

# FCC CFR47 PART 27 CERTIFICATION TEST REPORT FCC ID: 2A8X4-RAPTOR5G

**Product:** Smart Phone  
**Trade Mark:** IIF150  
**Model Number:** RAPTOR 5G  
**Family Model:** N/A  
**Report No.:** S25012007506007  
**Issue Date:** Mar. 13, 2025

## Prepared for

HONG KONG YO YOUNG INTELLIGENT CO., LIMITED  
19H MAXGRAND PLAZA NO.3 TAIYAU STREET SAN PO KONG,KOWLOON,  
HONG KONG

## Prepared by

Shenzhen NTEK Testing Technology Co., Ltd.  
No. 24 Xinfu East Road, Xiangshan Community, Xinqiao Street, Baoan District,  
Shenzhen, Guangdong, People's Republic of China  
Tel. 0755-23200050 Website: <http://www.ntek.org.cn>

## TEST RESULT CERTIFICATION

**Applicant's name** .....: HONG KONG YO YOUNG INTELLIGENT CO., LIMITED  
**Address** .....: 19H MAXGRAND PLAZA NO.3 TAIYAU STREET SAN PO  
 KONG,KOWLOON, HONG KONG  
**Manufacturer's Name** .....: HONG KONG YO YOUNG INTELLIGENT CO., LIMITED  
**Address** .....: 19H MAXGRAND PLAZA NO.3 TAIYAU STREET SAN PO  
 KONG,KOWLOON, HONG KONG  
**Product name** .....: Smart Phone  
**Trade Mark** .....: IIIF150  
**Model and/or type reference** : RAPTOR 5G  
**Family Model** .....: N/A  
**Test Sample number**.....: S250120075007  
**Date of Test**.....: Jan. 20, 2025 ~ Mar. 13, 2025  
**Standards** .....: FCC CFR 47 Part 27  
**Test procedure** ..... ANSI C63.26:2015  
 ANSI/TIA-603-E-2016

This device described above has been tested by NTEK, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

This report shall not be reproduced except in full, without the written approval of NTEK, this document may be altered or revised by NTEK, personal only, and shall be noted in the revision of the document.

Prepared : Joe. Yan  
 By : Joe Yan  
 (Project Engineer)

Reviewed : Aaron Cheng  
 By : Aaron Cheng  
 (Supervisor)

Approved : Alex Li  
 By : Alex Li  
 (Manager)

## TABLE OF CONTENTS

|                                               |           |
|-----------------------------------------------|-----------|
| <b>1. GENERAL INFORMATION.....</b>            | <b>5</b>  |
| 1.1 PRODUCT DESCRIPTION .....                 | 5         |
| 1.2 RELATED SUBMITTAL(S) / GRANT (S) .....    | 6         |
| 1.3 TEST METHODOLOGY.....                     | 6         |
| 1.4 TEST FACILITY.....                        | 6         |
| 1.5 MEASUREMENT UNCERTAINTY .....             | 6         |
| 1.6 SPECIAL ACCESSORIES.....                  | 6         |
| 1.7 WORST-CASE CONFIGURATION AND MODE.....    | 6         |
| 1.8 SUMMARY OF TEST RESULTS .....             | 7         |
| <b>2. SYSTEM TEST CONFIGURATION .....</b>     | <b>8</b>  |
| 2.1 EUT CONFIGURATION.....                    | 8         |
| 2.2 EUT EXERCISE .....                        | 8         |
| 2.3 CONFIGURATION OF EUT SYSTEM.....          | 8         |
| 2.4 TEST SETUP .....                          | 9         |
| <b>3.TEST AND MEASUREMENT EQUIPMENT .....</b> | <b>10</b> |
| <b>4. OUTPUT POWER.....</b>                   | <b>12</b> |
| 4.1 OUTPUT POWER MEASUREMENT .....            | 12        |
| <b>5. OCCUPIED BANDWIDTH .....</b>            | <b>13</b> |
| <b>6. BANDEDGE AND EMISSION MASK.....</b>     | <b>14</b> |
| <b>7. OUT OF BAND EMISSIONS .....</b>         | <b>15</b> |
| <b>8. RADIATED MEASUREMENT .....</b>          | <b>17</b> |
| 8.1. RADIATED POWER (ERP & EIRP).....         | 17        |
| 8.2 NR BAND 38 .....                          | 18        |
| 8.2 NR BAND 77 .....                          | 20        |
| <b>9. SPURIOUS RADIATION EMISSION .....</b>   | <b>22</b> |

|                                                     |           |
|-----------------------------------------------------|-----------|
| <b>9.1 NR N38 .....</b>                             | <b>24</b> |
| <b>9.2 NR N77 .....</b>                             | <b>26</b> |
| <b>10. FREQUENCY STABILITY .....</b>                | <b>28</b> |
| <b>10.1 NR BAND 38.....</b>                         | <b>29</b> |
| <b>10.2 NR BAND 77.....</b>                         | <b>31</b> |
| <b>11. PEAK-TO-AVERAGE RATIO.....</b>               | <b>33</b> |
| <b>11.1 Description of the PAR Measurement.....</b> | <b>33</b> |
| <b>11.2 Measuring Instruments .....</b>             | <b>33</b> |
| <b>11.3 Test Procedures.....</b>                    | <b>33</b> |
| <b>11.4 Test Setup.....</b>                         | <b>33</b> |
| <b>11.5 MODES TESTED .....</b>                      | <b>33</b> |

## 1. GENERAL INFORMATION

### 1.1 PRODUCT DESCRIPTION

A major technical description of EUT is described as following:

|                                                                                                                                                         |                                                                                                                                                                                                      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Equipment                                                                                                                                               | Smart Phone                                                                                                                                                                                          |
| Trade Mark                                                                                                                                              | IIIF150                                                                                                                                                                                              |
| Model Name                                                                                                                                              | RAPTOR 5G                                                                                                                                                                                            |
| Family Model                                                                                                                                            | N/A                                                                                                                                                                                                  |
| Model Difference                                                                                                                                        | N/A                                                                                                                                                                                                  |
| FCC ID:                                                                                                                                                 | 2A8X4-RAPTOR5G                                                                                                                                                                                       |
| Frequency Bands:                                                                                                                                        | U.S. Bands:<br><input checked="" type="checkbox"/> NR TDD Band 38 Uplink & Downlink: 2570 MHz to 2620 MHz<br><input checked="" type="checkbox"/> NR TDD Band 77 Uplink/Downlink: 3450 MHz - 3550 MHz |
| Frequency Range:                                                                                                                                        | NR FDD: n38, n77                                                                                                                                                                                     |
| Type of Modulation:                                                                                                                                     | DFT-s-OFDM: PI/2 BPSK/QPSK/16-QAM/64QAM/256QAM<br>CP-OFDM: QPSK/16-QAM/64QAM/256QAM                                                                                                                  |
| Subcarrier spacing                                                                                                                                      | <input checked="" type="checkbox"/> 15KHz, <input checked="" type="checkbox"/> 30KHz, <input type="checkbox"/> 60KHz                                                                                 |
| NR architecture                                                                                                                                         | <input checked="" type="checkbox"/> SA, <input type="checkbox"/> NSA                                                                                                                                 |
| Antenna:                                                                                                                                                | PIFA Antenna                                                                                                                                                                                         |
| Antenna gain:                                                                                                                                           | N38: -2.0 dBi; N77: 2.5 dBi;                                                                                                                                                                         |
| Adapter                                                                                                                                                 | Model: FC462U<br>Input: 100-240V~50/60Hz 1.5A Max<br>Output: 5V---3A OR 9V---3A OR 12V---3A<br>OR 15V---3A OR 20.0V---3.25A Max<br>PPS: 3.3V-20V---3.25A Max                                         |
| Battery                                                                                                                                                 | DC 3.89V, 10000mAh, 38.9Wh                                                                                                                                                                           |
| Power supply                                                                                                                                            | DC 3.89V from battery or DC 5V/9V/12V/15V/20V from adapter                                                                                                                                           |
| Extreme Vol. Limits:                                                                                                                                    | DC 4.47V to DC 8.90V (Nominal DC 3.31V) ( Note 1 )                                                                                                                                                   |
| HW Version                                                                                                                                              | N/A                                                                                                                                                                                                  |
| SW Version                                                                                                                                              | N/A                                                                                                                                                                                                  |
| ** Note1: The High Voltage 4.47V and Low Voltage 3.31V was declared by manufacturer, The EUT couldn't be operate normally with higher or lower voltage. |                                                                                                                                                                                                      |

## 1.2 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: 2A8X4-RAPTOR5G** filing to comply with the FCC Part 27.

## 1.3 TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI/TIA-603-E-2016, FCC CFR 47 Part 2, Part 27, ANSI C63.26:2015.

## 1.4 TEST FACILITY

The test site used to collect the radiated data is located at:

ShenZhen NTEK Testing Technology Co., Ltd.

No. 24 Xinfu East Road, Xiangshan Community, Xinqiao Street, Baoan District, Shenzhen, Guangdong, People's Republic of China

The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.26:2015& ANSI C63.4: 2014.

FCC Registration No.:463705

IC Registration No.:9270A,

CNAS Registration No.:L5516

## 1.5 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

| No. | Item                                                                     | Uncertainty |
|-----|--------------------------------------------------------------------------|-------------|
| 1   | Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2U_c(y)$ ) | 2.5dB       |
|     |                                                                          |             |

## 1.6 SPECIAL ACCESSORIES

The battery and the charger, earphone supplied by the applicant were used as accessories and being tested with EUT intended for FCC grant together.

## 1.7 WORST-CASE CONFIGURATION AND MODE

The worst-case scenario for all measurements is based on the investigation results.

The device has NR Bands of: Band 38/77.

The RB Size was selected to measure for peak or average ERP and EIRP, which was based on the conducted power verification baseline data.

For the fundamental investigation of radiated emissions, the EUT is investigated for vertical and horizontal antenna orientations and X Y and Z orientations of the EUT alone. After the investigations the worst case was determined to be at X orientation for all LTE bands.

## 1.8 SUMMARY OF TEST RESULTS

| FCC Part27, Subpart L,<br>KDB 971168 D01 Power Meas License Digital Systems v03                                                                                                                                                                                 |                                               |         |        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|---------|--------|
| FCC Rule                                                                                                                                                                                                                                                        | Test Item                                     | Verdict | Remark |
| 2.1046                                                                                                                                                                                                                                                          | Conducted Output Power                        | PASS    |        |
| 27.50(d)(5)<br>KDB 971168 D01 Clause 5.7                                                                                                                                                                                                                        | Peak-to-Average Ratio                         | PASS    |        |
| 2.1049<br>KDB 971168 D01 Clause 4.2                                                                                                                                                                                                                             | Occupied Bandwidth                            | PASS    |        |
| 2.1051<br>27.53(c), (g), (h)<br>KDB 971168 D01 Clause 6                                                                                                                                                                                                         | Band Edge                                     | PASS    |        |
| 27.50(b)(10), (c)(10)<br>KDB 971168 D01 Clause 5.6                                                                                                                                                                                                              | Effective Radiated Power                      | PASS    |        |
| 27.50(h)(2), (d)(4)<br>KDB 971168 D01 Clause 5.6                                                                                                                                                                                                                | Equivalent Isotropic Radiated Power           | PASS    |        |
| 2.1053<br>27.53(c)(g)(h)(m)<br>KDB 971168 D01 Clause 7                                                                                                                                                                                                          | Field Strength of Spurious Radiation          | PASS    |        |
| 2.1055<br>27.54<br>KDB 971168 D01 Clause 9                                                                                                                                                                                                                      | Frequency Stability for Temperature & Voltage | PASS    |        |
| 2.1051<br>27.53(c)(g)(h)(m)<br>KDB 971168 D01 Clause 6                                                                                                                                                                                                          | Conducted Emission                            | PASS    |        |
| Remark:<br>1. "N/A" denotes test is not applicable in this Test Report.<br>2. All test items were verified and recorded according to the standards and without any deviation during the test.<br>3. No modifications are made to the EUT during all test items. |                                               |         |        |

## 2. SYSTEM TEST CONFIGURATION

### 2.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

### 2.2 EUT EXERCISE

The Transmitter was operated in the maximum output power mode through Communication Tester. The TX frequency was fixed which was for the purpose of the measurements.

### 2.3 CONFIGURATION OF EUT SYSTEM

Table 2-1 Equipment Used in EUT System

| Item | Equipment   | Model No. | ID or Specification       | Note |
|------|-------------|-----------|---------------------------|------|
| 1    | Smart Phone | RAPTOR 5G | FCC ID:<br>2A8X4-RAPTOR5G | EUT  |
|      |             |           |                           |      |
|      |             |           |                           |      |

*Note: All the accessories have been used during the test.  
the following "EUT" in setup diagram means EUT system.*

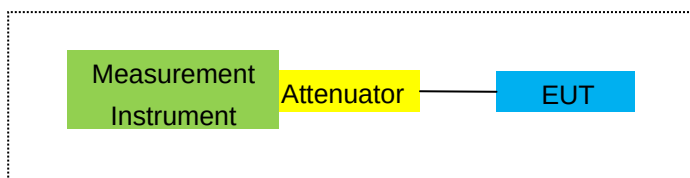


## 2.4 TEST SETUP

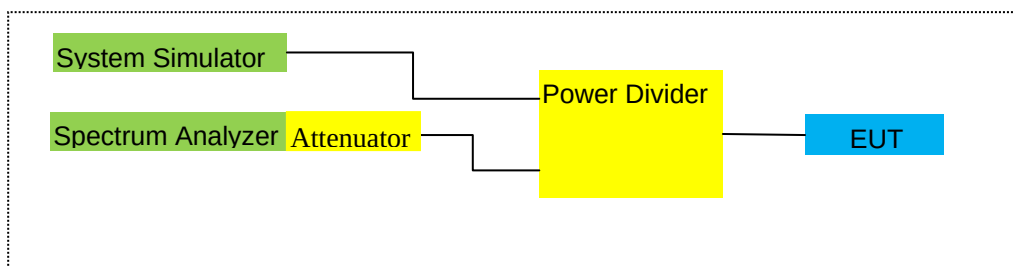
For Radiated Test Cases



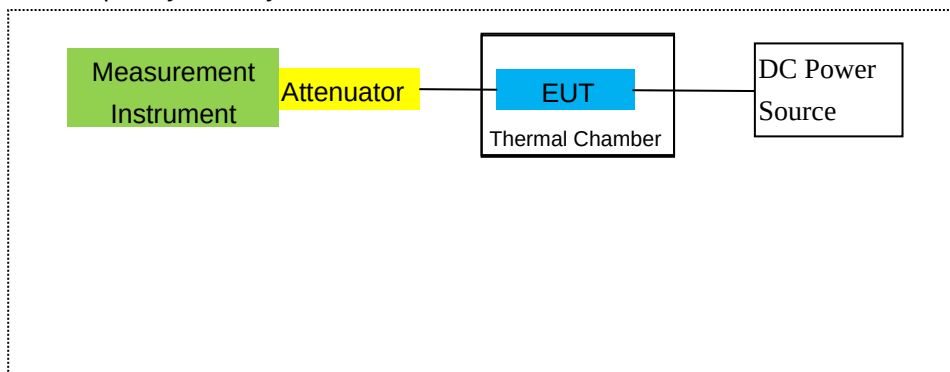
For Conducted Output Power



For Peak-to Average Ratio, Occupied Bandwidth, Conducted Band edge and Conducted Spurious Emission



For Frequency Stability



Note: EUT built-in battery-powered, the battery is fully-charged.

### 3.TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

| Item | Kind of Equipment                    | Manufacturer | Type No.    | Serial No.   | Last calibration | Calibrated until | Calibration period |
|------|--------------------------------------|--------------|-------------|--------------|------------------|------------------|--------------------|
| 1    | MXA Signal Analyzer                  | Agilent      | N9020A      | MY49100060   | 2024.04.25       | 2025.04.24       | 1 year             |
| 2    | Test Receiver                        | R&S          | ESPI        | 101318       | 2024.04.26       | 2025.04.25       | 1 year             |
| 3    | Bilog Antenna                        | TESEQ        | CBL6111D    | 31216        | 2024.05.12       | 2025.05.11       | 1 year             |
| 4    | 50Ω Coaxial Switch                   | Anritsu      | MP59B       | 6200983705   | 2024.04.26       | 2027.04.25       | 3 year             |
| 5    | Horn Antenna                         | EM           | EM-AH-10180 | 2011071402   | 2024.05.12       | 2027.05.11       | 3 year             |
| 6    | Horn Ant                             | Schwarzbeck  | BBHA 9170   | 9170-181     | 2024.05.12       | 2027.05.11       | 3 year             |
| 7    | Amplifier                            | EM           | EM-30180    | 060538       | 2024.04.26       | 2025.04.25       | 1 year             |
| 8    | Active Loop Antenna                  | SCHWARZBECK  | FMZB 1519B  | 055          | 2024.05.17       | 2027.05.16       | 3 year             |
| 9    | Power Meter                          | R&S          | NRVS        | 100696       | 2024.04.26       | 2025.04.25       | 1 year             |
| 10   | Power Sensor                         | R&S          | URV5-Z4     | 0395.1619.05 | 2024.04.26       | 2025.04.25       | 1 year             |
| 11   | Test Cable                           | N/A          | R-01        | N/A          | 2022.06.17       | 2025.06.16       | 3 year             |
| 12   | Test Cable                           | N/A          | R-02        | N/A          | 2022.06.17       | 2025.06.16       | 3 year             |
| 13   | Test Cable                           | N/A          | R-03        | N/A          | 2022.06.17       | 2025.06.16       | 3 year             |
| 14   | Test Receiver                        | R&S          | ESCI        | 101160       | 2024.04.26       | 2025.04.25       | 1 year             |
| 15   | LISN                                 | R&S          | ENV216      | 101313       | 2024.04.25       | 2025.04.24       | 1 year             |
| 16   | LISN                                 | EMCO         | 3816/2      | 00042990     | 2024.04.25       | 2025.04.24       | 1 year             |
| 17   | 50Ω Coaxial Switch                   | Anritsu      | MP59B       | 6200983705   | 2024.04.26       | 2027.04.25       | 3 year             |
| 18   | Field strength probe                 | narda        | EP601       | 711WX81278   | 2024.03.20       | 2025.03.19       | 1 year             |
| 19   | Test Cable                           | N/A          | C01         | N/A          | 2023.05.06       | 2026.05.05       | 3 year             |
| 20   | Test Cable                           | N/A          | C02         | N/A          | 2023.05.06       | 2026.05.05       | 3 year             |
| 21   | Test Cable                           | N/A          | C03         | N/A          | 2023.05.06       | 2026.05.05       | 3 year             |
| 22   | Attenuator                           | MCE          | 24-10-34    | BN9258       | N/A              | N/A              | N/A                |
| 23   | Spectrum Analyzer                    | Agilent      | E4440A      | MY41000130   | 2024.04.26       | 2025.04.25       | 1 year             |
| 24   | EMI Test Receiver                    | R&S          | ESCI        | 101160       | 2024.04.26       | 2025.04.25       | 1 year             |
| 25   | Universal Radio Communication Tester | R&S          | CMU200      | 105747       | 2024.04.26       | 2025.04.25       | 1 year             |

|    |                                  |         |                     |                |            |            |        |
|----|----------------------------------|---------|---------------------|----------------|------------|------------|--------|
| 26 | High and Low Temperature Box     | WEISS   | WT 20/40 EMC Simpac | 58226119460030 | 2024.05.30 | 2027.05.29 | 3 year |
| 27 | DC Power Source                  | N/A     | PS-6005D            | 20170402923    | 2024.04.25 | 2027.04.24 | 3 year |
| 28 | MXG Vector Signal Generator      | Agilent | N5182A              | MY47070317     | 2024.04.25 | 2025.04.24 | 1 year |
| 29 | Communication Tester             | R&S     | CMW500              | 148500         | 2024.05.30 | 2025.05.29 | 1 year |
| 30 | Radio Communication Analyzer     | Anritsu | MT8821C             | SN 6262186364  | 2024.04.25 | 2025.04.24 | 1 year |
| 31 | Radio Communication Test Station | Anritsu | MT8000A             | SN 6262192315  | 2024.04.25 | 2025.04.24 | 1 year |

Note: Each piece of equipment is scheduled for calibration once a year except the Test Cable& DC Power Source which is scheduled for calibration every 3 years.

#### Measurement Software

| Item | Manufacturer | Software Name | Software Version | Description       |
|------|--------------|---------------|------------------|-------------------|
| 1    | MWRFTest     | MTS 8200 NR   | 2.0              | RF Conducted Test |
| 2    | Farad        | EZ-EMC_RE     | AIT-03A          | RadiatedTest      |
| 3    | raditeq      | RadiMation    | 2023.1.3         | RadiatedTest      |
| 4    | Farad        | EZ-EMC_CE     | AIT-03A          | AC Conducted Test |

## 4. OUTPUT POWER

### 4.1 OUTPUT POWER MEASUREMENT

#### NR Measurement Procedure:

All NR bands conducted power peak and average are obtained from the MT8821C telecommunication test set. The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS 38.521-1 specification.

UE Power Class: 3 (23 +/- 2dBm). The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table Table 6.2.2.3-1: of the 3GPP TS 38.521-1 (V15.3.0) (07-2019).

**Table 6.2.2.3-1: UE Power Class**

| EUTRA band | Class 1 (dBm) | Tolerance (dB) | Class 2 (dBm) | Tolerance (dB) | Class 3 (dBm) | Tolerance (dB) | Class 4 (dBm) | Tolerance (dB) |
|------------|---------------|----------------|---------------|----------------|---------------|----------------|---------------|----------------|
| 1          |               |                |               |                | 23            | $\pm 2$        |               |                |
| 2          |               |                |               |                | 23            | $\pm 2^2$      |               |                |
| 3          |               |                |               |                | 23            | $\pm 2^2$      |               |                |
| 4          |               |                |               |                | 23            | $\pm 2$        |               |                |
| 5          |               |                |               |                | 23            | $\pm 2$        |               |                |
| 6          |               |                |               |                | 23            | $\pm 2$        |               |                |
| 7          |               |                |               |                | 23            | $\pm 2$        |               |                |
| 8          |               |                |               |                | 23            | $\pm 2$        |               |                |
| 9          |               |                |               |                | 23            | $\pm 2$        |               |                |
| 10         |               |                |               |                | 23            | $\pm 2$        |               |                |
| 11         |               |                |               |                | 23            | $\pm 2$        |               |                |
| 12         |               |                |               |                | 23            | $\pm 2$        |               |                |
| 13         |               |                |               |                | 23            | $\pm 2$        |               |                |
| 14         |               |                |               |                | 23            | $\pm 2$        |               |                |
| 15         |               |                |               |                | 23            | $\pm 2$        |               |                |
| 16         |               |                |               |                | 23            | $\pm 2$        |               |                |
| 17         |               |                |               |                | 23            | $\pm 2$        |               |                |
| 18         |               |                |               |                | 23            | $\pm 2$        |               |                |
| 19         |               |                |               |                | 23            | $\pm 2$        |               |                |
| 20         |               |                |               |                | 23            | $\pm 2$        |               |                |
| 21         |               |                |               |                | 23            | $\pm 2$        |               |                |
| 22         |               |                |               |                | 23            | $\pm 2$        |               |                |
| 23         |               |                |               |                | 23            | $\pm 2$        |               |                |
| 24         |               |                |               |                | 23            | $\pm 2$        |               |                |
| 25         |               |                |               |                | 23            | $\pm 2$        |               |                |
| 26         |               |                | 26            | $\pm 2$        | 23            | $\pm 2$        |               |                |
| 27         |               |                |               |                | 23            | $\pm 2$        |               |                |
| 28         |               |                |               |                | 23            | $\pm 2$        |               |                |
| 29         |               |                |               |                | 23            | $\pm 2$        |               |                |
| 30         |               |                |               |                | 23            | $\pm 2$        |               |                |
| 31         |               |                |               |                | 23            | $\pm 2$        |               |                |
| 32         |               |                |               |                | 23            | $\pm 2$        |               |                |
| 33         |               |                |               |                | 23            | $\pm 2$        |               |                |
| 34         |               |                |               |                | 23            | $\pm 2$        |               |                |
| 35         |               |                |               |                | 23            | $\pm 2$        |               |                |
| 36         |               |                |               |                | 23            | $\pm 2$        |               |                |
| 37         |               |                |               |                | 23            | $\pm 2$        |               |                |
| 38         |               |                |               |                | 23            | $\pm 2$        |               |                |
| 39         |               |                |               |                | 23            | $\pm 2$        |               |                |
| 40         |               |                |               |                | 23            | $\pm 2$        |               |                |
| 41         |               |                |               |                | 23            | $\pm 2^2$      |               |                |
| 42         |               |                |               |                | 23            | $+2/-3$        |               |                |
| 43         |               |                |               |                | 23            | $+2/-3$        |               |                |
| 44         |               |                |               |                | 23            | $+2/[-3]$      |               |                |
| 45         |               |                |               |                | 23            | $\pm 2$        |               |                |
| 46         |               |                |               |                | 23            | $\pm 2$        |               |                |
| 47         |               |                | 26            | $\pm 2$        | 23            | $\pm 2$        |               |                |

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS 38.521-1 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signaling Value of "NS\_01".3

Test data reference attachment.

## 5. OCCUPIED BANDWIDTH

### RULE PART(S)

FCC: §2.1049

### LIMITS

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 -26dB bandwidth was also measured and recorded.

### MODES TESTED

NR Band 38/77

### RESULTS

**PASS**

Test data reference attachment.

## 6. BANDEDGE AND EMISSION MASK

### RULE PART(S)

FCC: §2.1051, §27.53(c)(g)(h)(m)

FCC: §2.1046,

### LIMITS

The minimum permissible attenuation level of any spurious emission is  $43 + \log_{10}(P[\text{Watts}])$ , where P is the transmitter power in Watts.

The minimum permissible attenuation level for Band 7 is as following.

Per 27.53(g) for operations in the 698-746 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

Per 27.53(c.5) for operations in the 776-788 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

For all plots showing emissions in the 763 – 775MHz and 793 – 805MHz band, the FCC limit per 27.53(c.4) is  $65 + 10\log_{10}(P) = -35\text{dBm}$  in a 6.25kHz bandwidth.

Per 27.53(m) for operations in the BRS/EBS bands, the attenuation factor shall be not less than  $40 + 10 \log (P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log (P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log (P)$  dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth.

### TEST PROCEDURE

The transmitter output was connected to a CMW500Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

For each band edge measurement:

Set the spectrum analyzer span to include the block edge frequency

Set a marker to point the corresponding band edge frequency in each test case.

Set display line

Set resolution bandwidth to at least 1% of emission bandwidth.

### MODES TESTED

NR Band 38/77

### RESULTS

Test data reference attachment.

Note: Both DFT-s-OFDM:PI/2 BPSK/QPSK/16-QAM/64QAM/256QAM

CP-OFDM: QPSK/16-QAM/64QAM/256QAM has been tested, the worst case is CP\_QPSK mode, the report just reported the worst case.

## 7. OUT OF BAND EMISSIONS

### RULE PART(S)

FCC: §2.1051, §27.53(c)(g)(h)(m)

### LIMITS

The minimum permissible attenuation level of any spurious emission is  $43 + \log_{10}(P[\text{Watts}])$ , where P is the transmitter power in Watts.

The minimum permissible attenuation level for Band 7 is as following.

Per 27.53(g) for operations in the 698-746 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

Per 27.53(c.5) for operations in the 776-788 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

For all plots showing emissions in the 763 – 775MHz and 793 – 805MHz band, the FCC limit per 27.53(c.4) is  $65 + 10\log_{10}(P) = -35\text{dBm}$  in a 6.25kHz bandwidth.

Per 27.53(m) for operations in the BRS/EBS bands, the attenuation factor shall be not less than  $40 + 10 \log (P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log (P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log (P)$  dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth.

### TEST PROCEDURE

The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in maximum hold mode using a peak detector to ensure that the worst-case emissions were caught.

For each out of band emissions measurement:

Set display line

Set RBW & VBW to 100 kHz for the measurement below 1 GHz, and 1 MHz for the measurement above 1 GHz.

### MODES TESTED

NR Band 38/77

## MEASUREMENT METHOD

The test set up and general procedure is similar to conducted peak output power test. Only different for setting the measurement configuration of the measuring instrument of Spectrum Analyzer.

Test data reference attachment.

Note: Both DFT-s-OFDM:PI/2 BPSK/QPSK/16-QAM/64QAM/256QAM

CP-OFDM: QPSK/16-QAM/64QAM/256QAM has been tested, the worst case is CP\_QPSK mode, the report just reported the worst case.



## 8. RADIATED MEASUREMENT

### 8.1. RADIATED POWER (ERP & EIRP)

#### RULE PART(S)

FCC: §2.1046, §27.50 (h)(2), (b)(10), (c)(10), (d)(4)

#### LIMITS:

27.50 (c) (10) the following power and antenna height requirements apply to stations transmitting in the 698–746 MHz band, the portable stations (hand-held devices) are limited to 3 watts ERP.

27.50 (b)(10) Portable stations (hand-held devices) transmitting in the 746–757 MHz, 758–763 MHz, 776–793 MHz, and 805–806 MHz bands are limited to 3 watts ERP.

27.50 (d)(4) The following power and antenna height requirements apply to stations transmitting in the 1710–1755 MHz and 2110–2155 MHz bands: Fixed, mobile, and portable (hand-held) stations operating in the 1710–1755 MHz band are limited to 1 watt EIRP.

27.50 (h)(2) Mobile and other user stations in the 2500–2570 MHz and 2620–2690 MHz bands. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

#### TEST PROCEDURE

ANSI/TIA-603-E Clause 2.2.17

KDB 971168 v02r01 RF power output using broadband peak and average power meter method.

KDB 971168 D01 Power Meas License Digital Systems v02r01, “Measurement Guidance for Certification of Licensed Digital Transmitters”

#### MODES TESTED

NR Band 38/77

#### RESULTS

Pass

## 8.2 NR BAND 38

| Radiated Power (EIRP) for N38 /SCS (30kHz) |                 |           |                   |                     |                     |                               |                              |                                |            |
|--------------------------------------------|-----------------|-----------|-------------------|---------------------|---------------------|-------------------------------|------------------------------|--------------------------------|------------|
| Mode                                       | RB/ RB Position | Frequency | Result            |                     |                     |                               |                              |                                | Conclusion |
|                                            |                 |           | SG Level<br>(dBm) | Cable Loss<br>(dBm) | Factor Gain<br>(dB) | Max. EIRP<br>Average<br>(dBm) | Max. EIRP<br>Average<br>(mW) | Polarization<br>Of Max.<br>ERP |            |
| 10.0MHz<br>DFT_QPSK                        | 1@1             | 2575      | -1.32             | 5.12                | 29.16               | 22.72                         | 187.175                      | Horizontal                     | Pass       |
|                                            |                 | 2595      | -0.98             | 5.18                | 28.92               | 22.76                         | 188.842                      | Horizontal                     | Pass       |
|                                            |                 | 2615      | -1.23             | 5.23                | 28.91               | 22.45                         | 175.629                      | Horizontal                     | Pass       |
| 15.0MHz<br>DFT_QPSK                        | 1@1             | 2577.5    | -1.10             | 5.12                | 28.97               | 22.75                         | 188.366                      | Horizontal                     | Pass       |
|                                            |                 | 2595      | -1.56             | 5.18                | 28.92               | 22.18                         | 165.149                      | Horizontal                     | Pass       |
|                                            |                 | 2612.5    | -1.38             | 5.22                | 28.91               | 22.31                         | 170.293                      | Horizontal                     | Pass       |
| 20.0MHz<br>DFT_QPSK                        | 1@1             | 2580      | -1.57             | 5.13                | 28.97               | 22.27                         | 168.643                      | Horizontal                     | Pass       |
|                                            |                 | 2595      | -1.19             | 5.18                | 28.92               | 22.55                         | 180.081                      | Horizontal                     | Pass       |
|                                            |                 | 2610      | -0.93             | 5.21                | 28.89               | 22.75                         | 188.549                      | Horizontal                     | Pass       |
| 30.0MHz<br>DFT_QPSK                        | 1@1             | 2582.5    | -1.95             | 5.13                | 28.98               | 21.9                          | 154.950                      | Horizontal                     | Pass       |
|                                            |                 | 2595      | -1.70             | 5.18                | 28.92               | 22.04                         | 159.914                      | Horizontal                     | Pass       |
|                                            |                 | 2607.5    | -2.45             | 5.21                | 28.9                | 21.24                         | 133.103                      | Horizontal                     | Pass       |
| 40.0MHz<br>DFT_QPSK                        | 1@1             | 2585      | -1.98             | 5.14                | 28.98               | 21.86                         | 153.513                      | Horizontal                     | Pass       |
|                                            |                 | 2595      | -1.16             | 5.18                | 28.93               | 22.59                         | 181.513                      | Horizontal                     | Pass       |
|                                            |                 | 2605      | -0.26             | 5.2                 | 28.9                | 23.44                         | 220.576                      | Horizontal                     | Pass       |

| Radiated Power (EIRP) for N38 /SCS (30kHz) |                 |           |                |                  |                  |                         |                        |                          |            |
|--------------------------------------------|-----------------|-----------|----------------|------------------|------------------|-------------------------|------------------------|--------------------------|------------|
| Mode                                       | RB/ RB Position | Frequency | Result         |                  |                  |                         |                        |                          | Conclusion |
|                                            |                 |           | SG Level (dBm) | Cable Loss (dBm) | Factor Gain (dB) | Max. EIRP Average (dBm) | Max. EIRP Average (mW) | Polarization Of Max. ERP |            |
| 10.0MHz<br>DFT_16QAM                       | 1@1             | 2575      | -6.87          | 5.12             | 29.16            | 21.96                   | 157.19                 | Vertical                 | Pass       |
|                                            |                 | 2595      | -6.67          | 5.18             | 28.92            | 21.68                   | 147.27                 | Vertical                 | Pass       |
|                                            |                 | 2615      | -6.38          | 5.23             | 28.91            | 21.54                   | 142.63                 | Vertical                 | Pass       |
| 15.0MHz<br>DFT_16QAM                       | 1@1             | 2577.5    | -6.75          | 5.12             | 28.97            | 21.34                   | 136.02                 | Vertical                 | Pass       |
|                                            |                 | 2595      | -6.72          | 5.18             | 28.92            | 21.83                   | 152.32                 | Vertical                 | Pass       |
|                                            |                 | 2612.5    | -6.90          | 5.22             | 28.91            | 21.67                   | 146.93                 | Vertical                 | Pass       |
| 20.0MHz<br>DFT_16QAM                       | 1@1             | 2580      | -7.05          | 5.13             | 28.97            | 21.44                   | 139.17                 | Vertical                 | Pass       |
|                                            |                 | 2595      | -6.49          | 5.18             | 28.92            | 20.92                   | 123.53                 | Vertical                 | Pass       |
|                                            |                 | 2610      | -6.44          | 5.21             | 28.89            | 21.44                   | 139.43                 | Vertical                 | Pass       |
| 30.0MHz<br>DFT_16QAM                       | 1@1             | 2582.5    | -6.95          | 5.13             | 28.98            | 21.70                   | 147.80                 | Vertical                 | Pass       |
|                                            |                 | 2595      | -6.48          | 5.18             | 28.92            | 21.75                   | 149.50                 | Vertical                 | Pass       |
|                                            |                 | 2607.5    | -6.42          | 5.21             | 28.9             | 21.22                   | 132.33                 | Vertical                 | Pass       |
| 40.0MHz<br>DFT_16QAM                       | 1@1             | 2585      | -6.65          | 5.14             | 28.98            | 21.27                   | 134.08                 | Vertical                 | Pass       |
|                                            |                 | 2595      | -6.59          | 5.18             | 28.93            | 22.02                   | 159.20                 | Vertical                 | Pass       |
|                                            |                 | 2605      | -6.97          | 5.2              | 28.9             | 21.53                   | 142.15                 | Vertical                 | Pass       |

Note:

SG Level= Signal generator output

Max. EIRP Average (dBm)= Factor Gain (dB)+ SG Level (dBm)- Cable Loss(dBm)

Factor Gain(dB)=Antenna Gain(dB) + Amplifier Factor (dB)

## 8.2 NR BAND 77

| Radiated Power (EIRP) for N77 /SCS (30kHz) |                 |           |                |                  |                  |                         |                        |                          |            |
|--------------------------------------------|-----------------|-----------|----------------|------------------|------------------|-------------------------|------------------------|--------------------------|------------|
| Mode                                       | RB/ RB Position | Frequency | Result         |                  |                  |                         |                        |                          | Conclusion |
|                                            |                 |           | SG Level (dBm) | Cable Loss (dBm) | Factor Gain (dB) | Max. EIRP Average (dBm) | Max. EIRP Average (mW) | Polarization Of Max. ERP |            |
| 10.0MHz<br>DFT_QPSK                        | 1@1             | 3455.01   | -1.98          | 5.12             | 29.16            | 22.06                   | 160.812                | Horizontal               | Pass       |
|                                            |                 | 3500.01   | -0.83          | 5.18             | 28.92            | 22.91                   | 195.238                | Horizontal               | Pass       |
|                                            |                 | 3544.98   | -1.06          | 5.23             | 28.91            | 22.62                   | 182.778                | Horizontal               | Pass       |
| 15.0MHz<br>DFT_QPSK                        | 1@1             | 3457.5    | -1.62          | 5.12             | 28.97            | 22.23                   | 167.300                | Horizontal               | Pass       |
|                                            |                 | 3500.01   | -1.24          | 5.18             | 28.92            | 22.50                   | 177.795                | Horizontal               | Pass       |
|                                            |                 | 3542.49   | -1.96          | 5.22             | 28.91            | 21.73                   | 148.968                | Horizontal               | Pass       |
| 20.0MHz<br>DFT_QPSK                        | 1@1             | 3460.02   | -1.12          | 5.13             | 28.97            | 22.72                   | 186.953                | Horizontal               | Pass       |
|                                            |                 | 3500.01   | -1.55          | 5.18             | 28.92            | 22.19                   | 165.614                | Horizontal               | Pass       |
|                                            |                 | 3540      | -1.98          | 5.21             | 28.89            | 21.70                   | 147.839                | Horizontal               | Pass       |
| 40.0MHz<br>DFT_QPSK                        | 1@1             | 3470.01   | -1.38          | 5.13             | 28.98            | 22.47                   | 176.442                | Horizontal               | Pass       |
|                                            |                 | 3500.01   | -1.53          | 5.18             | 28.92            | 22.21                   | 166.340                | Horizontal               | Pass       |
|                                            |                 | 3529.98   | -2.32          | 5.21             | 28.9             | 21.37                   | 137.020                | Horizontal               | Pass       |
| 50.0MHz<br>DFT_QPSK                        | 1@1             | 3475.02   | -0.95          | 5.14             | 28.98            | 22.89                   | 194.461                | Horizontal               | Pass       |
|                                            |                 | 3500.01   | -1.07          | 5.18             | 28.93            | 22.68                   | 185.419                | Horizontal               | Pass       |
|                                            |                 | 3525      | -1.19          | 5.2              | 28.9             | 22.51                   | 178.233                | Horizontal               | Pass       |
| 60.0MHz<br>DFT_QPSK                        | 1@1             | 3480      | -1.77          | 5.14             | 28.99            | 22.08                   | 161.578                | Horizontal               | Pass       |
|                                            |                 | 3500.01   | -1.53          | 5.18             | 28.92            | 22.21                   | 166.158                | Horizontal               | Pass       |
|                                            |                 | 3519.99   | -1.21          | 5.19             | 28.88            | 22.48                   | 176.857                | Horizontal               | Pass       |
| 70.0MHz<br>DFT_QPSK                        | 1@1             | 3485.01   | -1.84          | 5.19             | 28.88            | 21.85                   | 153.103                | Horizontal               | Pass       |
|                                            |                 | 3500.01   | -2.30          | 5.19             | 28.88            | 21.39                   | 137.731                | Horizontal               | Pass       |
|                                            |                 | 3514.98   | -1.47          | 5.19             | 28.88            | 22.22                   | 166.791                | Horizontal               | Pass       |
| 80.0MHz<br>DFT_QPSK                        | 1@1             | 3490.02   | -1.19          | 5.14             | 28.95            | 22.62                   | 182.872                | Horizontal               | Pass       |
|                                            |                 | 3500.01   | -1.10          | 5.18             | 28.93            | 22.65                   | 184.151                | Horizontal               | Pass       |
|                                            |                 | 3510      | -0.91          | 5.19             | 28.92            | 22.82                   | 191.232                | Horizontal               | Pass       |
| 90.0MHz<br>DFT_QPSK                        | 1@1             | 3495      | -1.84          | 5.14             | 28.96            | 21.98                   | 157.792                | Horizontal               | Pass       |
|                                            |                 | 3500.01   | -1.41          | 5.18             | 28.93            | 22.34                   | 171.453                | Horizontal               | Pass       |
|                                            |                 | 3504.99   | -0.45          | 5.19             | 28.9             | 23.26                   | 211.860                | Horizontal               | Pass       |
| 100.0MHz<br>DFT_QPSK                       | 1@1             | 3500.01   | -0.45          | 5.14             | 28.97            | 23.38                   | 217.771                | Horizontal               | Pass       |

| Radiated Power (EIRP) for N77/SCS (30kHz) |                 |           |                |                  |                  |                         |                        |                          |            |
|-------------------------------------------|-----------------|-----------|----------------|------------------|------------------|-------------------------|------------------------|--------------------------|------------|
| Mode                                      | RB/ RB Position | Frequency | Result         |                  |                  |                         |                        |                          | Conclusion |
|                                           |                 |           | SG Level (dBm) | Cable Loss (dBm) | Factor Gain (dB) | Max. EIRP Average (dBm) | Max. EIRP Average (mW) | Polarization Of Max. ERP |            |
| 10.0MHz<br>DFT_16QAM                      | 1@1             | 3455.01   | -6.87          | 5.12             | 29.16            | 21.14                   | 130.144                | Vertical                 | Pass       |
|                                           |                 | 3500.01   | -6.67          | 5.18             | 28.92            | 20.74                   | 118.491                | Vertical                 | Pass       |
|                                           |                 | 3544.98   | -6.38          | 5.23             | 28.91            | 20.59                   | 114.519                | Vertical                 | Pass       |
| 15.0MHz<br>DFT_16QAM                      | 1@1             | 3457.5    | -6.75          | 5.12             | 28.97            | 20.84                   | 121.375                | Vertical                 | Pass       |
|                                           |                 | 3500.01   | -6.72          | 5.18             | 28.92            | 21.08                   | 128.118                | Vertical                 | Pass       |
|                                           |                 | 3542.49   | -6.90          | 5.22             | 28.91            | 21.13                   | 129.649                | Vertical                 | Pass       |
| 20.0MHz<br>DFT_16QAM                      | 1@1             | 3460.02   | -7.05          | 5.13             | 28.97            | 21.22                   | 132.293                | Vertical                 | Pass       |
|                                           |                 | 3500.01   | -6.49          | 5.18             | 28.92            | 21.19                   | 131.449                | Vertical                 | Pass       |
|                                           |                 | 3540      | -6.44          | 5.21             | 28.89            | 21.22                   | 132.410                | Vertical                 | Pass       |
| 40.0MHz<br>DFT_16QAM                      | 1@1             | 3470.01   | -6.95          | 5.13             | 28.98            | 20.94                   | 124.062                | Vertical                 | Pass       |
|                                           |                 | 3500.01   | -6.48          | 5.18             | 28.92            | 21.62                   | 145.335                | Vertical                 | Pass       |
|                                           |                 | 3529.98   | -6.42          | 5.21             | 28.9             | 20.74                   | 118.646                | Vertical                 | Pass       |
| 50.0MHz<br>DFT_16QAM                      | 1@1             | 3475.02   | -6.65          | 5.14             | 28.98            | 21.37                   | 137.183                | Vertical                 | Pass       |
|                                           |                 | 3500.01   | -6.59          | 5.18             | 28.93            | 21.03                   | 126.848                | Vertical                 | Pass       |
|                                           |                 | 3525      | -6.97          | 5.2              | 28.9             | 20.99                   | 125.629                | Vertical                 | Pass       |
| 60.0MHz<br>DFT_16QAM                      | 1@1             | 3480      | -6.74          | 5.14             | 28.99            | 21.23                   | 132.797                | Vertical                 | Pass       |
|                                           |                 | 3500.01   | -6.58          | 5.18             | 28.92            | 21.00                   | 125.771                | Vertical                 | Pass       |
|                                           |                 | 3519.99   | -6.49          | 5.19             | 28.88            | 20.89                   | 122.680                | Vertical                 | Pass       |
| 70.0MHz<br>DFT_16QAM                      | 1@1             | 3485.01   | -6.49          | 5.19             | 28.88            | 20.54                   | 113.135                | Vertical                 | Pass       |
|                                           |                 | 3500.01   | -6.49          | 5.19             | 28.88            | 20.67                   | 116.793                | Vertical                 | Pass       |
|                                           |                 | 3514.98   | -6.49          | 5.19             | 28.88            | 21.19                   | 131.423                | Vertical                 | Pass       |
| 80.0MHz<br>DFT_16QAM                      | 1@1             | 3490.02   | -6.93          | 5.14             | 28.95            | 20.81                   | 120.542                | Vertical                 | Pass       |
|                                           |                 | 3500.01   | -6.91          | 5.18             | 28.93            | 21.26                   | 133.793                | Vertical                 | Pass       |
|                                           |                 | 3510      | -6.73          | 5.19             | 28.92            | 20.82                   | 120.907                | Vertical                 | Pass       |
| 90.0MHz<br>DFT_16QAM                      | 1@1             | 3495      | -6.68          | 5.14             | 28.96            | 20.97                   | 124.898                | Vertical                 | Pass       |
|                                           |                 | 3500.01   | -6.76          | 5.18             | 28.93            | 21.43                   | 139.115                | Vertical                 | Pass       |
|                                           |                 | 3504.99   | -6.53          | 5.19             | 28.9             | 21.00                   | 125.846                | Vertical                 | Pass       |
| 100.0MHz<br>DFT_16QAM                     | 1@1             | 3500.01   | -2.05          | 5.19             | 28.9             | 21.66                   | 146.555                | Vertical                 | Pass       |

Note:

SG Level= Signal generator output

Max. EIRP Average (dBm)= Factor Gain (dB)+ SG Level (dBm)- Cable Loss(dBm)

Factor Gain(dB)=Antenna Gain(dB) + Amplifier Factor (dB)

## 9. SPURIOUS RADIATION EMISSION

### RULE PART(S)

FCC: §2.1051, §27.53(c)(g)(h)(m)

### LIMIT

For Band 7, the minimum permissible attenuation level of any spurious emission is  $55 + \log_{10}(P)$  [Watts]).

The minimum permissible attenuation level of any spurious emission is  $43 + \log_{10}(P)$  [Watts]), where P is the transmitter power in Watts.

### TEST PROCEDURE

For Cellular equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). 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.

For PCS equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth ( i.e. 1 MHz or 1 percent of emission bandwidth, as specified). 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.

The unwanted emission power shall be measured with a resolution bandwidth of at least 1% of the occupied bandwidth in the 1 MHz band immediately outside and adjacent to the channel edge of the equipment. Beyond the 1 MHz band immediately outside the channel edge of the equipment, a resolution bandwidth of 1 MHz shall be employed. A narrower resolution bandwidth is allowed to be used provided that the measured power is integrated over the full required measurement bandwidth of 1 MHz or 1% of the occupied bandwidth as applicable.

The power of any unwanted emissions measured from the channel edge of the equipment shall be attenuated below the transmitter power,  $P$  (dBW), as follows:

- a. for base station and subscriber equipment, other than mobile subscriber equipment, the attenuation shall not be less than  $43 + 10 \log_{10}(p)$ , dB; and
- b. for mobile subscriber equipment, the attenuation shall not be less than  $43 + 10 \log_{10}(p)$ , dB at the channel edges and  $55 + 10 \log_{10}(p)$  at 5.5 MHz away and beyond the channel edges where  $p$  in (a) and (b) is the transmitter power measured in watts.

#### **MODES TESTED**

NR Band 38/77

#### **RESULTS**

PASS

## 9.1 NR N38

### QPSK NR N38 10MHZ SCS 30kHz

| Test Results for Low Channel 2575MHz  |               |                |                  |                     |             |             |            |
|---------------------------------------|---------------|----------------|------------------|---------------------|-------------|-------------|------------|
| Frequency(MHz)                        | SG Level(dBm) | Cable Loss(dB) | Antenna Gain(dB) | Absolute Level(dBm) | Limit (dBm) | Margin(dBm) | Polarity   |
| 5150                                  | -53.75        | 2.63           | 28.37            | -28.01              | -13         | -15.01      | Horizontal |
| 5150                                  | -55.02        | 2.63           | 28.37            | -29.28              | -13         | -16.28      | Vertical   |
| 7725                                  | -52.99        | 3.38           | 28.25            | -28.12              | -13         | -15.12      | Vertical   |
| 7725                                  | -54.32        | 3.38           | 28.25            | -29.45              | -13         | -16.45      | Horizontal |
| 183.7                                 | -46.17        | 0.61           | 15.10            | -31.68              | -13         | -18.68      | Vertical   |
| 412.6                                 | -48.05        | 1.38           | 15.45            | -33.98              | -13         | -20.98      | Horizontal |
| Test Results for Mid Channel 2595MHz  |               |                |                  |                     |             |             |            |
| 5190                                  | -53.50        | 2.65           | 28.33            | -27.82              | -13         | -14.82      | Horizontal |
| 5190                                  | -48.52        | 2.65           | 28.33            | -22.84              | -13         | -9.84       | Vertical   |
| 7785                                  | -50.93        | 4.14           | 28.26            | -26.81              | -13         | -13.81      | Vertical   |
| 7785                                  | -52.98        | 4.14           | 28.26            | -28.86              | -13         | -15.86      | Horizontal |
| 184.8                                 | -50.59        | 0.62           | 16.35            | -34.86              | -13         | -21.86      | Vertical   |
| 416.6                                 | -50.08        | 1.39           | 15.55            | -35.92              | -13         | -22.92      | Horizontal |
| Test Results for High Channel 2615MHz |               |                |                  |                     |             |             |            |
| 5230                                  | -47.39        | 2.65           | 28.41            | -21.63              | -13         | -8.63       | Horizontal |
| 5230                                  | -54.26        | 2.65           | 28.41            | -28.50              | -13         | -15.50      | Vertical   |
| 7845                                  | -51.48        | 5.23           | 28.15            | -28.56              | -13         | -15.56      | Vertical   |
| 7845                                  | -55.23        | 5.23           | 28.89            | -31.57              | -13         | -18.57      | Horizontal |
| 195.3                                 | -49.46        | 0.65           | 15.20            | -34.91              | -13         | -21.91      | Vertical   |
| 330.0                                 | -52.01        | 1.10           | 15.16            | -37.95              | -13         | -24.95      | Horizontal |



**OPSK NR N38 40MHZ SCS 30kHz**

| Test Results for Mid Channel 2585MHz |               |                |                  |                     |             |             |            |
|--------------------------------------|---------------|----------------|------------------|---------------------|-------------|-------------|------------|
| Frequency(MHz)                       | SG Level(dBm) | Cable Loss(dB) | Antenna Gain(dB) | Absolute Level(dBm) | Limit (dBm) | Margin(dBm) | Polarity   |
| 5170                                 | -48.55        | 2.63           | 28.33            | -22.85              | -13         | -9.85       | Horizontal |
| 5170                                 | -51.66        | 2.63           | 28.33            | -25.96              | -13         | -12.96      | Vertical   |
| 7755                                 | -45.62        | 3.38           | 28.26            | -20.74              | -13         | -7.74       | Vertical   |
| 7755                                 | -46.36        | 3.38           | 28.26            | -21.48              | -13         | -8.48       | Horizontal |
| 185.3                                | -51.36        | 0.62           | 15.28            | -36.70              | -13         | -23.70      | Vertical   |
| 373.6                                | -50.25        | 1.24           | 16.64            | -34.85              | -13         | -21.85      | Horizontal |
| Test Results for Mid Channel 2595MHz |               |                |                  |                     |             |             |            |
| Frequency(MHz)                       | SG Level(dBm) | Cable Loss(dB) | Antenna Gain(dB) | Absolute Level(dBm) | Limit (dBm) | Margin(dBm) | Polarity   |
| 5190                                 | -48.42        | 2.63           | 28.33            | -22.72              | -13         | -9.72       | Horizontal |
| 5190                                 | -51.17        | 2.63           | 28.33            | -25.47              | -13         | -12.47      | Vertical   |
| 7785                                 | -45.57        | 3.38           | 28.26            | -20.69              | -13         | -7.69       | Vertical   |
| 7785                                 | -46.04        | 3.38           | 28.26            | -21.16              | -13         | -8.16       | Horizontal |
| 184.8                                | -50.90        | 0.62           | 15.28            | -36.24              | -13         | -23.24      | Vertical   |
| 373.0                                | -50.08        | 1.24           | 16.64            | -34.69              | -13         | -21.69      | Horizontal |
| Test Results for Mid Channel 2605MHz |               |                |                  |                     |             |             |            |
| Frequency(MHz)                       | SG Level(dBm) | Cable Loss(dB) | Antenna Gain(dB) | Absolute Level(dBm) | Limit (dBm) | Margin(dBm) | Polarity   |
| 5210                                 | -48.36        | 2.63           | 28.33            | -22.66              | -13         | -9.66       | Horizontal |
| 5210                                 | -51.89        | 2.63           | 28.33            | -26.19              | -13         | -13.19      | Vertical   |
| 7815                                 | -45.79        | 3.38           | 28.26            | -20.91              | -13         | -7.91       | Vertical   |
| 7815                                 | -46.45        | 3.38           | 28.26            | -21.57              | -13         | -8.57       | Horizontal |
| 185.1                                | -50.95        | 0.62           | 15.28            | -36.28              | -13         | -23.28      | Vertical   |
| 373.4                                | -50.14        | 1.24           | 16.64            | -34.74              | -13         | -21.74      | Horizontal |

## 9.2 NR N77

### QPSK NR N77 10MHZ SCS 30kHz

| Test Results for Low Channel 3455.01MHz  |               |                |                  |                     |             |             |            |
|------------------------------------------|---------------|----------------|------------------|---------------------|-------------|-------------|------------|
| Frequency(MHz)                           | SG Level(dBm) | Cable Loss(dB) | Antenna Gain(dB) | Absolute Level(dBm) | Limit (dBm) | Margin(dBm) | Polarity   |
| 6910                                     | -53.93        | 2.63           | 28.37            | -28.19              | -13         | -15.19      | Horizontal |
| 6910                                     | -54.43        | 2.63           | 28.37            | -28.69              | -13         | -15.69      | Vertical   |
| 10365                                    | -52.77        | 3.38           | 28.25            | -27.90              | -13         | -14.90      | Vertical   |
| 10365                                    | -54.26        | 3.38           | 28.25            | -29.39              | -13         | -16.39      | Horizontal |
| 183.8                                    | -46.91        | 0.61           | 15.10            | -32.42              | -13         | -19.42      | Vertical   |
| 413.4                                    | -48.01        | 1.38           | 15.45            | -33.94              | -13         | -20.94      | Horizontal |
| Test Results for Mid Channel 3500.01MHz  |               |                |                  |                     |             |             |            |
| 7000                                     | -52.52        | 2.65           | 28.33            | -26.84              | -13         | -13.84      | Horizontal |
| 7000                                     | -49.11        | 2.65           | 28.33            | -23.43              | -13         | -10.43      | Vertical   |
| 10500                                    | -51.08        | 4.14           | 28.26            | -26.96              | -13         | -13.96      | Vertical   |
| 10500                                    | -53.32        | 4.14           | 28.26            | -29.20              | -13         | -16.20      | Horizontal |
| 184.3                                    | -50.81        | 0.62           | 16.35            | -35.08              | -13         | -22.08      | Vertical   |
| 418.0                                    | -50.75        | 1.39           | 15.55            | -36.59              | -13         | -23.59      | Horizontal |
| Test Results for High Channel 3544.98MHz |               |                |                  |                     |             |             |            |
| 7090                                     | -46.51        | 2.65           | 28.41            | -20.75              | -13         | -7.75       | Horizontal |
| 7090                                     | -53.30        | 2.65           | 28.41            | -27.54              | -13         | -14.54      | Vertical   |
| 10635                                    | -51.99        | 5.23           | 28.15            | -29.07              | -13         | -16.07      | Vertical   |
| 10635                                    | -55.88        | 5.23           | 28.89            | -32.22              | -13         | -19.22      | Horizontal |
| 195.1                                    | -48.72        | 0.65           | 15.20            | -34.17              | -13         | -21.17      | Vertical   |
| 329.8                                    | -52.19        | 1.10           | 15.16            | -38.13              | -13         | -25.13      | Horizontal |

**QPSK NR N77 100MHZ SCS 30kHz**

| Test Results for Mid Channel 3500.01MHz |               |                |                  |                     |             |             |            |
|-----------------------------------------|---------------|----------------|------------------|---------------------|-------------|-------------|------------|
| Frequency(MHz)                          | SG Level(dBm) | Cable Loss(dB) | Antenna Gain(dB) | Absolute Level(dBm) | Limit (dBm) | Margin(dBm) | Polarity   |
| 7000                                    | -49.37        | 2.63           | 28.33            | -23.67              | -13         | -10.67      | Horizontal |
| 7000                                    | -52.17        | 2.63           | 28.33            | -26.47              | -13         | -13.47      | Vertical   |
| 10500                                   | -46.56        | 3.38           | 28.26            | -21.68              | -13         | -8.68       | Vertical   |
| 10500                                   | -47.67        | 3.38           | 28.26            | -22.79              | -13         | -9.79       | Horizontal |
| 184.7                                   | -51.99        | 0.62           | 15.28            | -37.33              | -13         | -24.33      | Vertical   |
| 373.8                                   | -51.78        | 1.24           | 16.64            | -36.38              | -13         | -23.38      | Horizontal |

## 10. FREQUENCY STABILITY

### RULE PART(S)

FCC: §2.1055, §27.54

### LIMITS

§22.355 - The carrier frequency shall not depart from the reference frequency in excess of  $\pm 2.5$  ppm for mobile stations.

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

### TEST PROCEDURE

Use CMW 500 with Frequency Error measurement capability.

Temp. =  $-30^{\circ}$  to  $+50^{\circ}\text{C}$

Voltage = low voltage, DC 3.31V, Normal, DC 3.89V and High voltage, DC 4.47V.

### Frequency Stability vs Temperature:

The EUT is placed inside a temperature chamber. The temperature is set to  $-30^{\circ}\text{C}$  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.

### Frequency Stability vs Voltage:

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

### MODES TESTED

NR Band 38/77

### RESULTS

See the following pages.

## 10.1 NR BAND 38

### N38 QPSK, (40MHz CH 519000 RB Allocation 50@25)

#### Frequency error vs. Voltage

| Voltage [Vdc] | Frequency [MHz] | Frequency* Error[Hz] | Frequency Error[ppm] | Limit [ppm] |
|---------------|-----------------|----------------------|----------------------|-------------|
| 3.31          | 2595            | 6.10                 | 0.002352             | 2.5         |
| 3.89          | 2595            | 2.67                 | 0.001028             | 2.5         |
| 4.47          | 2595            | 2.46                 | 0.000947             | 2.5         |

#### Frequency error vs. Temperature

| Temperature [°C] | Frequency [MHz] | Frequency* Error[Hz] | Frequency Error[ppm] | Limit [ppm] |
|------------------|-----------------|----------------------|----------------------|-------------|
| Normal (25C)     | 2595            | 6.10                 | 0.002352             | 2.5         |
| Extreme (50C)    | 2595            | 8.07                 | 0.003108             | 2.5         |
| Extreme (40C)    | 2595            | 6.01                 | 0.002316             | 2.5         |
| Extreme (30C)    | 2595            | 4.11                 | 0.001586             | 2.5         |
| Extreme (10C)    | 2595            | 8.96                 | 0.003452             | 2.5         |
| Extreme (0C)     | 2595            | 13.28                | 0.005117             | 2.5         |
| Extreme (-10C)   | 2595            | 10.54                | 0.004061             | 2.5         |
| Extreme (-20C)   | 2595            | 10.86                | 0.004185             | 2.5         |
| Extreme (-30C)   | 2595            | 14.81                | 0.005709             | 2.5         |

**\*Note:** Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.

**N38 16QAM, (40MHz CH 519000 RB Allocation 50@25)**

**Frequency error vs. Voltage**

| Voltage<br>[Vdc] | Frequency<br>[MHz] | Frequency*<br>Error[Hz] | Frequency<br>Error[ppm] | Limit<br>[ppm] |
|------------------|--------------------|-------------------------|-------------------------|----------------|
| 3.31             | 2595               | 5.50                    | 0.002119                | 2.5            |
| 3.89             | 2595               | 2.76                    | 0.001064                | 2.5            |
| 4.47             | 2595               | 1.23                    | 0.000474                | 2.5            |

**Frequency error vs. Temperature**

| Temperature<br>[°C] | Frequency<br>[MHz] | Frequency*<br>Error[Hz] | Frequency<br>Error[ppm] | Limit<br>[ppm] |
|---------------------|--------------------|-------------------------|-------------------------|----------------|
| Normal (25C)        | 2595               | 5.83                    | 0.002247                | 2.5            |
| Extreme (50C)       | 2595               | 7.59                    | 0.002925                | 2.5            |
| Extreme (40C)       | 2595               | 5.95                    | 0.002293                | 2.5            |
| Extreme (30C)       | 2595               | 4.71                    | 0.001815                | 2.5            |
| Extreme (10C)       | 2595               | 8.28                    | 0.003191                | 2.5            |
| Extreme (0C)        | 2595               | 12.40                   | 0.004778                | 2.5            |
| Extreme (-10C)      | 2595               | 9.88                    | 0.003807                | 2.5            |
| Extreme (-20C)      | 2595               | 10.11                   | 0.003896                | 2.5            |
| Extreme (-30C)      | 2595               | 14.25                   | 0.005491                | 2.5            |

**\*Note:** Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.

## 10.2 NR BAND 77

### N77 QPSK, (100MHz CH 656000 RB Allocation 135@67)

#### Frequency error vs. Voltage

| Voltage [Vdc] | Frequency [MHz] | Frequency* Error[Hz] | Frequency Error[ppm] | Limit [ppm] |
|---------------|-----------------|----------------------|----------------------|-------------|
| 3.31          | 3500.01         | 10.27                | 0.002934             | 2.5         |
| 3.89          | 3500.01         | 14.94                | 0.004269             | 2.5         |
| 4.47          | 3500.01         | 12.91                | 0.003689             | 2.5         |

#### Frequency error vs. Temperature

| Temperature [°C] | Frequency [MHz] | Frequency* Error[Hz] | Frequency Error[ppm] | Limit [ppm] |
|------------------|-----------------|----------------------|----------------------|-------------|
| Normal (25C)     | 3500.01         | 4.96                 | 0.001417             | 2.5         |
| Extreme (50C)    | 3500.01         | 6.69                 | 0.001911             | 2.5         |
| Extreme (40C)    | 3500.01         | 3.58                 | 0.001023             | 2.5         |
| Extreme (30C)    | 3500.01         | 5.70                 | 0.001629             | 2.5         |
| Extreme (10C)    | 3500.01         | 7.22                 | 0.002063             | 2.5         |
| Extreme (0C)     | 3500.01         | 10.53                | 0.003009             | 2.5         |
| Extreme (-10C)   | 3500.01         | 15.13                | 0.004323             | 2.5         |
| Extreme (-20C)   | 3500.01         | 14.41                | 0.004117             | 2.5         |
| Extreme (-30C)   | 3500.01         | 16.08                | 0.004594             | 2.5         |

**\*Note:** Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.

**N77 16QAM, (100MHz CH 656000 RB Allocation 135@67)**

**Frequency error vs. Voltage**

| Voltage<br>[Vdc] | Frequency<br>[MHz] | Frequency*<br>Error[Hz] | Frequency<br>Error[ppm] | Limit<br>[ppm] |
|------------------|--------------------|-------------------------|-------------------------|----------------|
| 3.31             | 3500.01            | 9.56                    | 0.002731                | 2.5            |
| 3.89             | 3500.01            | 14.09                   | 0.004026                | 2.5            |
| 4.47             | 3500.01            | 12.84                   | 0.003669                | 2.5            |

**Frequency error vs. Temperature**

| Temperature<br>[°C] | Frequency<br>[MHz] | Frequency*<br>Error[Hz] | Frequency<br>Error[ppm] | Limit<br>[ppm] |
|---------------------|--------------------|-------------------------|-------------------------|----------------|
| Normal (25C)        | 3500.01            | 4.72                    | 0.001349                | 2.5            |
| Extreme (50C)       | 3500.01            | 6.80                    | 0.001943                | 2.5            |
| Extreme (40C)       | 3500.01            | 2.84                    | 0.000811                | 2.5            |
| Extreme (30C)       | 3500.01            | 5.74                    | 0.001640                | 2.5            |
| Extreme (10C)       | 3500.01            | 8.00                    | 0.002286                | 2.5            |
| Extreme (0C)        | 3500.01            | 9.69                    | 0.002769                | 2.5            |
| Extreme (-10C)      | 3500.01            | 14.35                   | 0.004100                | 2.5            |
| Extreme (-20C)      | 3500.01            | 13.31                   | 0.003803                | 2.5            |
| Extreme (-30C)      | 3500.01            | 15.30                   | 0.004371                | 2.5            |

**\*Note:** Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.



## 11. Peak-to-Average Ratio

### 11.1 Description of the PAR Measurement

The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

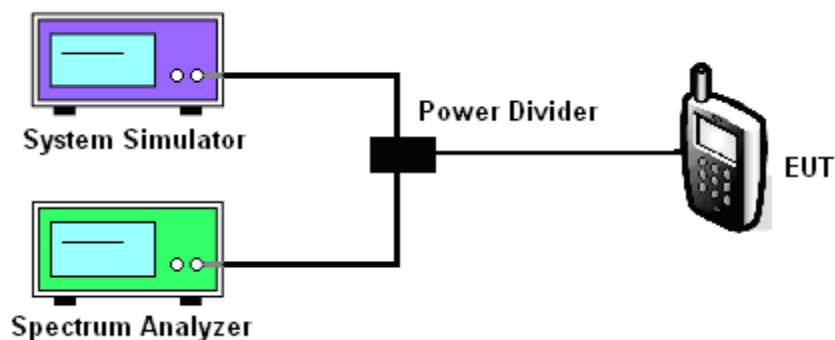
### 11.2 Measuring Instruments

See list of measuring instruments of this test report.

### 11.3 Test Procedures

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. For GSM/EGPRS operating modes:
  - a. Set the RBW = 1MHz, VBW = 1MHz, Peak detector in spectrum analyzer.
  - b. Set EUT in maximum power output, and triggered the burst signal.
  - c. Measured respectively the Peak level and Mean level, and the deviation was recorded as Peak to Average Ratio.
4. For UMTS operating modes:
  - a. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
  - b. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.

### 11.4 Test Setup



### 11.5 MODES TESTED

NR Band 38/77

Test data reference attachment.

----END OF REPORT----