

# TEST REPORT

of

FCC Part 2 Subpart J, Part 22 Subpart C/H,  
Part 24 Subpart E and Part 27 Subpart C,  
IC RSS-130 Issue 2, RSS-132 Issue 3, RSS-133 Issue 6,  
RSS-139 Issue 3 and RSS-Gen Issue 5

FCC ID: BEJGEN11NAN  
IC Certification: 2703H-GEN11NAN

1. Equipment Under Test : Telematics
2. Model Name : GEN11NAN
3. Variant Model Name(s) : -
4. FCC Applicant : LG Electronics USA
5. IC Applicant : LG ELECTRONICS INC.
6. Manufacturer : LG Electronics Inc.
7. Date of Receipt : 2020.06.02
8. Date of Test(s) : 2020.07.06 ~ 2020.07.28
9. Date of Issue : 2020.07.31

In the configuration tested, the EUT complied with the standards specified above. This test report does not assure KOLAS accreditation.

- 1) The results of this test report are effective only to the items tested.
- 2) The SGS Korea is not responsible for the sampling, the results of this test report apply to the sample as received.

Tested by:

Murphy Kim

Technical  
Manager:

Jungmin Yang

**SGS Korea Co., Ltd. Gunpo Laboratory**



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## 1. General Information

### 1.1. Testing Laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)

- 10-2, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807
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- Designation number: KR0150

All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>.

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### 1.2. Details of Applicant

FCC Applicant : LG Electronics USA

FCC Address : 1000 Sylvan Avenue, Englewood Cliffs, New Jersey, United States, 07632

IC Applicant : LG ELECTRONICS INC.

IC Address : 222, LG-ro, Jinwi-myeon, Pyeongtaek-si, Gyeonggi-do, Korea (Republic of), 451-713

Contact Person : Han, Kyung-su

Phone No. : +1 201 472 2623

### 1.3. Details of Manufacturer

Company : LG Electronics Inc.

Address : 10, Magokjungang 10-ro, Gangseo-gu, Seoul, Korea, 07796

## 1.4. Description of EUT

|                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Kind of Product</b>      | Telematics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Model Name</b>           | GEN11NAN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Model Serial Number</b>  | 01518-5006831731                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Power Supply</b>         | DC 12 V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Rated Power</b>          | GSM 850: 33 dBm<br>GSM 1900: 30 dBm<br>WCDMA II, V: 23 dBm<br>WCDMA IV: 22.7 dBm<br>LTE Band 2, 5, 12, 13: 23 dBm<br>LTE Band 4: 22.7 dBm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Frequency Range</b>      | GSM 850: 824 MHz ~ 849 MHz<br>GSM 1900: 1 850 MHz ~ 1 910 MHz<br>WCDMA II: 1 850 MHz ~ 1 910 MHz<br>WCDMA IV: 1 710 MHz ~ 1 755 MHz<br>WCDMA V: 824 MHz ~ 849 MHz<br>LTE Band 2: 1 850 MHz ~ 1 910 MHz<br>LTE Band 4: 1 710 MHz ~ 1 755 MHz<br>LTE Band 5: 824 MHz ~ 849 MHz<br>LTE Band 12: 699 MHz ~ 716 MHz<br>LTE Band 13: 777 MHz ~ 787 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Emission Designator</b>  | GSM 850: 244KGXW (Voice) / 243KG7W (EDGE)<br>GSM 1900: 243KGXW (Voice) / 243KG7W (EDGE)<br>WCDMA II: 4M15F9W<br>WCDMA IV: 4M14F9W<br>WCDMA V: 4M13F9W<br>LTE Band 2 (1.4 MHz): 1M10G7D (QPSK) / 1M10W7D (16QAM)<br>LTE Band 2 (3 MHz): 2M76G7D (QPSK) / 2M75W7D (16QAM)<br>LTE Band 2 (5 MHz): 4M51G7D (QPSK) / 4M51W7D (16QAM)<br>LTE Band 2 (10 MHz): 9M01G7D (QPSK) / 8M99W7D (16QAM)<br>LTE Band 2 (15 MHz): 13M5G7D (QPSK) / 13M5W7D (16QAM)<br>LTE Band 2 (20 MHz): 18M1G7D (QPSK) / 18M1W7D (16QAM)<br>LTE Band 4 (1.4 MHz): 1M10G7D (QPSK) / 1M10W7D (16QAM)<br>LTE Band 4 (3 MHz): 2M75G7D (QPSK) / 2M75W7D (16QAM)<br>LTE Band 4 (5 MHz): 4M51G7D (QPSK) / 4M51W7D (16QAM)<br>LTE Band 4 (10 MHz): 9M01G7D (QPSK) / 9M00W7D (16QAM)<br>LTE Band 4 (15 MHz): 13M5G7D (QPSK) / 13M5W7D (16QAM)<br>LTE Band 4 (20 MHz): 18M1G7D (QPSK) / 18M1W7D (16QAM)<br>LTE Band 5 (1.4 MHz): 1M10G7D (QPSK) / 1M10W7D (16QAM)<br>LTE Band 5 (3 MHz): 2M75G7D (QPSK) / 2M75W7D (16QAM)<br>LTE Band 5 (5 MHz): 4M51G7D (QPSK) / 4M51W7D (16QAM)<br>LTE Band 5 (10 MHz): 9M02G7D (QPSK) / 9M01W7D (16QAM)<br>LTE Band 12 (1.4 MHz): 1M10G7D (QPSK) / 1M09W7D (16QAM)<br>LTE Band 12 (3 MHz): 2M75G7D (QPSK) / 2M75W7D (16QAM)<br>LTE Band 12 (5 MHz): 4M52G7D (QPSK) / 4M51W7D (16QAM)<br>LTE Band 12 (10 MHz): 9M00G7D (QPSK) / 9M00W7D (16QAM)<br>LTE Band 13 (5 MHz): 4M54G7D (QPSK) / 4M54W7D (16QAM)<br>LTE Band 13 (10 MHz): 9M00G7D (QPSK) / 9M01W7D (16QAM) |
| <b>Modulation Technique</b> | QPSK, 16QAM, GMSK, 8PSK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>H/W Version</b>          | CCM Rev.E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>S/W Version</b>          | V4.58                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

## 1.5. Test Equipment List

| Equipment         | Manufacturer                | Model                                | S/N                   | Cal. Date     | Cal. Interval | Cal. Due      |
|-------------------|-----------------------------|--------------------------------------|-----------------------|---------------|---------------|---------------|
| Signal Generator  | Agilent                     | E8257D                               | MY51501169            | Nov. 21, 2019 | Annual        | Nov. 21, 2020 |
| Spectrum Analyzer | R&S                         | FSV30                                | 103210                | Dec. 05, 2019 | Annual        | Dec. 05, 2020 |
| Mobile Test Unit  | R&S                         | CMW500                               | 144034                | Feb. 28, 2020 | Annual        | Feb. 28, 2021 |
| High Pass Filter  | Wainwright Instrument GmbH  | WHKX10-900-1000-18000-40SS           | 7                     | Mar. 04, 2020 | Annual        | Mar. 04, 2021 |
| High Pass Filter  | Wainwright Instrument GmbH  | WHKX1.5/15G-6SS                      | 4                     | Jun. 11, 2020 | Annual        | Jun. 11, 2021 |
| High Pass Filter  | Wainwright Instrument GmbH  | WHKX2.2/12.75G-10SS                  | 8                     | Mar. 04, 2020 | Annual        | Mar. 04, 2021 |
| High Pass Filter  | Wainwright Instrument GmbH  | WHK3.0/18G-10SS                      | 344                   | May 18, 2020  | Annual        | May 18, 2021  |
| DC Power Supply   | Agilent                     | U8002A                               | MY50060028            | Mar. 03, 2020 | Annual        | Mar. 03, 2021 |
| Preamplifier      | H.P.                        | 8447F                                | 2944A03909            | Aug. 07, 2019 | Annual        | Aug. 07, 2020 |
| Preamplifier      | R&S                         | SCU 18                               | 10117                 | Jun. 10, 2020 | Annual        | Jun. 10, 2021 |
| Preamplifier      | MITEQ Inc.                  | JS44-18004000-35-8P                  | 1546891               | May 08, 2020  | Annual        | May 08, 2021  |
| Test Receiver     | R&S                         | ESU26                                | 100109                | Feb. 18, 2020 | Annual        | Feb. 18, 2021 |
| Loop Antenna      | Schwarzbeck Mess-Elektronik | FMZB 1519                            | 1519-039              | Aug. 22, 2019 | Biennial      | Aug. 22, 2021 |
| Bilog Antenna     | Schwarzbeck Mess-Elektronik | VULB9163                             | 396                   | Mar. 21, 2019 | Biennial      | Mar. 21, 2021 |
| Horn Antenna      | R&S                         | HF906                                | 100326                | Feb. 14, 2020 | Annual        | Feb. 14, 2021 |
| Horn Antenna      | Schwarzbeck Mess-Elektronik | BBHA9170                             | BBHA9170223           | Sep. 10, 2018 | Biennial      | Sep. 10, 2020 |
| Antenna Master    | Innco systems GmbH          | MA4640-XP-ET                         | MA4640/536/38330516/L | N.C.R.        | N/A           | N.C.R.        |
| Turn Table        | Innco systems GmbH          | DS 1200S                             | N/A                   | N.C.R.        | N/A           | N.C.R.        |
| Controller        | Innco systems GmbH          | CONTROLLER CO3000-4P                 | CO3000/963/38330516/L | N.C.R.        | N/A           | N.C.R.        |
| Anechoic Chamber  | SY Corporation              | L x W x H<br>(9.6 m x 6.4 m x 6.4 m) | N/A                   | N.C.R.        | N/A           | N.C.R.        |
| Coaxial Cable     | RFONE                       | PL520-NMNM-4M (4 m)                  | 20200324001           | May 06, 2020  | Semi-annual   | Nov. 06, 2020 |
| Coaxial Cable     | RFONE                       | PL520-NMNM-10M (10 m)                | 20200324001           | May 06, 2020  | Semi-annual   | Nov. 06, 2020 |

### ► Support Equipment

| Description | Manufacturer | Model | Serial Number |
|-------------|--------------|-------|---------------|
| N/A         | -            | -     | -             |

## 1.6. Summary of Test Results

The EUT has been tested according to the following specifications:

| APPLIED STANDARD: FCC Part 2, 22, 24 and 27 /<br>IC part RSS-130 Issue 2, RSS-132 Issue 3, RSS-133 Issue 6, RSS-139 Issue 3 and<br>RSS-Gen Issue 5 |                                                                                                                  |                                       |                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------|
| Section in FCC                                                                                                                                     | Section in IC                                                                                                    | Test Item                             | Result            |
| §22.913(a)(5)<br>§24.232(c)<br>§27.50(b)(10)<br>§27.50(c)(10)<br>§27.50(d)(4)                                                                      | RSS-130 Issue 2 4.6<br>RSS-132 Issue 3 5.4<br>RSS-133 Issue 6 6.4<br>RSS-139 Issue 3 6.5                         | RF Radiated Output Power              | Complied          |
| §22.917(a)<br>§24.238(a)<br>§27.53(c)(2)<br>§27.53(g)<br>§27.53(h)(1)                                                                              | RSS-130 Issue 2 4.7<br>RSS-132 Issue 3 5.5<br>RSS-133 Issue 6 6.5<br>RSS-139 Issue 3 6.6                         | Spurious Radiated Emission            | Complied          |
| §2.1046                                                                                                                                            | RSS-Gen Issue 5 6.12                                                                                             | Conducted Output Power                | Complied          |
| §2.1049                                                                                                                                            | RSS-Gen Issue 5 6.7                                                                                              | Occupied Bandwidth                    | N/A <sup>1)</sup> |
| §22.913(d)<br>§24.232(d)<br>§27.50(d)(5)                                                                                                           | RSS-130 Issue 2 4.6<br>RSS-132 Issue 3 5.4<br>RSS-133 Issue 6 6.4<br>RSS-139 Issue 3 6.5                         | Peak-Average Ratio                    | N/A <sup>1)</sup> |
| §22.917(a)<br>§24.238(a)<br>§27.53(c)(2)<br>§27.53(g)<br>§27.53(h)(1)                                                                              | RSS-130 Issue 2 4.7<br>RSS-132 Issue 3 5.5<br>RSS-133 Issue 6 6.5<br>RSS-139 Issue 3 6.6                         | Spurious Emission at Antenna Terminal | N/A <sup>1)</sup> |
| §22.917(a)<br>§24.238(a)<br>§27.53(c)(2)<br>§27.53(g)<br>§27.53(h)(1)                                                                              | RSS-130 Issue 2 4.7<br>RSS-132 Issue 3 5.5<br>RSS-133 Issue 6 6.5<br>RSS-139 Issue 3 6.6                         | Band Edge                             | N/A <sup>1)</sup> |
| §2.1055<br>§22.355<br>§24.235<br>§27.54                                                                                                            | RSS-Gen Issue 5 6.11<br>RSS-130 Issue 2 4.5<br>RSS-132 Issue 3 5.3<br>RSS-133 Issue 6 6.3<br>RSS-139 Issue 3 6.4 | Frequency Stability                   | Complied          |

### Note;

1) This product is a C2PC case due to the change of filter. So only spurious radiated emission test and frequency stability test were performed.

This C2PC report only tested with GSM 850, WCDMA Band IV, V and LTE Band 4, 5 because of the change on the associated filters.

Due to the changes of B4/B5 duplexers in FEM, RF radiated output power, spurious radiated emission, conducted output power and radio frequency stability testing on Band 4 and Band 5 were performed.

## 1.7. Test Report Revision

| Revision | Report Number          | Date of Issue | Description                                                                                            |
|----------|------------------------|---------------|--------------------------------------------------------------------------------------------------------|
| 0        | F690501-RF-RTL001025   | 2020.07.28    | Initial                                                                                                |
| 1        | F690501-RF-RTL001025-1 | 2020.07.31    | Deleted information of LTE Band 17,<br>modified some typo and<br>added comment at the clause 1.6 note. |

## 1.8. Sample Calculation for Offset

Where relevant, the following sample calculation is provided:

### 1.8.1. Radiation test

- E.I.R.P. (dB m) = Measured level (dB $\mu$ V) + Antenna factor (dB) + Cable loss (dB) + 20 Log D - 104.5; where D is the measurement distance in meters.
- E.R.P. (dB m) = E.I.R.P. (dB m) - 2.15 (dB)

## 1.9. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

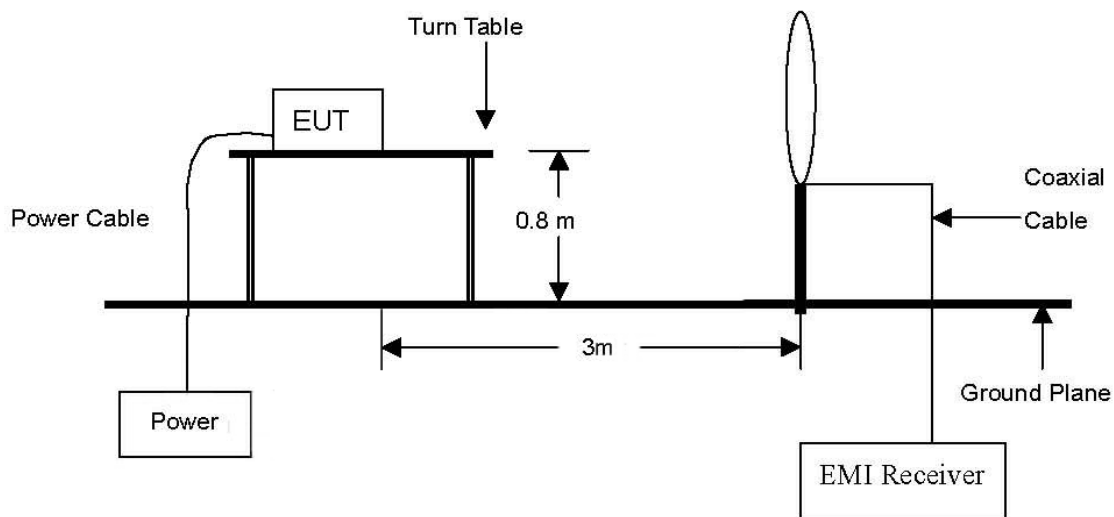
| Parameter                          | Uncertainty   |
|------------------------------------|---------------|
| Radiated Emission, 9 kHz to 30 MHz | $\pm 3.59$ dB |
| Radiated Emission, below 1 GHz     | $\pm 5.88$ dB |
| Radiated Emission, above 1 GHz     | $\pm 5.94$ dB |

Uncertainty figures are valid to a confidence level of 95 %.

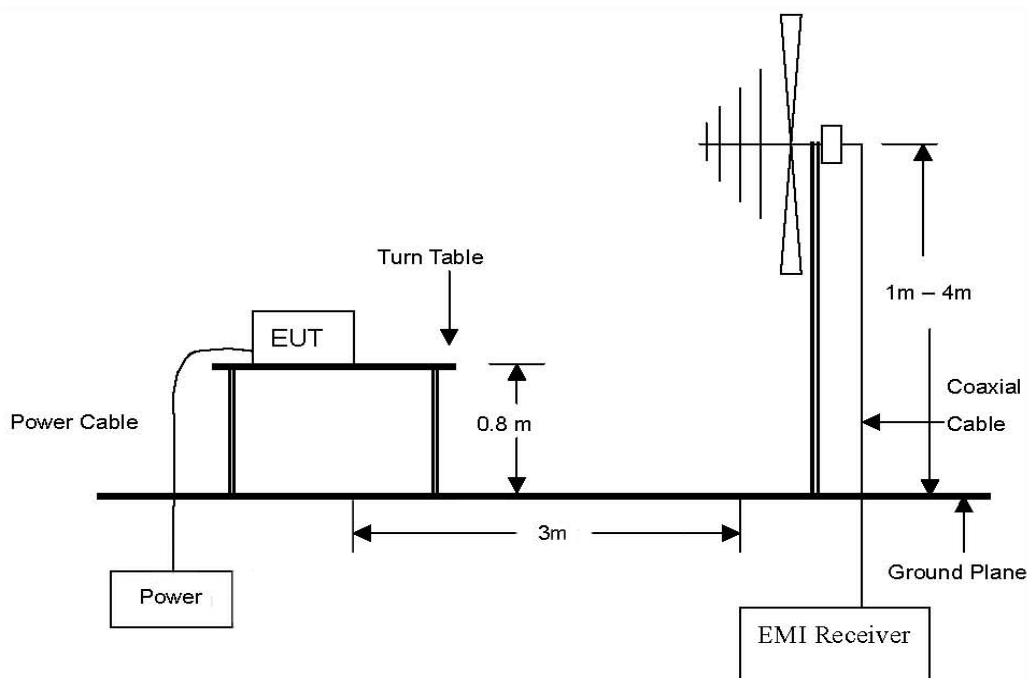
## 2. RF Radiated Output Power & Spurious Radiated Emission

### 2.1. Test Setup

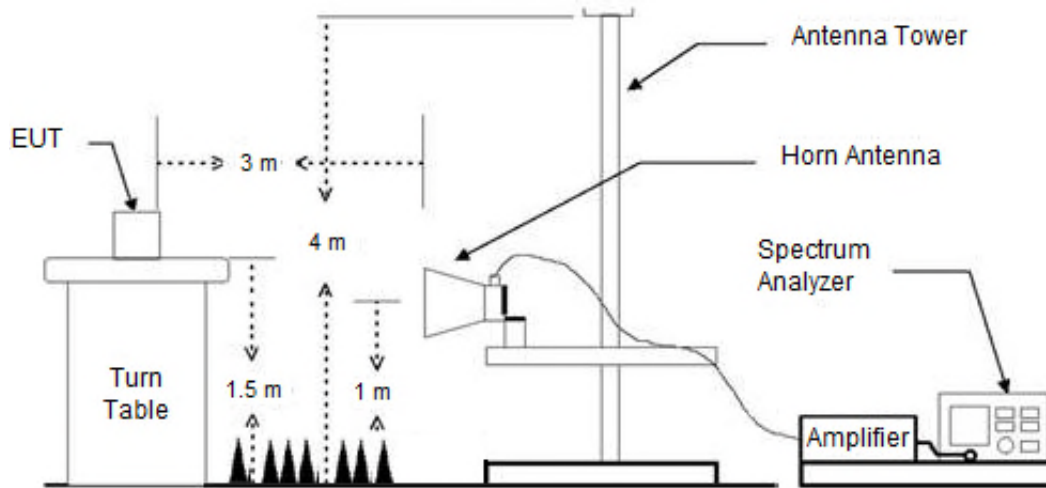
The diagram below shows the test setup that is utilized to make the measurements for emission from 9 kHz to 30 MHz.



The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz.



The diagram below shows the test setup that is utilized to make the measurements for emission from 1 GHz to 20 GHz.



## 2.2. Limit

### 2.2.1. Limit of Radiated Output Power

#### FCC

- §22.913(a)(5), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

- §27.50(d)(4), fixed, mobile, and portable (hand-held) stations operating in the 1 710-1 755 MHz band and mobile and portable stations operating in the 1 695-1 710 MHz and 1 755-1 780 MHz bands are limited to 1 watt EIRP.

#### IC

- RSS-132 Issue 3

5.4, the transmitter output power shall be measured in terms of average power.

The equivalent isotropically radiated power (e.i.r.p.) for mobile equipment shall not exceed 11.5 watts.

Refer to SRSP-503 for base station e.i.r.p. limits.

- RSS-139 Issue 3

6.5, the equivalent isotropically radiated power (e.i.r.p.) for mobile and portable transmitters shall not exceed one watt. The e.i.r.p. for fixed and base stations in the band 1 710-1 780 MHz shall not exceed one watt.

### 2.2.2. Limit of spurious radiated emission

#### FCC

- §22.917(a), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10\log(P)$  dB.

- §27.53(h)(1), for operations in the 1 695-1 710 MHz, 1 710-1 755 MHz, 1 755-1 780 MHz, 1 915-1 920 MHz, 1 995-2 000 MHz, 2 000-2 020 MHz, 2 110-2 155 MHz, 2 155-2 180 MHz, and 2 180-2 200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log_{10}(P)$  dB.

#### IC

- RSS-132 Issue 3

5.5, Mobile and base station equipment shall comply with the limits in (i) and (ii) below.

(i) In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1 % of the occupied bandwidth shall be attenuated (in dB) below the transmitter output power P (dB W) by at least  $43 + 10 \log_{10} p$  (watts).

(ii) After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dB W) by at least  $43 + 10 \log_{10} p$  (watts). If the measurement is performed using 1 % of the occupied bandwidth, power integration over 100 kHz is required.

- RSS-139 Issue 3

6.6, (i) In the first 1.0 MHz bands immediately outside and adjacent to the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power per any 1 % of the emission bandwidth shall be attenuated below the transmitter output power P (in dB W) by at least  $43 + 10 \log_{10} p$  (watts) dB.

(ii) After the first 1.0 MHz outside the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P (in dB W) by at least  $43 + 10 \log_{10} p$  (watts) dB.

**2.3. Test procedure: Based on ANSI/TIA 603E: 2016 and ANSI C63.26-2015**

1. On a test site, the EUT shall be placed at 80 cm height on a turn table, and in the position close to normal use as declared by the applicant.
2. The test antenna shall be oriented initially for vertical polarization located 3 m from EUT to correspond to the fundamental frequency of the transmitter.
3. The output of the test antenna shall be connected to the measuring receiver and the peak detector is used for the measurement.
4. The maximized power level is recorded using the spectrum analyzer "Channel Power" function with the integration band set to the emissions occupied bandwidth, RBW = 1-5 % of the OBW (not to exceed 1 MHz), VBW  $\geq 3 \times$  RBW, Detector = power averaging (rms), sweep time = auto, trace average at least 100 traces in power averaging (rms) mode, per the guidelines of KDB 971168 D01 Power Meas License Digital Systems v03r01.
5. Radiated spurious emissions measurement method was set as follows:  
RBW = 100 kHz for emissions below 1 GHz and 1 MHz for emissions above 1 GHz, VBW  $\geq 3 \times$  RBW, Detector = RMS, trace mode = max hold, per the guidelines of ANSI C63.26-2015 and KDB 971168 D01 Power Meas License Digital Systems v03r01.
6. The transmitter shall be switched on, the measuring receiver shall be tuned to the frequency of the transmitter under test.
7. The test antenna shall be raised and lowered through the specified range of height until the maximum signal level is detected by the measuring receiver.
8. The transmitter shall be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
9. The test antenna shall be raised and lowered again through the specified range of height until the maximum signal level is detected by the measuring receiver.
10. The maximum signal level detected by the measuring receiver shall be noted.
11. In necessary, the input attenuator setting on the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
12. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
13. The measurement shall be repeated with the test antenna orientated for horizontal polarization.

## 2.4. Test Result for RF Radiated Output Power

Ambient temperature : (23 ± 1) °C  
Relative humidity : 47 % R.H.

| Band     | Frequency (MHz) | Maximum Conducted Power (dB m) | Maximum Conducted Power (W) | Final Gain Incl. (dB i) | Power Reduction (dB) | Final E.I.R.P. (dB m) | Final E.I.R.P. (W) | Final E.R.P. (dB m) | Final E.R.P. (W) | Output Power Limit |
|----------|-----------------|--------------------------------|-----------------------------|-------------------------|----------------------|-----------------------|--------------------|---------------------|------------------|--------------------|
| GSM 850  | 824 ~ 849       | 32.90                          | 1.95                        | 3.81                    | 1                    | 35.71                 | 3.72               | 33.56               | 2.27             | 7 W E.R.P.         |
| WCDMA IV | 1 710 ~ 1 755   | 22.55                          | 0.18                        | 6.19                    | -                    | 28.74                 | 0.75               |                     |                  | 1 W E.I.R.P.       |
| WCDMA V  | 824 ~ 849       | 22.47                          | 0.18                        | 3.81                    | -                    | 26.28                 | 0.42               | 24.13               | 0.26             | 7 W E.R.P.         |
| LTE 4    | 1 710 ~ 1 755   | 22.71                          | 0.19                        | 6.19                    | -                    | 28.90                 | 0.78               |                     |                  | 1 W E.I.R.P.       |
| LTE 5    | 824 ~ 849       | 23.10                          | 0.20                        | 3.81                    | -                    | 26.91                 | 0.49               | 24.76               | 0.30             | 7 W E.R.P.         |

### Remark;

1. Final Gain Incl. (dB i) = Antenna Gain (dB i) + Cable Loss (dB).
2. Final E.I.R.P (dB m) = Maximum Conducted Power (dB m) + Final Gain Incl. (dB i) - Power Reduction (dB).
3. Final E.R.P. (dB m) = Final E.I.R.P. (dB m) - 2.15 (dB); where E.R.P. and E.I.R.P. are expressed in consistent units.

## 2.5. Spurious Radiated Emission

### GSM 850

| Frequency (MHz)            | Measured Level (dBμV) | Ant. Pol. | AF (dB/m) | AMP+CL (dB) | E (dBμV/m) | CF (dB) | E.R.P. (dB m) | Limit (dB m) | Margin (dB) |
|----------------------------|-----------------------|-----------|-----------|-------------|------------|---------|---------------|--------------|-------------|
| Low Channel (824.2 MHz)    |                       |           |           |             |            |         |               |              |             |
| 1 648.26                   | 47.15                 | H         | 25.77     | -40.48      | 32.44      | -97.41  | -64.97        | -13          | 51.97       |
| 1 648.50                   | 59.79                 | V         | 25.78     | -40.48      | 45.09      | -97.41  | -52.32        | -13          | 39.32       |
| 2 472.59                   | 42.79                 | H         | 28.41     | -38.54      | 32.66      | -97.41  | -64.75        | -13          | 51.75       |
| 2 472.83                   | 44.51                 | V         | 28.41     | -38.54      | 34.38      | -97.41  | -63.03        | -13          | 50.03       |
| 4 945.69                   | 41.35                 | H         | 33.18     | -35.93      | 38.60      | -97.41  | -58.81        | -13          | 45.81       |
| Middle Channel (836.6 MHz) |                       |           |           |             |            |         |               |              |             |
| 1 673.39                   | 53.90                 | H         | 26.36     | -40.41      | 39.85      | -97.41  | -57.56        | -13          | 44.56       |
| 1 673.17                   | 59.18                 | V         | 26.36     | -40.41      | 45.13      | -97.41  | -52.28        | -13          | 39.28       |
| 2 509.75                   | 43.49                 | H         | 28.30     | -38.83      | 32.96      | -97.41  | -64.45        | -13          | 51.45       |
| 2 509.46                   | 48.44                 | V         | 28.30     | -38.83      | 37.91      | -97.41  | -59.50        | -13          | 46.50       |
| 4 182.97                   | 42.91                 | H         | 32.00     | -36.77      | 38.14      | -97.41  | -59.27        | -13          | 46.27       |
| 4 183.05                   | 49.55                 | V         | 32.00     | -36.77      | 44.78      | -97.41  | -52.63        | -13          | 39.63       |
| High Channel (848.8 MHz)   |                       |           |           |             |            |         |               |              |             |
| 1 697.71                   | 86.72                 | H         | 26.95     | -40.39      | 73.28      | -97.41  | -24.13        | -13          | 11.13       |
| 1 697.53                   | 88.66                 | V         | 26.94     | -40.39      | 75.21      | -97.41  | -22.20        | -13          | 9.20        |
| 2 546.38                   | 85.08                 | H         | 28.30     | -38.79      | 74.59      | -97.41  | -22.82        | -13          | 9.82        |
| 2 546.41                   | 86.57                 | V         | 28.30     | -38.79      | 76.08      | -97.41  | -21.33        | -13          | 8.33        |
| 3 395.45                   | 59.88                 | H         | 30.87     | -37.65      | 53.10      | -97.41  | -44.31        | -13          | 31.31       |
| 3 395.68                   | 65.72                 | V         | 30.87     | -37.65      | 58.94      | -97.41  | -38.47        | -13          | 25.47       |
| 4 244.33                   | 68.13                 | H         | 32.00     | -36.66      | 63.47      | -97.41  | -33.94        | -13          | 20.94       |
| 4 244.09                   | 76.91                 | V         | 32.00     | -36.66      | 72.25      | -97.41  | -25.16        | -13          | 12.16       |
| 5 093.44                   | 59.95                 | H         | 33.37     | -35.64      | 57.68      | -97.41  | -39.73        | -13          | 26.73       |
| 5 092.74                   | 68.23                 | V         | 33.37     | -35.64      | 65.96      | -97.41  | -31.45        | -13          | 18.45       |
| 5 941.85                   | 56.09                 | H         | 34.57     | -34.77      | 55.89      | -97.41  | -41.52        | -13          | 28.52       |
| 5 942.09                   | 52.61                 | V         | 34.57     | -34.77      | 52.41      | -97.41  | -45.00        | -13          | 32.00       |
| 6 790.26                   | 46.35                 | V         | 35.28     | -33.48      | 48.15      | -97.41  | -49.26        | -13          | 36.26       |
| 7 639.38                   | 47.50                 | H         | 36.00     | -34.58      | 48.92      | -97.41  | -48.49        | -13          | 35.49       |
| 7 638.91                   | 47.94                 | V         | 36.00     | -34.58      | 49.36      | -97.41  | -48.05        | -13          | 35.05       |

**EDGE 850**

| Frequency<br>(MHz)         | Measured<br>Level<br>(dBμV) | Ant.<br>Pol. | AF<br>(dB/m) | AMP+CL<br>(dB) | E<br>(dBμV/m) | CF<br>(dB) | E.R.P.<br>(dB m) | Limit<br>(dB m) | Margin<br>(dB) |
|----------------------------|-----------------------------|--------------|--------------|----------------|---------------|------------|------------------|-----------------|----------------|
| Low Channel (824.2 MHz)    |                             |              |              |                |               |            |                  |                 |                |
| 1 648.29                   | 46.35                       | H            | 25.77        | -40.48         | 31.64         | -97.41     | -65.77           | -13             | 52.77          |
| 1 648.44                   | 58.11                       | V            | 25.78        | -40.48         | 43.41         | -97.41     | -54.00           | -13             | 41.00          |
| 2 472.91                   | 44.73                       | H            | 28.41        | -38.54         | 34.60         | -97.41     | -62.81           | -13             | 49.81          |
| 2 472.89                   | 44.64                       | V            | 28.41        | -38.54         | 34.51         | -97.41     | -62.90           | -13             | 49.90          |
| Middle Channel (836.6 MHz) |                             |              |              |                |               |            |                  |                 |                |
| 1 673.49                   | 53.10                       | H            | 26.36        | -40.41         | 39.05         | -97.41     | -58.36           | -13             | 45.36          |
| 1 673.29                   | 62.89                       | V            | 26.36        | -40.41         | 48.84         | -97.41     | -48.57           | -13             | 35.57          |
| 2 509.95                   | 44.89                       | H            | 28.30        | -38.83         | 34.36         | -97.41     | -63.05           | -13             | 50.05          |
| 2 509.73                   | 45.00                       | V            | 28.30        | -38.83         | 34.47         | -97.41     | -62.94           | -13             | 49.94          |
| 4 182.77                   | 45.07                       | H            | 32.00        | -36.78         | 40.29         | -97.41     | -57.12           | -13             | 44.12          |
| 4 183.09                   | 50.69                       | V            | 32.00        | -36.77         | 45.92         | -97.41     | -51.49           | -13             | 38.49          |
| High Channel (848.8 MHz)   |                             |              |              |                |               |            |                  |                 |                |
| 1 697.92                   | 86.06                       | H            | 26.95        | -40.39         | 72.62         | -97.41     | -24.79           | -13             | 11.79          |
| 1 697.69                   | 86.58                       | V            | 26.94        | -40.39         | 73.13         | -97.41     | -24.28           | -13             | 11.28          |
| 2 546.37                   | 84.56                       | H            | 28.30        | -38.79         | 74.07         | -97.41     | -23.34           | -13             | 10.34          |
| 2 546.59                   | 85.25                       | V            | 28.30        | -38.79         | 74.76         | -97.41     | -22.65           | -13             | 9.65           |
| 3 395.69                   | 64.70                       | H            | 30.87        | -37.65         | 57.92         | -97.41     | -39.49           | -13             | 26.49          |
| 3 395.48                   | 66.92                       | V            | 30.87        | -37.65         | 60.14         | -97.41     | -37.27           | -13             | 24.27          |
| 4 244.30                   | 69.58                       | H            | 32.00        | -36.66         | 64.92         | -97.41     | -32.49           | -13             | 19.49          |
| 4 244.21                   | 78.18                       | V            | 32.00        | -36.66         | 73.52         | -97.41     | -23.89           | -13             | 10.89          |
| 5 093.21                   | 59.97                       | H            | 33.37        | -35.64         | 57.70         | -97.41     | -39.71           | -13             | 26.71          |
| 5 092.97                   | 65.02                       | V            | 33.37        | -35.64         | 62.75         | -97.41     | -34.66           | -13             | 21.66          |
| 5 941.74                   | 59.05                       | H            | 34.57        | -34.77         | 58.85         | -97.41     | -38.56           | -13             | 25.56          |
| 5 941.88                   | 51.68                       | V            | 34.57        | -34.77         | 51.48         | -97.41     | -45.93           | -13             | 32.93          |
| 7 638.94                   | 46.26                       | H            | 36.00        | -34.58         | 47.68         | -97.41     | -49.73           | -13             | 36.73          |
| 7 639.14                   | 46.33                       | V            | 36.00        | -34.58         | 47.75         | -97.41     | -49.66           | -13             | 36.66          |

**WCDMA Band IV**

| Frequency (MHz)              | Measured Level (dBμV) | Ant. Pol. | AF (dB/m) | AMP+CL (dB) | E (dBμV/m) | CF (dB) | E.I.R.P. (dB m) | Limit (dB m) | Margin (dB) |
|------------------------------|-----------------------|-----------|-----------|-------------|------------|---------|-----------------|--------------|-------------|
| Low Channel (1 712.4 MHz)    |                       |           |           |             |            |         |                 |              |             |
| 3 422.76                     | 44.56                 | H         | 31.04     | -39.85      | 35.75      | -95.26  | -59.51          | -13          | 46.51       |
| 3 426.20                     | 54.39                 | V         | 31.06     | -39.85      | 45.60      | -95.26  | -49.66          | -13          | 36.66       |
| 5 134.83                     | 45.51                 | H         | 33.47     | -38.74      | 40.24      | -95.26  | -55.02          | -13          | 42.02       |
| 5 139.42                     | 51.40                 | V         | 33.48     | -38.73      | 46.15      | -95.26  | -49.11          | -13          | 36.11       |
| Middle Channel (1 732.6 MHz) |                       |           |           |             |            |         |                 |              |             |
| 3 466.84                     | 46.08                 | H         | 31.20     | -39.83      | 37.45      | -95.26  | -57.81          | -13          | 44.81       |
| 3 462.69                     | 50.71                 | V         | 31.20     | -39.84      | 42.07      | -95.26  | -53.19          | -13          | 40.19       |
| 5 196.61                     | 44.97                 | H         | 33.59     | -38.57      | 39.99      | -95.26  | -55.27          | -13          | 42.27       |
| 5 194.12                     | 50.16                 | V         | 33.59     | -38.58      | 45.17      | -95.26  | -50.09          | -13          | 37.09       |
| High Channel (1 752.6 MHz)   |                       |           |           |             |            |         |                 |              |             |
| 3 503.53                     | 49.10                 | H         | 31.19     | -39.82      | 40.47      | -95.26  | -54.79          | -13          | 41.79       |
| 3 503.88                     | 48.34                 | V         | 31.19     | -39.81      | 39.72      | -95.26  | -55.54          | -13          | 42.54       |
| 5 254.62                     | 47.49                 | H         | 33.71     | -38.49      | 42.71      | -95.26  | -52.55          | -13          | 39.55       |
| 5 255.71                     | 51.42                 | V         | 33.71     | -38.49      | 46.64      | -95.26  | -48.62          | -13          | 35.62       |

**WCDMA Band V**

| Frequency (MHz)            | Measured Level (dBμV) | Ant. Pol. | AF (dB/m) | AMP+CL (dB) | E (dBμV/m) | CF (dB) | E.R.P. (dB m) | Limit (dB m) | Margin (dB) |
|----------------------------|-----------------------|-----------|-----------|-------------|------------|---------|---------------|--------------|-------------|
| Low Channel (826.4 MHz)    |                       |           |           |             |            |         |               |              |             |
| 2 476.29                   | 49.03                 | H         | 28.39     | -40.92      | 36.50      | -97.41  | -60.91        | -13          | 47.91       |
| 2 481.87                   | 51.67                 | V         | 28.37     | -40.91      | 39.13      | -97.41  | -58.28        | -13          | 45.28       |
| Middle Channel (836.6 MHz) |                       |           |           |             |            |         |               |              |             |
| 2 507.64                   | 53.67                 | H         | 28.30     | -40.91      | 41.06      | -97.41  | -56.35        | -13          | 43.35       |
| 2 512.29                   | 56.87                 | V         | 28.30     | -40.92      | 44.25      | -97.41  | -53.16        | -13          | 40.16       |
| High Channel (846.6 MHz)   |                       |           |           |             |            |         |               |              |             |
| 2 543.42                   | 57.28                 | H         | 28.30     | -40.92      | 44.66      | -97.41  | -52.75        | -13          | 39.75       |
| 2 541.99                   | 59.27                 | V         | 28.30     | -40.92      | 46.65      | -97.41  | -50.76        | -13          | 37.76       |

**LTE band 4**

- Modulation Signal: LTE band 4 (1.4 MHz – QPSK)

| Frequency<br>(MHz)           | Measured<br>Level<br>(dBμV) | Ant.<br>Pol. | AF<br>(dB/m) | AMP+CL<br>(dB) | E<br>(dBμV/m) | CF<br>(dB) | E.I.R.P.<br>(dB m) | Limit<br>(dB m) | Margin<br>(dB) |
|------------------------------|-----------------------------|--------------|--------------|----------------|---------------|------------|--------------------|-----------------|----------------|
| Low Channel (1 710.7 MHz)    |                             |              |              |                |               |            |                    |                 |                |
| 3 420.45                     | 54.39                       | H            | 31.02        | -37.57         | 47.84         | -95.26     | -47.42             | -13             | 34.42          |
| 3 420.49                     | 58.28                       | V            | 31.02        | -37.57         | 51.73         | -95.26     | -43.53             | -13             | 30.53          |
| 5 130.71                     | 48.74                       | H            | 33.46        | -35.68         | 46.52         | -95.26     | -48.74             | -13             | 35.74          |
| 5 130.74                     | 58.04                       | V            | 33.46        | -35.68         | 55.82         | -95.26     | -39.44             | -13             | 26.44          |
| Middle Channel (1 732.5 MHz) |                             |              |              |                |               |            |                    |                 |                |
| 3 464.17                     | 49.92                       | H            | 31.20        | -37.39         | 43.73         | -95.26     | -51.53             | -13             | 38.53          |
| 3 464.02                     | 57.07                       | V            | 31.20        | -37.40         | 50.87         | -95.26     | -44.39             | -13             | 31.39          |
| 5 196.25                     | 53.70                       | H            | 33.59        | -35.66         | 51.63         | -95.26     | -43.63             | -13             | 30.63          |
| 5 196.24                     | 59.82                       | V            | 33.59        | -35.66         | 57.75         | -95.26     | -37.51             | -13             | 24.51          |
| High Channel (1 754.3 MHz)   |                             |              |              |                |               |            |                    |                 |                |
| 3 507.65                     | 46.68                       | H            | 31.18        | -37.30         | 40.56         | -95.26     | -54.70             | -13             | 41.70          |
| 3 507.84                     | 54.59                       | V            | 31.18        | -37.30         | 48.47         | -95.26     | -46.79             | -13             | 33.79          |
| 5 261.48                     | 55.27                       | H            | 33.72        | -35.48         | 53.51         | -95.26     | -41.75             | -13             | 28.75          |
| 5 261.64                     | 59.97                       | V            | 33.72        | -35.48         | 58.21         | -95.26     | -37.05             | -13             | 24.05          |

\* 1.4 BW 1RB size / 0 Offset for B4

**LTE band 4**

- Modulation Signal: LTE band 4 (3 MHz – QPSK)

| Frequency<br>(MHz)           | Measured<br>Level<br>(dBμV) | Ant.<br>Pol. | AF<br>(dB/m) | AMP+CL<br>(dB) | E<br>(dBμV/m) | CF<br>(dB) | E.I.R.P.<br>(dB m) | Limit<br>(dB m) | Margin<br>(dB) |
|------------------------------|-----------------------------|--------------|--------------|----------------|---------------|------------|--------------------|-----------------|----------------|
| Low Channel (1 711.5 MHz)    |                             |              |              |                |               |            |                    |                 |                |
| 3 420.49                     | 54.40                       | H            | 31.02        | -37.57         | 47.85         | -95.26     | -47.41             | -13             | 34.41          |
| 3 420.56                     | 58.22                       | V            | 31.02        | -37.57         | 51.67         | -95.26     | -43.59             | -13             | 30.59          |
| 5 130.89                     | 48.84                       | H            | 33.46        | -35.68         | 46.62         | -95.26     | -48.64             | -13             | 35.64          |
| 5 130.79                     | 58.07                       | V            | 33.46        | -35.68         | 55.85         | -95.26     | -39.41             | -13             | 26.41          |
| Middle Channel (1 732.5 MHz) |                             |              |              |                |               |            |                    |                 |                |
| 3 462.66                     | 49.90                       | H            | 31.20        | -37.40         | 43.70         | -95.26     | -51.56             | -13             | 38.56          |
| 3 462.43                     | 57.85                       | V            | 31.20        | -37.40         | 51.65         | -95.26     | -43.61             | -13             | 30.61          |
| 5 193.75                     | 53.50                       | H            | 33.59        | -35.66         | 51.43         | -95.26     | -43.83             | -13             | 30.83          |
| 5 193.75                     | 60.33                       | V            | 33.59        | -35.66         | 58.26         | -95.26     | -37.00             | -13             | 24.00          |
| High Channel (1 753.5 MHz)   |                             |              |              |                |               |            |                    |                 |                |
| 3 504.55                     | 45.80                       | H            | 31.19        | -37.35         | 39.64         | -95.26     | -55.62             | -13             | 42.62          |
| 3 504.56                     | 55.68                       | V            | 31.19        | -37.35         | 49.52         | -95.26     | -45.74             | -13             | 32.74          |
| 5 256.73                     | 54.07                       | H            | 33.71        | -35.48         | 52.30         | -95.26     | -42.96             | -13             | 29.96          |
| 5 256.58                     | 59.65                       | V            | 33.71        | -35.48         | 57.88         | -95.26     | -37.38             | -13             | 24.38          |

\* 3 BW 1RB size / 0 Offset for B4

**LTE band 4**

- Modulation Signal: LTE band 4 (5 MHz – QPSK)

| Frequency<br>(MHz)           | Measured<br>Level<br>(dBμV) | Ant.<br>Pol. | AF<br>(dB/m) | AMP+CL<br>(dB) | E<br>(dBμV/m) | CF<br>(dB) | E.I.R.P.<br>(dB m) | Limit<br>(dB m) | Margin<br>(dB) |
|------------------------------|-----------------------------|--------------|--------------|----------------|---------------|------------|--------------------|-----------------|----------------|
| Low Channel (1 712.5 MHz)    |                             |              |              |                |               |            |                    |                 |                |
| 3 420.69                     | 53.88                       | H            | 31.02        | -37.57         | 47.33         | -95.26     | -47.93             | -13             | 34.93          |
| 3 420.73                     | 58.89                       | V            | 31.02        | -37.57         | 52.34         | -95.26     | -42.92             | -13             | 29.92          |
| 5 130.87                     | 48.81                       | H            | 33.46        | -35.68         | 46.59         | -95.26     | -48.67             | -13             | 35.67          |
| 5 130.98                     | 57.87                       | V            | 33.46        | -35.68         | 55.65         | -95.26     | -39.61             | -13             | 26.61          |
| Middle Channel (1 732.5 MHz) |                             |              |              |                |               |            |                    |                 |                |
| 3 460.70                     | 50.65                       | H            | 31.20        | -37.41         | 44.44         | -95.26     | -50.82             | -13             | 37.82          |
| 3 460.73                     | 57.97                       | V            | 31.20        | -37.41         | 51.76         | -95.26     | -43.50             | -13             | 30.50          |
| 5 191.01                     | 53.38                       | H            | 33.58        | -35.66         | 51.30         | -95.26     | -43.96             | -13             | 30.96          |
| 5 191.06                     | 59.83                       | V            | 33.58        | -35.66         | 57.75         | -95.26     | -37.51             | -13             | 24.51          |
| High Channel (1 752.5 MHz)   |                             |              |              |                |               |            |                    |                 |                |
| 3 500.71                     | 47.46                       | H            | 31.20        | -37.39         | 41.27         | -95.26     | -53.99             | -13             | 40.99          |
| 3 500.70                     | 55.79                       | V            | 31.20        | -37.39         | 49.60         | -95.26     | -45.66             | -13             | 32.66          |
| 5 250.92                     | 50.81                       | H            | 33.70        | -35.49         | 49.02         | -95.26     | -46.24             | -13             | 33.24          |
| 5 250.92                     | 58.33                       | V            | 33.70        | -35.49         | 56.54         | -95.26     | -38.72             | -13             | 25.72          |

\* 5 BW 1RB size / 0 Offset for B4

**LTE band 4**

- Modulation Signal: LTE band 4 (10 MHz – QPSK)

| Frequency<br>(MHz)           | Measured<br>Level<br>(dBμV) | Ant.<br>Pol. | AF<br>(dB/m) | AMP+CL<br>(dB) | E<br>(dBμV/m) | CF<br>(dB) | E.I.R.P.<br>(dB m) | Limit<br>(dB m) | Margin<br>(dB) |
|------------------------------|-----------------------------|--------------|--------------|----------------|---------------|------------|--------------------|-----------------|----------------|
| Low Channel (1 715.0 MHz)    |                             |              |              |                |               |            |                    |                 |                |
| 3 421.36                     | 54.12                       | H            | 31.03        | -37.57         | 47.58         | -95.26     | -47.68             | -13             | 34.68          |
| 3 421.09                     | 58.19                       | V            | 31.03        | -37.57         | 51.65         | -95.26     | -43.61             | -13             | 30.61          |
| 5 131.78                     | 48.37                       | H            | 33.46        | -35.68         | 46.15         | -95.26     | -49.11             | -13             | 36.11          |
| 5 131.86                     | 57.38                       | V            | 33.46        | -35.68         | 55.16         | -95.26     | -40.10             | -13             | 27.10          |
| Middle Channel (1 732.5 MHz) |                             |              |              |                |               |            |                    |                 |                |
| 3 456.16                     | 52.41                       | H            | 31.20        | -37.42         | 46.19         | -95.26     | -49.07             | -13             | 36.07          |
| 3 456.18                     | 57.36                       | V            | 31.20        | -37.42         | 51.14         | -95.26     | -44.12             | -13             | 31.12          |
| 5 184.19                     | 51.59                       | H            | 33.57        | -35.67         | 49.49         | -95.26     | -45.77             | -13             | 32.77          |
| 5 184.18                     | 59.17                       | V            | 33.57        | -35.67         | 57.07         | -95.26     | -38.19             | -13             | 25.19          |
| High Channel (1 750.0 MHz)   |                             |              |              |                |               |            |                    |                 |                |
| 3 491.32                     | 49.61                       | H            | 31.20        | -37.38         | 43.43         | -95.26     | -51.83             | -13             | 38.83          |
| 3 491.08                     | 53.15                       | V            | 31.20        | -37.38         | 46.97         | -95.26     | -48.29             | -13             | 35.29          |
| 5 236.72                     | 49.80                       | H            | 33.67        | -35.54         | 47.93         | -95.26     | -47.33             | -13             | 34.33          |
| 5 236.86                     | 56.65                       | V            | 33.67        | -35.53         | 54.79         | -95.26     | -40.47             | -13             | 27.47          |

\* 10 BW 1RB size / 0 Offset for B4

**LTE band 4**

- Modulation Signal: LTE band 4 (15 MHz – QPSK)

| Frequency<br>(MHz)           | Measured<br>Level<br>(dBμV) | Ant.<br>Pol. | AF<br>(dB/m) | AMP+CL<br>(dB) | E<br>(dBμV/m) | CF<br>(dB) | E.I.R.P.<br>(dB m) | Limit<br>(dB m) | Margin<br>(dB) |
|------------------------------|-----------------------------|--------------|--------------|----------------|---------------|------------|--------------------|-----------------|----------------|
| Low Channel (1 717.5 MHz)    |                             |              |              |                |               |            |                    |                 |                |
| 3 421.89                     | 53.91                       | H            | 31.03        | -37.56         | 47.38         | -95.26     | -47.88             | -13             | 34.88          |
| 3 421.77                     | 58.90                       | V            | 31.03        | -37.56         | 52.37         | -95.26     | -42.89             | -13             | 29.89          |
| 5 132.43                     | 49.60                       | H            | 33.46        | -35.69         | 47.37         | -95.26     | -47.89             | -13             | 34.89          |
| 5 132.56                     | 57.82                       | V            | 33.47        | -35.69         | 55.60         | -95.26     | -39.66             | -13             | 26.66          |
| Middle Channel (1 732.5 MHz) |                             |              |              |                |               |            |                    |                 |                |
| 3 451.57                     | 52.19                       | H            | 31.20        | -37.44         | 45.95         | -95.26     | -49.31             | -13             | 36.31          |
| 3 451.71                     | 56.13                       | V            | 31.20        | -37.44         | 49.89         | -95.26     | -45.37             | -13             | 32.37          |
| 5 177.30                     | 52.10                       | H            | 33.55        | -35.68         | 49.97         | -95.26     | -45.29             | -13             | 32.29          |
| 5 177.54                     | 57.43                       | V            | 33.56        | -35.68         | 55.31         | -95.26     | -39.95             | -13             | 26.95          |
| High Channel (1 747.5 MHz)   |                             |              |              |                |               |            |                    |                 |                |
| 3 481.60                     | 50.59                       | H            | 31.20        | -37.36         | 44.43         | -95.26     | -50.83             | -13             | 37.83          |
| 3 481.48                     | 50.49                       | V            | 31.20        | -37.36         | 44.33         | -95.26     | -50.93             | -13             | 37.93          |
| 5 222.33                     | 49.75                       | H            | 33.64        | -35.57         | 47.82         | -95.26     | -47.44             | -13             | 34.44          |
| 5 222.57                     | 56.85                       | V            | 33.65        | -35.57         | 54.93         | -95.26     | -40.33             | -13             | 27.33          |

\* 15 BW 1RB size / 0 Offset for B4

**LTE band 4**

- Modulation Signal: LTE band 4 (20 MHz – QPSK)

| Frequency<br>(MHz)           | Measured<br>Level<br>(dBμV) | Ant.<br>Pol. | AF<br>(dB/m) | AMP+CL<br>(dB) | E<br>(dBμV/m) | CF<br>(dB) | E.I.R.P.<br>(dB m) | Limit<br>(dB m) | Margin<br>(dB) |
|------------------------------|-----------------------------|--------------|--------------|----------------|---------------|------------|--------------------|-----------------|----------------|
| Low Channel (1 720.0 MHz)    |                             |              |              |                |               |            |                    |                 |                |
| 3 422.13                     | 54.05                       | H            | 31.03        | -37.56         | 47.52         | -95.26     | -47.74             | -13             | 34.74          |
| 3 422.29                     | 59.06                       | V            | 31.03        | -37.56         | 52.53         | -95.26     | -42.73             | -13             | 29.73          |
| 5 146.72                     | 51.26                       | H            | 33.49        | -35.71         | 49.04         | -95.26     | -46.22             | -13             | 33.22          |
| 5 146.76                     | 58.47                       | V            | 33.49        | -35.71         | 56.25         | -95.26     | -39.01             | -13             | 26.01          |
| Middle Channel (1 732.5 MHz) |                             |              |              |                |               |            |                    |                 |                |
| 3 447.28                     | 52.01                       | H            | 31.18        | -37.46         | 45.73         | -95.26     | -49.53             | -13             | 36.53          |
| 3 447.31                     | 55.26                       | V            | 31.18        | -37.46         | 48.98         | -95.26     | -46.28             | -13             | 33.28          |
| 5 184.39                     | 52.12                       | H            | 33.57        | -35.67         | 50.02         | -95.26     | -45.24             | -13             | 32.24          |
| 5 184.23                     | 59.05                       | V            | 33.57        | -35.67         | 56.95         | -95.26     | -38.31             | -13             | 25.31          |
| High Channel (1 745.0 MHz)   |                             |              |              |                |               |            |                    |                 |                |
| 3 472.07                     | 47.09                       | H            | 31.20        | -37.36         | 40.93         | -95.26     | -54.33             | -13             | 41.33          |
| 3 472.27                     | 55.39                       | V            | 31.20        | -37.36         | 49.23         | -95.26     | -46.03             | -13             | 33.03          |
| 5 208.85                     | 50.92                       | H            | 33.62        | -35.62         | 48.92         | -95.26     | -46.34             | -13             | 33.34          |
| 5 208.78                     | 56.58                       | V            | 33.62        | -35.62         | 54.58         | -95.26     | -40.68             | -13             | 27.68          |

\* 20 BW 1RB size / 0 Offset for B4

**LTE band 5**

- Modulation Signal: LTE band 5 (1.4 MHz – QPSK)

| Frequency<br>(MHz)         | Measured<br>Level<br>(dBμV) | Ant.<br>Pol. | AF<br>(dB/m) | AMP+CL<br>(dB) | E<br>(dBμV/m) | CF<br>(dB) | E.R.P.<br>(dB m) | Limit<br>(dB m) | Margin<br>(dB) |
|----------------------------|-----------------------------|--------------|--------------|----------------|---------------|------------|------------------|-----------------|----------------|
| Low Channel (824.7 MHz)    |                             |              |              |                |               |            |                  |                 |                |
| 1 648.41                   | 49.50                       | H            | 25.77        | -40.48         | 34.79         | -97.41     | -62.62           | -13             | 49.62          |
| 1 648.31                   | 49.16                       | V            | 25.77        | -40.48         | 34.45         | -97.41     | -62.96           | -13             | 49.96          |
| 2 472.83                   | 48.68                       | V            | 28.41        | -38.54         | 38.55         | -97.41     | -58.86           | -13             | 45.86          |
| Middle Channel (836.5 MHz) |                             |              |              |                |               |            |                  |                 |                |
| 1 671.99                   | 50.03                       | H            | 26.33        | -40.41         | 35.95         | -97.41     | -61.46           | -13             | 48.46          |
| 1 671.82                   | 50.29                       | V            | 26.32        | -40.42         | 36.19         | -97.41     | -61.22           | -13             | 48.22          |
| 2 508.27                   | 46.59                       | V            | 28.30        | -38.83         | 36.06         | -97.41     | -61.35           | -13             | 48.35          |
| High Channel (848.3 MHz)   |                             |              |              |                |               |            |                  |                 |                |
| 1 695.78                   | 48.41                       | H            | 26.90        | -40.39         | 34.92         | -97.41     | -62.49           | -13             | 49.49          |
| 1 695.78                   | 48.30                       | V            | 26.90        | -40.39         | 34.81         | -97.41     | -62.60           | -13             | 49.60          |
| 2 543.58                   | 52.63                       | V            | 28.30        | -38.80         | 42.13         | -97.41     | -55.28           | -13             | 42.28          |

\* 1.4 BW 1RB size / 0 Offset for B5

**LTE band 5**

- Modulation Signal: LTE band 5 (3 MHz – QPSK)

| Frequency<br>(MHz)         | Measured<br>Level<br>(dBμV) | Ant.<br>Pol. | AF<br>(dB/m) | AMP+CL<br>(dB) | E<br>(dBμV/m) | CF<br>(dB) | E.R.P.<br>(dB m) | Limit<br>(dB m) | Margin<br>(dB) |
|----------------------------|-----------------------------|--------------|--------------|----------------|---------------|------------|------------------|-----------------|----------------|
| Low Channel (825.5 MHz)    |                             |              |              |                |               |            |                  |                 |                |
| 1 648.50                   | 49.25                       | H            | 25.78        | -40.48         | 34.55         | -97.41     | -62.86           | -13             | 49.86          |
| 1 648.45                   | 49.41                       | V            | 25.78        | -40.48         | 34.71         | -97.41     | -62.70           | -13             | 49.70          |
| 2 475.73                   | 46.58                       | V            | 28.40        | -38.55         | 36.43         | -97.41     | -60.98           | -13             | 47.98          |
| Middle Channel (836.5 MHz) |                             |              |              |                |               |            |                  |                 |                |
| 1 670.55                   | 50.36                       | H            | 26.29        | -40.42         | 36.23         | -97.41     | -61.18           | -13             | 48.18          |
| 1 670.36                   | 50.51                       | V            | 26.29        | -40.42         | 36.38         | -97.41     | -61.03           | -13             | 48.03          |
| 2 505.72                   | 46.43                       | V            | 28.30        | -38.83         | 35.90         | -97.41     | -61.51           | -13             | 48.51          |
| High Channel (847.5 MHz)   |                             |              |              |                |               |            |                  |                 |                |
| 1 692.52                   | 49.29                       | H            | 26.82        | -40.39         | 35.72         | -97.41     | -61.69           | -13             | 48.69          |
| 1 692.31                   | 47.75                       | V            | 26.82        | -40.39         | 34.18         | -97.41     | -63.23           | -13             | 50.23          |
| 2 538.57                   | 50.97                       | V            | 28.30        | -38.81         | 40.46         | -97.41     | -56.95           | -13             | 43.95          |

\* 3 BW 1RB size / 0 Offset for B5

**LTE band 5**

- Modulation Signal: LTE band 5 (5 MHz – QPSK)

| Frequency<br>(MHz)         | Measured<br>Level<br>(dBμV) | Ant.<br>Pol. | AF<br>(dB/m) | AMP+CL<br>(dB) | E<br>(dBμV/m) | CF<br>(dB) | E.R.P.<br>(dB m) | Limit<br>(dB m) | Margin<br>(dB) |
|----------------------------|-----------------------------|--------------|--------------|----------------|---------------|------------|------------------|-----------------|----------------|
| Low Channel (826.5 MHz)    |                             |              |              |                |               |            |                  |                 |                |
| 1 648.76                   | 47.86                       | H            | 25.78        | -40.48         | 33.16         | -97.41     | -64.25           | -13             | 51.25          |
| 1 648.60                   | 49.61                       | V            | 25.78        | -40.48         | 34.91         | -97.41     | -62.50           | -13             | 49.50          |
| 2 473.04                   | 47.73                       | V            | 28.41        | -38.54         | 37.60         | -97.41     | -59.81           | -13             | 46.81          |
| Middle Channel (836.5 MHz) |                             |              |              |                |               |            |                  |                 |                |
| 1 668.78                   | 49.28                       | H            | 26.25        | -40.43         | 35.10         | -97.41     | -62.31           | -13             | 49.31          |
| 1 668.69                   | 50.94                       | V            | 26.25        | -40.43         | 36.76         | -97.41     | -60.65           | -13             | 47.65          |
| 2 502.99                   | 46.42                       | V            | 28.30        | -38.83         | 35.89         | -97.41     | -61.52           | -13             | 48.52          |
| High Channel (846.5 MHz)   |                             |              |              |                |               |            |                  |                 |                |
| 1 688.69                   | 49.90                       | H            | 26.73        | -40.40         | 36.23         | -97.41     | -61.18           | -13             | 48.18          |
| 1 688.69                   | 48.82                       | V            | 26.73        | -40.40         | 35.15         | -97.41     | -62.26           | -13             | 49.26          |
| 2 533.18                   | 48.80                       | V            | 28.30        | -38.83         | 38.27         | -97.41     | -59.14           | -13             | 46.14          |

\* 5 BW 1RB size / 0 Offset for B5

**LTE band 5**

- Modulation Signal: LTE band 5 (10 MHz – QPSK)

| Frequency (MHz)            | Measured Level (dBμV) | Ant. Pol. | AF (dB/m) | AMP+CL (dB) | E (dBμV/m) | CF (dB) | E.R.P. (dB m) | Limit (dB m) | Margin (dB) |
|----------------------------|-----------------------|-----------|-----------|-------------|------------|---------|---------------|--------------|-------------|
| Low Channel (829.0 MHz)    |                       |           |           |             |            |         |               |              |             |
| 1 649.23                   | 48.49                 | H         | 25.79     | -40.47      | 33.81      | -97.41  | -63.60        | -13          | 50.60       |
| 1 649.26                   | 49.28                 | V         | 25.79     | -40.47      | 34.60      | -97.41  | -62.81        | -13          | 49.81       |
| 2 473.63                   | 46.40                 | V         | 28.41     | -38.54      | 36.27      | -97.41  | -61.14        | -13          | 48.14       |
| Middle Channel (836.5 MHz) |                       |           |           |             |            |         |               |              |             |
| 1 663.98                   | 49.11                 | H         | 26.14     | -40.44      | 34.81      | -97.41  | -62.60        | -13          | 49.60       |
| 1 664.14                   | 51.72                 | V         | 26.14     | -40.44      | 37.42      | -97.41  | -59.99        | -13          | 46.99       |
| 2 496.29                   | 45.62                 | V         | 28.31     | -38.79      | 35.14      | -97.41  | -62.27        | -13          | 49.27       |
| High Channel (844.0 MHz)   |                       |           |           |             |            |         |               |              |             |
| 1 679.45                   | 48.54                 | H         | 26.51     | -40.41      | 34.64      | -97.41  | -62.77        | -13          | 49.77       |
| 1 679.31                   | 49.49                 | V         | 26.50     | -40.41      | 35.58      | -97.41  | -61.83        | -13          | 48.83       |
| 2 518.66                   | 46.89                 | V         | 28.30     | -38.84      | 36.35      | -97.41  | -61.06        | -13          | 48.06       |

\* 10 BW 1RB size / 0 Offset for B5

**Remark;**

1.  $E \text{ (dB}\mu\text{V/m)} = \text{Measured Level (dB}\mu\text{V)} + \text{Antenna Factor (dB/m)} + \text{Cable Loss (dB)}$ .
2.  $E.I.R.P. \text{ (dB m)} = E \text{ (dB}\mu\text{V/m)} + 20 \log D - 104.8$ ; where D is the measurement distance in meters.
3.  $E.R.P. \text{ (dB m)} = E.I.R.P. \text{ (dB m)} - 2.15 \text{ (dB)}$ ; where E.R.P. and E.I.R.P. are expressed in consistent units.
4.  $CF \text{ (dB)} (E.I.R.P.) = 20 \log D - 104.8$ .
5.  $CF \text{ (dB)} (E.R.P.) = 20 \log D - 104.8 - 2.15$ .
6. AF = Antenna Factor, CL = Cable Loss, CF = Conversion Factor.

### 3. Conducted Output Power

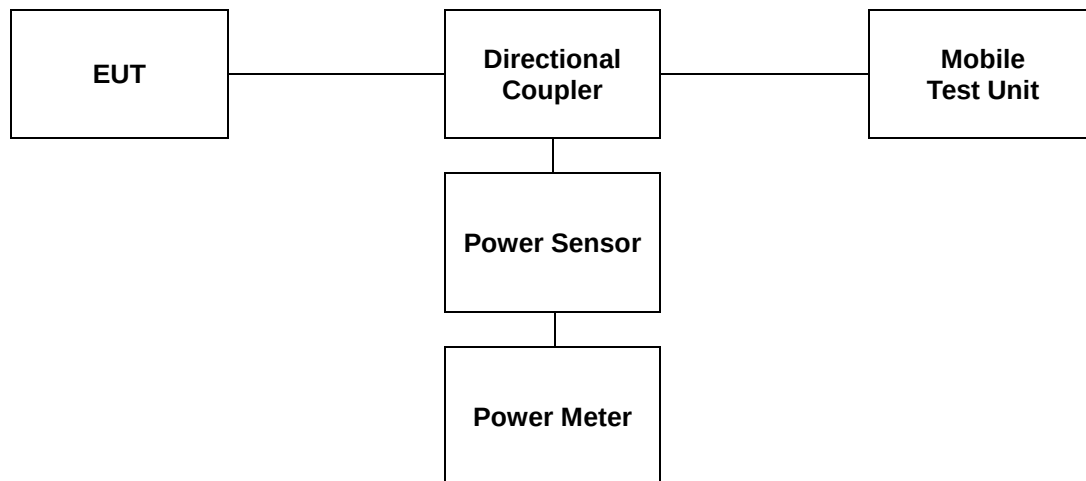
#### 3.1. Limit

CFR 47, Section FCC §2.1046 and IC RSS-Gen Issue 5 6.12.

#### 3.2. Test Procedure

Output power shall be measured at the RF output terminals for all configurations.

1. The RF output of the transmitter was connected to the input of the mobile test unit in order to establish communication with the EUT.
2. The EUT was set up for the max. output power with pseudo random data modulation by using mobile test unit parameters.
3. The measurement performed using a wideband RF power meter.
4. This EUT was tested under all configurations and the highest power was investigated and reported.



### 3.3. Test Result

Ambient temperature : (23 ± 1) °C  
Relative humidity : 47 % R.H.

| Band    | Channel | Frequency (MHz) | GSM    | GPRS      |           | EDGE      |           |
|---------|---------|-----------------|--------|-----------|-----------|-----------|-----------|
|         |         |                 | Voice  | 1 Tx slot | 2 Tx slot | 1 Tx slot | 2 Tx slot |
|         |         |                 | (dB m) | (dB m)    | (dB m)    | (dB m)    | (dB m)    |
| GSM 850 | 128     | 824.2           | 32.90  | 32.83     | 30.89     | 26.76     | 26.69     |
|         | 190     | 836.6           | 32.87  | 32.81     | 30.90     | 26.56     | 26.49     |
|         | 251     | 848.8           | 32.83  | 32.83     | 30.81     | 26.68     | 26.50     |

| Band     | 3GPP Release Version | Channel         |           | 1312    | 1413    | 1513    |
|----------|----------------------|-----------------|-----------|---------|---------|---------|
|          |                      | Frequency (MHz) |           | 1 712.4 | 1 732.6 | 1 752.6 |
| WCDMA IV | 99                   | WCDMA           | RMC       | 22.41   | 22.46   | 22.55   |
|          | 5                    | HSDPA           | Subtest 1 | 21.35   | 21.43   | 21.53   |
|          | 5                    |                 | Subtest 2 | 21.33   | 21.35   | 21.28   |
|          | 5                    |                 | Subtest 3 | 21.14   | 20.10   | 21.08   |
|          | 5                    |                 | Subtest 4 | 21.01   | 21.11   | 21.07   |
|          | 6                    | HSUPA           | Subtest 1 | 21.07   | 21.21   | 21.22   |
|          | 6                    |                 | Subtest 2 | 19.27   | 19.19   | 19.24   |
|          | 6                    |                 | Subtest 3 | 20.13   | 20.18   | 20.33   |
|          | 6                    |                 | Subtest 4 | 20.08   | 20.21   | 20.24   |
|          | 6                    |                 | Subtest 5 | 21.33   | 21.16   | 21.36   |

| Band    | 3GPP Release Version | Channel         |           | 4132  | 4182  | 4233  |
|---------|----------------------|-----------------|-----------|-------|-------|-------|
|         |                      | Frequency (MHz) |           | 826.4 | 836.6 | 846.6 |
| WCDMA V | 99                   | WCDMA           | RMC       | 22.29 | 22.41 | 22.47 |
|         | 5                    | HSDPA           | Subtest 1 | 21.59 | 21.57 | 21.73 |
|         | 5                    |                 | Subtest 2 | 21.42 | 21.52 | 21.67 |
|         | 5                    |                 | Subtest 3 | 21.24 | 21.25 | 21.37 |
|         | 5                    |                 | Subtest 4 | 21.28 | 21.32 | 21.33 |
|         | 6                    | HSUPA           | Subtest 1 | 21.49 | 21.41 | 21.69 |
|         | 6                    |                 | Subtest 2 | 19.55 | 19.47 | 19.87 |
|         | 6                    |                 | Subtest 3 | 20.50 | 20.42 | 20.70 |
|         | 6                    |                 | Subtest 4 | 20.54 | 20.42 | 20.70 |
|         | 6                    |                 | Subtest 5 | 21.59 | 21.47 | 21.74 |

| Band  | Bandwidth<br>(MHz) | RB<br>Size | RB<br>Offset | QPSK   |        |        | 16QAM  |        |        |
|-------|--------------------|------------|--------------|--------|--------|--------|--------|--------|--------|
|       |                    |            |              | 19957  | 20175  | 20393  | 19957  | 20175  | 20393  |
|       |                    |            |              | 1710.7 | 1732.5 | 1754.3 | 1710.7 | 1732.5 | 1754.3 |
| LTE 4 | 1.4                | 1          | 0            | 22.65  | 22.49  | 22.50  | 21.86  | 21.58  | 21.63  |
|       |                    | 1          | 3            | 22.68  | 22.64  | 22.63  | 21.91  | 21.67  | 21.73  |
|       |                    | 1          | 5            | 22.63  | 22.52  | 22.59  | 21.86  | 21.62  | 21.64  |
|       |                    | 3          | 0            | 22.71  | 22.50  | 22.49  | 21.78  | 21.54  | 21.60  |
|       |                    | 3          | 2            | 22.70  | 22.52  | 22.48  | 21.73  | 21.60  | 21.59  |
|       |                    | 3          | 3            | 22.66  | 22.56  | 22.52  | 21.74  | 21.62  | 21.61  |
|       |                    | 6          | 0            | 21.70  | 21.46  | 21.59  | 20.72  | 20.51  | 20.62  |
|       | Bandwidth<br>(MHz) | RB<br>Size | RB<br>Offset | 19965  | 20175  | 20385  | 19965  | 20175  | 20385  |
|       |                    |            |              | 1711.5 | 1732.5 | 1753.5 | 1711.5 | 1732.5 | 1753.5 |
|       | 3                  | 1          | 0            | 22.45  | 22.56  | 22.05  | 21.82  | 21.72  | 21.35  |
|       |                    | 1          | 8            | 22.42  | 22.59  | 22.16  | 21.80  | 21.69  | 21.35  |
|       |                    | 1          | 14           | 22.49  | 22.55  | 22.42  | 21.76  | 21.63  | 21.59  |
|       |                    | 8          | 0            | 21.62  | 21.55  | 21.10  | 20.78  | 20.59  | 20.26  |
|       |                    | 8          | 4            | 21.65  | 21.58  | 21.22  | 20.75  | 20.58  | 20.33  |
|       |                    | 8          | 7            | 21.64  | 21.55  | 21.37  | 20.73  | 20.59  | 20.55  |
|       |                    | 15         | 0            | 21.67  | 21.61  | 21.23  | 21.75  | 20.64  | 20.35  |
|       | Bandwidth<br>(MHz) | RB<br>Size | RB<br>Offset | 19975  | 20175  | 20375  | 19975  | 20175  | 20375  |
|       |                    |            |              | 1712.5 | 1732.5 | 1752.5 | 1712.5 | 1732.5 | 1752.5 |
|       | 5                  | 1          | 0            | 22.05  | 22.65  | 21.78  | 21.35  | 21.88  | 21.09  |
|       |                    | 1          | 12           | 22.15  | 22.61  | 22.06  | 21.41  | 21.78  | 21.35  |
|       |                    | 1          | 24           | 22.20  | 22.41  | 22.28  | 21.42  | 21.56  | 21.50  |
|       |                    | 12         | 0            | 21.28  | 21.59  | 20.98  | 20.42  | 20.61  | 20.12  |
|       |                    | 12         | 7            | 21.00  | 21.55  | 21.05  | 20.44  | 20.58  | 20.23  |
|       |                    | 12         | 13           | 21.31  | 21.53  | 21.23  | 20.45  | 20.56  | 20.35  |
|       |                    | 25         | 0            | 21.29  | 21.61  | 21.14  | 20.45  | 20.67  | 20.28  |
|       | Bandwidth<br>(MHz) | RB<br>Size | RB<br>Offset | 20000  | 20175  | 20350  | 20000  | 20175  | 20350  |
|       |                    |            |              | 1715.0 | 1732.5 | 1750.0 | 1715.0 | 1732.5 | 1750.0 |
|       | 10                 | 1          | 0            | 21.88  | 22.66  | 21.36  | 21.17  | 21.83  | 20.60  |
|       |                    | 1          | 25           | 22.21  | 22.51  | 21.81  | 21.53  | 21.69  | 21.06  |
|       |                    | 1          | 49           | 22.66  | 22.50  | 22.11  | 21.82  | 21.51  | 21.33  |
|       |                    | 25         | 0            | 21.21  | 21.58  | 20.68  | 20.38  | 20.57  | 19.85  |
|       |                    | 25         | 12           | 21.44  | 21.50  | 20.92  | 20.60  | 20.55  | 20.00  |
|       |                    | 25         | 25           | 21.53  | 21.44  | 21.05  | 20.67  | 20.58  | 20.21  |
|       |                    | 50         | 0            | 21.43  | 21.59  | 20.82  | 20.55  | 20.59  | 19.94  |
|       | Bandwidth<br>(MHz) | RB<br>Size | RB<br>Offset | 20025  | 20175  | 20325  | 20025  | 20175  | 20325  |
|       |                    |            |              | 1717.5 | 1732.5 | 1747.5 | 1717.5 | 1732.5 | 1747.5 |
|       | 15                 | 1          | 0            | 22.17  | 22.24  | 21.92  | 21.44  | 21.41  | 21.07  |
|       |                    | 1          | 37           | 22.49  | 22.49  | 21.63  | 21.71  | 21.69  | 20.88  |
|       |                    | 1          | 74           | 22.31  | 22.19  | 22.38  | 21.42  | 21.44  | 21.45  |
|       |                    | 36         | 0            | 21.38  | 21.48  | 20.82  | 20.53  | 20.44  | 19.95  |
|       |                    | 36         | 20           | 21.42  | 21.52  | 20.95  | 20.65  | 20.48  | 20.04  |
|       |                    | 36         | 39           | 21.61  | 21.54  | 21.11  | 20.58  | 20.52  | 20.24  |
|       |                    | 75         | 0            | 21.61  | 21.50  | 20.96  | 20.61  | 20.48  | 20.10  |
|       | Bandwidth<br>(MHz) | RB<br>Size | RB<br>Offset | 20050  | 20175  | 20300  | 20050  | 20175  | 20300  |
|       |                    |            |              | 1720.0 | 1732.5 | 1745.0 | 1720.0 | 1732.5 | 1745.0 |
|       | 20                 | 1          | 0            | 22.08  | 22.22  | 22.34  | 21.33  | 21.35  | 21.51  |
|       |                    | 1          | 49           | 22.66  | 22.50  | 21.53  | 21.77  | 21.66  | 20.81  |
|       |                    | 1          | 99           | 22.25  | 21.94  | 22.34  | 21.45  | 21.24  | 21.60  |
|       |                    | 50         | 0            | 21.46  | 21.40  | 21.08  | 20.47  | 20.45  | 20.21  |
|       |                    | 50         | 24           | 21.62  | 21.54  | 21.01  | 20.64  | 20.61  | 20.00  |
|       |                    | 50         | 50           | 21.44  | 21.48  | 20.93  | 20.45  | 20.49  | 20.06  |
|       |                    | 100        | 0            | 21.50  | 21.51  | 21.04  | 20.51  | 20.53  | 20.17  |

| Band  | Bandwidth<br>(MHz) | RB<br>Size | RB<br>Offset | QPSK  |       |       | 16QAM |       |       |
|-------|--------------------|------------|--------------|-------|-------|-------|-------|-------|-------|
|       |                    |            |              | 20407 | 20525 | 20643 | 20407 | 20525 | 20643 |
|       |                    |            |              | 824.7 | 836.5 | 848.3 | 824.7 | 836.5 | 848.3 |
| LTE 5 | 1.4                | 1          | 0            | 22.64 | 22.20 | 21.54 | 21.70 | 21.77 | 21.61 |
|       |                    | 1          | 3            | 22.71 | 22.57 | 22.65 | 21.38 | 22.06 | 22.24 |
|       |                    | 1          | 5            | 22.73 | 22.74 | 22.46 | 21.86 | 21.71 | 22.03 |
|       |                    | 3          | 0            | 22.70 | 22.70 | 22.49 | 21.56 | 21.67 | 21.65 |
|       |                    | 3          | 2            | 22.77 | 22.73 | 22.50 | 21.69 | 21.78 | 21.77 |
|       |                    | 3          | 3            | 22.83 | 22.75 | 22.52 | 21.80 | 21.83 | 21.91 |
|       |                    | 6          | 0            | 21.73 | 21.68 | 21.72 | 20.73 | 20.81 | 20.63 |
|       | Bandwidth<br>(MHz) | RB<br>Size | RB<br>Offset | 20415 | 20525 | 20635 | 20415 | 20525 | 20635 |
|       |                    |            |              | 825.5 | 836.5 | 847.5 | 825.5 | 836.5 | 847.5 |
|       | 3                  | 1          | 0            | 22.68 | 22.26 | 23.03 | 22.01 | 21.40 | 22.08 |
|       |                    | 1          | 8            | 22.74 | 22.17 | 23.02 | 22.26 | 21.34 | 22.30 |
|       |                    | 1          | 14           | 22.76 | 22.17 | 22.96 | 21.89 | 21.94 | 21.87 |
|       |                    | 8          | 0            | 21.65 | 21.11 | 21.84 | 20.75 | 20.24 | 20.78 |
|       |                    | 8          | 4            | 21.69 | 21.15 | 21.78 | 20.73 | 20.17 | 20.79 |
|       |                    | 8          | 7            | 21.73 | 21.18 | 21.75 | 20.70 | 20.07 | 20.80 |
|       |                    | 15         | 0            | 21.78 | 21.26 | 21.78 | 20.86 | 20.30 | 20.78 |
|       | Bandwidth<br>(MHz) | RB<br>Size | RB<br>Offset | 20425 | 20525 | 20625 | 20425 | 20525 | 20625 |
|       |                    |            |              | 826.5 | 836.5 | 846.5 | 826.5 | 836.5 | 846.5 |
|       | 5                  | 1          | 0            | 22.82 | 22.35 | 22.98 | 21.76 | 21.37 | 21.71 |
|       |                    | 1          | 12           | 22.98 | 22.32 | 23.10 | 22.08 | 21.51 | 22.29 |
|       |                    | 1          | 24           | 22.79 | 22.49 | 22.90 | 22.13 | 21.60 | 22.28 |
|       |                    | 12         | 0            | 21.96 | 21.40 | 22.01 | 20.98 | 20.27 | 21.02 |
|       |                    | 12         | 7            | 21.54 | 21.35 | 21.99 | 20.96 | 20.26 | 21.03 |
|       |                    | 12         | 13           | 21.12 | 21.31 | 21.88 | 20.94 | 20.27 | 21.04 |
|       |                    | 25         | 0            | 21.94 | 21.32 | 22.08 | 20.98 | 20.47 | 21.07 |
|       | Bandwidth<br>(MHz) | RB<br>Size | RB<br>Offset | 20450 | 20525 | 20600 | 20450 | 20525 | 20600 |
|       |                    |            |              | 829.0 | 836.5 | 844.0 | 829.0 | 836.5 | 844.0 |
|       | 10                 | 1          | 0            | 22.65 | 22.33 | 22.75 | 21.41 | 21.39 | 21.50 |
|       |                    | 1          | 25           | 22.80 | 22.30 | 22.91 | 22.14 | 21.97 | 22.05 |
|       |                    | 1          | 49           | 22.47 | 21.96 | 22.75 | 21.57 | 21.57 | 22.18 |
|       |                    | 25         | 0            | 21.77 | 21.44 | 21.84 | 20.88 | 20.41 | 20.88 |
|       |                    | 25         | 12           | 21.71 | 21.40 | 21.90 | 20.80 | 20.40 | 20.96 |
|       |                    | 25         | 25           | 21.67 | 21.35 | 21.95 | 20.70 | 20.46 | 21.00 |
|       |                    | 50         | 0            | 21.69 | 21.44 | 22.04 | 20.80 | 20.35 | 21.01 |

## 4. Frequency Stability

### 4.1. Limit

#### FCC

- § 2.1055 (a), § 2.1055 (d) & following:

- §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table of this section.

For Mobile devices operating in the 824 to 849 MHz band at a power level less than or equal to 3 Watts, the limit specified in Table C-1 is +/- 2.5 ppm.

- §27.54, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

#### IC

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6.11, for licensed devices, the following measurement conditions apply:

a. at the temperatures of -30°C (-22°F), +20°C (+68°F) and +50°C (+122°F), and at the manufacturer's rated supply voltage

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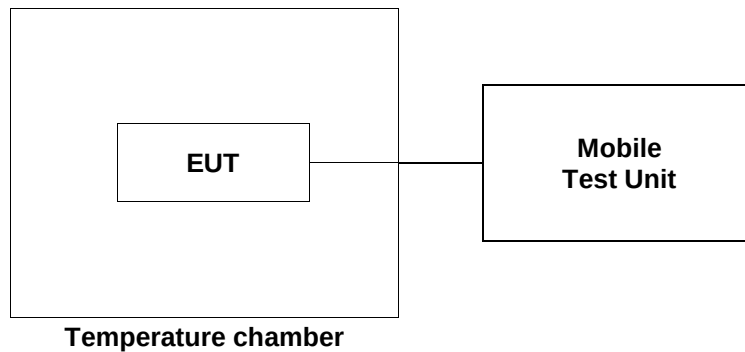
5.3, The carrier frequency shall not depart from the reference frequency in excess of  $\pm 2.5$  ppm for mobile stations and  $\pm 1.5$  ppm for base stations.

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6.4, the frequency stability shall be sufficient to ensure that the occupied bandwidth stays within the operating frequency block when tested to the temperature and supply voltage variations specified in RSS-Gen.

## 4.2. Test Procedure

1. Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to a Mobile Test Unit via feed-through attenuators.
2. The EUT was placed inside the temperature chamber.
3. After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from Mobile Test Unit.



### 4.3. Test Results

Ambient temperature : (23 ± 1) °C  
Relative humidity : 47 % R.H.

#### GSM 850 mode at middle channel

1. See Mode at Input Channel.

| Reference Frequency: 836.6 MHz          |                                   |                                    |          |
|-----------------------------------------|-----------------------------------|------------------------------------|----------|
| Frequency Stability versus Temperature  |                                   |                                    |          |
| Environment Temperature (°C)            | Power Supplied (V <sub>dc</sub> ) | Frequency Measure with Time Elapse |          |
|                                         |                                   | Frequency Error (Hz)               | ppm      |
| 50                                      | 12                                | -1.63                              | -0.001 9 |
| 40                                      |                                   | -1.88                              | -0.002 2 |
| 30                                      |                                   | 0.82                               | 0.001 0  |
| 23                                      |                                   | 0.66                               | 0.000 8  |
| 10                                      |                                   | 1.17                               | 0.001 4  |
| 0                                       |                                   | -0.30                              | -0.000 4 |
| -10                                     |                                   | 2.37                               | 0.002 8  |
| -20                                     |                                   | 1.24                               | 0.001 5  |
| -30                                     |                                   | 2.21                               | 0.002 6  |
| Frequency Stability versus Power Supply |                                   |                                    |          |
| Environment Temperature (°C)            | Power Supplied (V <sub>dc</sub> ) | Frequency Measure with Time Elapse |          |
|                                         |                                   | Frequency Error (Hz)               | ppm      |
| 23                                      | 13.8                              | 1.13                               | 0.001 4  |
|                                         | 10.2                              | 0.82                               | 0.001 0  |

**WCDMA IV mode at middle channel**

| Reference Frequency: 1 732.5 MHz        |                                   |                                    |          |
|-----------------------------------------|-----------------------------------|------------------------------------|----------|
| Frequency Stability versus Temperature  |                                   |                                    |          |
| Environment Temperature (°C)            | Power Supplied (V <sub>dc</sub> ) | Frequency Measure with Time Elapse |          |
|                                         |                                   | Frequency Error (Hz)               | ppm      |
| 50                                      | 12                                | -2.59                              | -0.001 5 |
| 40                                      |                                   | -1.17                              | -0.000 7 |
| 30                                      |                                   | -3.14                              | -0.001 8 |
| 23                                      |                                   | -1.28                              | -0.000 7 |
| 10                                      |                                   | 0.45                               | 0.000 3  |
| 0                                       |                                   | 0.64                               | 0.000 4  |
| -10                                     |                                   | 1.89                               | 0.001 1  |
| -20                                     |                                   | 0.95                               | 0.000 5  |
| -30                                     |                                   | 1.36                               | 0.000 8  |
| Frequency Stability versus Power Supply |                                   |                                    |          |
| Environment Temperature (°C)            | Power Supplied (V <sub>dc</sub> ) | Frequency Measure with Time Elapse |          |
|                                         |                                   | Frequency Error (Hz)               | ppm      |
| 23                                      | 13.8                              | 0.11                               | 0.000 1  |
|                                         | 10.2                              | -1.34                              | -0.000 8 |

**WCDMA V mode at middle channel**

| Reference Frequency: 836.6 MHz          |                                   |                                    |          |
|-----------------------------------------|-----------------------------------|------------------------------------|----------|
| Frequency Stability versus Temperature  |                                   |                                    |          |
| Environment Temperature (°C)            | Power Supplied (V <sub>dc</sub> ) | Frequency Measure with Time Elapse |          |
|                                         |                                   | Frequency Error (Hz)               | ppm      |
| 50                                      | 12                                | -1.37                              | -0.001 6 |
| 40                                      |                                   | 0.33                               | 0.000 4  |
| 30                                      |                                   | -1.96                              | -0.002 3 |
| 23                                      |                                   | 1.32                               | 0.001 6  |
| 10                                      |                                   | 0.56                               | 0.000 7  |
| 0                                       |                                   | 1.97                               | 0.002 4  |
| -10                                     |                                   | 2.21                               | 0.002 6  |
| -20                                     |                                   | 2.12                               | 0.002 5  |
| -30                                     |                                   | 3.35                               | 0.004 0  |
| Frequency Stability versus Power Supply |                                   |                                    |          |
| Environment Temperature (°C)            | Power Supplied (V <sub>dc</sub> ) | Frequency Measure with Time Elapse |          |
|                                         |                                   | Frequency Error (Hz)               | ppm      |
| 23                                      | 13.8                              | 1.11                               | 0.001 3  |
|                                         | 10.2                              | 2.78                               | 0.003 3  |

**LTE band 4 at middle channel**

| Reference Frequency: 1 732.5 MHz        |                                   |                                    |          |
|-----------------------------------------|-----------------------------------|------------------------------------|----------|
| Frequency Stability versus Temperature  |                                   |                                    |          |
| Environment Temperature (°C)            | Power Supplied (V <sub>dc</sub> ) | Frequency Measure with Time Elapse |          |
|                                         |                                   | Frequency Error (Hz)               | ppm      |
| 50                                      | 12                                | -0.16                              | -0.000 1 |
| 40                                      |                                   | 0.22                               | 0.000 1  |
| 30                                      |                                   | 1.67                               | 0.001 0  |
| 23                                      |                                   | 0.63                               | 0.000 4  |
| 10                                      |                                   | 1.38                               | 0.000 8  |
| 0                                       |                                   | 2.22                               | 0.001 3  |
| -10                                     |                                   | 3.11                               | 0.001 8  |
| -20                                     |                                   | 2.49                               | 0.001 4  |
| -30                                     |                                   | 2.15                               | 0.001 2  |
| Frequency Stability versus Power Supply |                                   |                                    |          |
| Environment Temperature (°C)            | Power Supplied (V <sub>dc</sub> ) | Frequency Measure with Time Elapse |          |
|                                         |                                   | Frequency Error (Hz)               | ppm      |
| 23                                      | 13.8                              | 1.56                               | 0.000 9  |
|                                         | 10.2                              | 1.34                               | 0.000 8  |

**LTE band 5 at middle channel**

| Reference Frequency: 836.5 MHz          |                                   |                                    |          |
|-----------------------------------------|-----------------------------------|------------------------------------|----------|
| Frequency Stability versus Temperature  |                                   |                                    |          |
| Environment Temperature (°C)            | Power Supplied (V <sub>dc</sub> ) | Frequency Measure with Time Elapse |          |
|                                         |                                   | Frequency Error (Hz)               | ppm      |
| 50                                      | 12                                | -1.84                              | -0.002 2 |
| 40                                      |                                   | 0.27                               | 0.000 3  |
| 30                                      |                                   | -1.90                              | -0.002 3 |
| 23                                      |                                   | -0.68                              | -0.000 8 |
| 10                                      |                                   | 1.14                               | 0.001 4  |
| 0                                       |                                   | 1.22                               | 0.001 5  |
| -10                                     |                                   | 1.59                               | 0.001 9  |
| -20                                     |                                   | 3.31                               | 0.004 0  |
| -30                                     |                                   | 2.55                               | 0.003 0  |
| Frequency Stability versus Power Supply |                                   |                                    |          |
| Environment Temperature (°C)            | Power Supplied (V <sub>dc</sub> ) | Frequency Measure with Time Elapse |          |
|                                         |                                   | Frequency Error (Hz)               | ppm      |
| 23                                      | 13.8                              | 1.13                               | 0.001 4  |
|                                         | 10.2                              | 0.26                               | 0.000 3  |

- End of the Test Report -