650000                   | 656000 | 662000 |
| Frequency (MHz) |              |             |           | 3740.01                 | 3840   | 3939.99 | 3750                     | 3840   | 3930   |
| DFT-s-OFDM      | $\pi/2$ BPSK | 1           | Left      | 21.77                   | 21.71  | 21.54   | 21.70                    | 21.80  | 21.42  |
|                 | $\pi/2$ BPSK | 1           | Right     | 22.13                   | 21.65  | 21.81   | 21.98                    | 21.83  | 21.82  |
|                 | $\pi/2$ BPSK | Innter_Full | Mid       | 22.10                   | 21.88  | 21.94   | 22.16                    | 22.00  | 21.91  |
|                 | QPSK         | 1           | Left      | 21.74                   | 21.76  | 21.43   | 21.89                    | 21.78  | 21.62  |
|                 | QPSK         | 1           | Right     | 22.07                   | 21.72  | 21.72   | 22.25                    | 21.96  | 21.79  |
|                 | QPSK         | Innter_Full | Mid       | 22.00                   | 21.80  | 21.66   | 22.14                    | 21.86  | 21.71  |
|                 | 16QAM        | 1           | Left      | 21.83                   | 22.04  | 22.00   | 22.06                    | 22.06  | 21.75  |
|                 | 16QAM        | 1           | Right     | 22.13                   | 21.90  | 22.08   | 22.04                    | 22.01  | 21.94  |
|                 | 16QAM        | Innter_Full | Mid       | 22.05                   | 21.91  | 21.94   | 22.01                    | 21.73  | 21.82  |
|                 | 64QAM        | 1           | Left      | 20.17                   | 20.48  | 19.99   | 20.36                    | 20.35  | 20.29  |
|                 | 64QAM        | 1           | Right     | 20.72                   | 20.29  | 20.27   | 20.60                    | 20.21  | 20.46  |
|                 | 64QAM        | Innter_Full | Mid       | 20.61                   | 20.33  | 20.34   | 20.51                    | 20.18  | 20.24  |
|                 | 256QAM       | 1           | Left      | 18.19                   | 18.15  | 17.82   | 18.41                    | 17.98  | 17.84  |
|                 | 256QAM       | 1           | Right     | 18.52                   | 18.03  | 18.11   | 18.66                    | 17.76  | 17.98  |
|                 | 256QAM       | Innter_Full | Mid       | 18.59                   | 18.12  | 18.19   | 18.34                    | 18.24  | 18.25  |
| CP-OFDM         | QPSK         | 1           | Left      | 21.31                   | 21.27  | 21.12   | 21.05                    | 21.26  | 20.98  |
|                 | QPSK         | 1           | Right     | 21.73                   | 21.16  | 21.29   | 21.45                    | 21.15  | 21.27  |
|                 | QPSK         | Innter_Full | Mid       | 21.54                   | 21.37  | 21.47   | 21.56                    | 21.39  | 21.27  |
|                 | 16QAM        | 1           | Left      | 21.05                   | 20.72  | 20.48   | 20.81                    | 20.69  | 20.51  |
|                 | 16QAM        | 1           | Right     | 21.37                   | 20.57  | 20.77   | 21.05                    | 20.58  | 20.67  |
|                 | 16QAM        | Innter_Full | Mid       | 21.08                   | 20.84  | 20.81   | 21.10                    | 20.91  | 20.78  |
|                 | 64QAM        | 1           | Left      | 19.44                   | 19.50  | 19.27   | 19.28                    | 19.51  | 19.20  |
|                 | 64QAM        | 1           | Right     | 19.82                   | 19.35  | 19.49   | 19.49                    | 19.30  | 19.34  |
|                 | 64QAM        | Innter_Full | Mid       | 19.66                   | 19.37  | 19.42   | 19.60                    | 19.43  | 19.09  |
|                 | 256QAM       | 1           | Left      | 16.30                   | 16.41  | 16.15   | 16.53                    | 16.47  | 16.44  |
|                 | 256QAM       | 1           | Right     | 16.52                   | 16.38  | 16.43   | 16.77                    | 16.28  | 16.57  |
|                 | 256QAM       | Innter_Full | Mid       | 16.57                   | 16.40  | 16.34   | 16.55                    | 16.34  | 16.02  |

| 5G NR n78       |              | RB Size     | RB Offset | 20MHz BW<br>SCS = 30kHz |         |        | 30MHz BW<br>SCS = 30kHz |         |         | 40MHz BW<br>SCS = 30kHz |         |         | 50MHz BW<br>SCS = 30kHz |         |        |
|-----------------|--------------|-------------|-----------|-------------------------|---------|--------|-------------------------|---------|---------|-------------------------|---------|---------|-------------------------|---------|--------|
| Channel         |              |             |           | 630666                  | 633334  | 636000 | 631000                  | 633334  | 635666  | 631334                  | 633334  | 635334  | 631668                  | 633334  | 635000 |
| Frequency (MHz) |              |             |           | 3459.99                 | 3500.01 | 3540   | 3465                    | 3500.01 | 3534.99 | 3470.01                 | 3500.01 | 3530.01 | 3475.02                 | 3500.01 | 3525   |
| DFT-s-OFDM      | $\pi/2$ BPSK | 1           | Left      | 21.82                   | 21.85   | 21.71  | 21.79                   | 21.83   | 21.64   | 21.95                   | 22.06   | 21.91   | 21.72                   | 21.78   | 21.69  |
|                 | $\pi/2$ BPSK | 1           | Right     | 21.92                   | 21.69   | 21.67  | 21.79                   | 21.64   | 21.52   | 22.08                   | 21.89   | 21.88   | 21.67                   | 21.49   | 21.57  |
|                 | $\pi/2$ BPSK | Innter_Full | Mid       | 21.86                   | 21.85   | 21.62  | 21.81                   | 21.80   | 21.61   | 21.95                   | 21.88   | 21.83   | 21.79                   | 21.82   | 21.60  |
|                 | QPSK         | 1           | Left      | 22.14                   | 22.13   | 21.99  | 21.81                   | 21.81   | 21.54   | 22.12                   | 22.21   | 21.92   | 21.55                   | 22.19   | 21.69  |
|                 | QPSK         | 1           | Right     | 22.17                   | 22.00   | 21.95  | 21.87                   | 21.55   | 21.54   | 22.05                   | 21.89   | 21.82   | 21.53                   | 21.56   | 21.59  |
|                 | QPSK         | Innter_Full | Mid       | 21.88                   | 21.90   | 21.64  | 22.22                   | 21.73   | 21.56   | 21.93                   | 22.02   | 21.90   | 21.80                   | 21.80   | 21.75  |
|                 | 16QAM        | 1           | Left      | 21.85                   | 21.86   | 21.73  | 22.20                   | 22.05   | 21.89   | 22.17                   | 22.20   | 22.20   | 21.87                   | 22.18   | 22.09  |
|                 | 16QAM        | 1           | Right     | 21.86                   | 21.70   | 21.71  | 22.05                   | 21.94   | 21.82   | 22.15                   | 22.02   | 22.19   | 21.93                   | 21.94   | 21.87  |
|                 | 16QAM        | Innter_Full | Mid       | 21.89                   | 21.84   | 21.57  | 21.80                   | 21.74   | 21.57   | 21.95                   | 21.96   | 21.95   | 21.78                   | 21.76   | 21.65  |
|                 | 64QAM        | 1           | Left      | 20.60                   | 20.58   | 20.44  | 20.48                   | 20.53   | 20.35   | 20.59                   | 20.76   | 20.56   | 20.34                   | 20.56   | 20.41  |
|                 | 64QAM        | 1           | Right     | 20.63                   | 20.58   | 20.39  | 20.51                   | 20.30   | 20.26   | 20.78                   | 20.59   | 20.55   | 20.49                   | 20.37   | 20.35  |
|                 | 64QAM        | Innter_Full | Mid       | 20.33                   | 20.26   | 20.10  | 20.29                   | 20.20   | 20.05   | 20.45                   | 20.43   | 20.42   | 20.28                   | 20.37   | 20.17  |
|                 | 256QAM       | 1           | Left      | 18.01                   | 18.10   | 17.91  | 17.88                   | 17.94   | 17.70   | 18.06                   | 18.20   | 18.01   | 17.86                   | 17.99   | 17.81  |
|                 | 256QAM       | 1           | Right     | 18.03                   | 17.97   | 17.87  | 18.04                   | 17.74   | 17.71   | 18.20                   | 17.99   | 18.08   | 17.94                   | 17.83   | 17.78  |
|                 | 256QAM       | Innter_Full | Mid       | 18.23                   | 18.21   | 18.04  | 18.12                   | 17.95   | 17.81   | 18.31                   | 18.31   | 18.19   | 18.24                   | 18.18   | 18.04  |
| CP-OFDM         | QPSK         | 1           | Left      | 21.27                   | 21.37   | 21.13  | 21.23                   | 21.06   | 21.03   | 21.42                   | 21.44   | 21.25   | 21.12                   | 21.23   | 21.23  |
|                 | QPSK         | 1           | Right     | 21.38                   | 21.25   | 21.22  | 21.38                   | 20.97   | 21.09   | 21.52                   | 21.34   | 21.46   | 21.26                   | 21.23   | 20.98  |
|                 | QPSK         | Innter_Full | Mid       | 21.39                   | 21.40   | 21.09  | 21.20                   | 21.04   | 21.11   | 21.55                   | 21.48   | 21.36   | 21.35                   | 21.29   | 21.07  |
|                 | 16QAM        | 1           | Left      | 21.06                   | 21.17   | 21.00  | 20.65                   | 20.59   | 20.65   | 20.94                   | 20.99   | 20.88   | 20.83                   | 21.12   | 20.83  |
|                 | 16QAM        | 1           | Right     | 21.33                   | 21.16   | 21.21  | 20.73                   | 20.40   | 20.47   | 20.91                   | 20.74   | 20.80   | 21.04                   | 20.91   | 20.78  |
|                 | 16QAM        | Innter_Full | Mid       | 20.93                   | 20.89   | 19.26  | 20.85                   | 20.66   | 20.57   | 20.92                   | 20.79   | 20.76   | 20.99                   | 20.79   | 20.53  |
|                 | 64QAM        | 1           | Left      | 19.24                   | 19.27   | 19.13  | 19.53                   | 19.38   | 19.03   | 19.74                   | 19.67   | 19.61   | 19.11                   | 19.22   | 19.04  |
|                 | 64QAM        | 1           | Right     | 19.36                   | 19.29   | 19.29  | 19.58                   | 19.10   | 19.00   | 19.75                   | 19.56   | 19.50   | 19.33                   | 19.11   | 18.98  |
|                 | 64QAM        | Innter_Full | Mid       | 19.44                   | 19.40   | 19.22  | 19.21                   | 18.99   | 19.01   | 19.51                   | 19.34   | 19.30   | 19.39                   | 19.30   | 19.05  |
|                 | 256QAM       | 1           | Left      | 16.74                   | 16.78   | 16.70  | 16.41                   | 16.36   | 16.41   | 16.69                   | 16.71   | 16.59   | 16.53                   | 16.72   | 16.42  |
|                 | 256QAM       | 1           | Right     | 16.76                   | 16.76   | 16.85  | 16.46                   | 16.45   | 16.52   | 16.74                   | 16.60   | 16.54   | 16.73                   | 16.53   | 16.46  |
|                 | 256QAM       | Innter_Full | Mid       | 16.22                   | 16.22   | 16.13  | 16.21                   | 16.10   | 16.08   | 16.41                   | 16.26   | 16.21   | 16.29                   | 16.21   | 15.99  |

| 5G NR n78       |              | RB Size     | RB Offset | 60MHz BW<br>SCS = 30kHz |         |         | 70MHz BW<br>SCS = 30kHz |         |         | 80MHz BW<br>SCS = 30kHz |         |        | 90MHz BW<br>SCS = 30kHz |         |         |
|-----------------|--------------|-------------|-----------|-------------------------|---------|---------|-------------------------|---------|---------|-------------------------|---------|--------|-------------------------|---------|---------|
| Channel         |              |             |           | 632000                  | 633334  | 634666  | 632334                  | 633334  | 634334  | 632666                  | 633334  | 634000 | 633000                  | 633334  | 636666  |
| Frequency (MHz) |              |             |           | 3480                    | 3500.01 | 3519.99 | 3485.01                 | 3500.01 | 3515.01 | 3489.99                 | 3500.01 | 3510   | 3495                    | 3500.01 | 3504.99 |
| DFT-s-OFDM      | $\pi/2$ BPSK | 1           | Left      | 21.69                   | 21.76   | 21.71   | 21.56                   | 21.62   | 21.68   | 21.58                   | 21.51   | 21.73  | 21.77                   | 21.92   | 21.85   |
|                 | $\pi/2$ BPSK | 1           | Right     | 21.51                   | 21.51   | 21.45   | 21.36                   | 21.33   | 21.48   | 21.28                   | 21.27   | 21.34  | 21.75                   | 21.80   | 21.72   |
|                 | $\pi/2$ BPSK | Innter_Full | Mid       | 21.86                   | 21.75   | 21.63   | 21.70                   | 21.59   | 21.57   | 21.60                   | 21.59   | 21.48  | 21.95                   | 22.00   | 21.79   |
|                 | QPSK         | 1           | Left      | 21.74                   | 21.92   | 21.58   | 21.55                   | 21.62   | 21.58   | 21.42                   | 21.51   | 21.74  | 21.84                   | 21.83   | 22.00   |
|                 | QPSK         | 1           | Right     | 21.57                   | 21.42   | 21.33   | 21.55                   | 21.39   | 21.36   | 21.32                   | 21.24   | 21.51  | 21.65                   | 21.76   | 21.76   |
|                 | QPSK         | Innter_Full | Mid       | 22.12                   | 21.79   | 21.47   | 21.69                   | 22.01   | 21.50   | 21.49                   | 21.86   | 21.52  | 21.94                   | 22.16   | 21.84   |
|                 | 16QAM        | 1           | Left      | 21.94                   | 22.11   | 22.05   | 21.96                   | 21.97   | 21.88   | 21.80                   | 21.84   | 21.82  | 22.12                   | 22.14   | 22.08   |
|                 | 16QAM        | 1           | Right     | 21.75                   | 21.75   | 21.75   | 21.53                   | 21.65   | 21.66   | 21.58                   | 21.54   | 21.66  | 22.04                   | 22.01   | 21.97   |
|                 | 16QAM        | Innter_Full | Mid       | 21.88                   | 21.82   | 21.56   | 21.80                   | 21.58   | 21.47   | 21.59                   | 21.58   | 21.53  | 21.97                   | 21.99   | 21.86   |
|                 | 64QAM        | 1           | Left      | 20.44                   | 20.54   | 20.37   | 20.26                   | 20.51   | 20.29   | 20.13                   | 20.27   | 20.30  | 20.61                   | 20.70   | 20.53   |
|                 | 64QAM        | 1           | Right     | 20.26                   | 20.25   | 20.19   | 20.12                   | 20.14   | 20.08   | 19.98                   | 20.02   | 20.10  | 20.52                   | 20.48   | 20.40   |
|                 | 64QAM        | Innter_Full | Mid       | 20.35                   | 20.26   | 20.02   | 20.19                   | 20.09   | 19.96   | 20.03                   | 20.03   | 20.00  | 20.55                   | 20.47   | 20.36   |
|                 | 256QAM       | 1           | Left      | 17.87                   | 18.02   | 18.03   | 17.57                   | 17.86   | 17.72   | 17.79                   | 17.70   | 17.69  | 18.08                   | 17.92   | 18.07   |
|                 | 256QAM       | 1           | Right     | 17.70                   | 17.73   | 17.72   | 17.50                   | 17.56   | 17.45   | 17.55                   | 17.46   | 17.57  | 17.94                   | 17.84   | 17.88   |
|                 | 256QAM       | Innter_Full | Mid       | 18.15                   | 18.21   | 18.08   | 17.99                   | 18.00   | 17.85   | 17.98                   | 17.98   | 17.81  | 18.34                   | 18.17   | 18.25   |
| CP-OFDM         | QPSK         | 1           | Left      | 21.10                   | 21.26   | 21.19   | 20.96                   | 21.40   | 21.07   | 20.98                   | 21.05   | 21.13  | 21.59                   | 21.37   | 21.37   |
|                 | QPSK         | 1           | Right     | 21.01                   | 20.97   | 20.93   | 20.92                   | 20.89   | 20.89   | 20.89                   | 20.93   | 20.91  | 21.32                   | 21.30   | 21.24   |
|                 | QPSK         | Innter_Full | Mid       | 21.40                   | 21.28   | 21.13   | 21.24                   | 21.09   | 20.94   | 21.28                   | 21.13   | 21.10  | 21.61                   | 21.36   | 21.29   |
|                 | 16QAM        | 1           | Left      | 20.64                   | 21.05   | 20.98   | 20.46                   | 20.89   | 20.86   | 20.50                   | 20.86   | 20.85  | 21.12                   | 21.18   | 21.16   |
|                 | 16QAM        | 1           | Right     | 20.50                   | 20.81   | 20.84   | 20.49                   | 20.69   | 20.77   | 20.28                   | 20.56   | 20.69  | 21.06                   | 21.01   | 20.88   |
|                 | 16QAM        | Innter_Full | Mid       | 20.94                   | 20.80   | 20.70   | 20.89                   | 20.68   | 20.52   | 20.62                   | 20.53   | 20.56  | 20.96                   | 21.00   | 20.85   |
|                 | 64QAM        | 1           | Left      | 19.34                   | 19.18   | 19.23   | 19.33                   | 19.09   | 19.03   | 19.30                   | 18.95   | 19.07  | 19.25                   | 19.35   | 19.22   |
|                 | 64QAM        | 1           | Right     | 19.37                   | 19.01   | 18.99   | 19.11                   | 18.81   | 18.92   | 18.79                   | 18.72   | 18.84  | 19.23                   | 19.17   | 19.25   |
|                 | 64QAM        | Innter_Full | Mid       | 19.32                   | 19.25   | 19.00   | 19.16                   | 19.05   | 18.92   | 19.02                   | 19.06   | 18.92  | 19.43                   | 19.41   | 19.31   |
|                 | 256QAM       | 1           | Left      | 16.34                   | 16.69   | 16.63   | 16.38                   | 16.56   | 16.51   | 16.48                   | 16.41   | 16.54  | 16.72                   | 16.73   | 16.67   |
|                 | 256QAM       | 1           | Right     | 16.26                   | 16.53   | 16.43   | 16.23                   | 16.28   | 16.32   | 16.31                   | 16.28   | 16.34  | 16.66                   | 16.71   | 16.75   |
|                 | 256QAM       | Innter_Full | Mid       | 16.24                   | 16.22   | 16.06   | 16.01                   | 16.09   | 15.86   | 16.02                   | 16.00   | 15.98  | 16.38                   | 16.39   | 16.26   |

| 5G NR n78       |              | RB Size     | RB Offset | 100MHz BW<br>SCS = 30kHz |  |  | 20MHz BW<br>SCS = 30kHz |        |         | 30MHz BW<br>SCS = 30kHz |        |         | 40MHz BW<br>SCS = 30kHz |        |        |
|-----------------|--------------|-------------|-----------|--------------------------|--|--|-------------------------|--------|---------|-------------------------|--------|---------|-------------------------|--------|--------|
| Channel         |              |             |           | 633334                   |  |  | 647334                  | 650000 | 652666  | 647668                  | 650000 | 652332  | 648000                  | 650000 | 652000 |
| Frequency (MHz) |              |             |           | 3500.01                  |  |  | 3710.01                 | 3750   | 3789.99 | 3715.02                 | 3750   | 3784.98 | 3720                    | 3750   | 3780   |
| DFT-s-OFDM      | $\pi/2$ BPSK | 1           | Left      | 21.99                    |  |  | 21.69                   | 21.91  | 21.96   | 21.68                   | 21.98  | 22.07   | 21.62                   | 21.81  | 21.91  |
|                 | $\pi/2$ BPSK | 1           | Right     | 22.09                    |  |  | 21.71                   | 21.84  | 21.96   | 22.02                   | 21.96  | 22.07   | 21.90                   | 21.78  | 21.85  |
|                 | $\pi/2$ BPSK | Innter_Full | Mid       | 22.19                    |  |  | 21.67                   | 21.94  | 21.98   | 21.85                   | 21.92  | 21.94   | 21.63                   | 21.74  | 21.73  |
|                 | QPSK         | 1           | Left      | 21.95                    |  |  | 22.01                   | 22.17  | 22.13   | 22.00                   | 22.13  | 22.18   | 21.92                   | 22.08  | 22.08  |
|                 | QPSK         | 1           | Right     | 22.08                    |  |  | 22.08                   | 22.06  | 22.15   | 22.14                   | 22.18  | 22.18   | 22.03                   | 22.06  | 22.16  |
|                 | QPSK         | Innter_Full | Mid       | 22.21                    |  |  | 21.68                   | 21.75  | 21.97   | 21.92                   | 21.93  | 22.06   | 21.65                   | 21.77  | 21.78  |
|                 | 16QAM        | 1           | Left      | 22.15                    |  |  | 21.66                   | 21.82  | 21.99   | 21.70                   | 22.02  | 21.92   | 21.63                   | 21.86  | 21.81  |
|                 | 16QAM        | 1           | Right     | 22.12                    |  |  | 21.76                   | 21.83  | 21.87   | 21.88                   | 21.97  | 21.99   | 21.90                   | 21.78  | 21.89  |
|                 | 16QAM        | Innter_Full | Mid       | 22.20                    |  |  | 21.66                   | 21.85  | 21.91   | 21.87                   | 21.96  | 22.06   | 21.58                   | 21.69  | 21.70  |
|                 | 64QAM        | 1           | Left      | 20.89                    |  |  | 20.51                   | 20.62  | 20.73   | 20.46                   | 20.67  | 20.78   | 20.27                   | 20.50  | 20.45  |
|                 | 64QAM        | 1           | Right     | 20.74                    |  |  | 20.59                   | 20.56  | 20.70   | 20.55                   | 20.65  | 20.73   | 20.45                   | 20.45  | 20.61  |
|                 | 64QAM        | Innter_Full | Mid       | 20.69                    |  |  | 20.19                   | 20.27  | 20.35   | 20.36                   | 20.42  | 20.57   | 20.18                   | 20.20  | 20.21  |
|                 | 256QAM       | 1           | Left      | 18.22                    |  |  | 17.93                   | 18.11  | 18.18   | 17.88                   | 18.13  | 18.20   | 17.79                   | 17.98  | 18.07  |
|                 | 256QAM       | 1           | Right     | 18.15                    |  |  | 18.03                   | 18.04  | 18.15   | 18.03                   | 18.20  | 18.26   | 18.00                   | 18.00  | 18.04  |
|                 | 256QAM       | Innter_Full | Mid       | 18.62                    |  |  | 18.15                   | 18.18  | 18.37   | 18.28                   | 18.35  | 18.30   | 18.08                   | 18.09  | 18.14  |
| CP-OFDM         | QPSK         | 1           | Left      | 21.59                    |  |  | 21.20                   | 21.38  | 21.46   | 21.22                   | 21.43  | 21.48   | 21.09                   | 21.21  | 21.38  |
|                 | QPSK         | 1           | Right     | 21.62                    |  |  | 21.32                   | 21.36  | 21.50   | 21.39                   | 21.53  | 21.61   | 21.26                   | 21.39  | 21.47  |
|                 | QPSK         | Innter_Full | Mid       | 21.73                    |  |  | 21.18                   | 21.42  | 21.47   | 21.33                   | 21.38  | 21.49   | 21.15                   | 21.19  | 21.19  |
|                 | 16QAM        | 1           | Left      | 21.36                    |  |  | 20.87                   | 20.81  | 21.33   | 20.56                   | 20.96  | 21.32   | 20.63                   | 20.84  | 20.75  |
|                 | 16QAM        | 1           | Right     | 21.42                    |  |  | 21.21                   | 21.35  | 21.22   | 20.85                   | 21.00  | 21.27   | 20.81                   | 20.77  | 21.46  |
|                 | 16QAM        | Innter_Full | Mid       | 21.18                    |  |  | 20.77                   | 20.92  | 21.05   | 20.79                   | 20.96  | 21.04   | 20.57                   | 20.63  | 20.63  |
|                 | 64QAM        | 1           | Left      | 19.88                    |  |  | 19.25                   | 19.52  | 19.48   | 19.35                   | 19.78  | 19.45   | 19.37                   | 19.51  | 19.46  |
|                 | 64QAM        | 1           | Right     | 19.90                    |  |  | 19.43                   | 19.34  | 19.41   | 19.64                   | 19.70  | 19.53   | 19.55                   | 19.52  | 19.36  |
|                 | 64QAM        | Innter_Full | Mid       | 19.69                    |  |  | 19.28                   | 19.39  | 19.52   | 19.26                   | 19.45  | 19.55   | 19.11                   | 19.17  | 19.22  |
|                 | 256QAM       | 1           | Left      | 16.95                    |  |  | 16.71                   | 16.81  | 16.94   | 16.42                   | 16.70  | 16.88   | 16.32                   | 16.53  | 16.50  |
|                 | 256QAM       | 1           | Right     | 16.99                    |  |  | 16.73                   | 16.55  | 16.95   | 16.57                   | 16.93  | 16.99   | 16.52                   | 16.50  | 16.63  |
|                 | 256QAM       | Innter_Full | Mid       | 16.55                    |  |  | 16.19                   | 16.28  | 16.30   | 16.34                   | 16.28  | 16.33   | 15.98                   | 16.12  | 16.15  |

| 5G NR n78       |              | RB Size     | RB Offset | 50MHz BW<br>SCS = 30kHz |        |         | 60MHz BW<br>SCS = 30kHz |        |         | 70MHz BW<br>SCS = 30kHz |        |        | 80MHz BW<br>SCS = 30kHz |        |         |
|-----------------|--------------|-------------|-----------|-------------------------|--------|---------|-------------------------|--------|---------|-------------------------|--------|--------|-------------------------|--------|---------|
| Channel         |              |             |           | 648334                  | 650000 | 651666  | 648668                  | 650000 | 651332  | 649000                  | 650000 | 651000 | 649334                  | 650000 | 650666  |
| Frequency (MHz) |              |             |           | 3725.01                 | 3750   | 3774.99 | 3730.02                 | 3750   | 3769.98 | 3735                    | 3750   | 3765   | 3740.01                 | 3750   | 3759.99 |
| DFT-s-OFDM      | $\pi/2$ BPSK | 1           | Left      | 21.52                   | 21.71  | 21.74   | 21.41                   | 21.55  | 21.70   | 21.31                   | 21.53  | 21.52  | 21.40                   | 21.53  | 21.57   |
|                 | $\pi/2$ BPSK | 1           | Right     | 21.68                   | 21.74  | 21.82   | 21.74                   | 21.81  | 21.81   | 21.61                   | 21.48  | 21.52  | 21.59                   | 21.54  | 21.60   |
|                 | $\pi/2$ BPSK | Innter_Full | Mid       | 21.68                   | 21.81  | 21.81   | 21.76                   | 21.73  | 21.79   | 21.64                   | 21.68  | 21.67  | 21.63                   | 21.72  | 21.61   |
|                 | QPSK         | 1           | Left      | 21.43                   | 22.02  | 22.03   | 21.44                   | 21.49  | 21.59   | 21.37                   | 21.58  | 21.81  | 21.32                   | 21.37  | 21.81   |
|                 | QPSK         | 1           | Right     | 21.59                   | 22.05  | 22.02   | 21.77                   | 21.60  | 21.72   | 21.54                   | 21.68  | 21.74  | 21.63                   | 21.65  | 21.88   |
|                 | QPSK         | Innter_Full | Mid       | 21.78                   | 21.73  | 21.72   | 21.95                   | 21.78  | 21.66   | 21.63                   | 21.79  | 21.62  | 21.63                   | 21.67  | 21.65   |
|                 | 16QAM        | 1           | Left      | 21.70                   | 21.72  | 21.81   | 21.66                   | 21.80  | 21.87   | 21.58                   | 21.80  | 21.57  | 21.64                   | 21.66  | 21.51   |
|                 | 16QAM        | 1           | Right     | 21.87                   | 21.69  | 21.73   | 21.94                   | 21.94  | 21.89   | 21.76                   | 21.76  | 21.55  | 21.81                   | 21.83  | 21.62   |
|                 | 16QAM        | Innter_Full | Mid       | 21.74                   | 21.74  | 21.87   | 21.81                   | 21.75  | 21.69   | 21.67                   | 21.72  | 21.60  | 21.76                   | 21.75  | 21.66   |
|                 | 64QAM        | 1           | Left      | 20.18                   | 20.42  | 20.52   | 20.18                   | 20.28  | 20.26   | 20.01                   | 20.16  | 20.22  | 20.08                   | 20.08  | 20.20   |
|                 | 64QAM        | 1           | Right     | 20.40                   | 20.38  | 20.39   | 20.45                   | 20.32  | 20.36   | 20.25                   | 20.26  | 20.18  | 20.38                   | 20.25  | 20.23   |
|                 | 64QAM        | Innter_Full | Mid       | 20.19                   | 20.34  | 20.25   | 20.29                   | 20.23  | 20.17   | 20.10                   | 20.17  | 20.12  | 20.12                   | 20.13  | 20.14   |
|                 | 256QAM       | 1           | Left      | 17.73                   | 17.89  | 17.96   | 17.67                   | 17.78  | 17.73   | 17.60                   | 17.78  | 17.82  | 17.59                   | 17.71  | 17.68   |
|                 | 256QAM       | 1           | Right     | 17.88                   | 17.89  | 18.02   | 17.88                   | 17.86  | 17.89   | 17.77                   | 17.71  | 17.75  | 17.75                   | 17.78  | 17.77   |
|                 | 256QAM       | Innter_Full | Mid       | 18.08                   | 18.21  | 18.19   | 18.24                   | 18.21  | 18.16   | 17.95                   | 18.13  | 18.04  | 18.07                   | 18.11  | 18.06   |
| CP-OFDM         | QPSK         | 1           | Left      | 21.01                   | 21.24  | 21.25   | 20.84                   | 20.90  | 21.15   | 20.71                   | 20.95  | 21.03  | 20.70                   | 20.88  | 21.08   |
|                 | QPSK         | 1           | Right     | 21.20                   | 21.20  | 21.26   | 21.13                   | 21.02  | 21.22   | 21.08                   | 21.07  | 21.08  | 21.19                   | 21.18  | 21.14   |
|                 | QPSK         | Innter_Full | Mid       | 21.23                   | 21.31  | 21.32   | 21.34                   | 21.29  | 21.23   | 21.13                   | 21.18  | 21.16  | 21.25                   | 21.26  | 21.15   |
|                 | 16QAM        | 1           | Left      | 20.84                   | 21.02  | 21.16   | 20.43                   | 20.53  | 20.61   | 20.33                   | 20.47  | 20.58  | 20.32                   | 20.32  | 20.49   |
|                 | 16QAM        | 1           | Right     | 20.66                   | 20.99  | 21.10   | 20.69                   | 20.61  | 20.67   | 20.60                   | 20.58  | 20.58  | 20.59                   | 20.56  | 20.56   |
|                 | 16QAM        | Innter_Full | Mid       | 20.68                   | 20.77  | 20.80   | 20.79                   | 20.75  | 20.81   | 20.69                   | 20.76  | 20.63  | 20.58                   | 20.60  | 20.58   |
|                 | 64QAM        | 1           | Left      | 19.13                   | 19.04  | 19.25   | 19.06                   | 19.15  | 19.34   | 19.03                   | 19.14  | 19.23  | 19.01                   | 19.07  | 19.18   |
|                 | 64QAM        | 1           | Right     | 19.25                   | 19.24  | 19.21   | 19.39                   | 19.32  | 19.35   | 19.27                   | 19.35  | 19.20  | 19.21                   | 19.27  | 19.27   |
|                 | 64QAM        | Innter_Full | Mid       | 19.27                   | 19.25  | 19.27   | 19.14                   | 19.22  | 19.28   | 19.03                   | 19.12  | 19.13  | 19.09                   | 19.16  | 19.11   |
|                 | 256QAM       | 1           | Left      | 16.39                   | 16.60  | 16.67   | 16.18                   | 16.30  | 16.37   | 16.05                   | 16.19  | 16.25  | 16.03                   | 16.11  | 16.24   |
|                 | 256QAM       | 1           | Right     | 16.42                   | 16.65  | 16.70   | 16.38                   | 16.33  | 16.37   | 16.33                   | 16.32  | 16.24  | 16.26                   | 16.30  | 16.33   |
|                 | 256QAM       | Innter_Full | Mid       | 16.14                   | 16.13  | 16.22   | 16.24                   | 16.11  | 16.08   | 15.95                   | 16.03  | 16.00  | 16.03                   | 16.08  | 16.12   |

| 5G NR n78       |              | RB Size     | RB Offset | 90MHz BW<br>SCS = 30kHz |        |         | 100MHz BW<br>SCS = 30kHz |  |
|-----------------|--------------|-------------|-----------|-------------------------|--------|---------|--------------------------|--|
| Channel         |              |             |           | 649668                  | 650000 | 650332  | 650000                   |  |
| Frequency (MHz) |              |             |           | 3745.02                 | 3750   | 3754.98 | 3750                     |  |
| DFT-s-OFDM      | $\pi/2$ BPSK | 1           | Left      | 21.42                   | 21.42  | 21.42   | 21.95                    |  |
|                 | $\pi/2$ BPSK | 1           | Right     | 21.73                   | 21.66  | 21.85   | 22.16                    |  |
|                 | $\pi/2$ BPSK | Innter_Full | Mid       | 21.76                   | 21.68  | 21.66   | 22.18                    |  |
|                 | QPSK         | 1           | Left      | 21.34                   | 21.39  | 21.75   | 21.85                    |  |
|                 | QPSK         | 1           | Right     | 21.71                   | 21.79  | 22.05   | 22.23                    |  |
|                 | QPSK         | Innter_Full | Mid       | 21.62                   | 21.68  | 21.63   | 22.17                    |  |
|                 | 16QAM        | 1           | Left      | 21.65                   | 21.74  | 21.46   | 22.06                    |  |
|                 | 16QAM        | 1           | Right     | 21.90                   | 22.02  | 21.80   | 22.18                    |  |
|                 | 16QAM        | Innter_Full | Mid       | 21.61                   | 21.72  | 21.72   | 22.19                    |  |
|                 | 64QAM        | 1           | Left      | 20.02                   | 20.16  | 20.17   | 20.51                    |  |
|                 | 64QAM        | 1           | Right     | 20.41                   | 20.42  | 20.41   | 20.86                    |  |
|                 | 64QAM        | Innter_Full | Mid       | 20.15                   | 20.20  | 20.15   | 20.63                    |  |
|                 | 256QAM       | 1           | Left      | 17.61                   | 17.59  | 17.68   | 18.09                    |  |
|                 | 256QAM       | 1           | Right     | 17.84                   | 17.88  | 17.93   | 18.39                    |  |
|                 | 256QAM       | Innter_Full | Mid       | 18.04                   | 18.03  | 18.06   | 18.67                    |  |
| CP-OFDM         | QPSK         | 1           | Left      | 20.88                   | 20.73  | 20.96   | 21.24                    |  |
|                 | QPSK         | 1           | Right     | 21.12                   | 21.09  | 21.27   | 21.70                    |  |
|                 | QPSK         | Innter_Full | Mid       | 21.23                   | 21.19  | 21.20   | 21.73                    |  |
|                 | 16QAM        | 1           | Left      | 20.33                   | 20.35  | 20.42   | 20.85                    |  |
|                 | 16QAM        | 1           | Right     | 20.63                   | 20.66  | 20.78   | 21.28                    |  |
|                 | 16QAM        | Innter_Full | Mid       | 20.70                   | 20.66  | 20.68   | 21.14                    |  |
|                 | 64QAM        | 1           | Left      | 19.01                   | 19.02  | 19.09   | 19.52                    |  |
|                 | 64QAM        | 1           | Right     | 19.38                   | 19.31  | 19.40   | 19.81                    |  |
|                 | 64QAM        | Innter_Full | Mid       | 19.05                   | 19.10  | 19.08   | 19.63                    |  |
|                 | 256QAM       | 1           | Left      | 16.02                   | 16.07  | 16.12   | 16.79                    |  |
|                 | 256QAM       | 1           | Right     | 16.36                   | 16.31  | 16.49   | 16.77                    |  |
|                 | 256QAM       | Innter_Full | Mid       | 16.15                   | 16.09  | 16.07   | 16.63                    |  |

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UTTR-RF-FCC4G-V1.1

### 5.3 EIRP

**Test Requirement:** FCC 47 CFR Part 2.1046(a)  
FCC 47 CFR Part 27.50(j)(3)  
FCC 47 CFR Part 27.50(k)(3)

**Test Method:** KDB 971168 D01v03r01 Section 5.6 & ANSI C63.26-2015

**Limit:**

**FCC 47 CFR Part 27.50(j)(3): 3700-3980 MHz band**

Mobile and portable stations are limited to 1 Watt EIRP. Mobile and portable stations operating in these bands must employ a means for limiting power to the minimum necessary for successful communications.

**FCC 47 CFR Part 27.50(k)(3): 3450-3550 MHz band**

Mobile devices are limited to 1Watt (30 dBm) EIRP. Mobile devices operating in these bands must employ a means for limiting power to the minimum necessary for successful communications.

**Test Procedure:**

According to KDB 412172 D01 Power Approach,

- $ERP \text{ or } EIRP = P_T + G_T - L_c$
- $ERP = EIRP - 2.15$

where

- $P_T$  = transmitter output power, expressed in dBW, dBm, or PSD;
- $G_T$  = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);
- $L_c$  = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

**Test Setup:** Refer to section 4.2.1 for details.

**Instruments Used:** Refer to section 3 for details

**Test Mode:** Link mode

**Test Results:** Pass

| 5G NR Band | TX Frequency (MHz) | Antenna Gain (dBi) | Max. Conducted Power (dBm) | Max. Tune Up (dBm) | ERP/EIRP (dBm) | ERP/EIRP (W) |
|------------|--------------------|--------------------|----------------------------|--------------------|----------------|--------------|
| n77        | 3450-3550          | -1.44              | 22.23                      | 22.5               | 21.06          | 0.2673       |
| n77        | 3700-3980          | -1.44              | 22.25                      | 22.5               | 21.06          | 0.3614       |
| n78        | 3450-3550          | -1.44              | 22.22                      | 22.5               | 21.06          | 0.2673       |
| n78        | 3700-3800          | -1.44              | 22.23                      | 22.5               | 21.06          | 0.3614       |

**Note:**

- The maximum ERP/EIRP is calculated from max output power and antenna gain, the antenna gain provided by the customer, and the customer takes all the responsibilities for the accuracy of antenna gain.
- $EIRP = \text{Tune Up (dBm)} + \text{Antenna Gain (dBi)}$

## 5.4 PEAK-TO-AVERAGE RATIO

**Test Requirement:** FCC 47 CFR Part 2.1046(a)  
FCC 47 CFR Part 27.50(j)(4)  
FCC 47 CFR Part 27.50(k)(4)

**Test Method:** KDB 971168 D01v03r01 Section 5.7

**Limit:** In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB

**Test Procedure:**

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer.

- Set resolution/measurement bandwidth  $\geq$  signal's occupied bandwidth
- Set the number of counts to a value that stabilizes the measured CCDF curve
- Record the maximum PAPR level associated with a probability of 0.1 %

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

**Test Setup:** Refer to section 4.2.2 for details.

**Instruments Used:** Refer to section 3 for details

**Test Mode:** Link mode

**Test Results:** Pass

**Test Data:** Please refer to Appendix A to D

## 5.5 99%&26DB BANDWIDTH

**Test Requirement:** FCC 47 CFR Part 2.1049(h)

**Test Method:** ANSI C63.26-2015 & KDB 971168 D01v03r01 Section 4

**Limit:** No Limit, for reporting purposes only.

**Test Procedure:**

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at the low, middle and high channel in each band. The 99% and -26dB bandwidths was also measured and recorded.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

**Test Setup:** Refer to section 4.2.2 for details.

**Instruments Used:** Refer to section 3 for details

**Test Mode:** Link mode

**Test Results:** Pass

**Test Data:** Please refer to Appendix A to D

## 5.6 BAND EDGE AT ANTENNA TERMINALS

**Test Requirement:** FCC 47 CFR Part 2.1051  
FCC 47 CFR Part 27.53(l)(2)  
FCC 47 CFR Part 27.53(n)(2)  
**Test Method:** ANSI C63.26-2015 & KDB 971168 D01v03r01

**Limit:**

**FCC 47 CFR Part 27.53(l)(2): 3700-3980 MHz band**

For mobile operations in the 3700-3980 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed -13 dBm/MHz. Compliance with this paragraph (l)(2) is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be either one percent of the emission bandwidth of the fundamental emission of the transmitter or 350 kHz. In the bands between 1 and 5 MHz removed from the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be 500 kHz. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

**FCC 47 CFR Part 27.53(n)(2): 3450-3550 MHz band**

For mobile operations in the 3450-3550 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed -13 dBm/MHz. Compliance with this paragraph (n)(2) is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed, but limited to a maximum of 200 kHz. In the bands between 1 and 5 MHz removed from the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be 500 kHz. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

**Test Procedure:**

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer.

For each band edge measurement:

- 1) Set the spectrum analyzer span to include the block edge frequency.
- 2) Set a marker to point the corresponding band edge frequency in each test case.
- 3) Set display line at -13 dBm
- 4) Set resolution bandwidth to at least 1% of emission bandwidth.
- 5) Set spectrum analyzer with RMS detector.
- 6) Record the max trace plot into the test report

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

**Test Setup:** Refer to section 4.2.2 for details.

**Instruments Used:** Refer to section 3 for details

**Test Mode:** Link mode

**Test Results:** Pass

**Test Data:** Please refer to Appendix A to D

## 5.7 SPURIOUS EMISSIONS AT ANTENNA TERMINALS

**Test Requirement:** FCC 47 CFR Part 2.1051  
FCC 47 CFR Part 27.53(l)(2)  
FCC 47 CFR Part 27.53(n)(2)

**Test Method:** ANSI C63.26-2015 & KDB 971168 D01v03r01

**Limit:**

**FCC 47 CFR Part 27.53(l)(2): 3700-3980 MHz band**

For mobile operations in the 3700-3980 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed -13 dBm/MHz. Compliance with this paragraph (l)(2) is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be either one percent of the emission bandwidth of the fundamental emission of the transmitter or 350 kHz. In the bands between 1 and 5 MHz removed from the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be 500 kHz. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

**FCC 47 CFR Part 27.53(n)(2): 3450-3550 MHz band**

For mobile operations in the 3450-3550 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed -13 dBm/MHz. Compliance with this paragraph (n)(2) is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed, but limited to a maximum of 200 kHz. In the bands between 1 and 5 MHz removed from the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be 500 kHz. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

**Test Procedure:**

The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range. b. Measuring frequency range is from 30 MHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower. Set RBW & VBW to 100 kHz for the measurement below 1 GHz, and 1 MHz for the measurement above 1 GHz.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

**Test Setup:** Refer to section 4.2.2 for details.

**Instruments Used:** Refer to section 3 for details

**Test Mode:** Link mode

**Test Results:** Pass

**Test Data:** Please refer to Appendix A to D

## 5.8 FIELD STRENGTH OF SPURIOUS RADIATION

**Test Requirement:** FCC 47 CFR Part 2.1051  
FCC 47 CFR Part 27.53(l)(2)  
FCC 47 CFR Part 27.53(n)(2)

**Test Method:** ANSI C63.26-2015 & KDB 971168 D01v03r01

**Receiver Setup:**

| Frequency        | Detector   | RBW     | VBW     | Remark |
|------------------|------------|---------|---------|--------|
| 0.009 MHz-30 MHz | Peak       | 10 kHz  | 30 KHz  | Peak   |
| 30 MHz-1 GHz     | Quasi-peak | 100 kHz | 300 KHz | Peak   |
| Above 1 GHz      | Peak       | 1 MHz   | 3 MHz   | Peak   |

**Limits:**

### **FCC 47 CFR Part 27.53(l)(2): 3700-3980 MHz band**

For mobile operations in the 3700-3980 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed -13 dBm/MHz. Compliance with this paragraph (l)(2) is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be either one percent of the emission bandwidth of the fundamental emission of the transmitter or 350 kHz. In the bands between 1 and 5 MHz removed from the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be 500 kHz. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

### **FCC 47 CFR Part 27.53(n)(2): 3450-3550 MHz band**

For mobile operations in the 3450-3550 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed -13 dBm/MHz. Compliance with this paragraph (n)(2) is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed, but limited to a maximum of 200 kHz. In the bands between 1 and 5 MHz removed from the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be 500 kHz. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

**Test Setup:** Refer to section 4.2.1 for details.

**Test Procedures:** KDB 971168 D01v03r01 Section 7

**Equipment Used:** Refer to section 3 for details.

**Test Result:** Pass

**The measurement data as follows:**

**3450-3550 MHz band:**

| 5G NR n77_ 100 MHz_QPSK |                    |                        |                                |                         |                |                |            |
|-------------------------|--------------------|------------------------|--------------------------------|-------------------------|----------------|----------------|------------|
| No.                     | Frequency<br>(MHz) | SA<br>Reading<br>(dBm) | Correction<br>factor<br>(dB/m) | EIRP<br>Result<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Ant. Pol.  |
| Middle Channel          |                    |                        |                                |                         |                |                |            |
| 1                       | 42.630             | -72.53                 | -1.82                          | -74.35                  | -13.00         | -61.35         | Horizontal |
| 2                       | 899.958            | -80.71                 | 16.12                          | -64.59                  | -13.00         | -51.59         | Horizontal |
| 3                       | 1000.000           | -80.96                 | 17.07                          | -63.89                  | -13.00         | -50.89         | Horizontal |
| 4                       | 7000.020           | -61.28                 | 14.22                          | -47.06                  | -13.00         | -34.06         | Horizontal |
| 5                       | 10500.030          | -62.21                 | 16.74                          | -45.47                  | -13.00         | -32.47         | Horizontal |
| 6                       | 17500.050          | -64.95                 | 20.78                          | -44.17                  | -13.00         | -31.17         | Horizontal |
| 7                       | 35000.100          | -63.40                 | 7.64                           | -55.76                  | -13.00         | -42.76         | Horizontal |
| 8                       | 44.154             | -64.41                 | -3.98                          | -68.39                  | -13.00         | -55.39         | Vertical   |
| 9                       | 919.132            | -80.87                 | 16.17                          | -64.70                  | -13.00         | -51.70         | Vertical   |
| 10                      | 965.474            | -80.77                 | 16.02                          | -64.75                  | -13.00         | -51.75         | Vertical   |
| 11                      | 7000.020           | -61.58                 | 14.22                          | -47.36                  | -13.00         | -34.36         | Vertical   |
| 12                      | 10500.030          | -62.56                 | 16.74                          | -45.82                  | -13.00         | -32.82         | Vertical   |
| 13                      | 17500.050          | -65.27                 | 20.78                          | -44.49                  | -13.00         | -31.49         | Vertical   |
| 14                      | 35000.100          | -64.48                 | 7.54                           | -56.94                  | -13.00         | -43.94         | Vertical   |

**3700-3980 MHz band:**

| 5G NR n77_ 100 MHz_QPSK |                    |                        |                                |                         |                |                |            |
|-------------------------|--------------------|------------------------|--------------------------------|-------------------------|----------------|----------------|------------|
| No.                     | Frequency<br>(MHz) | SA<br>Reading<br>(dBm) | Correction<br>factor<br>(dB/m) | EIRP<br>Result<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Ant. Pol.  |
| Lowest Channel          |                    |                        |                                |                         |                |                |            |
| 1                       | 868.886            | -80.84                 | 15.52                          | -65.32                  | -13.00         | -52.32         | Horizontal |
| 2                       | 906.304            | -81.04                 | 16.24                          | -64.80                  | -13.00         | -51.80         | Horizontal |
| 3                       | 972.283            | -80.87                 | 16.45                          | -64.42                  | -13.00         | -51.42         | Horizontal |
| 4                       | 7500.000           | -60.71                 | 14.23                          | -46.48                  | -13.00         | -33.48         | Horizontal |
| 5                       | 11250.000          | -62.64                 | 16.52                          | -46.12                  | -13.00         | -33.12         | Horizontal |
| 6                       | 15000.000          | -62.67                 | 21.19                          | -41.48                  | -13.00         | -28.48         | Horizontal |
| 7                       | 33750.000          | -62.91                 | 7.64                           | -55.27                  | -13.00         | -42.27         | Horizontal |
| 8                       | 37500.000          | -63.29                 | 7.65                           | -55.64                  | -13.00         | -42.64         | Horizontal |
| 9                       | 44.154             | -64.18                 | -3.98                          | -68.16                  | -13.00         | -55.16         | Vertical   |
| 10                      | 912.695            | -80.17                 | 16.20                          | -63.97                  | -13.00         | -50.97         | Vertical   |
| 11                      | 1000.000           | -80.68                 | 17.07                          | -63.61                  | -13.00         | -50.61         | Vertical   |
| 12                      | 7500.000           | -60.58                 | 14.23                          | -46.35                  | -13.00         | -33.35         | Vertical   |
| 13                      | 11250.000          | -62.58                 | 16.52                          | -46.06                  | -13.00         | -33.06         | Vertical   |
| 14                      | 15000.000          | -63.82                 | 21.19                          | -42.63                  | -13.00         | -29.63         | Vertical   |
| 15                      | 33750.000          | -63.73                 | 7.54                           | -56.19                  | -13.00         | -43.19         | Vertical   |
| 16                      | 37500.000          | -63.58                 | 6.55                           | -57.03                  | -13.00         | -44.03         | Vertical   |
| Middle Channel          |                    |                        |                                |                         |                |                |            |
| 1                       | 798.620            | -79.80                 | 13.85                          | -65.95                  | -13.00         | -52.95         | Horizontal |
| 2                       | 906.304            | -80.54                 | 16.24                          | -64.30                  | -13.00         | -51.30         | Horizontal |
| 3                       | 979.139            | -80.76                 | 16.52                          | -64.24                  | -13.00         | -51.24         | Horizontal |
| 4                       | 7680.000           | -61.19                 | 14.16                          | -47.03                  | -13.00         | -34.03         | Horizontal |
| 5                       | 11520.000          | -62.31                 | 16.71                          | -45.60                  | -13.00         | -32.60         | Horizontal |
| 6                       | 15360.000          | -64.49                 | 20.67                          | -43.82                  | -13.00         | -30.82         | Horizontal |
| 7                       | 34560.000          | -62.81                 | 7.34                           | -55.47                  | -13.00         | -42.47         | Horizontal |
| 8                       | 38400.000          | -63.19                 | 7.42                           | -55.77                  | -13.00         | -42.77         | Horizontal |
| 9                       | 44.154             | -64.45                 | -3.98                          | -68.43                  | -13.00         | -55.43         | Vertical   |
| 10                      | 912.695            | -80.91                 | 16.20                          | -64.71                  | -13.00         | -51.71         | Vertical   |
| 11                      | 965.474            | -80.08                 | 16.02                          | -64.06                  | -13.00         | -51.06         | Vertical   |
| 12                      | 7680.000           | -61.86                 | 14.16                          | -47.70                  | -13.00         | -34.70         | Vertical   |

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UTTR-RF-FCC4G-V1.1

| 5G NR n77_ 100 MHz_ QPSK |                    |                        |                                |                         |                |                |            |
|--------------------------|--------------------|------------------------|--------------------------------|-------------------------|----------------|----------------|------------|
| No.                      | Frequency<br>(MHz) | SA<br>Reading<br>(dBm) | Correction<br>factor<br>(dB/m) | EIRP<br>Result<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Ant. Pol.  |
| 13                       | 11520.000          | -62.48                 | 16.71                          | -45.77                  | -13.00         | -32.77         | Vertical   |
| 14                       | 15360.000          | -65.56                 | 20.67                          | -44.89                  | -13.00         | -31.89         | Vertical   |
| 15                       | 34560.000          | -63.30                 | 7.26                           | -56.04                  | -13.00         | -43.04         | Vertical   |
| 16                       | 38400.000          | -63.83                 | 7.36                           | -56.47                  | -13.00         | -43.47         | Vertical   |
| Highest Channel          |                    |                        |                                |                         |                |                |            |
| 1                        | 868.886            | -80.33                 | 15.52                          | -64.81                  | -13.00         | -51.81         | Horizontal |
| 2                        | 925.613            | -80.50                 | 16.24                          | -64.26                  | -13.00         | -51.26         | Horizontal |
| 3                        | 1000.000           | -81.53                 | 17.07                          | -64.46                  | -13.00         | -51.46         | Horizontal |
| 4                        | 7860.000           | -61.18                 | 14.09                          | -47.09                  | -13.00         | -34.09         | Horizontal |
| 5                        | 11790.000          | -62.54                 | 17.12                          | -45.42                  | -13.00         | -32.42         | Horizontal |
| 6                        | 15720.000          | -62.73                 | 20.03                          | -42.70                  | -13.00         | -29.70         | Horizontal |
| 7                        | 35370.000          | -63.61                 | 7.78                           | -55.83                  | -13.00         | -42.83         | Horizontal |
| 8                        | 39300.000          | -63.91                 | 8.50                           | -55.41                  | -13.00         | -42.41         | Horizontal |
| 9                        | 44.154             | -63.44                 | -3.98                          | -67.42                  | -13.00         | -54.42         | Vertical   |
| 10                       | 958.714            | -80.40                 | 16.27                          | -64.13                  | -13.00         | -51.13         | Vertical   |
| 11                       | 1000.000           | -81.31                 | 17.07                          | -64.24                  | -13.00         | -51.24         | Vertical   |
| 12                       | 7860.000           | -61.39                 | 14.09                          | -47.30                  | -13.00         | -34.30         | Vertical   |
| 13                       | 11790.000          | -61.96                 | 17.12                          | -44.84                  | -13.00         | -31.84         | Vertical   |
| 14                       | 15720.000          | -63.01                 | 20.03                          | -42.98                  | -13.00         | -29.98         | Vertical   |
| 15                       | 35370.000          | -64.28                 | 7.82                           | -56.46                  | -13.00         | -43.46         | Vertical   |
| 16                       | 39300.000          | -63.56                 | 8.60                           | -54.96                  | -13.00         | -41.96         | Vertical   |

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## 5.9 FREQUENCY STABILITY

**Test Requirement:** FCC 47 CFR Part 2.1055 &  
FCC 47 CFR Part 27.54

**Test Method:** ANSI C63.26-2015 & KDB 971168 D01v03r01

**Limits:**

**FCC 47 CFR Part 24.235, FCC 47 CFR Part 27.54**

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

**Test Setup:** Refer to section 4.2.2 for details.

**Test Procedures:**

- 1) Use E7515B with Frequency Error measurement capability.
  - a) Temp. =  $-30^{\circ}$  to  $+50^{\circ}\text{C}$
  - b) Voltage = low voltage, 3.4 Vdc, Normal, 3.87 Vdc and High voltage, 4.38 Vdc.

- 2) Frequency Stability vs Temperature:

The EUT is placed inside a temperature chamber. The temperature is set to  $20^{\circ}\text{C}$  and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured. The temperature is increased by 10 degrees, allowed to stabilize and soak, and then the measurement is repeated. This is repeated until  $+50^{\circ}\text{C}$  is reached.

- 3) Frequency Stability vs Voltage:

The peak frequency error is recorded (worst-case).

**Equipment Used:** Refer to section 3 for details.

**Test Result:** Please refer to Appendix A to D

## APPENDIX 1 PHOTOS OF TEST SETUP

See test photos attached in Appendix 1 for the actual connections between Product and support equipment.

## APPENDIX 2 PHOTOS OF EUT CONSTRUCTIONAL DETAILS

Refer to Appendix 2 for EUT external and internal photos.

\*\*\* End of Report \*\*\*

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The test report is effective only with both signature and specialized stamp. The result(s) shown in this report refer only to the sample(s) tested. Without written approval of UnionTrust, this report can't be reproduced except in full.

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