**47 CFR PART 2**
**47 CFR PART 22 H**
**47 CFR PART 27**
**RSS-Gen Issue 5**
**RSS-132 Issue 4**
**RSS-195 Issue 2**
**RSS-199 Issue 4**

# TEST REPORT

*For*

**GMLINK IoT Gateway**

**MODEL NUMBER: GBM-NL100**

**REPORT NUMBER: 4791227002-1-RF-1**

**ISSUE DATE: December 3, 2024**

**FCC ID: 2ADAP-GBMNL100**
**IC: 12478A-GBMNL100**

*Prepared for*

**GREE ELECTRIC APPLIANCES, INC. OF ZHUHAI**
**Jinji West Rd, Qianshan, Zhuhai, Guangdong,519070, P. R. China**

*Prepared by*

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Revision History

| Rev. | Issue Date | Revisions | Revised By |
|---|---|---|---|
| V0 | Oct. 23, 2024 | Initial Issue | \ |
| V1 | Nov. 6, 2024 | Updated by following CO' comments | James Qin |
| V2 | Nov. 8, 2024 | Updated by following CO' comments | James Qin |
| V3 | Nov. 12, 2024 | Updated by following CO' comments | James Qin |
| V4 | Nov. 14, 2024 | Antenna type updated | James Qin |
| V5 | Nov. 26, 2024 | Updated by following CO' comments | James Qin |
| V6 | December 3, 2024 | Updated by following CO' comments | James Qin |

Note:
1.This test report is only published to and used by the applicant, and it is not for evidence purpose in China.
2. The measurement result for the sample received is <Pass> according to < 47 CFR PART 22 H >< 47 CFR PART 27 > < RSS-Gen Issue 5, RSS-132 ISSUE 4, RSS-195 ISSUE 2, RSS-199 ISSUE 4 >when < Simple Acceptance > decision rule is applied.

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# 1. ATTESTATION OF TEST RESULTS

**Applicant Information**

| | |
|---|---|
| Company Name: | GREE ELECTRIC APPLIANCES, INC. OF ZHUHAI |
| Address: | Jinji West Rd, Qianshan, Zhuhai, Guangdong,519070, P. R. China |

**Manufacturer Information**

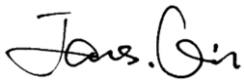
| | |
|---|---|
| Company Name: | GREE ELECTRIC APPLIANCES, INC. OF ZHUHAI |
| Address: | Jinji West Rd, Qianshan, Zhuhai, Guangdong,519070, P. R. China |

**EUT Information**

| | |
|---|---|
| EUT Name: | GMLINK IoT Gateway |
| LTE category: | Cat.1 |
| Model: | GBM-NL100 |
| Brand: | GREE GMLINK |
| Sample Received Date: | July 3, 2024 |
| Sample Status: | Normal |
| Sample ID: | 7311289 |
| Date of Tested: | Sep 19, 2024 ~ Oct. 22, 2024 |

| APPLICABLE STANDARDS | |
|---|---|
| **STANDARD** | **TEST RESULTS** |
| 47 CFR PART 22 H | PASS |
| 47 CFR PART 27 | PASS |
| RSS-Gen Issue 5, RSS-132 ISSUE 4, RSS-195 ISSUE 2, RSS-199 ISSUE 4 | PASS |

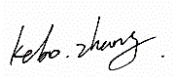
Prepared By:



James Qin

Project Engineer

Checked By:



Kebo Zhang

Senior Project Engineer

Approved By:

Stephen Guo

Operations Manager

# 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.26-2015, 971168 D01 Power Meas License Digital Systems v03r01, 971168 D02 Misc Rev Approv License Devices v02r01, 412172 D01 v01r01 Determining ERP and EIRP, 47 CFR PART 2, 47 CFR PART 22 H, 47 CFR PART 27, RSS-Gen Issue 5, RSS-132 ISSUE 4, RSS-195 ISSUE 2, RSS-199 ISSUE 4.

# 3. FACILITIES AND ACCREDITATION

| | |
|---|---|
| Accreditation Certificate | **A2LA (Certificate No.: 4102.01)**<br>UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with A2LA.<br>**FCC (FCC Designation No.: CN1187)**<br>UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. Has been recognized to perform compliance testing on equipment subject to the Commission's Delcaration of Conformity (DoC) and Certification rules<br>**ISED (Company No.: 21320)**<br>UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been registered and fully described in a report filed with ISED.<br>The Company Number is 21320 and the test lab Conformity Assessment Body Identifier (CABID) is CN0046.<br>**VCCI (Registration No.: G-20192, C-20153, T-20155 and R-20202)**<br>UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with VCCI, the Membership No. is 3793.<br>Facility Name:<br>Chamber D, the VCCI registration No. is G-20192 and R-20202.<br>Shielding Room B, the VCCI registration No. is C-20153 and T-20155. |

Note 1: All tests measurement facilities use to collect the measurement data are located at Building 10, Innovation Technology Park, Song Shan Lake Hi tech Development Zone, Dongguan, 523808, China

Note 2: The test anechoic chamber in UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch had been calibrated and compared to the open field sites and the test anechoic chamber is shown to be equivalent to or worst case from the open field site.

Note 3: For below 30 MHz, lab had performed measurements at test anechoic chamber and comparing to measurements obtained on an open field site. And these measurements below 30 MHz had been correlated to measurements performed on an OFS.

# 4. CALIBRATION AND UNCERTAINTY

## 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations and is traceable to recognize national standards.

## 4.2. MEASUREMENT UNCERTAINTY

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

| Test Item | Uncertainty |
|---|---|
| Conduction emission | 3.62 dB |
| Radiated Emission (Included Fundamental Emission) (9 kHz ~ 30 MHz) | 2.2 dB |
| Radiated Emission (Included Fundamental Emission) (30 MHz ~ 1 GHz) | 4.00 dB |
| Radiated Emission (Included Fundamental Emission) (1 GHz to 40 GHz) | 5.78 dB (1 GHz-18 GHz) |
| | 5.23dB (18 GHz-26 GHz) |
| | 5.64 dB (26 GHz-40 GHz) |
| Bandwidth | 1.1 % |
| Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of k=2. | |

# 5. EQUIPMENT UNDER TEST

## 5.1. DESCRIPTION OF EUT

| | |
|---|---|
| EUT Name: | GMLINK IoT Gateway |
| Model: | GBM-NL100 |

## 5.2. TEST CHANNEL CONFIGURATION

| Band | Test Frequency ID | Bandwidth [MHz] | NUL | Frequency of Uplink [MHz] | NDL | Frequency of Downlink [MHz] |
|---|---|---|---|---|---|---|
| Band 5 | Low Range | 1.4 | 20407 | 824.7 | 2407 | 869.7 |
| | | 3 | 20415 | 825.5 | 2415 | 870.5 |
| | | 5 | 20425 | 826.5 | 2425 | 871.5 |
| | | 10 | 20450 | 829 | 2450 | 874 |
| | Mid Range | 1.4/3/5/10 | 20525 | 836.5 | 2525 | 881.5 |
| | High Range | 1.4 | 20643 | 848.3 | 2643 | 893.3 |
| | | 3 | 20635 | 847.5 | 2635 | 892.5 |
| | | 5 | 20625 | 846.5 | 2625 | 891.5 |
| | | 10 | 20600 | 844 | 2600 | 889 |

| Band | Test Frequency ID | Bandwidth [MHz] | EARFCN | Frequency (UL and DL) [MHz] |
|---|---|---|---|---|
| Band 40 (Lower range) | Low Range | 5 | 2307.5 | 38725 |
| | | 10 | \ | \ |
| | Mid Range | 5/10 | 2310 | 38750 |
| | High Range | 5 | 2312.5 | 38775 |
| | | 10 | \ | \ |

| Band | Test Frequency ID | Bandwidth [MHz] | EARFCN | Frequency (UL and DL) [MHz] |
|---|---|---|---|---|
| Band 40 (Upper range) | Low Range | 5 | 2352.5 | 39175 |
| | | 10 | \ | \ |
| | Mid Range | 5/10 | 2355 | 39200 |
| | High Range | 5 | 2357.5 | 39225 |
| | | 10 | \ | \ |

| Band | Test Frequency ID | Bandwidth [MHz] | EARFCN | Frequency (UL and DL) [MHz] |
|---|---|---|---|---|
| Band 41 | Low Range | 5 | 40065 | 2537.5 |
| | | 10 | 40090 | 2540 |
| | | 15 | 40115 | 2542.5 |
| | | 20 | 40140 | 2545 |
| | Mid Range | 5/10/15/20 | 40640 | 2595 |
| | High Range | 5 | 41215 | 2652.5 |
| | | 10 | 41190 | 2650 |
| | | 15 | 41165 | 2647.5 |
| | | 20 | 41140 | 2645 |

Note: same spectrum allocated for FCC and ISED.

## 5.3. MAXIMUM AVERAGE OUTPUT POWER

**LTE Band 5**

| Part 22H, RSS-132 ISSUE 4 | |
|---|---|
| ERP Limit(W) | 7.0 |
| Antenna Gain (dBi) | 2.84 |

| Bandwidth (MHz) | Modulation | Low Frequency (MHz) | Upper Frequency (MHz) | Conducted Average (dBm) | ERP Average (dBm) | ERP Average (W) | 99% OBW (kHz) | Emission Designator |
|---|---|---|---|---|---|---|---|---|
| 1.4 | QPSK | 824.7 | 848.3 | 24.31 | 25.00 | 0.316 | 1093 | 1M09G7W |
| | 16QAM | | | 23.90 | 24.59 | 0.288 | 1106 | 1M11D7W |
| 3 | QPSK | 825.5 | 847.5 | 24.46 | 25.15 | 0.327 | 2688 | 2M69G7W |
| | 16QAM | | | 23.40 | 24.09 | 0.256 | 2682 | 2M68D7W |
| 5 | QPSK | 826.5 | 846.5 | 24.33 | 25.02 | 0.318 | 4481 | 4M48G7W |
| | 16QAM | | | 23.38 | 24.07 | 0.255 | 4490 | 4M49D7W |
| 10 | QPSK | 829 | 844 | 24.34 | 25.03 | 0.318 | 8927 | 8M93G7W |
| | 16QAM | | | 23.38 | 24.07 | 0.255 | 5002 | 5M00D7W |

**LTE Band 40(2305-2315)**

| Part 27, RSS-195 ISSUE 2 | |
|---|---|
| EIRP Limit(W) | 0.25 |
| Antenna Gain (dBi) | 1.23 |

| Bandwidth (MHz) | Modulation | Low Frequency (MHz) | Upper Frequency (MHz) | Conducted Average (dBm) | EIRP Average (dBm) | EIRP Average (W) | 99% OBW (kHz) | Emission Designator |
|---|---|---|---|---|---|---|---|---|
| 5 | QPSK | 2307.5 | 2312.5 | 21.97 | 23.20 | 0.209 | 4500 | 4M50G7W |
| | 16QAM | | | 21.46 | 22.69 | 0.186 | 4495 | 4M50D7W |
| 10 | QPSK | 2310.0 | 2310.0 | 21.80 | 23.03 | 0.201 | 8996 | 9M00G7W |
| | 16QAM | | | 21.42 | 22.65 | 0.184 | 4984 | 4M98D7W |

**LTE Band 40(2350-2360)**

| Part 27, RSS-195 ISSUE 2 | |
|---|---|
| EIRP Limit(W) | 0.25 |
| Antenna Gain (dBi) | 2.18 |

| Bandwidth (MHz) | Modulation | Low Frequency (MHz) | Upper Frequency (MHz) | Conducted Average (dBm) | EIRP Average (dBm) | EIRP Average (W) | 99% OBW (kHz) | Emission Designator |
|---|---|---|---|---|---|---|---|---|
| 5 | QPSK | 2352.5 | 2357.5 | 21.72 | 23.90 | 0.245 | 4507 | 4M51G7W |
| | 16QAM | | | 21.38 | 23.56 | 0.227 | 4529 | 4M53D7W |
| 10 | QPSK | 2355.0 | 2355.0 | 21.71 | 23.89 | 0.245 | 8986 | 8M99G7W |
| | 16QAM | | | 21.36 | 23.54 | 0.226 | 4984 | 4M98D7W |

**LTE Band 41**

| Part 27, RSS-199 ISSUE 4 | |
|---|---|
| EIRP Limit(W) | 2.0 |
| Antenna Gain (dBi) | 4.94 |

| Bandwidth (MHz) | Modulation | Low Frequency (MHz) | Upper Frequency (MHz) | Conducted Average (dBm) | EIRP Average (dBm) | EIRP Average (W) | 99% OBW (kHz) | Emission Designator |
|---|---|---|---|---|---|---|---|---|
| 5 | QPSK | 2537.5 | 2652.5 | 22.77 | 27.71 | 0.590 | 4496 | 4M50G7W |
| | 16QAM | | | 21.83 | 26.77 | 0.475 | 4496 | 4M50D7W |
| 10 | QPSK | 2540 | 2650 | 22.84 | 27.78 | 0.600 | 8982 | 8M98G7W |
| | 16QAM | | | 21.97 | 26.91 | 0.491 | 4984 | 4M98D7W |
| 15 | QPSK | 2542.5 | 2647.5 | 22.74 | 27.68 | 0.586 | 13504 | 13M5G7W |
| | 16QAM | | | 21.95 | 26.89 | 0.489 | 5111 | 5M11D7W |
| 20 | QPSK | 2545 | 2645 | 22.77 | 27.71 | 0.590 | 18039 | 18M0G7W |
| | 16QAM | | | 21.91 | 26.85 | 0.484 | 5499 | 5M50D7W |

## 5.4. WORST-CASE CONFIGURATION AND MODE

During all testing, EUT is in link mode with base station emulator at maximum power level. The worst-case scenario for all measurements is based on the average conducted output power measurement investigation results. Output power measurements were measured on QPSK, 16QAM. All testing was performed using QPSK and 16QAM modulations to represent the worst case.

The radiated spurious emissions measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT was investigated in three orthogonal orientations X,Y and Z. It was determined that X orientation was the worst-case.

Radiated spurious emissions were investigated below 30 MHz, 30 MHz - 1 GHz and above 1 GHz. There are no emissions found on below 1GHz and above 18 GHz, the emissions between 1 GHz – 18 GHz are tested ate the low, mid, high channel and the worse configuration.

| Test Items | Worst case test configuration | | | |
|---|---|---|---|---|
| Description | Modulation | Channel | Bandwidth (MHz) | RB Configuration |
| Radiated Spurious Emissions | QPSK | L, M, H | Maximum BW | RB size=1, RB Location= Low |

## 5.5. DESCRIPTION OF AVAILABLE ANTENNAS

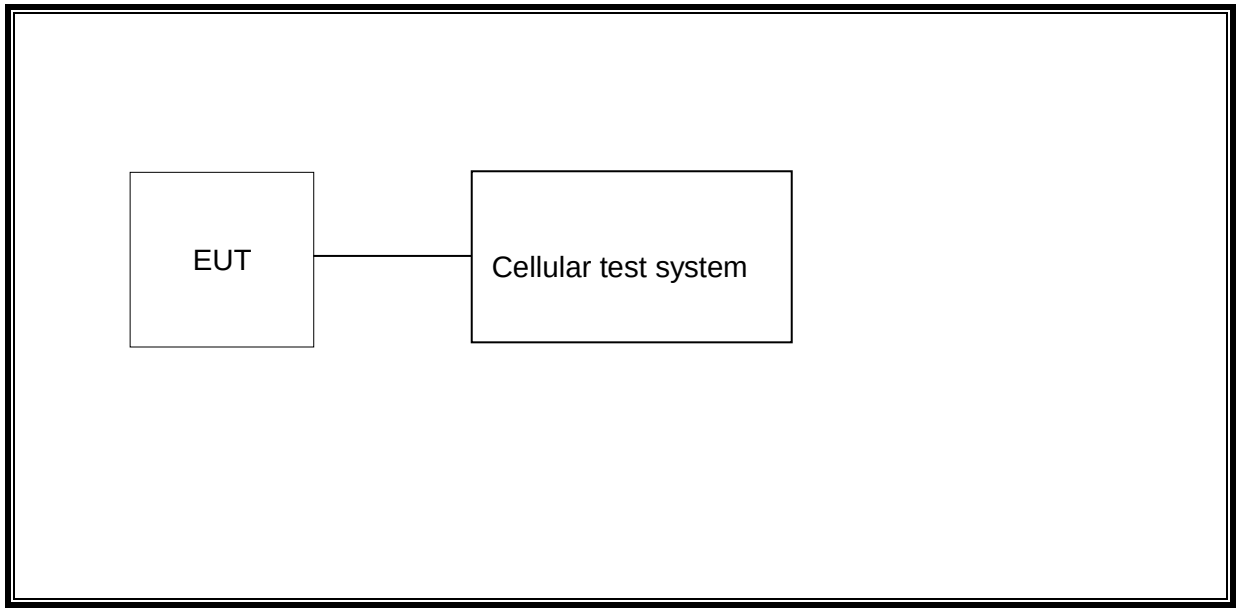
| Antenna | Band | Antenna Type | MAX Antenna Gain (dBi) |
|---|---|---|---|
| Ant0 | LTE Band 5 | Monopole antenna | 2.84 |
| Ant0 | LTE Band 40(2305-2315MHz) | Monopole antenna | 1.23 |
| Ant0 | LTE Band 40(2350-2360 MHz) | Monopole antenna | 2.18 |
| Ant0 | LTE Band 41 | Monopole antenna | 4.94 |

| Band | Transmit and Receive Mode | Description |
|---|---|---|
| LTE Band 5 | ☒1TX, 1RX | Main antenna can be used as transmitting/receiving antenna |
| LTE Band 40 | ☒1TX, 1RX | Main antenna can be used as transmitting/receiving antenna |
| LTE Band 41 | ☒1TX, 1RX | Main antenna can be used as transmitting/receiving antenna |

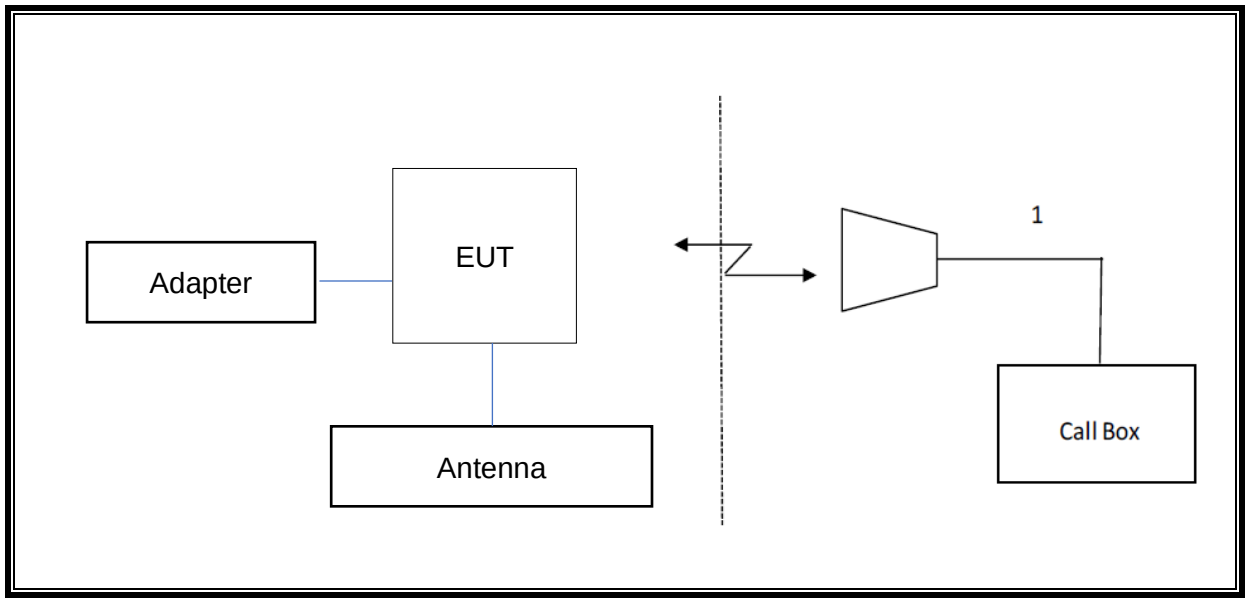
Note: The value of the antenna gain was declared by customer.

## 5.7. DESCRIPTION OF TEST SETUP

Conducted




Radiated



# 6. MEASURING INSTRUMENT AND SOFTWARE USED

| Antenna Terminal Test | | | | | | |
|---|---|---|---|---|---|---|
| Instrument | | | | | | |
| Used | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Next Cal. |
| ☑ | Spectrum Analyzer | R&S | FSV40 | S422060001 | Oct.12, 2023 | Oct.11, 2024 |
| ☑ | Spectrum Analyzer | R&S | FSV40 | S422060001 | Sep.28, 2024 | Sep.27, 2025 |
| ☑ | Wideband Radio Communication Tester | R&S | CMW500 | 161166 | Oct.12, 2023 | Oct.11, 2024 |
| ☑ | Wideband Radio Communication Tester | R&S | CMW500 | 161166 | Sep.28, 2024 | Sep.27, 2025 |

| Software | | | | |
|---|---|---|---|---|
| Used | Description | Manufacturer | Name | Version |
| ☑ | Tonsend Cellular Test System | Tonsend | JS1120 RF Auto Test System | 3.1.46 |

| Radiated Test | | | | | | |
|---|---|---|---|---|---|---|
| Instrument | | | | | | |
| Used | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Next Cal. |
| ☑ | MXE EMI Receiver | KESIGHT | N9038A | MY56400036 | Oct.12, 2023 | Oct.11, 2024 |
| ☑ | Hybrid Log Periodic Antenna | TDK | HLP-3003C | 130960 | Jun. 28, 2024 | Jun. 27, 2027 |
| ☑ | Preamplifier | HP | 8447D | 2944A09099 | Oct.12, 2023 | Oct.11, 2024 |
| ☑ | EMI Measurement Receiver | R&S | ESR26 | 101377 | Oct.12, 2023 | Oct.11, 2024 |
| ☑ | Horn Antenna | TDK | HRN-0118 | 130939 | April 29, 2022 | April 30, 2025 |
| ☑ | Horn Antenna | Schwarzbeck | BBHA9170 | 856 | Feb 28, 2022 | Feb 28, 2025 |
| ☑ | Preamplifier | TDK | PA-02-0118 | TRS-305-00067 | Oct.12, 2023 | Oct.11, 2024 |
| ☑ | Preamplifier | TDK | PA-02-2 | TRS-307-00003 | Oct.12, 2023 | Oct.11, 2024 |
| ☑ | Loop antenna | Schwarzbeck | 1519B | 00008 | Dec.14, 2021 | Dec.13, 2024 |
| ☑ | High Pass Filter | Wi | WHKX10-2700-3000-18000-40SS | 23 | Oct.12, 2023 | Oct.11, 2024 |

| Software | | | | |
|---|---|---|---|---|
| Used | Description | Manufacturer | Name | Version |
| ☑ | Test Software for Radiated disturbance | Farad | EZ-EMC | Ver. UL-3A1 |

# 7. ANTENNA TERMINAL TEST RESULTS

## 7.1. EFFECTIVE (ISOTROPIC) RADIATED POWER OF TRANSMITTER

**RULE PART(S)**

FCC: §2.1046, §22.913, §27.50
RSS-132 ISSUE 4, RSS-195 ISSUE 2, RSS-199 ISSUE 4

**LIMITS**

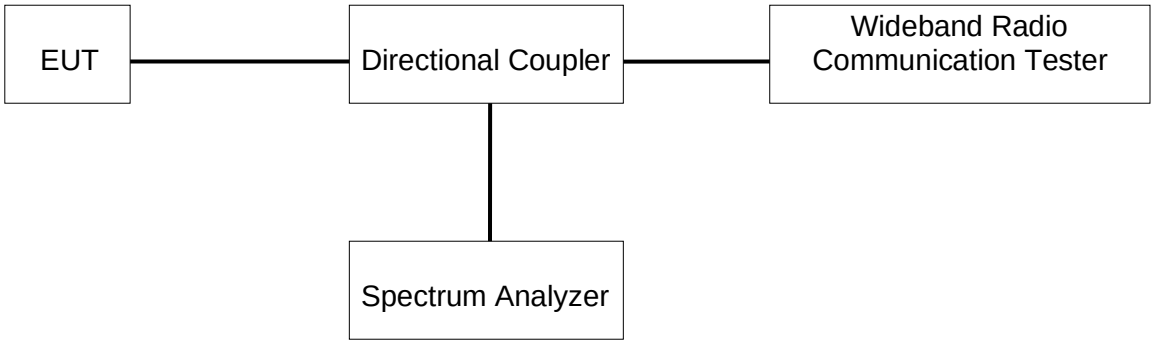
22.913(a) The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.
27.50(a) For mobile and portable stations transmitting in the 2305-2315 MHz band or the 2350-2360 MHz band, the average EIRP must not exceed 50 milliwatts within any 1 megahertz of authorized bandwidth, except that for mobile and portable stations compliant with 3GPP LTE standards or another advanced mobile broadband protocol that avoids concentrating energy at the edge of the operating band the average EIRP must not exceed 250 milliwatts within any 5 megahertz of authorized bandwidth but may exceed 50 milliwatts within any 1 megahertz of authorized bandwidth.
27.50(h) Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.
In addition, when the transmitter power is measured in terms of average value, the peak-to-average ratio of the power shall not exceed 13 dB.

**TEST PROCEDURE**

Refer to ANSI C63.26:2015 and KDB 971168 D01 Section 5.6
ERP/ EIRP = PMeas + GT − LC
where:
ERP or EIRP = effective or equivalent isotropically radiated power, respectively (expressed in the same units as PMeas, typically dBW or dBm);
PMeas = measured transmitter output power or PSD, in dBm or dBW;
GT = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);
LC = signal attenuation in the connecting cable between the transmitter and antenna, in dB

The transmitter has a maximum output powers as follows and maximum ERP/EIRP is tabulated in section 5.3.

**TEST SETUP**




**TEST ENVIRONMENT**

| | | | |
|---|---|---|---|
| Temperature | 22.9°C | Relative Humidity | 62.8% |
| Atmosphere Pressure | 101kPa | Test Voltage | DC 24 V |

**RESULTS**

### 7.1.1. LTE Band 5

| LTE FDD B5 | | | Conducted Power(dBm) | | | |
|---|---|---|---|---|---|---|
| Bandwidth (MHz) | Modulation | RB size | RB offset | Channel No. | Channel No. | Channel No. |
| | | | | 20407 | 20525 | 20643 |
| | | | | Fre. (MHz) | Fre. (MHz) | Fre. (MHz) |
| | | | | 824.70 | 836.50 | 848.30 |
| 1.4 | QPSK | 1 | 0 | 23.96 | 23.18 | 24.29 |
| | | 1 | 2 | 23.58 | 23.27 | 23.48 |
| | | 1 | 5 | 23.12 | 22.67 | 23.40 |
| | | 3 | 0 | 23.76 | 23.23 | 24.31 |
| | | 3 | 1 | 23.60 | 23.29 | 23.27 |
| | | 3 | 3 | 23.14 | 22.91 | 23.32 |
| | | 6 | 0 | 23.30 | 22.82 | 23.92 |
| | 16QAM | 1 | 0 | 23.43 | 22.63 | 22.60 |
| | | 1 | 2 | 23.08 | 22.91 | 23.90 |
| | | 1 | 5 | 23.07 | 23.21 | 23.42 |
| | | 3 | 0 | 23.22 | 22.56 | 23.86 |
| | | 3 | 1 | 23.26 | 22.70 | 23.87 |
| | | 3 | 3 | 23.22 | 23.12 | 23.50 |
| | | 6 | 0 | 22.14 | 21.73 | 23.01 |
| Bandwidth (MHz) | Modulation | RB size | RB offset | Channel No. | Channel No. | Channel No. |
| | | | | 20415 | 20525 | 20635 |
| | | | | Fre. (MHz) | Fre. (MHz) | Fre. (MHz) |
| | | | | 825.50 | 836.50 | 847.50 |
| 3 | QPSK | 1 | 0 | 23.80 | 23.14 | 24.46 |
| | | 1 | 8 | 23.33 | 23.27 | 23.28 |
| | | 1 | 14 | 23.21 | 22.67 | 23.30 |
| | | 8 | 0 | 23.21 | 22.66 | 24.00 |
| | | 8 | 4 | 23.12 | 22.92 | 23.89 |
| | | 8 | 7 | 23.08 | 23.09 | 23.37 |
| | | 15 | 0 | 22.50 | 22.25 | 22.86 |
| | 16QAM | 1 | 0 | 22.70 | 23.03 | 23.40 |
| | | 1 | 8 | 22.51 | 22.33 | 22.28 |
| | | 1 | 14 | 22.18 | 22.96 | 22.50 |
| | | 8 | 0 | 22.11 | 21.67 | 23.00 |
| | | 8 | 4 | 22.20 | 21.55 | 23.26 |
| | | 8 | 7 | 22.15 | 22.21 | 22.52 |
| | | 15 | 0 | 22.00 | 22.05 | 22.05 |
| Bandwidth (MHz) | Modulation | RB size | RB offset | Channel No. | Channel No. | Channel No. |
| | | | | 20425 | 20525 | 20625 |
| | | | | Fre. (MHz) | Fre. (MHz) | Fre. (MHz) |
| | | | | 826.50 | 836.50 | 846.50 |
| 5 | QPSK | 1 | 0 | 23.93 | 23.19 | 24.33 |
| | | 1 | 12 | 23.52 | 23.42 | 23.50 |
| | | 1 | 24 | 23.25 | 22.69 | 23.28 |
| | | 12 | 0 | 23.39 | 22.61 | 23.88 |
| | | 12 | 6 | 23.22 | 22.92 | 23.98 |
| | | 12 | 13 | 23.33 | 23.26 | 23.35 |
| | | 25 | 0 | 22.57 | 22.25 | 22.85 |
| | 16QAM | 1 | 0 | 22.66 | 23.01 | 23.38 |
| | | 1 | 12 | 22.53 | 22.41 | 22.38 |
| | | 1 | 24 | 22.34 | 22.93 | 22.59 |
| | | 12 | 0 | 22.18 | 21.65 | 22.93 |
| | | 12 | 6 | 22.17 | 21.55 | 23.17 |
| | | 12 | 13 | 22.08 | 22.02 | 22.57 |
| | | 25 | 0 | 22.21 | 21.99 | 22.16 |
| | Modulation | RB size | RB offset | Channel No. | Channel No. | Channel No. |

| Bandwidth (MHz) | | | | 20450 | 20525 | 20600 |
|---|---|---|---|---|---|---|
| | | | | Fre. (MHz) | Fre. (MHz) | Fre. (MHz) |
| | | | | 829.00 | 836.50 | 844.00 |
| 10 | QPSK | 1 | 0 | 23.82 | 23.10 | 24.34 |
| | | 1 | 24 | 23.48 | 23.37 | 23.39 |
| | | 1 | 49 | 23.18 | 22.81 | 23.26 |
| | | 25 | 0 | 23.34 | 22.68 | 23.95 |
| | | 25 | 12 | 23.14 | 22.77 | 23.89 |
| | | 25 | 25 | 23.19 | 23.16 | 23.40 |
| | | 50 | 0 | 22.49 | 22.24 | 22.86 |
| | 16QAM | 1 | 0 | 22.61 | 22.88 | 23.38 |
| | | 1 | 24 | 22.48 | 22.28 | 22.40 |
| | | 1 | 49 | 22.33 | 22.87 | 22.49 |
| | | 25 | 0 | 22.20 | 21.76 | 23.07 |
| | | 25 | 12 | 22.13 | 21.70 | 23.13 |
| | | 25 | 25 | 22.17 | 22.08 | 22.42 |
| | | 50 | 0 | N/A | N/A | N/A |

### 7.1.2. LTE Band 40

**LTE Band 40(2305-2315)**

| LTE FDD B40 | | | Conducted Power(dBm) | | | |
|---|---|---|---|---|---|---|
| Bandwidth (MHz) | Modulation | RB size | RB offset | Channel No. | Channel No. | Channel No. |
| | | | | 38725 | 38750 | 38775 |
| | | | | Fre. (MHz) | Fre. (MHz) | Fre. (MHz) |
| | | | | 2307.5 | 2310.00 | 2312.5 |
| 5 | QPSK | 1 | 0 | 21.90 | 21.94 | 21.79 |
| | | 1 | 12 | 21.62 | 21.97 | 21.69 |
| | | 1 | 24 | 21.70 | 21.89 | 21.73 |
| | | 12 | 0 | 20.11 | 20.20 | 20.04 |
| | | 12 | 6 | 20.23 | 20.32 | 20.18 |
| | | 12 | 13 | 20.35 | 20.24 | 20.28 |
| | | 25 | 0 | 20.67 | 20.63 | 20.68 |
| | 16QAM | 1 | 0 | 21.45 | 21.24 | 21.44 |
| | | 1 | 12 | 21.30 | 21.25 | 21.39 |
| | | 1 | 24 | 21.38 | 21.46 | 21.49 |
| | | 12 | 0 | 19.77 | 19.40 | 19.77 |
| | | 12 | 6 | 19.37 | 19.33 | 19.97 |
| | | 12 | 13 | 19.56 | 19.46 | 19.62 |
| | | 25 | 0 | 19.59 | 19.67 | 19.69 |
| Bandwidth (MHz) | Modulation | RB size | RB offset | Channel No. | Channel No. | Channel No. |
| | | | | \ | 38750 | \ |
| | | | | Fre. (MHz) | Fre. (MHz) | Fre. (MHz) |
| | | | | \ | 2310.00 | \ |
| 10 | QPSK | 1 | 0 | N/A | 21.50 | N/A |
| | | 1 | 12 | N/A | 21.80 | N/A |
| | | 1 | 24 | N/A | 21.52 | N/A |
| | | 12 | 0 | N/A | 21.33 | N/A |
| | | 12 | 6 | N/A | 21.17 | N/A |
| | | 12 | 13 | N/A | 21.24 | N/A |
| | | 25 | 0 | N/A | 20.37 | N/A |
| | 16QAM | 1 | 0 | N/A | 21.28 | N/A |
| | | 1 | 12 | N/A | 21.42 | N/A |
| | | 1 | 24 | N/A | 21.38 | N/A |
| | | 12 | 0 | N/A | 19.72 | N/A |
| | | 12 | 6 | N/A | 19.51 | N/A |
| | | 12 | 13 | N/A | 19.55 | N/A |
| | | 25 | 0 | N/A | 21.50 | N/A |

**LTE Band 40(2350-2360)**

| LTE FDD B40 | | | | Conducted Power(dBm) | | |
|---|---|---|---|---|---|---|
| Bandwidth (MHz) | Modulation | RB size | RB offset | Channel No. | Channel No. | Channel No. |
| | | | | 39175 | 39200 | 39225 |
| | | | | Fre. (MHz) | Fre. (MHz) | Fre. (MHz) |
| | | | | 2352.50 | 2355.00 | 2357.50 |
| 5 | QPSK | 1 | 0 | 21.59 | 21.64 | 21.62 |
| | | 1 | 12 | 21.50 | 21.72 | 21.30 |
| | | 1 | 24 | 21.61 | 21.63 | 21.55 |
| | | 12 | 0 | 21.19 | 21.25 | 21.36 |
| | | 12 | 6 | 21.01 | 21.38 | 21.26 |
| | | 12 | 13 | 21.11 | 21.22 | 21.18 |
| | | 25 | 0 | 21.02 | 20.99 | 20.79 |
| | 16QAM | 1 | 0 | 21.19 | 21.25 | 21.36 |
| | | 1 | 12 | 21.01 | 21.38 | 21.26 |
| | | 1 | 24 | 21.11 | 21.22 | 21.18 |
| | | 12 | 0 | 19.80 | 19.88 | 19.73 |
| | | 12 | 6 | 19.72 | 19.82 | 19.71 |
| | | 12 | 13 | 19.80 | 19.88 | 19.73 |
| | | 25 | 0 | 19.75 | 19.77 | 19.76 |
| Bandwidth (MHz) | Modulation | RB size | RB offset | Channel No. | Channel No. | Channel No. |
| | | | | \ | 39200 | \ |
| | | | | Fre. (MHz) | Fre. (MHz) | Fre. (MHz) |
| | | | | \ | 2355.00 | \ |
| 10 | QPSK | 1 | 0 | N/A | 21.60 | N/A |
| | | 1 | 12 | N/A | 21.71 | N/A |
| | | 1 | 24 | N/A | 21.55 | N/A |
| | | 12 | 0 | N/A | 21.31 | N/A |
| | | 12 | 6 | N/A | 21.02 | N/A |
| | | 12 | 13 | N/A | 21.25 | N/A |
| | | 25 | 0 | N/A | 20.45 | N/A |
| | 16QAM | 1 | 0 | N/A | 21.19 | N/A |
| | | 1 | 12 | N/A | 21.36 | N/A |
| | | 1 | 24 | N/A | 21.23 | N/A |
| | | 12 | 0 | N/A | 19.59 | N/A |
| | | 12 | 6 | N/A | 19.65 | N/A |
| | | 12 | 13 | N/A | 19.47 | N/A |
| | | 25 | 0 | N/A | N/A | N/A |

### 7.1.3. LTE Band 41

| LTE FDD B41 | | | | Conducted Power(dBm) | | |
|---|---|---|---|---|---|---|
| Bandwidth (MHz) | Modulation | RB size | RB offset | Channel No. | Channel No. | Channel No. |
| | | | | 40065 | 40640 | 41215 |
| | | | | Fre. (MHz) | Fre. (MHz) | Fre. (MHz) |
| | | | | 2537.50 | 2595.00 | 2652.50 |
| 5 | QPSK | 1 | 0 | **22.75** | **22.77** | **22.61** |
| | | 1 | 12 | 22.60 | 22.73 | 22.45 |
| | | 1 | 24 | 22.41 | 22.29 | 22.18 |
| | | 12 | 0 | 21.76 | **21.74** | **21.72** |
| | | 12 | 6 | **21.81** | 21.61 | 21.57 |
| | | 12 | 13 | 21.61 | 21.52 | 21.48 |
| | | 25 | 0 | **21.64** | 21.59 | 21.63 |
| | 16QAM | 1 | 0 | 21.51 | 21.83 | 21.22 |
| | | 1 | 12 | 21.69 | 21.71 | 21.13 |
| | | 1 | 24 | 21.72 | 21.12 | 21.32 |
| | | 12 | 0 | 20.44 | 20.65 | 20.22 |
| | | 12 | 6 | 20.42 | 20.63 | 20.11 |
| | | 12 | 13 | 20.58 | 20.45 | 20.21 |
| | | 25 | 0 | 20.24 | 20.09 | 20.14 |
| Bandwidth (MHz) | Modulation | RB size | RB offset | Channel No. | Channel No. | Channel No. |
| | | | | 40090 | 40640 | 41190 |
| | | | | Fre. (MHz) | Fre. (MHz) | Fre. (MHz) |
| | | | | 2540.00 | 2595.00 | 2650.00 |
| 10 | QPSK | 1 | 0 | 22.59 | **22.78** | 22.41 |
| | | 1 | 24 | **22.84** | 22.66 | **22.61** |
| | | 1 | 49 | 22.66 | 22.34 | 22.28 |
| | | 25 | 0 | 21.65 | 21.58 | 21.68 |
| | | 25 | 12 | **21.88** | **21.88** | **21.76** |
| | | 25 | 25 | 21.65 | 21.63 | 21.42 |
| | | 50 | 0 | 21.63 | 21.71 | **21.72** |
| | 16QAM | 1 | 0 | 21.52 | 21.80 | 21.13 |
| | | 1 | 24 | 21.82 | 21.47 | 21.27 |
| | | 1 | 49 | 21.69 | 21.15 | 21.97 |
| | | 25 | 0 | 20.67 | 20.75 | 20.13 |
| | | 25 | 12 | 20.51 | 20.44 | 19.96 |
| | | 25 | 25 | 20.57 | 20.45 | 20.18 |
| | | 50 | 0 | N/A | N/A | N/A |
| Bandwidth (MHz) | Modulation | RB size | RB offset | Channel No. | Channel No. | Channel No. |
| | | | | 40115 | 40640 | 41165 |
| | | | | Fre. (MHz) | Fre. (MHz) | Fre. (MHz) |
| | | | | 2542.50 | 2595.00 | 2647.50 |
| 15 | QPSK | 1 | 0 | **22.72** | **22.74** | 22.41 |
| | | 1 | 38 | 22.65 | 22.64 | **22.53** |
| | | 1 | 74 | 22.50 | 22.23 | 22.41 |
| | | 36 | 0 | 21.76 | **21.87** | **21.80** |
| | | 36 | 18 | **21.76** | 21.68 | 21.73 |
| | | 36 | 37 | 21.67 | 21.49 | 21.43 |
| | | 75 | 0 | 21.59 | **21.73** | 21.62 |
| | 16QAM | 1 | 0 | 21.56 | 21.95 | 21.06 |
| | | 1 | 38 | 21.62 | 21.72 | 21.08 |
| | | 1 | 74 | 21.69 | 21.19 | 21.90 |
| | | 36 | 0 | N/A | N/A | N/A |
| | | 36 | 18 | N/A | N/A | N/A |
| | | 36 | 37 | N/A | N/A | N/A |
| | | 75 | 0 | N/A | N/A | N/A |
| | Modulation | RB size | RB offset | Channel No. | Channel No. | Channel No. |

| Bandwidth (MHz) | | | | 40140 | 40640 | 41140 |
|---|---|---|---|---|---|---|
| | | | | Fre. (MHz) | Fre. (MHz) | Fre. (MHz) |
| | | | | 2545.00 | 2595.00 | 2645.00 |
| 20 | QPSK | 1 | 0 | 22.63 | **22.77** | 22.51 |
| | | 1 | 49 | **22.72** | 22.58 | **22.56** |
| | | 1 | 99 | 22.56 | 22.21 | 22.32 |
| | | 50 | 0 | **21.77** | **21.73** | 21.68 |
| | | 50 | 25 | 21.75 | **21.73** | **21.70** |
| | | 50 | 50 | 21.68 | 21.50 | 21.57 |
| | | 100 | 0 | **21.71** | 21.59 | 21.61 |
| | 16QAM | 1 | 0 | 21.62 | 21.80 | 21.17 |
| | | 1 | 49 | 21.74 | 21.61 | 21.15 |
| | | 1 | 99 | 21.59 | 21.25 | 21.91 |
| | | 50 | 0 | N/A | N/A | N/A |
| | | 50 | 25 | N/A | N/A | N/A |
| | | 50 | 50 | N/A | N/A | N/A |
| | | 100 | 0 | N/A | N/A | N/A |

## 7.2. PEAK TO AVERAGE RADIO

**LIMITS**

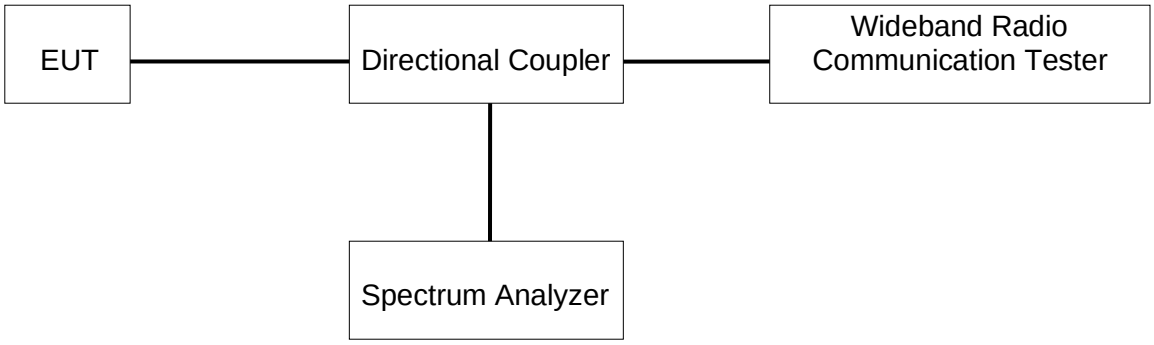
In addition, when the transmitter power is measured in terms of average value, the peak-to-average ratio of the power shall not exceed 13 dB.

**TEST PROCEDURE**

Refer to KDB 971168 D01 Power Meas License Digital Systems v03r01;

The transmitter output was connected to a CMW500 Test Set and configured to operate at maximum power. The PAR was measured on the Spectrum Analyzer.

**TEST SETUP**




**TEST ENVIRONMENT**

| | | | |
|---|---|---|---|
| Temperature | 22.9°C | Relative Humidity | 62.8% |
| Atmosphere Pressure | 101kPa | Test Voltage | DC 24 V |

**RESULTS**

Middle was used to measure as the worst case. The results from all CCDF plots are passed with 13dB peak-to-average power ratio criteria.

Please refer to Appendix LTE.

## 7.3. OCCUPIED BANDWIDTH

**RULE PART(S)**

FCC: §2.1049
RSS-132 ISSUE 4, RSS-195 ISSUE 2, RSS-199 ISSUE 4

**LIMITS**

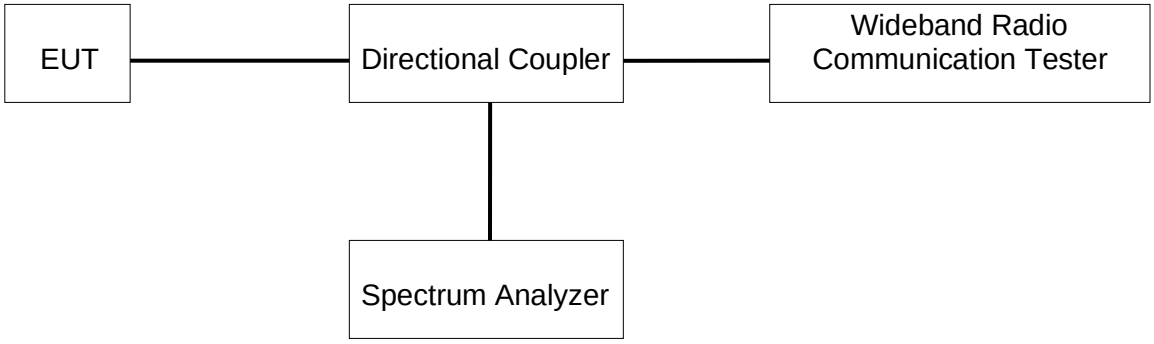
For reporting purposes only.

**TEST PROCEDURE**

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

(Refer to KDB 971168 D01 Power Meas License Digital Systems v03r01)

**TEST SETUP**




**TEST ENVIRONMENT**

| | | | |
|---|---|---|---|
| Temperature | 22.9°C | Relative Humidity | 62.8% |
| Atmosphere Pressure | 101kPa | Test Voltage | DC 24 V |

**RESULTS**

There is no limit required and power is the same for low, middle and high channel, therefore, only middle channel was tested.

Please refer to Appendix LTE.

## 7.4. BAND EDGE EMISSIONS

**RULE PART(S)**

FCC §2.1051, §22.917, §27.53
RSS-132 ISSUE 4, RSS-195 ISSUE 2, RSS-199 ISSUE 4

**LIMITS**

§22.917, §27.53
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.

RSS-132
(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 below the transmitter output power P (dBW) by at least 43 + 10 log(p) dB.
(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 below the transmitter output power P (dBW) by at least 43 + 10 log(p) dB. If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required.

RSS-195 Issue 2
Unwanted Emissions for Base Station, Fixed Station and High-Power Fixed Subscriber Equipment

| Frequency (MHz) | Attenuation (dB) |
|---|---|
| <2200 | $43 + 10 \log_{10}(p)$ |
| 2200 - 2285 | $75 + 10 \log_{10}(p)$ |
| 2285 - 2287.5 | $72 + 10 \log_{10}(p)$ |
| 2287.5 - 2300 | $70 + 10 \log_{10}(p)$ |
| 2300 - 2305 | $43 + 10 \log_{10}(p)$ |
| 2305 - 2320 | $43 + 10 \log_{10}(p)$ Note |
| 2320 - 2345 | $75 + 10 \log_{10}(p)$ |
| 2345 - 2360 | $43 + 10 \log_{10}(p)$ Note |
| 2360 - 2362.5 | $43 + 10 \log_{10}(p)$ |
| 2362.5 - 2365 | $55 + 10 \log_{10}(p)$ |
| 2365 - 2367.5 | $70 + 10 \log_{10}(p)$ |
| 2367.5 - 2370 | $72 + 10 \log_{10}(p)$ |
| 2370 - 2395 | $75 + 10 \log_{10}(p)$ |
| >2395 | $43 + 10 \log_{10}(p)$ |

Note:
1. Measured at the edges of the highest and lowest frequency range(s) in which the equipment is designed to operate. See Section 5.2 of RSS-195 Issue 2 for the permitted frequency ranges for the various equipment types.

RSS-199 Issue 4
Unwanted emission limits for fixed station, base station and fixed subscriber equipment

| Offset from the edge of the frequency block or frequency block group (MHz) | Unwanted emission limits |
|---|---|
| ≤ 1 | -13 dBm/(1% of OB*) |
| > 1 | -13 dBm/MHz |

*OB is the occupied bandwidth

**TEST PROCEDURE**

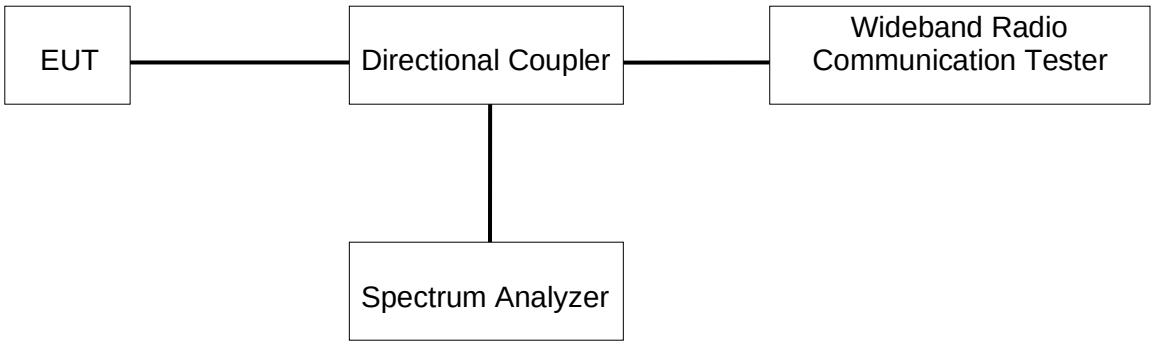
Refer to KDB 971168 D01 Power Meas License Digital Systems v03r01
The transmitter output was connected to a CMW500 Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

a) Set the RBW = 1 ~ 5 % of OBW (Typically limited to a minimum RBW of 1% of the OBW)
b) Set VBW ≥ 3 × RBW;
c) Set span ≥ 1.5 times the OBW;
d) Sweep time = Auto;
e) Detector = RMS;
f) Ensure that the number of measurement points ≥ 2*Span/RBW;
g) Trace mode = Average (100);

Test procedure for LTE Band 41

(m)(6)Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed; for mobile digital stations, in the 1 megahertz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least two percent may be employed, except when the 1 megahertz band is 2495-2496 MHz, in which case a resolution bandwidth of at least one percent may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 megahertz or 1 percent of emission bandwidth, as specified; or 1 megahertz or 2 percent for mobile digital stations, except in the band 2495-2496 MHz). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. With respect to television operations, measurements must be made of the separate visual and aural operating powers at sufficiently frequent intervals to ensure compliance with the rules.

**TEST SETUP**




**TEST ENVIRONMENT**

| | | | |
|---|---|---|---|
| Temperature | 22.9°C | Relative Humidity | 62.8% |
| Atmosphere Pressure | 101kPa | Test Voltage | DC 24 V |

**RESULTS**

Please refer to Appendix LTE.

## 7.5. SPURIOUS EMISSION AT ANTENNA TERMINAL

**RULE PART(S)**

FCC: §2.1051, §22.901, §22.917, §27.53
RSS-132 ISSUE 4, RSS-195 ISSUE 2, RSS-199 ISSUE 4

**LIMITS**

FCC: §22.901, §22.917, §27.53
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.

RSS-132
(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 below the transmitter output power P (dBW) by at least 43 + 10 log(p) dB.
(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 below the transmitter output power P (dBW) by at least 43 + 10 log(p) dB. If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required.

RSS-195 Issue 2
Unwanted Emissions for Base Station, Fixed Station and High-Power Fixed Subscriber Equipment

| Frequency (MHz) | Attenuation (dB) |
|---|---|
| <2200 | $43 + 10 \log_{10}(p)$ |
| 2200 - 2285 | $75 + 10 \log_{10}(p)$ |
| 2285 - 2287.5 | $72 + 10 \log_{10}(p)$ |
| 2287.5 - 2300 | $70 + 10 \log_{10}(p)$ |
| 2300 - 2305 | $43 + 10 \log_{10}(p)$ |
| 2305 - 2320 | $43 + 10 \log_{10}(p)$ Note |
| 2320 - 2345 | $75 + 10 \log_{10}(p)$ |
| 2345 - 2360 | $43 + 10 \log_{10}(p)$ Note |
| 2360 - 2362.5 | $43 + 10 \log_{10}(p)$ |
| 2362.5 - 2365 | $55 + 10 \log_{10}(p)$ |
| 2365 - 2367.5 | $70 + 10 \log_{10}(p)$ |
| 2367.5 - 2370 | $72 + 10 \log_{10}(p)$ |
| 2370 - 2395 | $75 + 10 \log_{10}(p)$ |
| >2395 | $43 + 10 \log_{10}(p)$ |

Note:
2. Measured at the edges of the highest and lowest frequency range(s) in which the equipment is designed to operate. See Section 5.2 of RSS-195 Issue 2 for the permitted frequency ranges for the various equipment types.

RSS-199 Issue 4
Unwanted emission limits for fixed station, base station and fixed subscriber equipment

| Offset from the edge of the frequency block or frequency block group (MHz) | Unwanted emission limits |
|---|---|
| ≤ 1 | -13 dBm/(1% of OB*) |
| > 1 | -13 dBm/MHz |

*OB is the occupied bandwidth

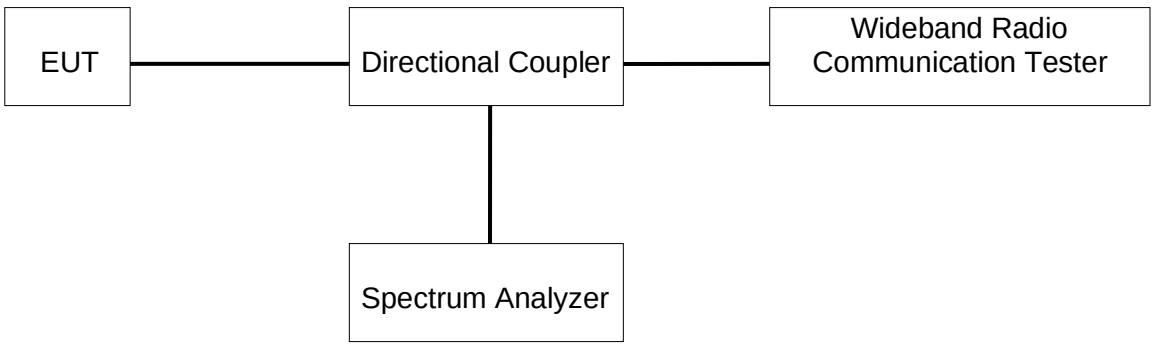
**TEST PROCEDURE**

Per KDB 971168 D01 Power Meas License Digital Systems v03r01
The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in maximum hold mode using a peak detector to ensure that the worst-case emissions were caught.

a) Set the RBW = 100 kHz for emission below 1GHz and 1MHz for emissions above 1GHz
(Tests were performed 1 MHz [Worst case], to sweep 1 time for all frequency range)
b) Set VBW ≥ 3 × RBW;
c) Set span ≥ 1.5 times the OBW;
d) Sweep time = auto couple;
e) Detector = rms;
f) Ensure that the number of measurement points = Max (40001);
g) Trace mode = average (LTE 5), Maxhold (LTE Band7);

Note: Please refer to section 5.4 for bandwidth and RB setting about LTE bands.

**TEST SETUP**



**TEST ENVIRONMENT**

| | | | |
|---|---|---|---|
| Temperature | 22.9°C | Relative Humidity | 62.8% |
| Atmosphere Pressure | 101kPa | Test Voltage | DC 24 V |

**RESULTS**

Please refer to Appendix LTE.

## 7.6. FREQUENCY STABILITY

**RULE PART(S)**

FCC: §2.1055, §22.355, §27.54
RSS-132 ISSUE 4, RSS-195 ISSUE 2, RSS-199 ISSUE 4

**LIMITS**

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

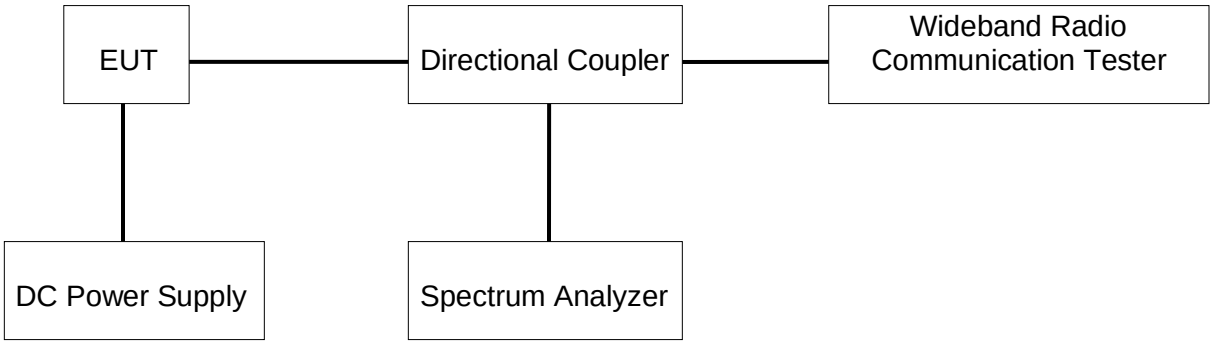
§27.54 - The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

**TEST PROCEDURE**

Refer to KDB 971168 D01 Power Meas License Digital Systems v03r01.

| | Normal Test Conditions | Extreme Test Conditions |
|---|---|---|
| Relative Humidity | 45 % - 75 % | / |
| Atmospheric Pressure | 100 kPa ~102 kPa | / |
| Temperature | $T_N$ (Normal Temperature): 24.5 °C | $T_L$ (Low Temperature): -30 °C |
| | | $T_H$ (High Temperature): 50 °C |
| Supply Voltage | $V_N$ (Normal Voltage): DC 24 V | $V_L$ (Low Voltage): DC 20.4V |
| | | $V_H$ (High Voltage): DC 27.6 V |

**TEST SETUP**




**RESULTS**

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

Please refer to Appendix LTE.

# 8. RADIATED SPURIOUS EMISSIONS

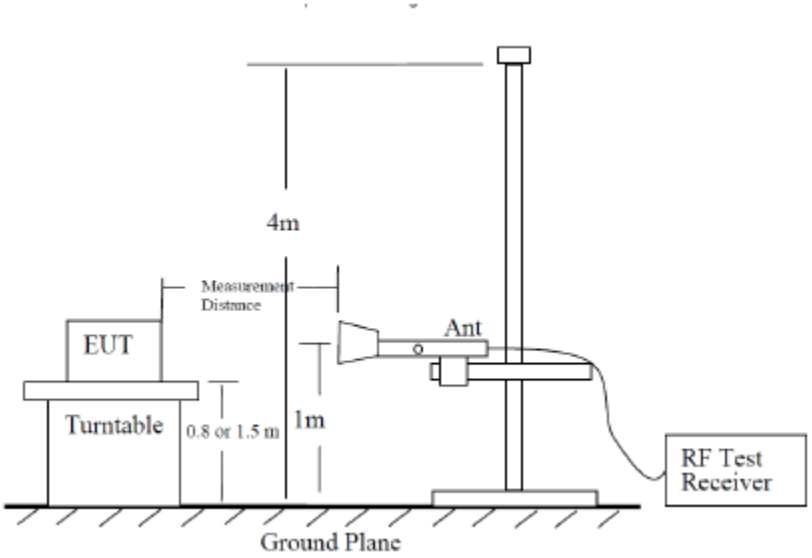
**LIMIT**

FCC: §27.53 (m), ISED: RSS-195 ISSUE 2 LTE (40), RSS-199 ISSUE 4 LTE (41)
At least 55+10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section.

FCC: §22.917(a) LTE, ISED: RSS-132 ISSUE 4 (B5)
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 10g (P) dB.

**TEST PROCEDURE**

Following the test configuration shown below, radiated emissions measured directly from the EUT and convert the measured field strength or received power to ERP or EIRP, as required, for comparison to the applicable limits. As stated in section 5.5.1 of ANSI C63.26-2015. The field strength measurement method by using a test site validated to the requirement of ANSI C63.4 is an alternative method to the substitution measurement.




**Radiated Power Measurement Calculation According to ANSI C63.26-2015**

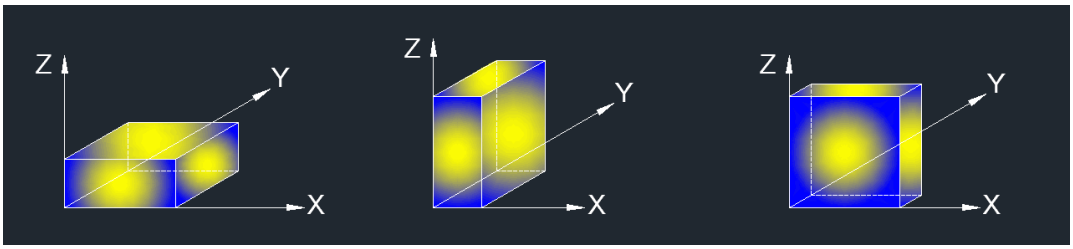
a) E (dBμV/m) = Measured amplitude level (dBμV) + Cable Loss (dB)+ Antenna Factor (dB/m).
b) E (dBμV/m) = Measured amplitude level (dBm) + 107 + Cable Loss (dB) + Antenna Factor (dB/m).
c) E (dBμV/m) = EIRP (dBm) -- 20l0g(D) + 104.8, where D is the measurement distance (in the far field region) in m.
d) EIRP (dBm) = E (dBμV/m) + 20l0g(D) - 104.8, where D is the measurement distance (in the far field region) in m.

So, from d)

The measuring distance is at 3m, then 20*Log (3) = 9.5424

Then, EIRP (dBm) = E (dBμV/m) + 9.5424 - 104.8 = E (dBμV/m) - 95.2576

X axis, Y axis, Z axis:




Note: The EUT was investigated in three orthogonal orientations X/Y/Z on ANT0 and ANT3 to determine the worst-case orientation. X orientation is finally determined the worst.

**TEST ENVIRONMENT**

| | | | |
|---|---|---|---|
| Temperature | 22.6°C | Relative Humidity | 61% |
| Atmosphere Pressure | 101kPa | Test Voltage | DC 24 V |

**RESULTS**

### 8.1.1. LTE Band 5

QPSK-10 MHz-Low Channel- Horizontal

| No. | Frequency (MHz) | Reading (dBuV) | Correct (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 1657.000 | 59.18 | -10.02 | 49.16 | 82.25 | -33.09 | peak |
| 2 | 2332.000 | 51.22 | -8.74 | 42.48 | 82.25 | -39.77 | peak |
| 3 | 4141.000 | 51.59 | -2.66 | 48.93 | 82.25 | -33.32 | peak |
| 4 | 6004.000 | 40.63 | 2.70 | 43.33 | 82.25 | -38.92 | peak |
| 5 | 7345.000 | 38.77 | 6.94 | 45.71 | 82.25 | -36.54 | peak |
| 6 | 9325.000 | 38.56 | 11.45 | 50.01 | 82.25 | -32.24 | peak |

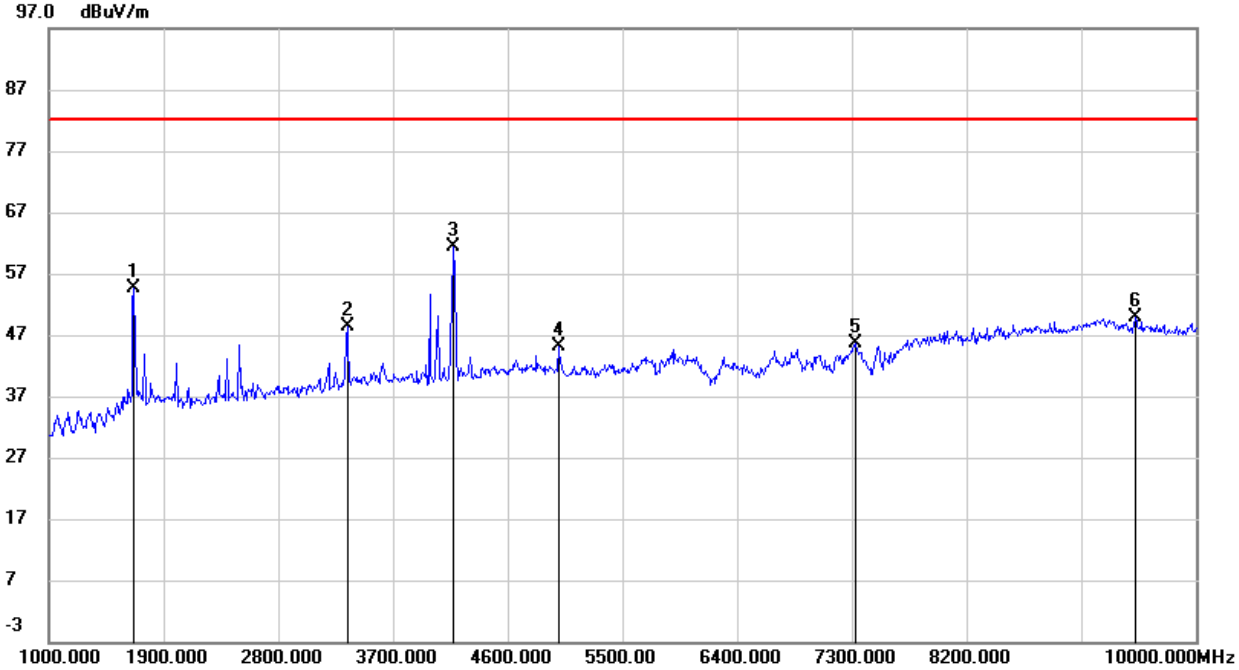
QPSK-10 MHz-Low Channel- Vertical

| No. | Frequency (MHz) | Reading (dBuV) | Correct (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 1657.000 | 65.16 | -9.67 | 55.49 | 82.25 | -26.76 | peak |
| 2 | 2512.000 | 59.87 | -7.24 | 52.63 | 82.25 | -29.62 | peak |
| 3 | 4141.000 | 61.35 | -1.62 | 59.73 | 82.25 | -22.52 | peak |
| 4 | 5860.000 | 40.92 | 3.35 | 44.27 | 82.25 | -37.98 | peak |
| 5 | 7282.000 | 38.36 | 7.56 | 45.92 | 82.25 | -36.33 | peak |
| 6 | 9712.000 | 38.11 | 12.02 | 50.13 | 82.25 | -32.12 | peak |

QPSK-10 MHz-Mid Channel- Horizontal

| No. | Frequency (MHz) | Reading (dBuV) | Correct (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 1666.000 | 58.40 | -9.98 | 48.42 | 82.25 | -33.83 | peak |
| 2 | 2539.000 | 51.97 | -7.94 | 44.03 | 82.25 | -38.22 | peak |
| 3 | 4177.000 | 51.76 | -2.54 | 49.22 | 82.25 | -33.03 | peak |
| 4 | 6004.000 | 40.76 | 2.70 | 43.46 | 82.25 | -38.79 | peak |
| 5 | 7705.000 | 39.76 | 7.30 | 47.06 | 82.25 | -35.19 | peak |
| 6 | 9334.000 | 38.30 | 11.47 | 49.77 | 82.25 | -32.48 | peak |

QPSK-10 MHz-Mid Channel- Vertical




| No. | Frequency (MHz) | Reading (dBuV) | Correct (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 1666.000 | 64.13 | -9.62 | 54.51 | 82.25 | -27.74 | peak |
| 2 | 3340.000 | 51.77 | -3.31 | 48.46 | 82.25 | -33.79 | peak |
| 3 | 4177.000 | 62.86 | -1.51 | 61.35 | 82.25 | -20.90 | peak |
| 4 | 4996.000 | 43.95 | 1.20 | 45.15 | 82.25 | -37.10 | peak |
| 5 | 7327.000 | 38.05 | 7.57 | 45.62 | 82.25 | -36.63 | peak |
| 6 | 9523.000 | 38.10 | 11.87 | 49.97 | 82.25 | -32.28 | peak |

QPSK-10 MHz-High Channel- Horizontal

| No. | Frequency (MHz) | Reading (dBuV) | Correct (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 1684.000 | 56.05 | -9.93 | 46.12 | 82.25 | -36.13 | peak |
| 2 | 2494.000 | 50.98 | -8.11 | 42.87 | 82.25 | -39.38 | peak |
| 3 | 4204.000 | 48.99 | -2.46 | 46.53 | 82.25 | -35.72 | peak |
| 4 | 6004.000 | 40.12 | 2.70 | 42.82 | 82.25 | -39.43 | peak |
| 5 | 7048.000 | 39.07 | 6.38 | 45.45 | 82.25 | -36.80 | peak |
| 6 | 9280.000 | 38.56 | 11.35 | 49.91 | 82.25 | -32.34 | peak |

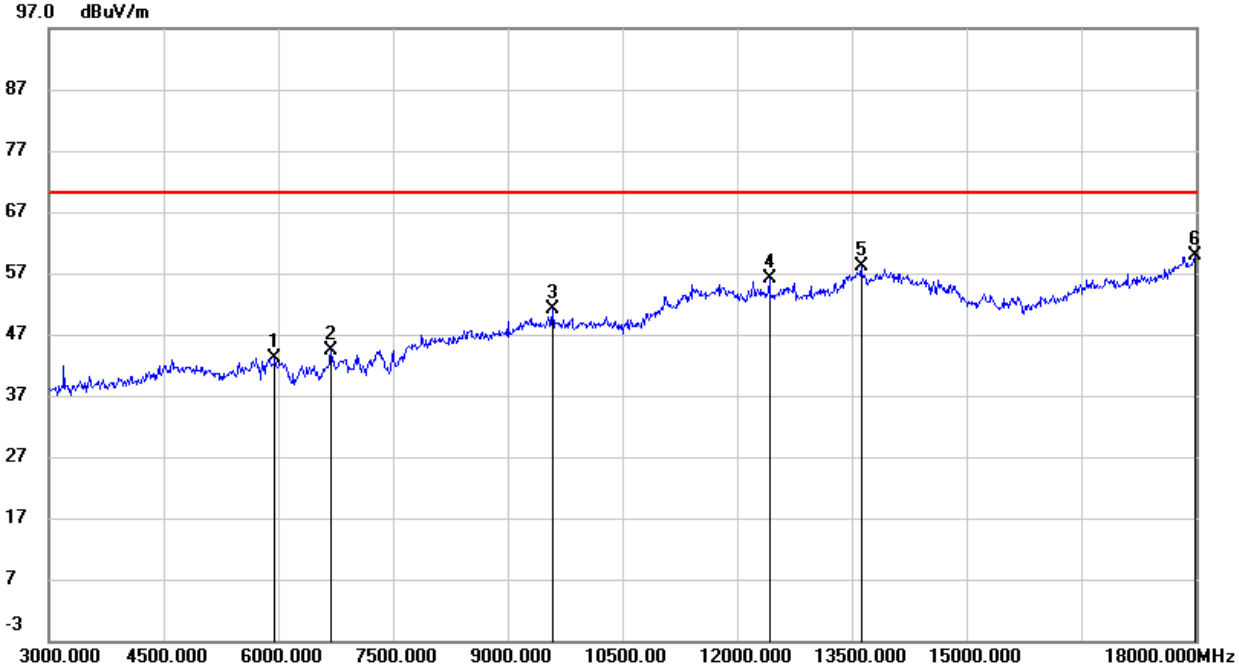
QPSK-10 MHz-High Channel- Vertical

| No. | Frequency (MHz) | Reading (dBuV) | Correct (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 1684.000 | 60.97 | -9.53 | 51.44 | 82.25 | -30.81 | peak |
| 2 | 3376.000 | 51.66 | -3.17 | 48.49 | 82.25 | -33.76 | peak |
| 3 | 4204.000 | 57.73 | -1.44 | 56.29 | 82.25 | -25.96 | peak |
| 4 | 4996.000 | 43.00 | 1.20 | 44.20 | 82.25 | -38.05 | peak |
| 5 | 7669.000 | 37.85 | 7.72 | 45.57 | 82.25 | -36.68 | peak |
| 6 | 9235.000 | 38.98 | 11.47 | 50.45 | 82.25 | -31.80 | peak |

Note: Limit= -13dBm+95.25=82.25 dBuV/m

### 8.1.2. LTE Band 40(2305-2315MHz)

QPSK-10 MHz-Mid Channel- Horizontal



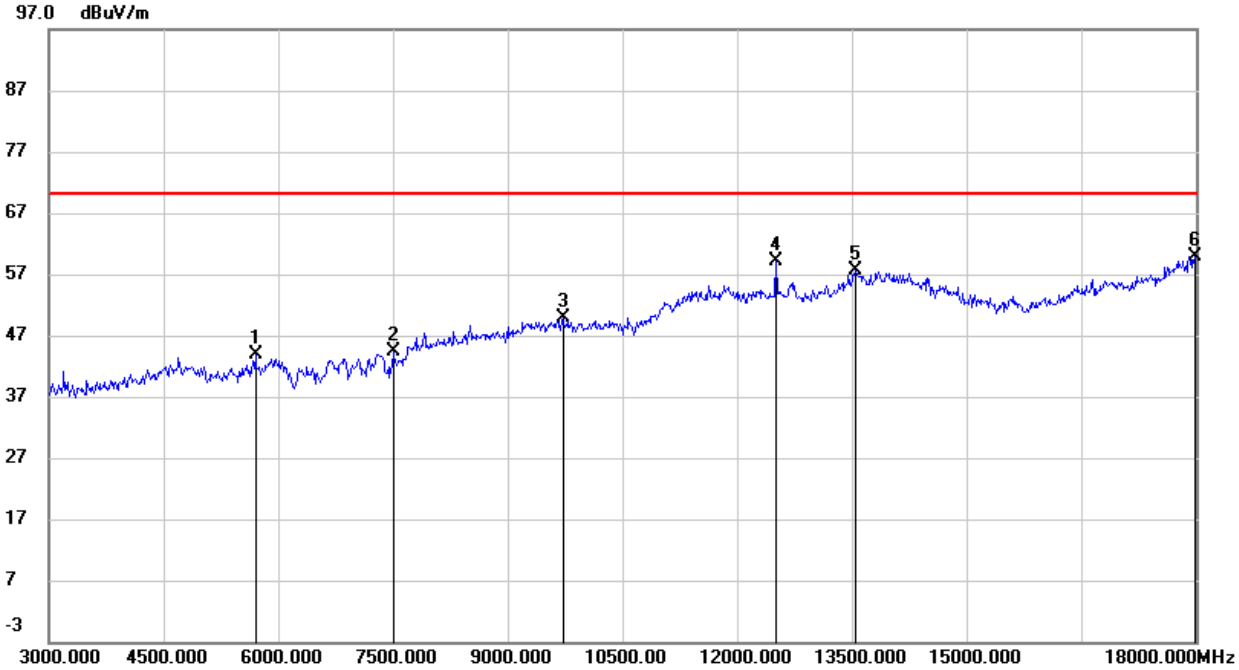

| No. | Frequency (MHz) | Reading (dBuV) | Correct (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 5955.000 | 39.98 | 3.15 | 43.13 | 70.25 | -27.12 | peak |
| 2 | 6690.000 | 38.89 | 5.52 | 44.41 | 70.25 | -25.84 | peak |
| 3 | 9585.000 | 38.28 | 12.73 | 51.01 | 70.25 | -19.24 | peak |
| 4 | 12420.000 | 37.07 | 19.03 | 56.10 | 70.25 | -14.15 | peak |
| 5 | 13620.000 | 35.63 | 22.49 | 58.12 | 70.25 | -12.13 | peak |
| 6 | 17985.000 | 30.48 | 29.29 | 59.77 | 70.25 | -10.48 | peak |

QPSK-10 MHz-Mid Channel- Vertical

| No. | Frequency (MHz) | Reading (dBuV) | Correct (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 4620.000 | 44.12 | 0.95 | 45.07 | 70.25 | -25.18 | peak |
| 2 | 7350.000 | 37.68 | 7.78 | 45.46 | 70.25 | -24.79 | peak |
| 3 | 9585.000 | 37.27 | 12.61 | 49.88 | 70.25 | -20.37 | peak |
| 4 | 12690.000 | 37.20 | 18.18 | 55.38 | 70.25 | -14.87 | peak |
| 5 | 14235.000 | 34.46 | 21.97 | 56.43 | 70.25 | -13.82 | peak |
| 6 | 16875.000 | 33.37 | 24.85 | 58.22 | 70.25 | -12.03 | peak |

### 8.1.3. LTE Band 40(2350-2360MHz)

QPSK-10 MHz-Mid Channel- Horizontal




| No. | Frequency (MHz) | Reading (dBuV) | Correct (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 5700.000 | 41.10 | 2.66 | 43.76 | 70.25 | -26.49 | peak |
| 2 | 7500.000 | 37.01 | 7.44 | 44.45 | 70.25 | -25.80 | peak |
| 3 | 9720.000 | 36.79 | 13.08 | 49.87 | 70.25 | -20.38 | peak |
| 4 | 12510.000 | 40.12 | 18.94 | 59.06 | 70.25 | -11.19 | peak |
| 5 | 13545.000 | 35.36 | 22.37 | 57.73 | 70.25 | -12.52 | peak |
| 6 | 17985.000 | 30.65 | 29.29 | 59.94 | 70.25 | -10.31 | peak |

QPSK-10 MHz-Mid Channel- Vertical

| No. | Frequency (MHz) | Reading (dBuV) | Correct (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 4695.000 | 43.73 | 1.25 | 44.98 | 70.25 | -25.27 | peak |
| 2 | 7305.000 | 37.51 | 7.75 | 45.26 | 70.25 | -24.99 | peak |
| 3 | 9225.000 | 38.16 | 11.34 | 49.50 | 70.25 | -20.75 | peak |
| 4 | 12615.000 | 36.27 | 18.06 | 54.33 | 70.25 | -15.92 | peak |
| 5 | 14445.000 | 34.47 | 21.46 | 55.93 | 70.25 | -14.32 | peak |
| 6 | 17265.000 | 32.94 | 25.14 | 58.08 | 70.25 | -12.17 | peak |

Note: Limit= -13dBm+95.25=82.25 dBuV/m

### 8.1.4. LTE Band 41

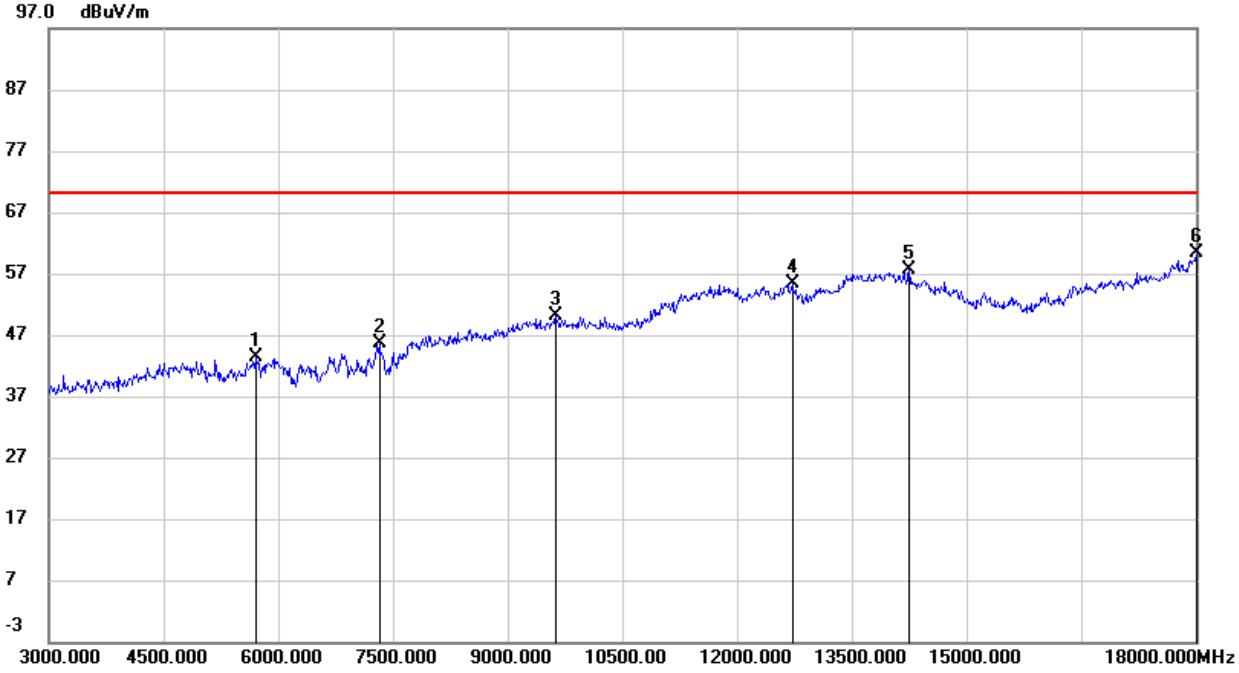
QPSK-20 MHz-Low Channel- Horizontal

| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | (dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 5865.000 | 39.83 | 2.98 | 42.81 | 70.25 | -27.44 | peak |
| 2 | 7500.000 | 39.35 | 7.44 | 46.79 | 70.25 | -23.46 | peak |
| 3 | 10140.000 | 36.96 | 13.28 | 50.24 | 70.25 | -20.01 | peak |
| 4 | 11340.000 | 37.32 | 17.46 | 54.78 | 70.25 | -15.47 | peak |
| 5 | 13590.000 | 35.40 | 22.45 | 57.85 | 70.25 | -12.40 | peak |
| 6 | 18000.000 | 29.99 | 29.44 | 59.43 | 70.25 | -10.82 | peak |

QPSK-20 MHz-Low Channel- Vertical

| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | (dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 5895.000 | 39.92 | 4.07 | 43.99 | 70.25 | -26.26 | peak |
| 2 | 7305.000 | 38.32 | 7.75 | 46.07 | 70.25 | -24.18 | peak |
| 3 | 9255.000 | 39.34 | 11.44 | 50.78 | 70.25 | -19.47 | peak |
| 4 | 12270.000 | 36.89 | 17.93 | 54.82 | 70.25 | -15.43 | peak |
| 5 | 14010.000 | 34.41 | 22.00 | 56.41 | 70.25 | -13.84 | peak |
| 6 | 17655.000 | 32.29 | 25.67 | 57.96 | 70.25 | -12.29 | peak |

QPSK-20 MHz-Mid Channel- Horizontal




| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | (dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 5700.000 | 40.74 | 2.66 | 43.40 | 70.25 | -26.85 | peak |
| 2 | 7320.000 | 38.39 | 7.12 | 45.51 | 70.25 | -24.74 | peak |
| 3 | 9630.000 | 37.28 | 12.86 | 50.14 | 70.25 | -20.11 | peak |
| 4 | 12720.000 | 36.01 | 19.28 | 55.29 | 70.25 | -14.96 | peak |
| 5 | 14250.000 | 34.73 | 22.89 | 57.62 | 70.25 | -12.63 | peak |
| 6 | 18000.000 | 30.99 | 29.44 | 60.43 | 70.25 | -9.82 | peak |

QPSK-20 MHz-Mid Channel- Vertical

| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | (dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | 5715.000 | 41.32 | 3.80 | 45.12 | 70.25 | -25.13 | peak |
| 2 | 7335.000 | 37.80 | 7.77 | 45.57 | 70.25 | -24.68 | peak |
| 3 | 9480.000 | 37.63 | 12.28 | 49.91 | 70.25 | -20.34 | peak |
| 4 | 11865.000 | 37.50 | 17.52 | 55.02 | 70.25 | -15.23 | peak |
| 5 | 13815.000 | 35.15 | 21.18 | 56.33 | 70.25 | -13.92 | peak |
| 6 | 16905.000 | 33.25 | 24.88 | 58.13 | 70.25 | -12.12 | peak |

QPSK-20 MHz-High Channel- Horizontal

| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | (dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 4695.000 | 42.53 | 0.23 | 42.76 | 70.25 | -27.49 | peak |
| 2 | 6540.000 | 39.71 | 4.96 | 44.67 | 70.25 | -25.58 | peak |
| 3 | 9375.000 | 38.26 | 11.78 | 50.04 | 70.25 | -20.21 | peak |
| 4 | 12570.000 | 36.59 | 18.97 | 55.56 | 70.25 | -14.69 | peak |
| 5 | 13830.000 | 35.22 | 22.88 | 58.10 | 70.25 | -12.15 | peak |
| 6 | 18000.000 | 30.58 | 29.44 | 60.02 | 70.25 | -10.23 | peak |

QPSK-20 MHz-High Channel- Vertical

| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | (dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 5685.000 | 40.53 | 3.76 | 44.29 | 70.25 | -25.96 | peak |
| 2 | 7350.000 | 38.22 | 7.78 | 46.00 | 70.25 | -24.25 | peak |
| 3 | 9225.000 | 38.57 | 11.34 | 49.91 | 70.25 | -20.34 | peak |
| 4 | 12615.000 | 36.12 | 18.06 | 54.18 | 70.25 | -16.07 | peak |
| 5 | 14295.000 | 34.70 | 21.81 | 56.51 | 70.25 | -13.74 | peak |
| 6 | 16800.000 | 33.28 | 24.77 | 58.05 | 70.25 | -12.20 | peak |

Note: Limit= -25dBm+95.25=70.25 dBuV/m

**END OF REPORT**