# FCC Test Report

# (PART 22)

| | |
|---|---|
| **Report No.:** | RF160601W004-3 |
| **FCC ID:** | 2AFZZ-RS6031 |
| **Test Model:** | 2016031 |
| **Received Date:** | Jun. 01, 2016 |
| **Test Date:** | Jun. 02, 2016 ~ Jun. 28, 2016 |
| **Issued Date:** | Jun. 29, 2016 |
| **Applicant:** | Xiaomi Communications Co., Ltd. |
| **Address:** | The Rainbow City of China Resources, NO.68, Qinghe Middle Street, Haidian District, Beijing, China |
| **Issued By:** | Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch |
| **Lab Address:** | No. 47-2, 14th Ling, Chia Cau Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C.) |
| **Test Location:** | No. 19, Hwa Ya 2nd Rd., Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C. |

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## RELEASE CONTROL RECORD

| Issue No. | Description | Date Issued |
|---|---|---|
| RF160601W004-3 | Original release | Jun. 29, 2016 |

## 1 Certificate of Conformity

| | |
|---|---|
| **Product:** | Mobile Phone |
| **Brand:** | MI |
| **Test Model:** | 2016031 |
| **Sample Status:** | Identical Prototype |
| **Applicant:** | Xiaomi Communications Co., Ltd. |
| **Test Date:** | Jun. 02, 2016 ~ Jun. 28, 2016 |
| **Standards:** | FCC Part 22, Subpart H |

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

**Prepared by :** _____ , **Date:** Jun. 29, 2016

Amyee Qian / Engineer

**Approved by :** _____ , **Date:** Jun. 29, 2016

William Chung / Manager

## 2 Summary of Test Results

| Applied Standard: FCC Part 22 & Part 2 | | | |
|---|---|---|---|
| FCC Clause | Test Item | Result | Remarks |
| 2.1046<br>22.913 (a) | Effective radiated power | PASS | Meet the requirement of limit. |
| --- | Peak To Average Ratio | PASS | Meet the requirement of limit. |
| 2.1055<br>22.355 | Frequency Stability | PASS | Meet the requirement of limit. |
| 2.1049<br>22.917b | Occupied Bandwidth | PASS | Meet the requirement of limit. |
| 22.917 | Band Edge Measurements | PASS | Meet the requirement of limit. |
| 2.1051<br>22.917 | Conducted Spurious Emissions | PASS | Meet the requirement of limit. |
| 2.1053<br>22.917 | Radiated Spurious Emissions | PASS | Meet the requirement of limit.<br>Minimum passing margin is -12.66dB at 43.58MHz. |

### 2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

| Measurement | Frequency | Expended Uncertainty (k=2) (±) |
|---|---|---|
| Conducted Emissions at mains ports | 150kHz ~ 30MHz | 2.44 dB |
| Radiated Emissions up to 1 GHz | 30MHz ~ 200MHz | 2.93 dB |
| | 200MHz ~1000MHz | 2.95 dB |
| Radiated Emissions above 1 GHz | 1GHz ~ 18GHz | 2.26 dB |
| | 18GHz ~ 40GHz | 1.94 dB |

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

## 2.2 Test Site And Instruments

| Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Next Cal. |
|---|---|---|---|---|---|
| EMI Test Receiver | Rohde&Schwarz | ESR7 | 101494 | Apr. 05,16 | Apr. 04,17 |
| Signal and Spectrum Analyzer | Rohde&Schwarz | FSV40 | 101094 | Apr. 05,16 | Apr. 04,17 |
| Bilog Antenna 1 | Teseq | CBL 6111D | 30643 | Oct. 26,15 | Jun. 24,17 |
| Bilog Antenna 2 | Teseq | CBL 6111D | 27089 | Oct. 25,15 | Jun. 24,17 |
| Horn Antenna | ETS-Lindgren | 3117 | 00062558 | May 30,15 | May 29,17 |
| Horn Antenna (15GHz-40GHz) | SCHWARZBECK | BBHA 9170 | BBHA9170147 | Jan. 21,15 | Jan. 20,17 |
| Amplifier | Burgeon | BPA-530 | 100220 | Apr. 05,16 | Apr. 04,17 |
| Pre-Amplifier | HP | 8449B | 3008A00409 | Apr. 24,16 | Apr. 23,17 |
| Pre-Amplifier (18GHz-40GHz) | EMCI | EMC 184045 | 980102 | Nov. 11,15 | Nov. 10,16 |
| GPS Generator+ Antenna | TOJOIN | GNSS-5000A | E1-010119 | Aug. 08, 14 | Aug. 07, 16 |
| 3m Semi-anechoic Chamber | ETS-LINDGREN | 9m*6m*6m | NSEMC003 | Mar. 12,16 | Mar. 11,18 |
| Test Software | ADT | ADT_Radiated_V7.6.15.9.2 | N/A | N/A | N/A |
| Power Meter | Anritsu | ML2495A | 1139001 | Feb.19,16 | Feb. 18,17 |
| Power Sensor | Anritsu | MA2411B | 1126068 | Feb.19,16 | Feb. 18,17 |
| Power Sensor | Keysight | U2021XA | MY55060016 | May 27,15 | May 26,17 |
| Power Sensor | Keysight | U2021XA | MY55060018 | May 27,15 | May 26,17 |
| Digital Multimeter | FLUKE | 15B | A1220010DG | Oct. 12, 15 | Oct. 11, 16 |
| Humid & Temp Programmable Tester | Haida | HD-2257 | 110807201 | Sep.07,15 | Sep. 06,16 |
| Oscilloscope | Agilent | DSO9254A | MY51260160 | Nov. 09,15 | Nov. 08,16 |
| Signal Analyzer | Rohde & Schwarz | FSV7 | 102331 | Nov. 09,15 | Nov. 08,16 |
| Signal Generator | Agilent | N5183A | MY50140980 | Apr. 21, 16 | Apr. 20, 17 |
| ESG Vector Signal Generator | Agilent | E4438C | MY49072505 | Sep. 01,15 | Aug. 31,16 |
| BLUETOOTH TESTER | Rohde&Schwarz | CBT32 | 100811 | Oct. 12, 15 | Oct. 11, 16 |

**NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The calibration interval of the loop antenna is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in HwaYa Chamber 4.
4. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
5. The FCC Site Registration No. is 460141.
6. The IC Site Registration No. is IC7450F-4.

## 3 General Information

### 3.1 General Description of EUT

| | | |
|---|---|---|
| **PRODUCT** | Mobile Phone | |
| **BRAND** | MI | |
| **MODEL NAME** | 2016031 | |
| **POWER SUPPLY** | 5.0Vdc (adapter or host equipment)<br>3.85Vdc (battery) | |
| **MODULATION TYPE** | **GSM/GPRS** | GMSK |
| | **EDGE** | GMSK, 8PSK |
| | **WCDMA** | QPSK |
| | **LTE** | QPSK, 16QAM |
| **FREQUENCY RANGE** | **GSM/GPRS/EDGE** | 824.2MHz ~ 848.8MHz |
| | **WCDMA** | 826.4MHz ~ 846.6MHz |
| | **LTE Band 5 (Channel Bandwidth: 1.4MHz)** | 824.7MHz ~ 848.3MHz |
| | **LTE Band 5 (Channel Bandwidth: 3MHz)** | 825.5MHz ~ 847.5MHz |
| | **LTE Band 5 (Channel Bandwidth: 5MHz)** | 826.5MHz ~ 846.5MHz |
| | **LTE Band 5 (Channel Bandwidth: 10MHz)** | 829MHz ~ 844MHz |
| **MAX. ERP POWER** | **GSM** | 608mW |
| | **EDGE** | 246mW |
| | **WCDMA** | 121mW |
| | **LTE Band 5 (Channel Bandwidth: 1.4MHz)** | 104mW |
| | **LTE Band 5 (Channel Bandwidth: 3MHz)** | 107mW |
| | **LTE Band 5 (Channel Bandwidth: 5MHz)** | 106mW |
| | **LTE Band 5 (Channel Bandwidth: 10MHz)** | 89mW |
| **EMISSION DESIGNATOR** | **GSM** | 245KGXW |
| | **EDGE** | 246KG7W |
| | **WCDMA** | 4M13F9W |
| | **LTE Band 5 (Channel Bandwidth: 1.4MHz)** | QPSK: 1M09G7D |
| | | 16QAM: 1M09W7D |
| | **LTE Band 5 (Channel Bandwidth: 3MHz)** | QPSK: 2M68G7D |
| | | 16QAM: 2M69W7D |
| | **LTE Band 5 (Channel Bandwidth: 5MHz)** | QPSK: 4M48G7D |
| | | 16QAM: 4M47W7D |
| | **LTE Band 5 (Channel Bandwidth: 10MHz)** | QPSK: 8M93G7D |
| | | 16QAM: 8M93W7D |
| **ANTENNA TYPE** | PIFA Antenna with -3.79dBi gain | |
| **HW VERSION** | P4 | |

| | |
|---|---|
| **SW VERSION** | V7.3.0.4.MALMIDE |
| **ACCESSORY DEVICE** | Refer to note as below |
| **DATA CABLE** | USB cable: non-shielded, detachable, 1.2m |

Note:

1. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.
2. The EUT was powered by the following adapter:

| **ADAPTER** | |
|---|---|
| **BRAND:** | MI |
| **MODEL:** | MDY-08-EF |
| **INPUT:** | AC 100-240V, 500mA |
| **OUTPUT:** | DC 5V, 2000mA |

3. The EUT matched the following USB cables:

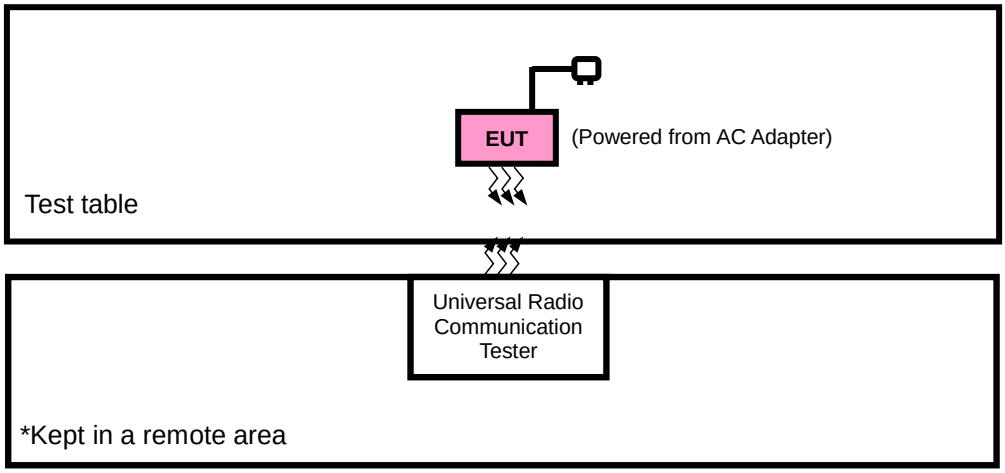
| **USB CABLE 1** | |
|---|---|
| **BRAND:** | MI |
| **MODEL:** | KLC-2100 |
| **SIGNAL LINE:** | 1.2 METER |

| **USB CABLE 2** | |
|---|---|
| **BRAND:** | MI |
| **MODEL:** | RS418D010(RICHSTAR) |
| **SIGNAL LINE:** | 1.2 METER |

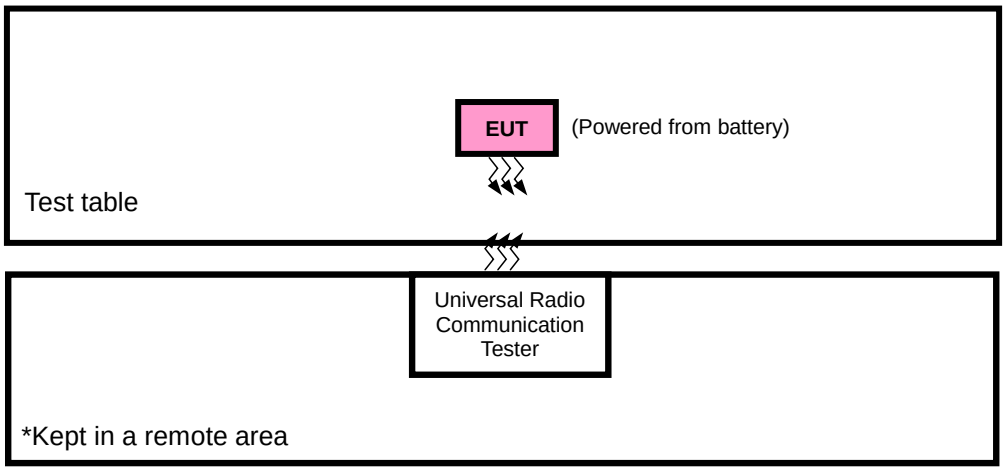
4. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

### 3.2 Configuration of System Under Test

**FOR RADIATION EMISSION TEST**




**FOR E.R.P. TEST**




#### 3.2.1 Description Of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| NO. | PRODUCT | BRAND | MODEL NO. | SERIAL NO. | FCC ID |
|---|---|---|---|---|---|
| 1 | DC source | LONG WEI | PS-6403D | 010934269 | N/A |
| 2 | PC | HP | A6608CN | 3CR83825X3 | N/A |

| NO. | SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS |
|---|---|
| 1 | DC Line: Unshielded, Detachable 1.0m |
| 2 | AC Line: Unshielded, Detachable 1.5m |

**NOTE:**

1. All power cords of the above support units are non shielded (1.8m).

### 3.3 Test Mode Applicability and Tested Channel Detail

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports
The worst case was found when positioned on Z-plane. Following channel(s) was (were) selected for the final test as listed below:

Test results are presented in the report as below.

| Test Mode | Test Condition |
|---|---|
| A | Power from adapter |
| B | Power from battery |

**GSM MODE**

| EUT Configure Mode | Test Item | Available Channel | Tested Channel | Mode |
|---|---|---|---|---|
| A | ERP | 128 to 251 | 128, 190, 251 | GSM |
| B | Frequency Stability | 128 to 251 | 190 | GSM |
| A | Occupied Bandwidth | 128 to 251 | 128, 190, 251 | GSM, EDGE |
| A | Band Edge | 128 to 251 | 128, 251 | GSM, EDGE |
| A | Peak To Average Ratio | 128 to 251 | 128, 190, 251 | GSM, EDGE |
| A | Condcudeted Emission | 128 to 251 | 128, 190, 251 | GSM, EDGE |
| A | Radiated Emission Below 1GHz | 128 to 251 | 128 | GSM |
| A | Radiated Emission Above 1GHz | 128 to 251 | 128, 190, 251 | GSM |

**WCDMA MODE**

| EUT Configure Mode | Test Item | Available Channel | Tested Channel | Mode |
|---|---|---|---|---|
| A | ERP | 4132 to 4233 | 4132, 4182, 4233 | WCDMA |
| B | Frequency Stability | 4132 to 4233 | 4182 | WCDMA |
| A | Occupied Bandwidth | 4132 to 4233 | 4132, 4182, 4233 | WCDMA |
| A | Band Edge | 4132 to 4233 | 4132, 4233 | WCDMA |
| A | Peak To Average Ratio | 4132 to 4233 | 4132, 4182, 4233 | WCDMA |
| A | Condcudeted Emission | 4132 to 4233 | 4132, 4182, 4233 | WCDMA |
| A | Radiated Emission Below 1GHz | 4132 to 4233 | 4132 | WCDMA |
| A | Radiated Emission Above 1GHz | 4132 to 4233 | 4132, 4182, 4233 | WCDMA |

**LTE BAND 5 MODE**

| TEST ITEM | Available Channel | Tested Channel | Channel bandwidth | modulation | mode |
|---|---|---|---|---|---|
| ERP | 20407 to 20643 | 20407, 20525, 20643 | 1.4MHz | QPSK,16QAM | 1 RB / 0 RB Offset |
| | 20415 to 20635 | 20415, 20525, 20635 | 3MHz | QPSK,16QAM | 1 RB / 0 RB Offset |
| | 20425 to 20625 | 20425, 20525, 20625 | 5MHz | QPSK,16QAM | 1 RB / 0 RB Offset |
| | 20450 to 20600 | 20450, 20525, 20600 | 10MHz | QPSK,16QAM | 1 RB / 0 RB Offset |
| FREQUENCY STABILITY | 20407 to 20643 | 20525 | 1.4MHz | QPSK | 1 RB / 0 RB Offset |
| | 20415 to 20635 | 20525 | 3MHz | QPSK | 1 RB / 0 RB Offset |
| | 20425 to 20625 | 20525 | 5MHz | QPSK | 1 RB / 0 RB Offset |
| | 20450 to 20600 | 20525 | 10MHz | QPSK | 1 RB / 0 RB Offset |
| OCCUPIED BANDWIDTH | 20407 to 20643 | 20407, 20525, 20643 | 1.4MHz | QPSK | 6 RB / 0 RB Offset |
| | | | | 16QAM | 6 RB / 0 RB Offset |
| | 20415 to 20635 | 20415, 20525, 20635 | 3MHz | QPSK | 15 RB / 0 RB Offset |
| | | | | 16QAM | 15 RB / 0 RB Offset |
| | 20425 to 20625 | 20425, 20525, 20625 | 5MHz | QPSK | 25 RB / 0 RB Offset |
| | | | | 16QAM | 25 RB / 0 RB Offset |
| | 20450 to 20600 | 20450, 20525, 20600 | 10MHz | QPSK | 50 RB / 0 RB Offset |
| | | | | 16QAM | 50 RB / 0 RB Offset |

| | | | | | |
|---|---|---|---|---|---|
| BAND EDGE | 20407 to 20643 | 20407 | 1.4 MHz | QPSK | 1 RB / 0 RB Offset |
| | | | | | 6 RB / 0 RB Offset |
| | 20407 to 20643 | 20643 | 1.4 MHz | QPSK | 1 RB / 5 RB Offset |
| | | | | | 6 RB / 0 RB Offset |
| | 20415 to 20635 | 20415 | 3 MHz | QPSK | 1 RB / 0 RB Offset |
| | | | | | 15 RB / 0 RB Offset |
| | 20415 to 20635 | 20635 | 3 MHz | QPSK | 1 RB / 14 RB Offset |
| | | | | | 15 RB / 0 RB Offset |
| | 20425 to 20625 | 20425 | 5MHz | QPSK | 1 RB / 0 RB Offset |
| | | | | | 25 RB / 0 RB Offset |
| | 20425 to 20625 | 20625 | 5MHz | QPSK | 1 RB / 24 RB Offset |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | 25 RB / 0 RB Offset |
| | 20450 to 20600 | 20450 | 10MHz | QPSK | 1 RB / 0 RB Offset |
| | | | | | 50 RB / 0 RB Offset |
| | 20450 to 20600 | 20600 | 10MHz | QPSK | 1 RB / 49 RB Offset |
| | | | | | 50 RB / 0 RB Offset |
| CONDCUDETED EMISSION | 20407 to 20643 | 20525 | 1.4MHz | QPSK | 1 RB / 0 RB Offset |
| | 20415 to 20635 | 20525 | 3MHz | QPSK | 1 RB / 0 RB Offset |
| | 20425 to 20625 | 20525 | 5MHz | QPSK | 1 RB / 0 RB Offset |
| | 20450 to 20600 | 20525 | 10MHz | QPSK | 1 RB / 0 RB Offset |
| RADIATED EMISSION | 20407 to 20643 | 20525 | 1.4MHz | QPSK | 1 RB / 0 RB Offset |
| | 20415 to 20635 | 20525 | 3MHz | QPSK | 1 RB / 0 RB Offset |
| | 20425 to 20625 | 20525 | 5MHz | QPSK | 1 RB / 0 RB Offset |
| | 20450 to 20600 | 20525 | 10MHz | QPSK | 1 RB / 0 RB Offset |

**Test Condition:**

| Test Item | Environmental Conditions | Input Power | Tested By |
|---|---|---|---|
| ERP | 23deg. C, 62%RH | DC 3.85V from battery | Yuqiang Yin |
| Frequency Stability | 23deg. C, 62%RH | DC 3.85V from battery | Yuqiang Yin |
| Occupied Bandwidth | 23deg. C, 62%RH | DC 3.85V from battery | Yuqiang Yin |
| Band Edge | 23deg. C, 62%RH | DC 3.85V from battery | Yuqiang Yin |
| Peak To Average Ratio | 23deg. C, 62%RH | DC 3.85V from battery | Yuqiang Yin |
| Condcudeted Emission | 25deg. C, 63.6%RH | 5.0Vdc from adapter | Yuqiang Yin |
| Radiated Emission | 23deg. C, 62%RH | 5.0Vdc from adapter | Alex Chen |

### 3.4 EUT Operating Conditions

The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency

### 3.5 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC 47 CFR Part 2**

**FCC 47 CFR Part 22**

**KDB 971168 D01 Power Meas License Digital Systems v02r05**

**ANSI/TIA/EIA-603-D**

**NOTE:** All test items have been performed and recorded as per the above standards.

# 4 Test Types and Results

## 4.1 Output Power Measurement

### 4.1.1 Limits of Output Power Measurement

Mobile / Portable station are limited to 7 watts e.r.p.

### 4.1.2 Test Procedures

**EIRP / ERP Measurement:**

a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 1MHz for GSM, GPRS & EDGE, 5MHz for WCDMA mode, and 10MHz for LTE mode.

b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.

c. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a tx cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value“ of step b. Record the power level of S.G

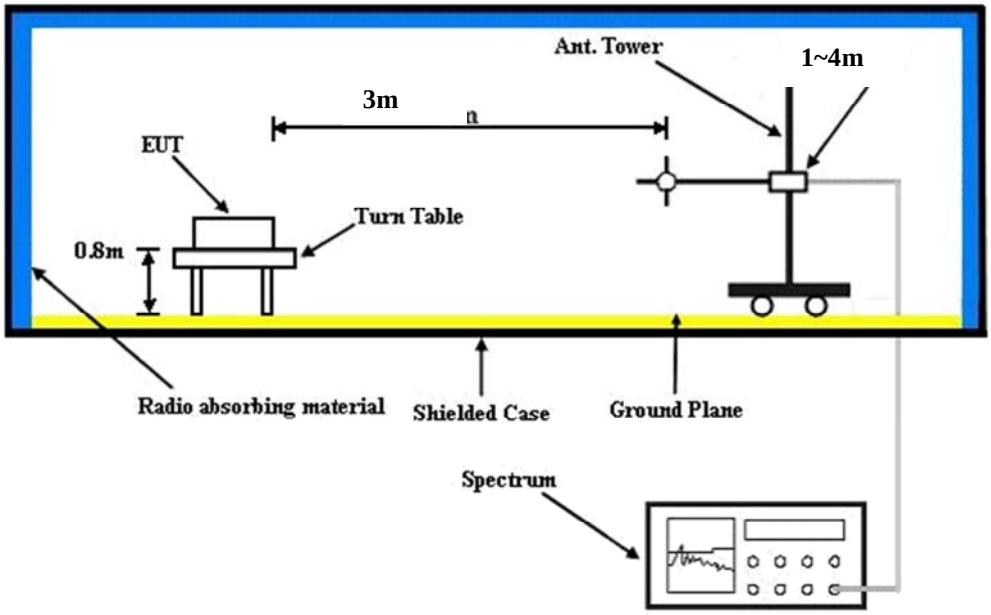
d. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.R.P power - 2.15dBi.

**Conducted Power Measurement:**

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

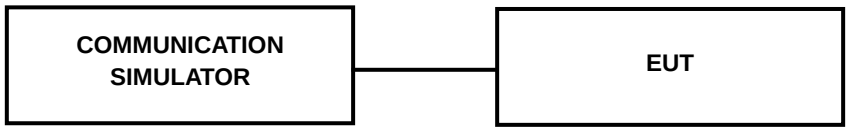
4.1.3 Test Setup

EIRP / ERP MEASUREMENT:




For the actual test configuration, please refer to the attached file (Test Setup Photo).

CONDUCTED POWER MEASUREMENT:




For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.4 Test Results

**CONDUCTED OUTPUT POWER (dBm)**

| Band | GSM850 | | |
|---|---|---|---|
| Channel | 128 | 190 | 251 |
| Frequency (MHz) | 824.2 | 836.6 | 848.8 |
| GSM | 32.36 | **32.56** | 32.50 |
| GPRS 8 | 32.40 | 32.46 | 32.49 |
| GPRS 10 | 30.86 | 30.96 | 30.90 |
| GPRS 11 | 29.51 | 29.53 | 29.60 |
| GPRS 12 | 28.26 | 28.35 | 28.28 |
| EDGE 8 (MCS1) | 25.20 | 25.12 | 25.03 |
| EDGE 10 (MCS1) | 23.75 | 23.71 | 23.61 |
| EDGE 11 (MCS9) | 22.57 | 22.49 | 22.47 |
| EDGE 12 (MCS9) | 21.33 | 21.30 | 21.19 |

| Band | WCDMA V | | |
|---|---|---|---|
| Channel | 4132 | 4182 | 4233 |
| Frequency (MHz) | 826.4 | 836.4 | 846.6 |
| RMC 12.2K | **22.44** | 22.43 | 22.32 |
| HSPA | | | |
| HSDPA Subtest-1 | 21.37 | 21.38 | 21.23 |
| HSDPA Subtest-2 | 21.35 | 21.34 | 21.20 |
| HSDPA Subtest-3 | 20.82 | 20.79 | 20.60 |
| HSDPA Subtest-4 | 20.81 | 20.77 | 20.58 |
| HSUPA Subtest-1 | 21.10 | 21.15 | 21.02 |
| HSUPA Subtest-2 | 19.92 | 20.16 | 20.02 |
| HSUPA Subtest-3 | 20.19 | 20.23 | 20.21 |
| HSUPA Subtest-4 | 20.53 | 20.79 | 20.77 |
| HSUPA Subtest-5 | 21.34 | 21.24 | 21.19 |

| Band/BW | Modulation | RB Size | RB Offset | Low CH 20407 | Mid CH 20525 | High CH 20643 | 3GPP MPR (dB) |
|---|---|---|---|---|---|---|---|
| | | | | Frequency 824.7 MHz | Frequency 836.5 MHz | Frequency 848.3 MHz | |
| 5/1.4 | QPSK | 1 | 0 | 22.41 | 22.32 | 22.28 | 0 |
| | | 1 | 2 | 22.28 | 22.30 | 22.25 | 0 |
| | | 1 | 5 | 22.24 | 22.00 | 22.18 | 0 |
| | | 3 | 0 | 22.39 | 22.30 | 22.26 | 0 |
| | | 3 | 1 | 22.26 | 22.28 | 22.23 | 0 |
| | | 3 | 3 | 22.22 | 21.98 | 22.16 | 0 |
| | | 6 | 0 | 21.40 | 21.12 | 21.22 | 1 |
| | 16QAM | 1 | 0 | 21.17 | 20.95 | 21.23 | 1 |
| | | 1 | 2 | 21.15 | 20.92 | 21.21 | 1 |
| | | 1 | 5 | 20.87 | 21.02 | 21.14 | 1 |
| | | 3 | 0 | 21.16 | 20.94 | 21.22 | 1 |
| | | 3 | 1 | 21.14 | 20.91 | 21.20 | 1 |
| | | 3 | 3 | 20.86 | 21.01 | 21.13 | 1 |
| | | 6 | 0 | 20.46 | 20.22 | 20.39 | 2 |

| Band/BW | Modulation | RB Size | RB Offset | Low CH 20415 | Mid CH 20525 | High CH 20635 | 3GPP MPR (dB) |
|---|---|---|---|---|---|---|---|
| | | | | Frequency 825.5 MHz | Frequency 836.5 MHz | Frequency 847.5 MHz | |
| 5/3 | QPSK | 1 | 0 | 22.45 | 22.36 | 22.32 | 0 |
| | | 1 | 7 | 22.32 | 22.34 | 22.29 | 0 |
| | | 1 | 14 | 22.28 | 22.04 | 22.22 | 0 |
| | | 8 | 0 | 21.52 | 21.34 | 21.36 | 1 |
| | | 8 | 3 | 21.40 | 21.32 | 21.35 | 1 |
| | | 8 | 7 | 21.41 | 21.21 | 21.24 | 1 |
| | | 15 | 0 | 21.44 | 21.16 | 21.26 | 1 |
| | 16QAM | 1 | 0 | 21.21 | 20.99 | 21.27 | 1 |
| | | 1 | 7 | 21.19 | 20.96 | 21.25 | 1 |
| | | 1 | 14 | 20.91 | 21.06 | 21.18 | 1 |
| | | 8 | 0 | 20.51 | 20.33 | 20.23 | 2 |
| | | 8 | 3 | 20.54 | 20.38 | 20.37 | 2 |
| | | 8 | 7 | 20.40 | 20.27 | 20.24 | 2 |
| | | 15 | 0 | 20.50 | 20.26 | 20.43 | 2 |

| Band/BW | Modulation | RB Size | RB Offset | Low CH 20425 | Mid CH 20525 | High CH 20625 | 3GPP MPR (dB) |
|---|---|---|---|---|---|---|---|
| | | | | Frequency 826.5 MHz | Frequency 836.5 MHz | Frequency 846.5 MHz | |
| 5/5 | QPSK | 1 | 0 | 22.51 | 22.42 | 22.38 | 0 |
| | | 1 | 12 | 22.38 | 22.40 | 22.35 | 0 |
| | | 1 | 24 | 22.34 | 22.10 | 22.28 | 0 |
| | | 12 | 0 | 21.58 | 21.40 | 21.42 | 1 |
| | | 12 | 6 | 21.46 | 21.38 | 21.41 | 1 |
| | | 12 | 13 | 21.47 | 21.27 | 21.30 | 1 |
| | | 25 | 0 | 21.50 | 21.22 | 21.32 | 1 |
| | 16QAM | 1 | 0 | 21.27 | 21.05 | 21.33 | 1 |
| | | 1 | 12 | 21.25 | 21.02 | 21.31 | 1 |
| | | 1 | 24 | 20.97 | 21.12 | 21.24 | 1 |
| | | 12 | 0 | 20.57 | 20.39 | 20.29 | 2 |
| | | 12 | 6 | 20.60 | 20.44 | 20.43 | 2 |
| | | 12 | 13 | 20.46 | 20.33 | 20.30 | 2 |
| | | 25 | 0 | 20.56 | 20.32 | 20.49 | 2 |

| Band/BW | Modulation | RB Size | RB Offset | Low CH 20450 | Mid CH 20525 | High CH 20600 | 3GPP MPR (dB) |
|---|---|---|---|---|---|---|---|
| | | | | Frequency 829 MHz | Frequency 836.5 MHz | Frequency 844 MHz | |
| 5/10 | QPSK | 1 | 0 | **22.54** | 22.45 | 22.41 | 0 |
| | | 1 | 24 | 22.41 | 22.43 | 22.38 | 0 |
| | | 1 | 49 | 22.37 | 22.13 | 22.31 | 0 |
| | | 25 | 0 | 21.61 | 21.43 | 21.45 | 1 |
| | | 25 | 12 | 21.49 | 21.41 | 21.44 | 1 |
| | | 25 | 25 | 21.50 | 21.30 | 21.33 | 1 |
| | | 50 | 0 | 21.53 | 21.25 | 21.35 | 1 |
| | 16QAM | 1 | 0 | 21.30 | 21.08 | 21.36 | 1 |
| | | 1 | 24 | 21.28 | 21.05 | 21.34 | 1 |
| | | 1 | 49 | 21.00 | 21.15 | 21.27 | 1 |
| | | 25 | 0 | 20.60 | 20.42 | 20.32 | 2 |
| | | 25 | 12 | 20.63 | 20.47 | 20.46 | 2 |
| | | 25 | 25 | 20.49 | 20.36 | 20.33 | 2 |
| | | 50 | 0 | 20.59 | 20.35 | 20.52 | 2 |

## ERP POWER (dBm)

### GSM

| Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | ERP(dBm) | ERP(mW) | Polarization (H/V) |
|---|---|---|---|---|---|---|
| 128 | 824.2 | -3.88 | 33.56 | 27.53 | 566.11 | H |
| 189 | 836.4 | -3.64 | 33.63 | 27.84 | **607.99** | H |
| 251 | 848.8 | -3.72 | 33.57 | 27.70 | 588.57 | H |
| 128 | 824.2 | -15.95 | 34.24 | 16.14 | 41.08 | V |
| 189 | 836.4 | -15.38 | 34.59 | 17.06 | 50.77 | V |
| 251 | 848.8 | -16.16 | 34.62 | 16.31 | 42.79 | V |

### EDGE

| Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | ERP(dBm) | ERP(mW) | Polarization (H/V) |
|---|---|---|---|---|---|---|
| 128 | 824.2 | -7.65 | 33.56 | 23.76 | 237.63 | H |
| 189 | 836.4 | -7.57 | 33.63 | 23.91 | **245.98** | H |
| 251 | 848.8 | -7.76 | 33.57 | 23.66 | 232.17 | H |
| 128 | 824.2 | -16.34 | 34.24 | 15.75 | 37.55 | V |
| 189 | 836.4 | -16.04 | 34.59 | 16.40 | 43.61 | V |
| 251 | 848.8 | -16.21 | 34.62 | 16.26 | 42.30 | V |

### WCDMA

| Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | ERP(dBm) | ERP(mW) | Polarization (H/V) |
|---|---|---|---|---|---|---|
| 4132 | 826.4 | -10.62 | 33.56 | 20.79 | 119.92 | H |
| 4182 | 836.4 | -10.77 | 33.63 | 20.71 | 117.73 | H |
| 4233 | 846.6 | -10.59 | 33.57 | 20.83 | **121.00** | H |
| 4132 | 826.4 | -24.51 | 34.24 | 7.58 | 5.72 | V |
| 4182 | 836.4 | -24.04 | 34.59 | 8.40 | 6.91 | V |
| 4233 | 846.6 | -24.83 | 34.62 | 7.64 | 5.81 | V |

## LTE BAND 5

### CHANNEL BANDWIDTH: 1.4MHz QPSK

| Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | ERP(dBm) | ERP(mW) | Polarization (H/V) | LIMIT (W) |
|---|---|---|---|---|---|---|---|
| 20407 | 824.7 | -12.08 | 33.67 | 19.44 | 87.96 | H | 7 |
| 20525 | 836.5 | -11.97 | 33.62 | 19.50 | 89.21 | H | 7 |
| 20643 | 848.3 | -11.33 | 33.65 | 20.17 | **103.87** | H | 7 |
| 20407 | 824.7 | -20.58 | 34.25 | 11.52 | 14.18 | V | 7 |
| 20525 | 836.5 | -20.56 | 34.60 | 11.89 | 15.45 | V | 7 |
| 20643 | 848.3 | -19.80 | 34.63 | 12.68 | 18.54 | V | 7 |

### CHANNEL BANDWIDTH: 1.4MHz 16QAM

| Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | ERP(dBm) | ERP(mW) | Polarization (H/V) | LIMIT (W) |
|---|---|---|---|---|---|---|---|
| 20407 | 824.7 | -12.91 | 33.67 | 18.61 | 72.66 | H | 7 |
| 20525 | 836.5 | -12.99 | 33.62 | 18.48 | 70.53 | H | 7 |
| 20643 | 848.3 | -12.43 | 33.65 | 19.07 | 80.63 | H | 7 |
| 20407 | 824.7 | -21.41 | 34.25 | 10.69 | 11.72 | V | 7 |
| 20525 | 836.5 | -21.58 | 34.60 | 10.87 | 12.21 | V | 7 |
| 20643 | 848.3 | -20.90 | 34.63 | 11.58 | 14.39 | V | 7 |

### CHANNEL BANDWIDTH: 3MHz QPSK

| Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | ERP(dBm) | ERP(mW) | Polarization (H/V) | LIMIT (W) |
|---|---|---|---|---|---|---|---|
| 20415 | 825.5 | -11.89 | 33.72 | 19.68 | 92.92 | H | 7 |
| 20525 | 836.5 | -11.91 | 33.62 | 19.56 | 90.45 | H | 7 |
| 20635 | 847.5 | -11.20 | 33.65 | 20.30 | **107.13** | H | 7 |
| 20415 | 825.5 | -20.39 | 34.30 | 11.76 | 15.00 | V | 7 |
| 20525 | 836.5 | -20.50 | 34.60 | 11.95 | 15.66 | V | 7 |
| 20635 | 847.5 | -19.67 | 34.57 | 12.75 | 18.84 | V | 7 |

### CHANNEL BANDWIDTH: 3MHz 16QAM

| Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | ERP(dBm) | ERP(mW) | Polarization (H/V) | LIMIT (W) |
|---|---|---|---|---|---|---|---|
| 20415 | 825.5 | -13.04 | 33.72 | 18.53 | 71.30 | H | 7 |
| 20525 | 836.5 | -13.01 | 33.62 | 18.46 | 70.21 | H | 7 |
| 20635 | 847.5 | -12.36 | 33.65 | 19.14 | 82.02 | H | 7 |
| 20415 | 825.5 | -21.54 | 34.30 | 10.61 | 11.51 | V | 7 |
| 20525 | 836.5 | -21.60 | 34.60 | 10.85 | 12.16 | V | 7 |
| 20635 | 847.5 | -20.83 | 34.57 | 11.59 | 14.42 | V | 7 |

### CHANNEL BANDWIDTH: 5MHz QPSK

| Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | ERP(dBm) | ERP(mW) | Polarization (H/V) | LIMIT (W) |
|---|---|---|---|---|---|---|---|
| 20425 | 826.5 | -11.90 | 33.69 | 19.64 | 92.13 | H | 7 |
| 20525 | 836.5 | -11.98 | 33.62 | 19.49 | 89.00 | H | 7 |
| 20625 | 846.5 | -11.27 | 33.66 | 20.24 | **105.71** | H | 7 |
| 20425 | 826.5 | -20.40 | 34.85 | 12.30 | 16.98 | V | 7 |
| 20525 | 836.5 | -20.57 | 34.60 | 11.88 | 15.41 | V | 7 |
| 20625 | 846.5 | -19.74 | 34.59 | 12.70 | 18.64 | V | 7 |

### CHANNEL BANDWIDTH: 5MHz 16QAM

| Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | ERP(dBm) | ERP(mW) | Polarization (H/V) | LIMIT (W) |
|---|---|---|---|---|---|---|---|
| 20425 | 826.5 | -12.76 | 33.69 | 18.78 | 75.58 | H | 7 |
| 20525 | 836.5 | -12.85 | 33.62 | 18.62 | 72.85 | H | 7 |
| 20625 | 846.5 | -12.12 | 33.66 | 19.39 | 86.92 | H | 7 |
| 20425 | 826.5 | -21.26 | 34.85 | 11.44 | 13.93 | V | 7 |
| 20525 | 836.5 | -21.44 | 34.60 | 11.01 | 12.61 | V | 7 |
| 20625 | 846.5 | -20.59 | 34.59 | 11.85 | 15.32 | V | 7 |

### CHANNEL BANDWIDTH: 10MHz QPSK

| Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | ERP(dBm) | ERP(mW) | Polarization (H/V) | LIMIT (W) |
|---|---|---|---|---|---|---|---|
| 20450 | 829 | -12.48 | 33.73 | 19.10 | 81.19 | H | 7 |
| 20525 | 836.5 | -12.43 | 33.62 | 19.04 | 80.24 | H | 7 |
| 20600 | 844 | -11.85 | 33.51 | 19.51 | **89.39** | H | 7 |
| 20450 | 829 | -20.98 | 34.54 | 11.41 | 13.82 | V | 7 |
| 20525 | 836.5 | -21.02 | 34.60 | 11.43 | 13.89 | V | 7 |
| 20600 | 844 | -20.32 | 34.46 | 11.99 | 15.79 | V | 7 |

### CHANNEL BANDWIDTH: 10MHz 16QAM

| Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | ERP(dBm) | ERP(mW) | Polarization (H/V) | LIMIT (W) |
|---|---|---|---|---|---|---|---|
| 20450 | 829 | -13.41 | 33.73 | 18.17 | 65.54 | H | 7 |
| 20525 | 836.5 | -13.50 | 33.62 | 17.97 | 62.72 | H | 7 |
| 20600 | 844 | -12.68 | 33.51 | 18.68 | 73.84 | H | 7 |
| 20450 | 829 | -21.91 | 34.54 | 10.48 | 11.16 | V | 7 |
| 20525 | 836.5 | -22.09 | 34.60 | 10.36 | 10.86 | V | 7 |
| 20600 | 844 | -21.15 | 34.46 | 11.16 | 13.05 | V | 7 |

**REMARKS:** 1. ERP Output Power (dBm) = SPA Reading (dBm) + Correction Factor (dB).
2. Correction factor (dB) = Free Space Loss + Antenna Factor + Cable Loss.

## 4.2 Frequency Stability Measurement

4.2.1 Limits of Frequency Stabiliity Measurement

1.5 ppm is for base and fixed station. 2.5 ppm is for mobile station.

4.2.2 Test Procedure

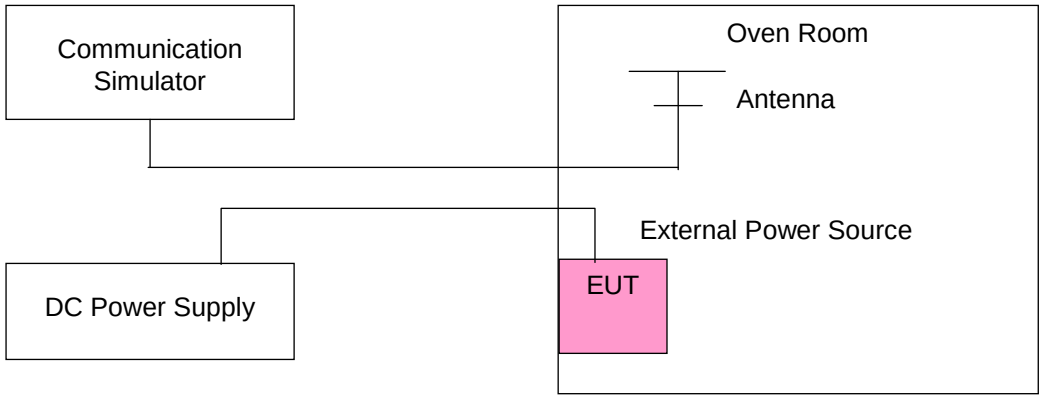
a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.

b. EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.

c. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ± 0.5℃ during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

**NOTE:** The frequency error was recorded frequency error from the communication simulator.

4.2.3 Test Setup



4.2.4 Test Results

**FREQUENCY ERROR VS. VOLTAGE**

| Voltage (Volts) | Frequency Error (ppm) | | | | | | | Limit (ppm) |
|---|---|---|---|---|---|---|---|---|
| | GSM | EDGE | WCDMA | LTE Band 5 | | | | |
| | | | | 1.4 MHz | 3 MHz | 5 MHz | 10MHz | |
| 3.85 | 0.0038 | 0.0036 | 0.0042 | 0.0032 | 0.0016 | 0.0022 | 0.0020 | 2.5 |
| 3.6 | -0.0047 | -0.0046 | -0.0032 | -0.0036 | -0.0030 | -0.0032 | -0.0029 | 2.5 |
| 4.35 | -0.0027 | -0.0030 | -0.0037 | -0.0036 | -0.0025 | -0.0027 | -0.0025 | 2.5 |

**NOTE:** The applicant defined the normal working voltage of the battery is from 3.6Vdc to 4.35Vdc.

**FREQUENCY ERROR vs. TEMPERATURE.**

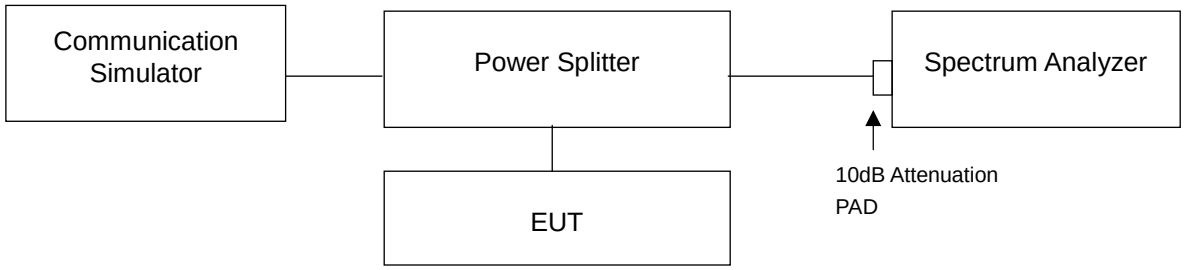
| TEMP. (℃) | Frequency Error (ppm) | | | | | | | Limit (ppm) |
|---|---|---|---|---|---|---|---|---|
| | GSM | EDGE | WCDMA | LTE Band 5 | | | | |
| | | | | 1.4 MHz | 3 MHz | 5 MHz | 10MHz | |
| -30 | -0.0131 | -0.0132 | -0.0132 | -0.0126 | -0.0122 | -0.0127 | -0.0126 | 2.5 |
| -20 | -0.0118 | -0.0119 | -0.0116 | -0.0109 | -0.0109 | -0.0111 | -0.0110 | 2.5 |
| -10 | -0.0099 | -0.0102 | -0.0103 | -0.0094 | -0.0092 | -0.0096 | -0.0094 | 2.5 |
| 0 | -0.0087 | -0.0088 | -0.0084 | -0.0078 | -0.0074 | -0.0076 | -0.0076 | 2.5 |
| 10 | -0.0072 | -0.0073 | -0.0071 | -0.0061 | -0.0060 | -0.0061 | -0.0061 | 2.5 |
| 20 | -0.0057 | -0.0059 | -0.0049 | -0.0044 | -0.0043 | -0.0044 | -0.0046 | 2.5 |
| 30 | -0.0041 | -0.0044 | -0.0030 | -0.0029 | -0.0027 | -0.0029 | -0.0029 | 2.5 |
| 40 | -0.0025 | -0.0030 | -0.0016 | -0.0016 | -0.0013 | -0.0015 | -0.0016 | 2.5 |
| 50 | -0.0010 | -0.0013 | -0.0001 | -0.0003 | -0.0004 | -0.0001 | -0.0003 | 2.5 |
| 60 | 0.0006 | 0.0001 | 0.0010 | 0.0011 | 0.0010 | 0.0012 | 0.0009 | 2.5 |

## 4.3 Occupied Bandwidth Measurement

### 4.3.1 Test Procedure

The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

### 4.3.2 Test Setup

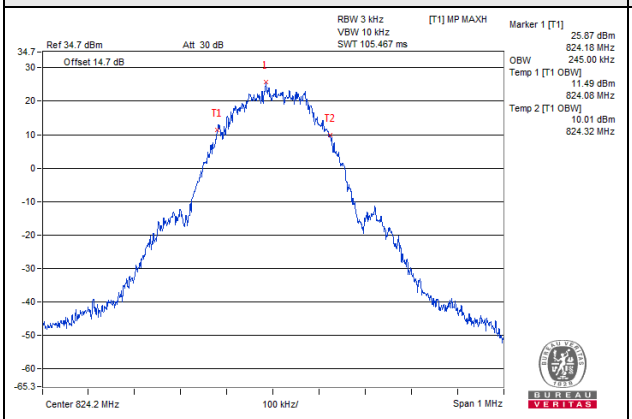


4.3.3 Test Result

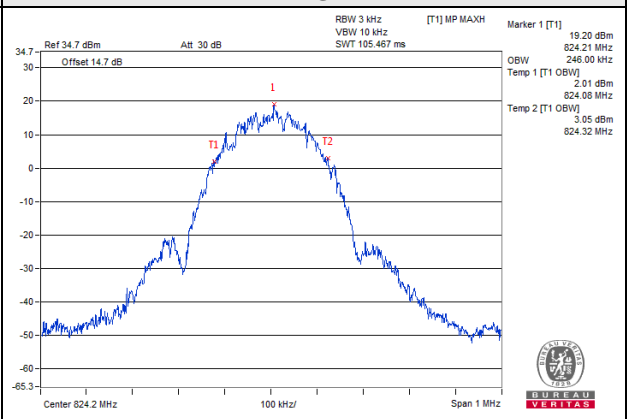
| Channel | Frequency (MHz) | 99% Occupied Bandwidth (kHz) | | Channel | FREQ. (MHz) | 99% Occupied Bandwidth (MHz) |
|---|---|---|---|---|---|---|
| | | GSM | EDGE | | | WCDMA |
| 128 | 824.2 | 245.00 | 246.00 | 4132 | 826.4 | 4.13 |
| 190 | 836.6 | 245.00 | 245.00 | 4182 | 836.6 | 4.13 |
| 251 | 848.8 | 245.00 | 241.00 | 4233 | 846.6 | 4.12 |

**SPECTRUM PLOT OF WORST VALUE**

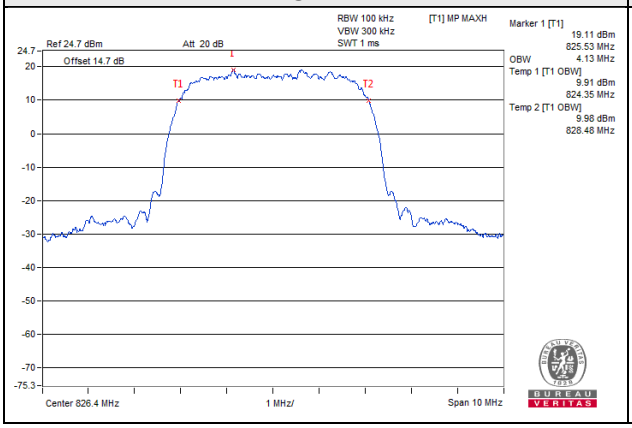
**GSM**




**EDGE**



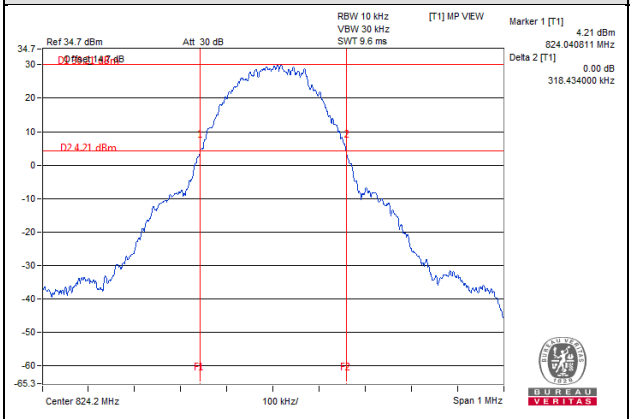

**WCDMA**



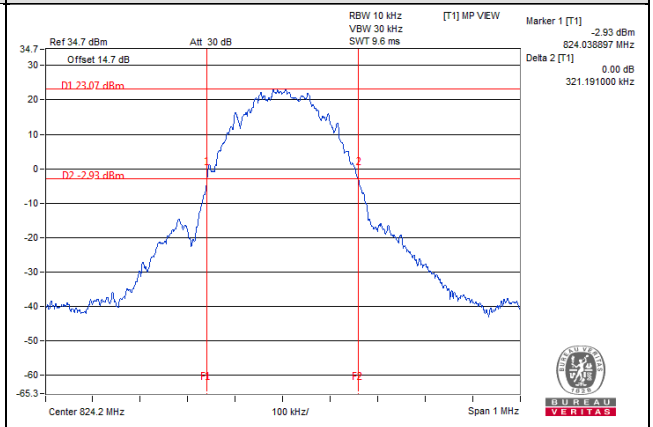
| CHANNEL | Frequency (MHz) | 26dB Bandwidth (kHz) | | CHANNEL | Frequency (MHz) | 26dB Bandwidth (MHz) |
|---|---|---|---|---|---|---|
| | | GSM | EDGE | | | WCDMA |
| 128 | 824.2 | 318.43 | 321.19 | 4132 | 826.4 | 4.73 |
| 190 | 836.6 | 313.38 | 312.64 | 4182 | 836.4 | 4.72 |
| 251 | 848.8 | 317.40 | 314.95 | 4233 | 846.6 | 4.71 |

**SPECTRUM PLOT OF WORST VALUE**

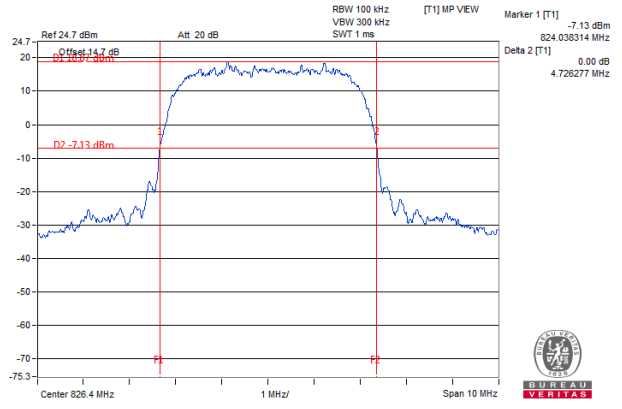
**GSM**




**EDGE**




**WCDMA**



| LTE band 5 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Channel Bandwidth : 1.4MHz | | | | | | | |
| Channel | Frequency (MHz) | 99% Occupied bandwidth (MHz) | | Channel | Frequency (MHz) | 26 dB bandwidth (MHz) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 20407 | 824.7 | 1.08 | 1.09 | 20407 | 824.7 | 1.27 | 1.28 |
| 20525 | 836.5 | 1.09 | 1.09 | 20525 | 836.5 | 1.27 | 1.29 |
| 20643 | 848.3 | 1.09 | 1.08 | 20643 | 848.3 | 1.27 | 1.27 |

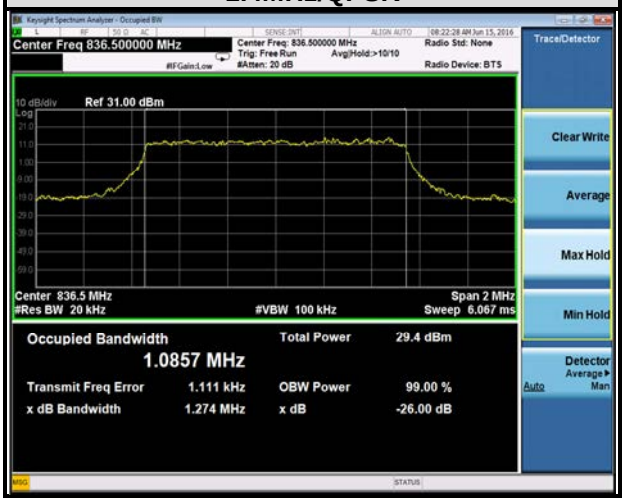
**SPECTRUM PLOT OF WORST VALUE of 99% Occupied Bandwidth**

**1.4MHz/QPSK**

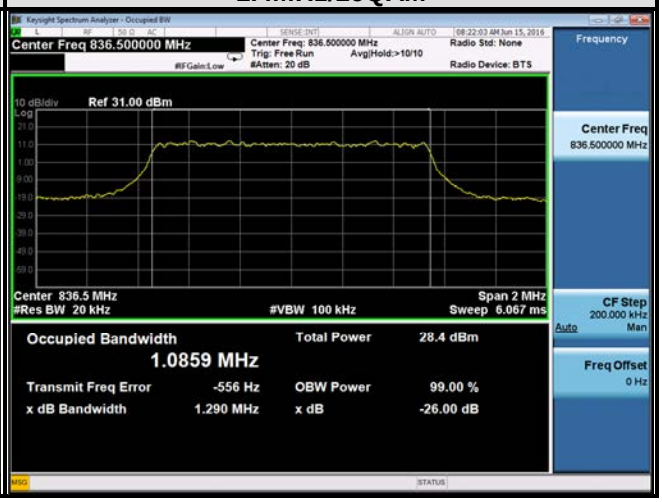

**1.4MHz/16QAM**


**SPECTRUM PLOT OF WORST VALUE of 26dB Occupied Bandwidth**

**1.4MHz/QPSK**




**1.4MHz/16QAM**

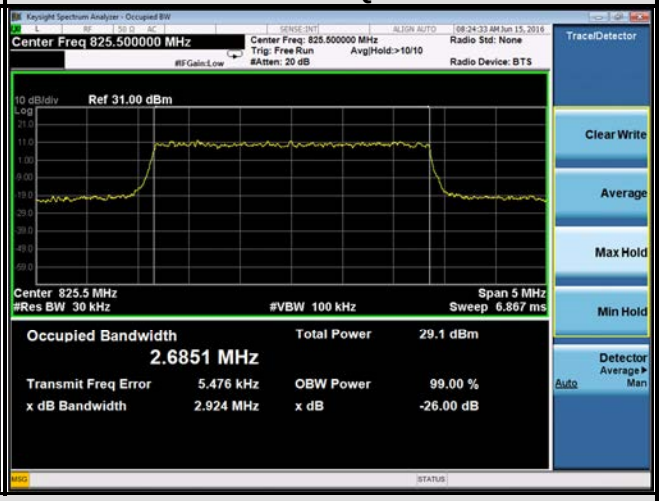


| LTE band 5 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Channel Bandwidth : 3MHz | | | | | | | |
| Channel | Frequency (MHz) | 99% Occupied bandwidth (MHz) | | Channel | Frequency (MHz) | 26 dB bandwidth (MHz) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 20415 | 825.5 | 2.68 | 2.69 | 20415 | 825.5 | 2.94 | 2.92 |
| 20525 | 836.5 | 2.68 | 2.68 | 20525 | 836.5 | 2.95 | 2.94 |
| 20635 | 847.5 | 2.68 | 2.68 | 20635 | 847.5 | 2.97 | 2.94 |

**SPECTRUM PLOT OF WORST VALUE of 99% Occupied Bandwidth**

**3MHz/QPSK**

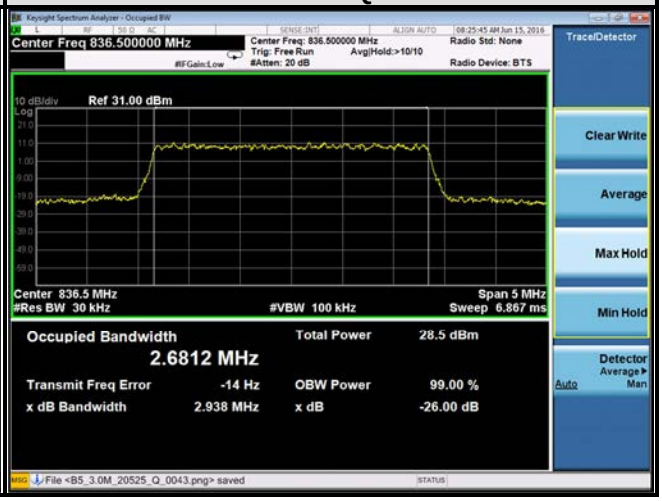

**3MHz/16QAM**




**SPECTRUM PLOT OF WORST VALUE of 26dB Occupied Bandwidth**

**3MHz/QPSK**

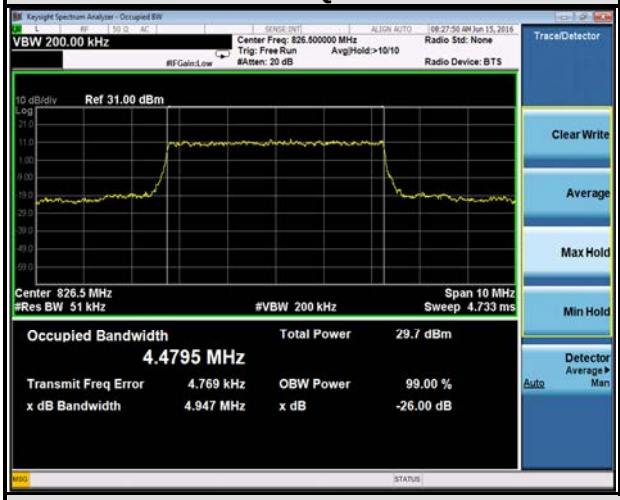

**3MHz/16QAM**



| LTE band 5 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Channel Bandwidth : 5 MHz | | | | | | | |
| Channel | Frequency (MHz) | 99% Occupied bandwidth (MHz) | | Channel | Frequency (MHz) | 26 dB bandwidth (MHz) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 20425 | 826.5 | 4.48 | 4.47 | 20425 | 826.5 | 4.95 | 4.95 |
| 20525 | 836.5 | 4.48 | 4.47 | 20525 | 836.5 | 4.90 | 4.96 |
| 20625 | 846.5 | 4.47 | 4.47 | 20625 | 846.5 | 4.47 | 4.84 |

**SPECTRUM PLOT OF WORST VALUE of 99% Occupied Bandwidth**

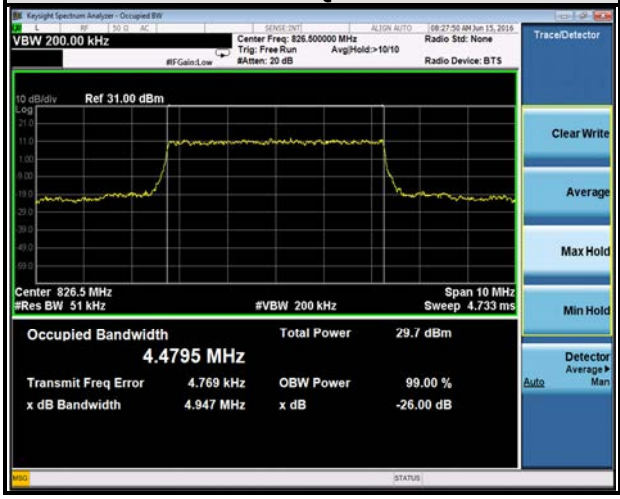
**5MHz/QPSK**



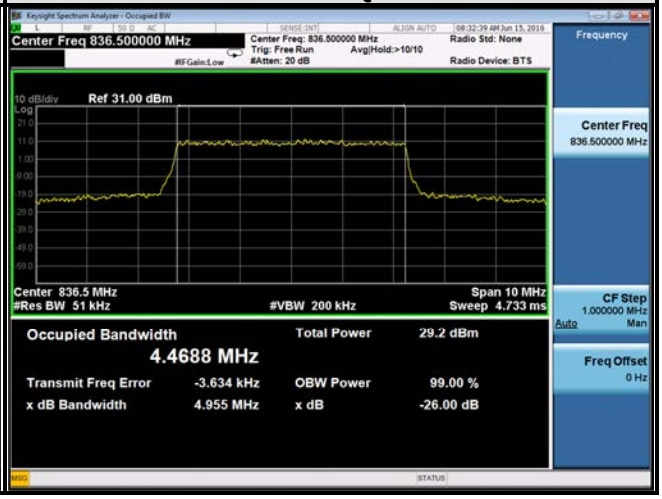

**5MHz/16QAM**


**SPECTRUM PLOT OF WORST VALUE of 26dB Occupied Bandwidth**

**5MHz/QPSK**



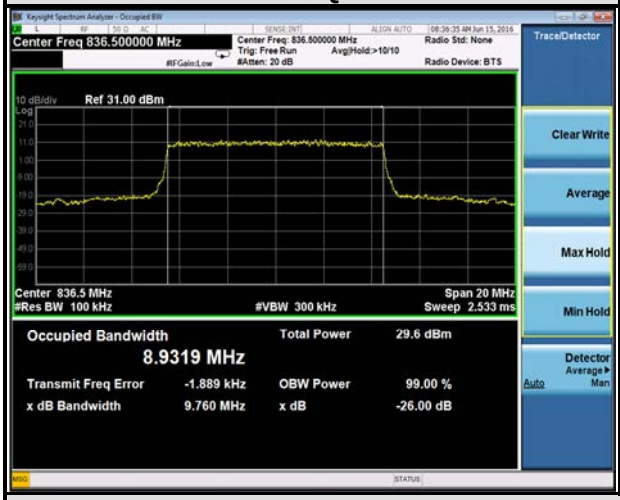

**5MHz/16QAM**



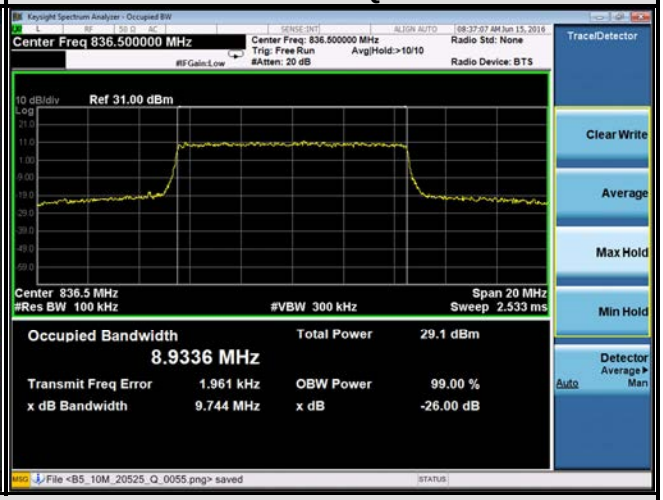
| LTE band 5 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Channel Bandwidth : 10 MHz | | | | | | | |
| Channel | Frequency (MHz) | 99% Occupied bandwidth (MHz) | | Channel | Frequency (MHz) | 26 dB bandwidth (MHz) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 20450 | 829 | 8.92 | 8.91 | 20450 | 829 | 9.77 | 9.69 |
| 20525 | 836.5 | 8.93 | 8.93 | 20525 | 836.5 | 9.76 | 9.74 |
| 20600 | 844 | 8.92 | 8.93 | 20600 | 844 | 9.78 | 9.81 |

**SPECTRUM PLOT OF WORST VALUE of 99% Occupied Bandwidth**

**10MHz/QPSK**

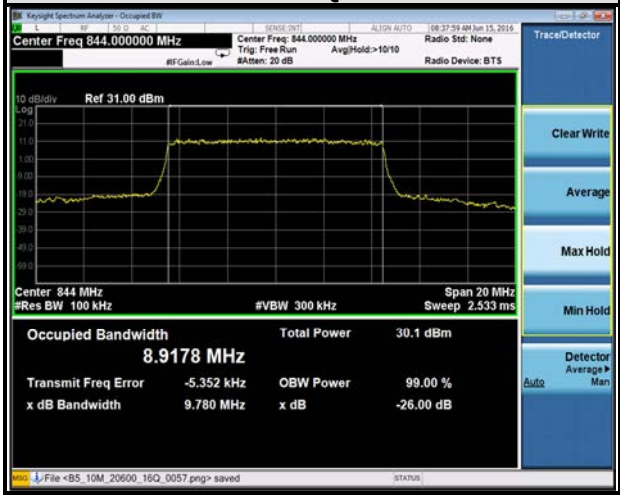



**10MHz/16QAM**




**SPECTRUM PLOT OF WORST VALUE of 26dB Occupied Bandwidth**

**10MHz/QPSK**



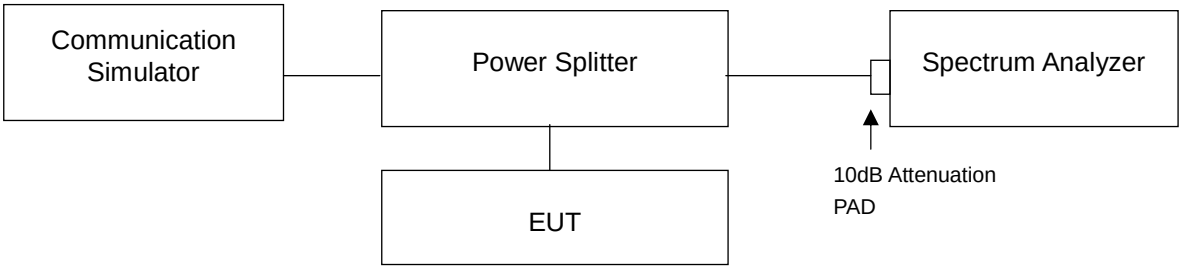

**10MHz/16QAM**

## 4.4 Band Edge Measurement

### 4.4.1 Limits of Band Edge Measurement

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. 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.

### 4.4.2 Test Setup




### 4.4.3 Test Procedures

a. All measurements were done at low and high operational frequency range.

b. The center frequency of spectrum is the band edge frequency and span is 1.5MHz. RB of the spectrum is 3kHz and VB of the spectrum is 10kHz (GSM/EDGE).

c. The center frequency of spectrum is the band edge frequency and span is 10MHz. RB of the spectrum is 100kHz and VB of the spectrum is 300kHz (WCDMA).

d. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RB of the spectrum is 20kHz and VB of the spectrum is 100 kHz. (LTE bandwidth 1.4MHz).

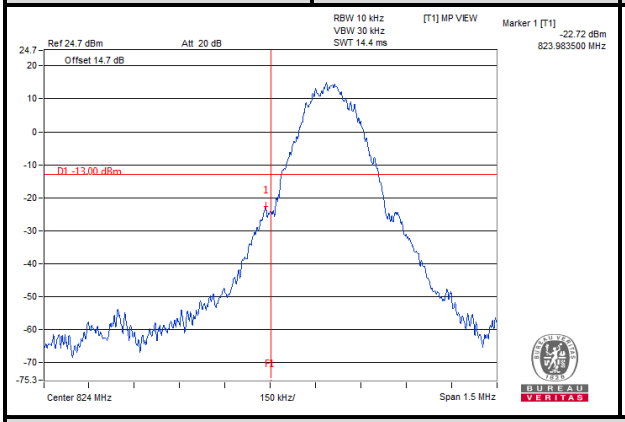
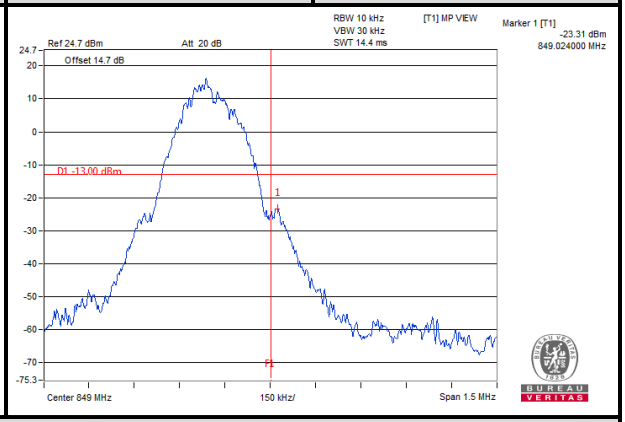
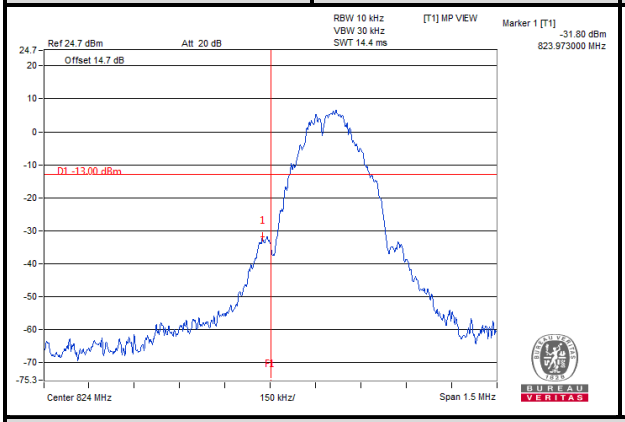
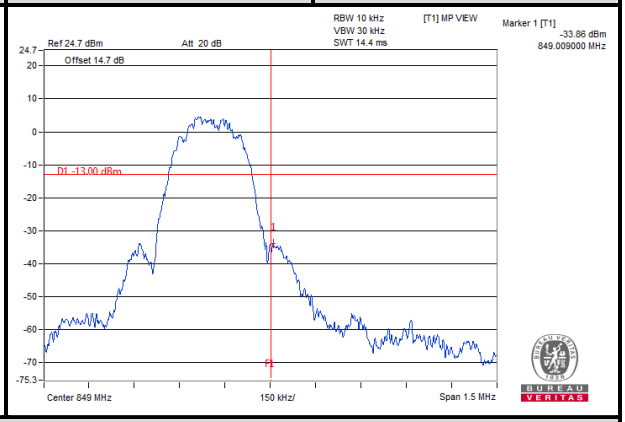
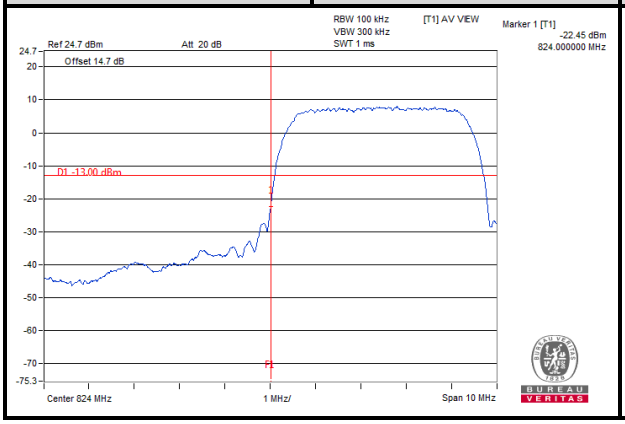
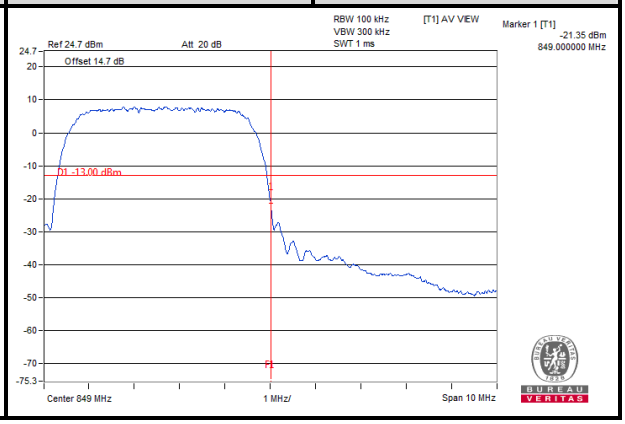
e. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RB of the spectrum is 30kHz and VB of the spectrum is 100kHz. (LTE bandwidth 3MHz)

f. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RB of the spectrum is 50kHz and VB of the spectrum is 200kHz. (LTE bandwidth 5MHz)

g. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RB of the spectrum is 100kHz and VB of the spectrum is 300kHz. (LTE bandwidth 10MHz)

h. Record the max trace plot into the test report.

## 4.4.4 Test Results

| GSM | | | |
|---|---|---|---|
| CHANNEL | 128 | CHANNEL | 251 |
|  | |  | |
| **EDGE** | | | |
| CHANNEL | 128 | CHANNEL | 251 |
|  | |  | |
| **WCDMA** | | | |
| CHANNEL | 4132 | CHANNEL | 4233 |
|  | |  | |

| LTE Band5 | | | | | |
|---|---|---|---|---|---|
| Channel Bandwidth: 1.4MHz | | | | | |
| CHANNEL | 20407 | 1 RB | CHANNEL | 20643 | 1 RB |
|  | | |  | | |

| LTE Band5 | | | | | |
|---|---|---|---|---|---|
| Channel Bandwidth: 1.4MHz | | | | | |
| CHANNEL | 20407 | Full RB | CHANNEL | 20643 | Full RB |
|  | | |  | | |

| LTE Band5 | | | | | |
|---|---|---|---|---|---|
| Channel Bandwidth: 3MHz | | | | | |
| CHANNEL | 20415 | 1 RB | CHANNEL | 20635 | 1 RB |
|  | | |  | | |
| LTE Band5 | | | | | |
| Channel Bandwidth: 3MHz | | | | | |
| CHANNEL | 20415 | Full RB | CHANNEL | 20635 | Full RB |
|  | | |  | | |

| LTE Band5 | | | | | |
|---|---|---|---|---|---|
| Channel Bandwidth: 5MHz | | | | | |
| CHANNEL | 20425 | 1 RB | CHANNEL | 20625 | 1 RB |
|  | | |  | | |

| LTE Band5 | | | | | |
|---|---|---|---|---|---|
| Channel Bandwidth: 5MHz | | | | | |
| CHANNEL | 20425 | Full RB | CHANNEL | 20625 | Full RB |
|  | | |  | | |

| LTE Band5 | | | | | |
|---|---|---|---|---|---|
| Channel Bandwidth: 10MHz | | | | | |
| CHANNEL | 20450 | 1 RB | CHANNEL | 20600 | 1 RB |



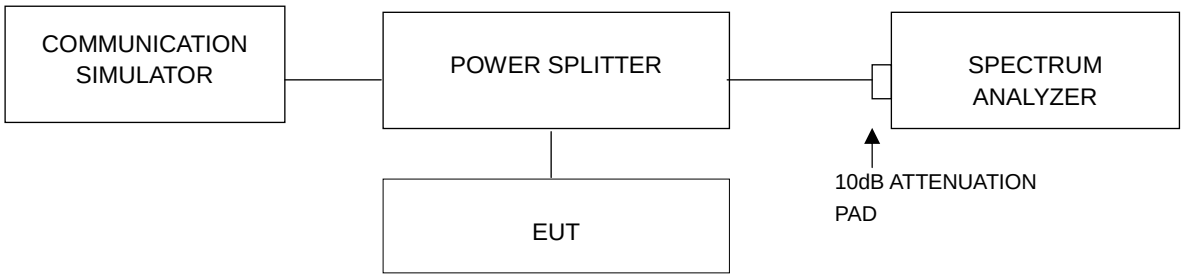
| LTE Band5 | | | | | |
|---|---|---|---|---|---|
| Channel Bandwidth: 10MHz | | | | | |
| CHANNEL | 20450 | Full RB | CHANNEL | 20600 | Full RB |


## 4.5 Peak To Average Ratio

### 4.5.1 Limits of Peak To Average Ratio Measurement

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

### 4.5.2 Test Setup




### 4.5.3 Test Procedures

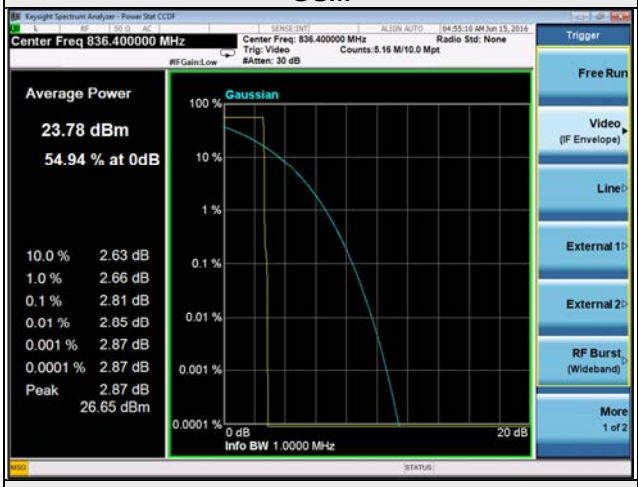
1. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1%.

4.5.4 Test Results

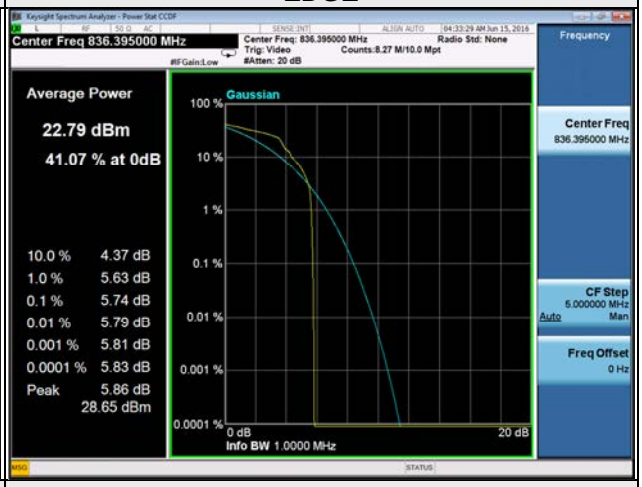
| Channel | Frequency (MHz) | Peak To Average Ratio (dB) | | Channel | Frequency (MHz) | Peak To Average Ratio (dB) |
|---|---|---|---|---|---|---|
| | | GSM | EDGE | | | WCDMA |
| 189 | 836.4 | 2.81 | 5.74 | 4182 | 836.4 | 3.05 |

**SPECTRUM PLOT OF WORST VALUE**

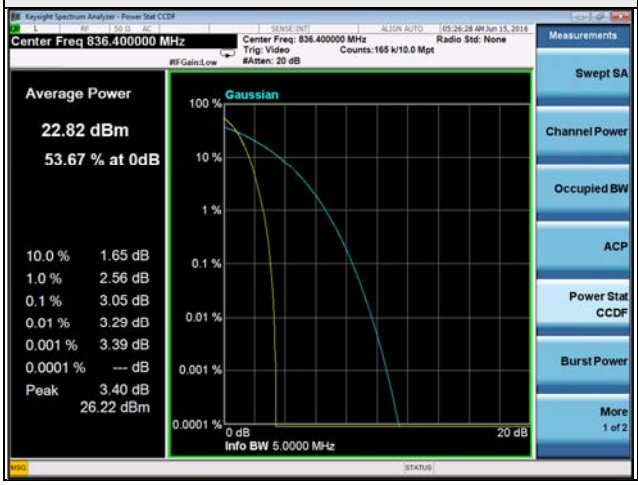
**GSM**




**EDGE**




**WCDMA**

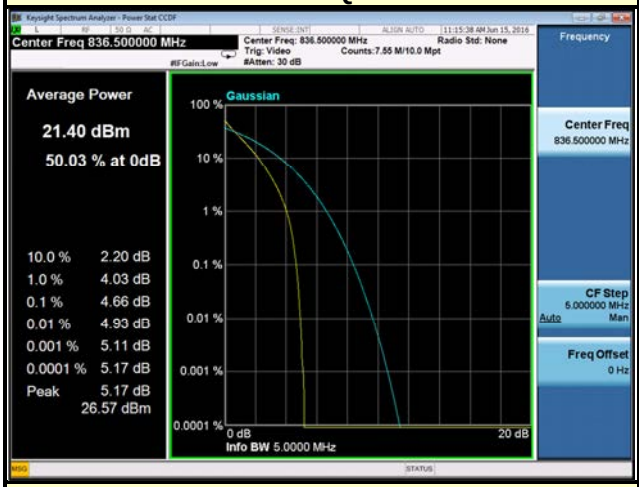


## LTE BAND 5

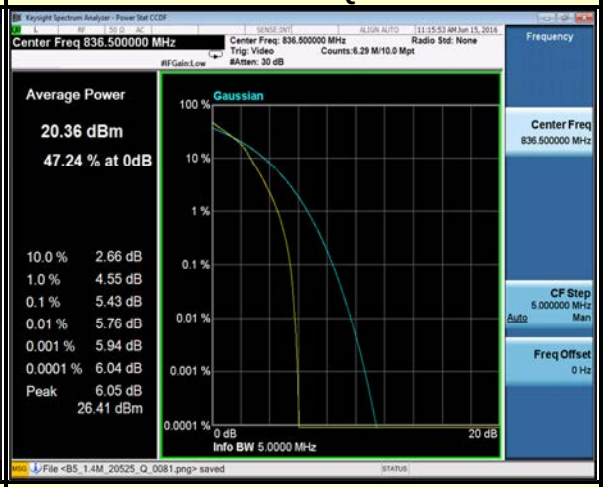
| CHANNEL BANDWIDTH: 1.4MHz | | | | CHANNEL BANDWIDTH: 3MHz | | | |
|---|---|---|---|---|---|---|---|
| CHANNEL | FREQUENCY (MHz) | PEAK TO AVERAGE RATIO (dB) | | CHANNEL | FREQUENCY (MHz) | PEAK TO AVERAGE RATIO (dB) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 20407 | 824.7 | 4.62 | 5.37 | 20415 | 825.5 | 4.65 | 5.40 |
| 20525 | 836.5 | 4.66 | 5.43 | 20525 | 836.5 | 4.70 | 5.45 |
| 20643 | 848.3 | 4.65 | 5.41 | 20635 | 847.5 | 4.71 | 5.45 |

**SPECTRUM PLOT OF WORST VALUE**

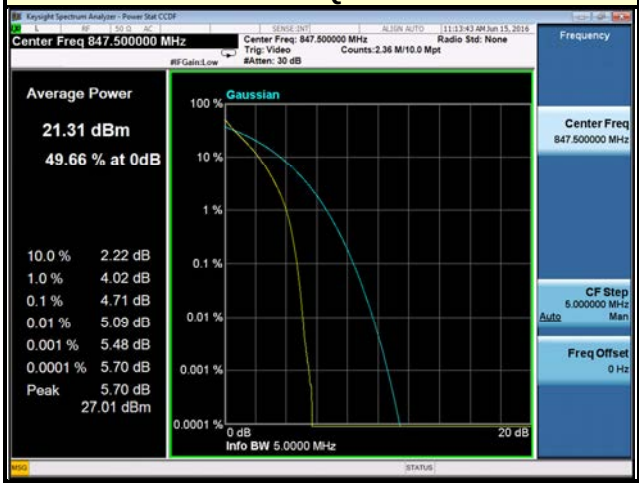
**1.4MHz/QPSK**



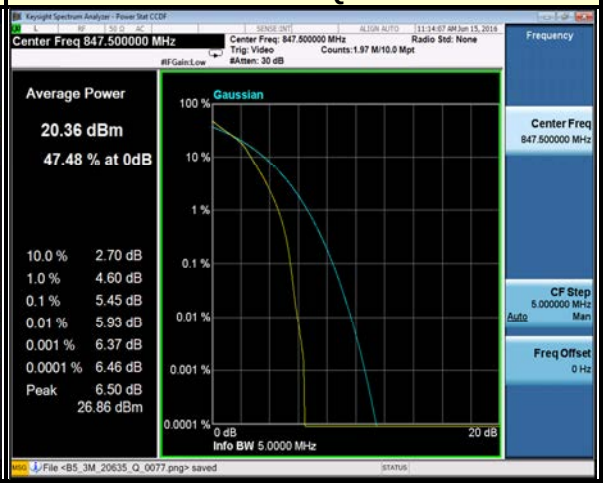

**1.4MHz/16QAM**




**3MHz/QPSK**



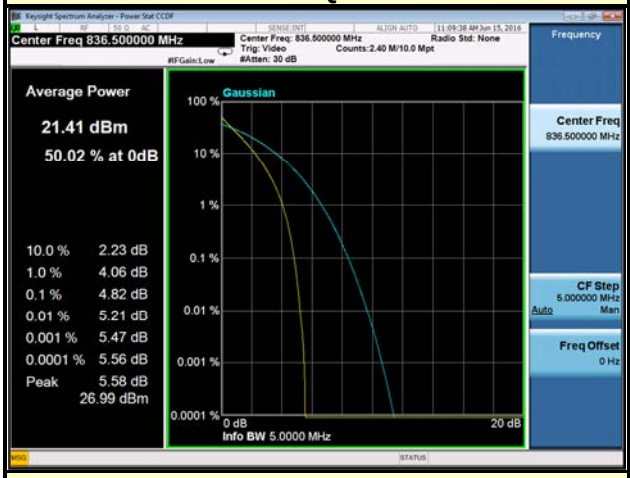

**3MHz/16QAM**



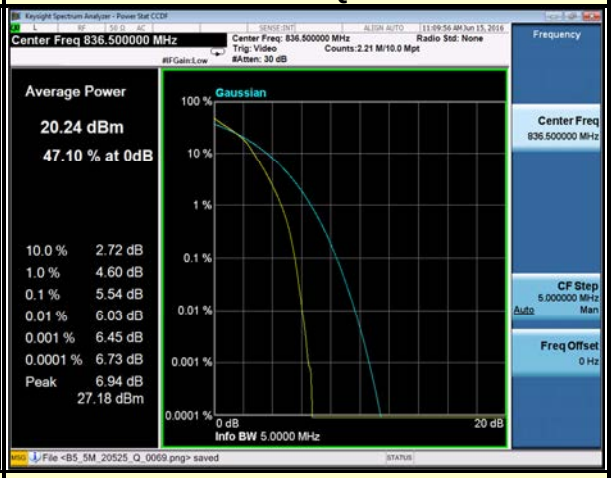
| CHANNEL BANDWIDTH: 5MHz | | | | CHANNEL BANDWIDTH: 10MHz | | | |
|---|---|---|---|---|---|---|---|
| CHANNEL | FREQUENCY (MHz) | PEAK TO AVERAGE RATIO (dB) | | CHANNEL | FREQUENCY (MHz) | PEAK TO AVERAGE RATIO (dB) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 20425 | 826.5 | 4.76 | 5.46 | 20450 | 829 | 4.62 | 5.36 |
| 20525 | 836.5 | 4.82 | 5.54 | 20525 | 836.5 | 4.67 | 5.38 |
| 20625 | 846.5 | 4.78 | 5.50 | 20600 | 844 | 4.69 | 5.43 |

**SPECTRUM PLOT OF WORST VALUE**

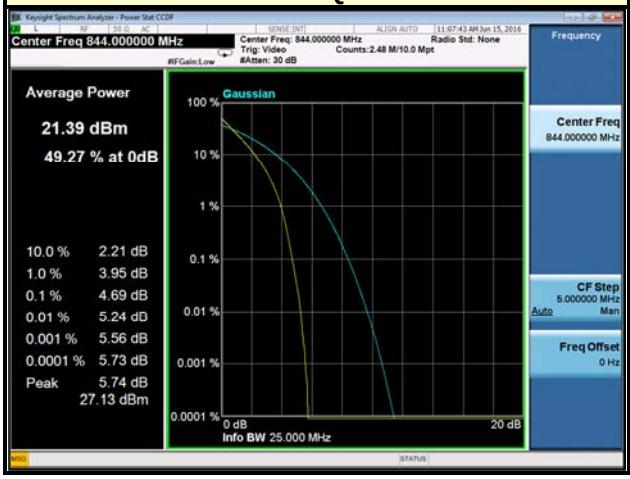
**5MHz/QPSK**



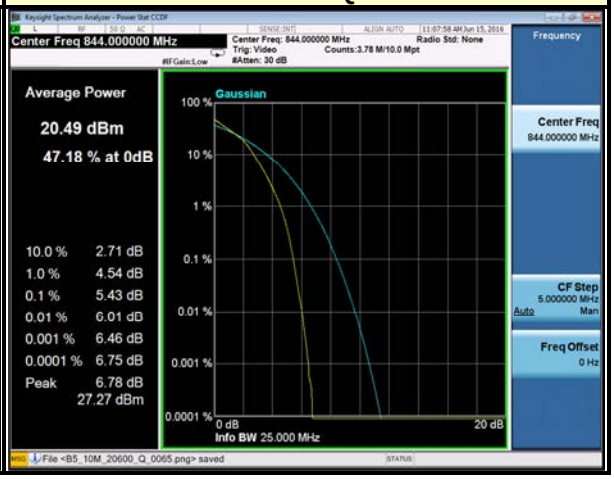

**5MHz/16QAM**




**10MHz/QPSK**




**10MHz/16QAM**

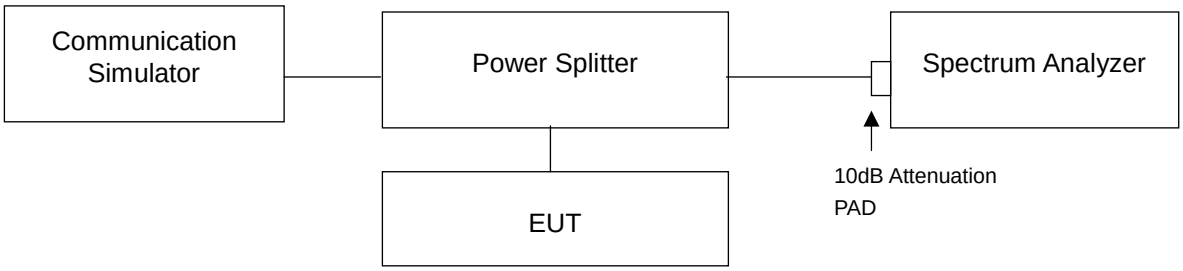


## 4.6 Conducted Spurious Emissions

### 4.6.1 Limits of Conducted Spurious Emissions Measurement

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. The emission limit equal to –13dBm.

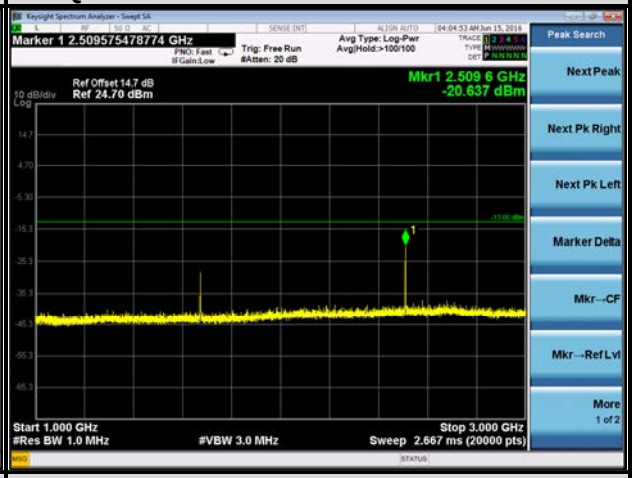
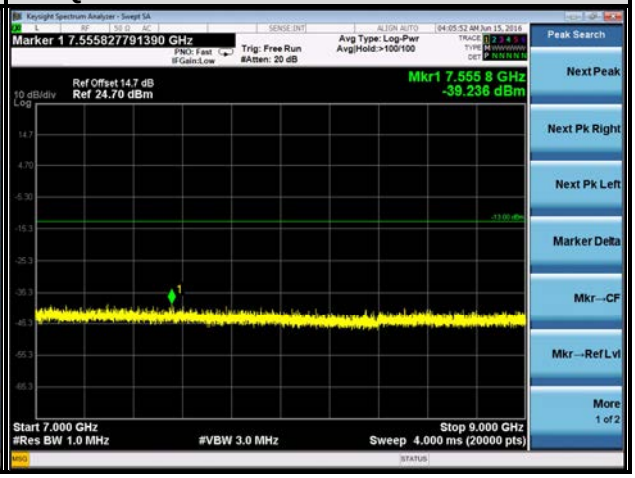
### 4.6.2 Test Setup

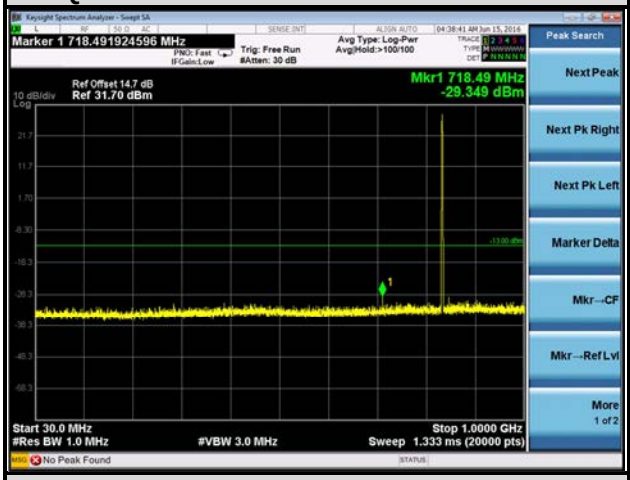
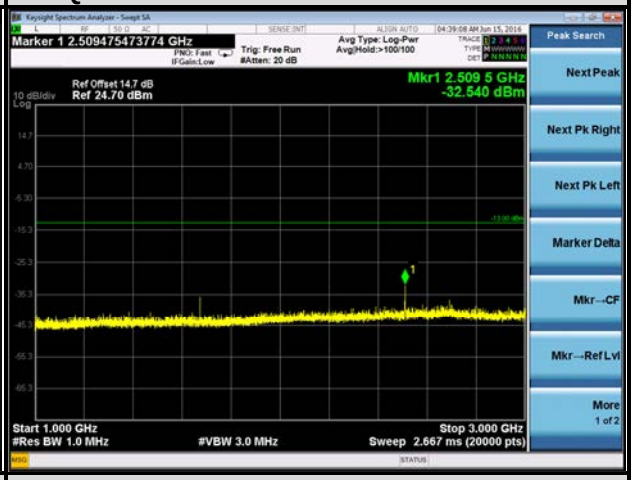
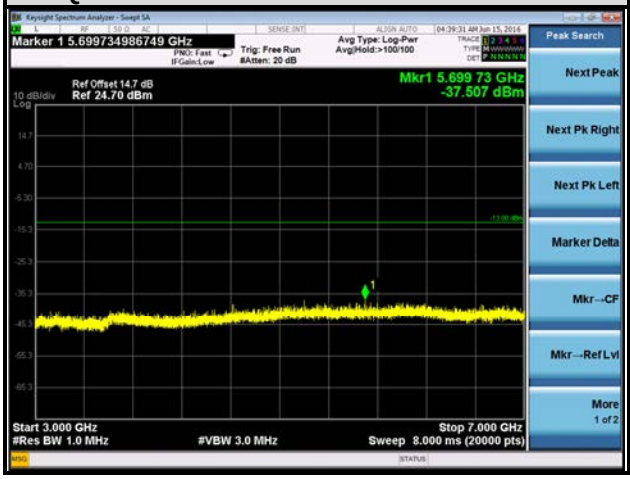
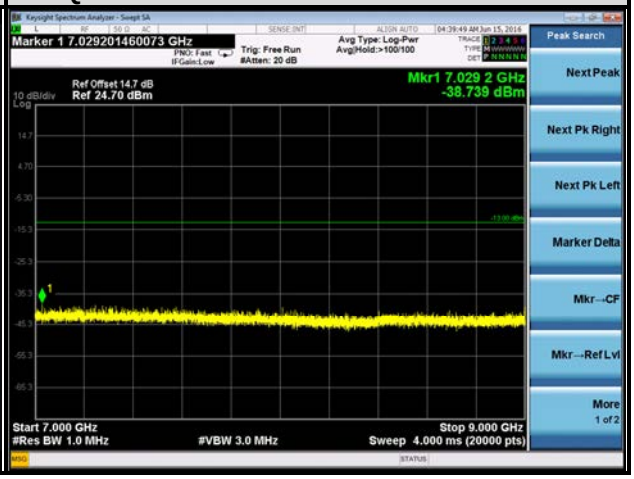


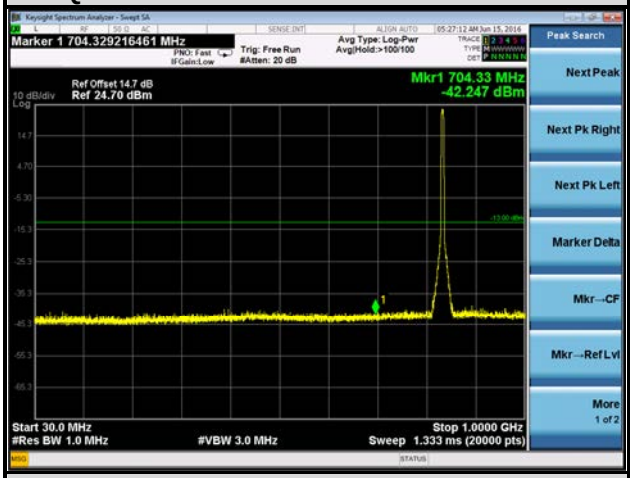
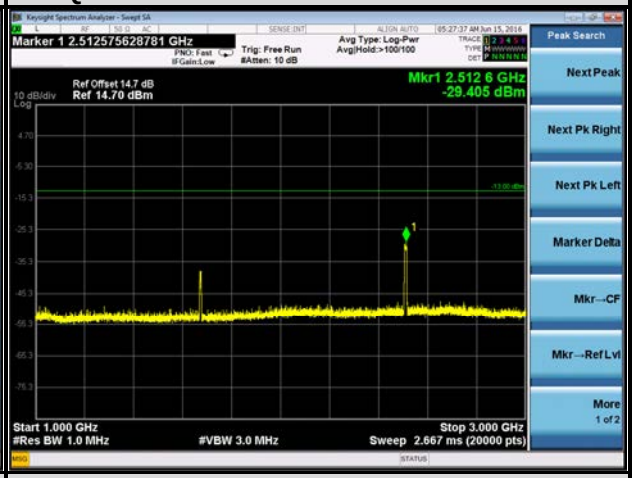
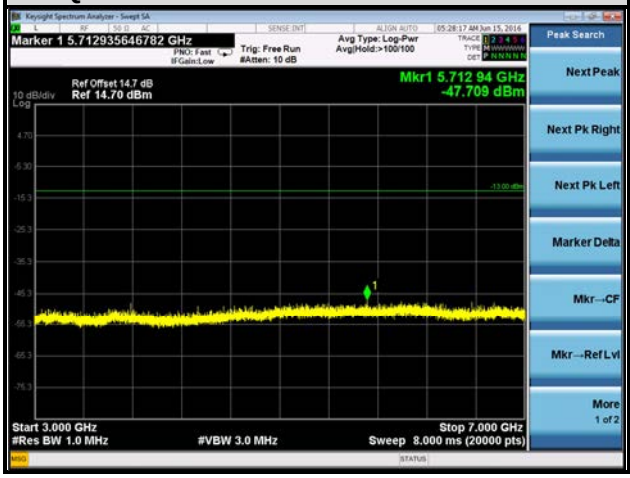
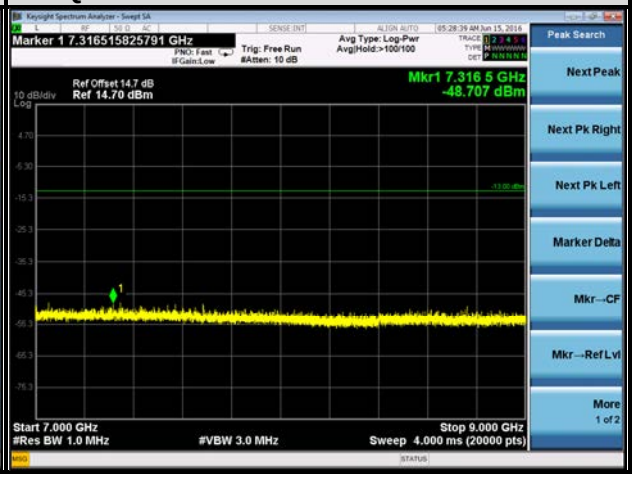

### 4.6.3 Test Procedure

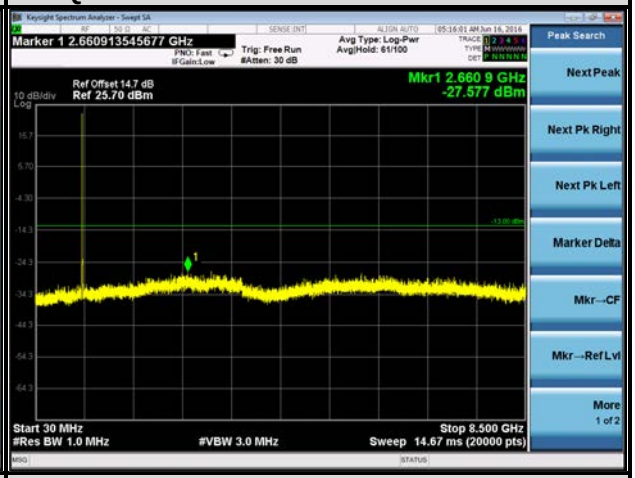
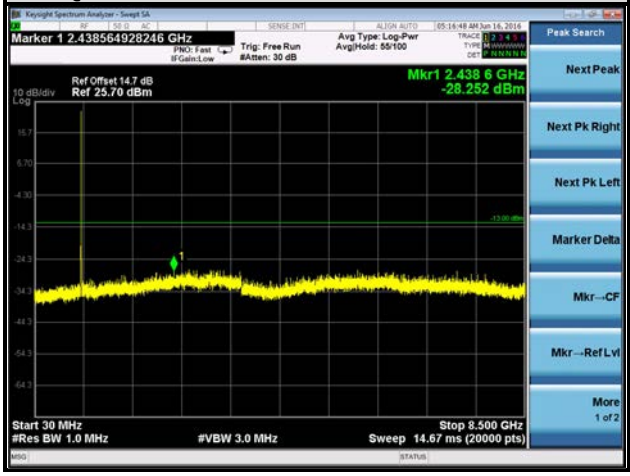
a. The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
b. Measuring frequency range is from 9 kHz to 9GHz. 20dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.

4.6.4 Test Results

| GSM | |
|---|---|
| CHANNEL 189 | |
| FREQUENCY RANGE : 30MHz~1GHz | FREQUENCY RANGE : 1GHz~3GHz |
|  |  |
| FREQUENCY RANGE : 3GHz~7GHz | FREQUENCY RANGE : 7GHz~9GHz |
|  |  |

| EDGE | |
|---|---|
| CHANNEL 189 | |
| FREQUENCY RANGE : 30MHz~1GHz | FREQUENCY RANGE : 1GHz~3GHz |
|  |  |
| FREQUENCY RANGE : 3GHz~7GHz | FREQUENCY RANGE : 7GHz~9GHz |
|  |  |

| WCDMA | |
|---|---|
| CHANNEL 4182 | |
| FREQUENCY RANGE : 30MHz~1GHz | FREQUENCY RANGE : 1GHz~3GHz |
|  |  |
| FREQUENCY RANGE : 3GHz~7GHz | FREQUENCY RANGE : 7GHz~9GHz |
|  |  |

| LTE Band 5 (Channel Bandwidth: 1.4MHz) | LTE Band 5 (Channel Bandwidth: 3MHz) |
|---|---|
| CHANNEL 20525 | CHANNEL 20525 |
| FREQUENCY RANGE : 30MHz~9.0GHz | FREQUENCY RANGE : 30MHz~9.0GHz |
|  |  |
| LTE Band 5 (Channel Bandwidth: 5MHz) | LTE Band 5 (Channel Bandwidth: 10MHz) |
| CHANNEL 20525 | CHANNEL 20525 |
| FREQUENCY RANGE : 30MHz~9.0GHz | FREQUENCY RANGE : 30MHz~9.0GHz |
|  |  |

## 4.7 Radiated Emission Measurement

### 4.7.1 Limits of Radiated Emission Measurement

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. The emission limit equal to –13dBm.

### 4.7.2 Test Procedure

a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.

b. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value “ of step a. Record the power level of S.G

c. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.

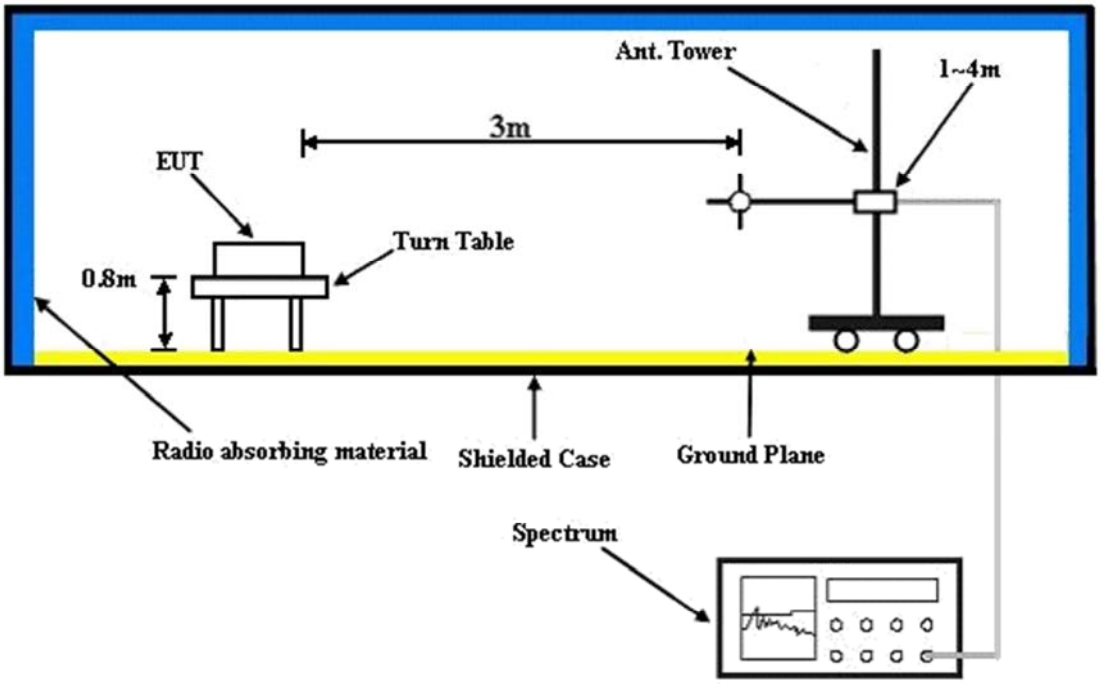
d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.R.P power - 2.15dBi.

**NOTE:** The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

### 4.7.3 Deviation from Test Standard

No deviation.

4.7.4 Test Setup




For the actual test configuration, please refer to the attached file (Test Setup Photo).

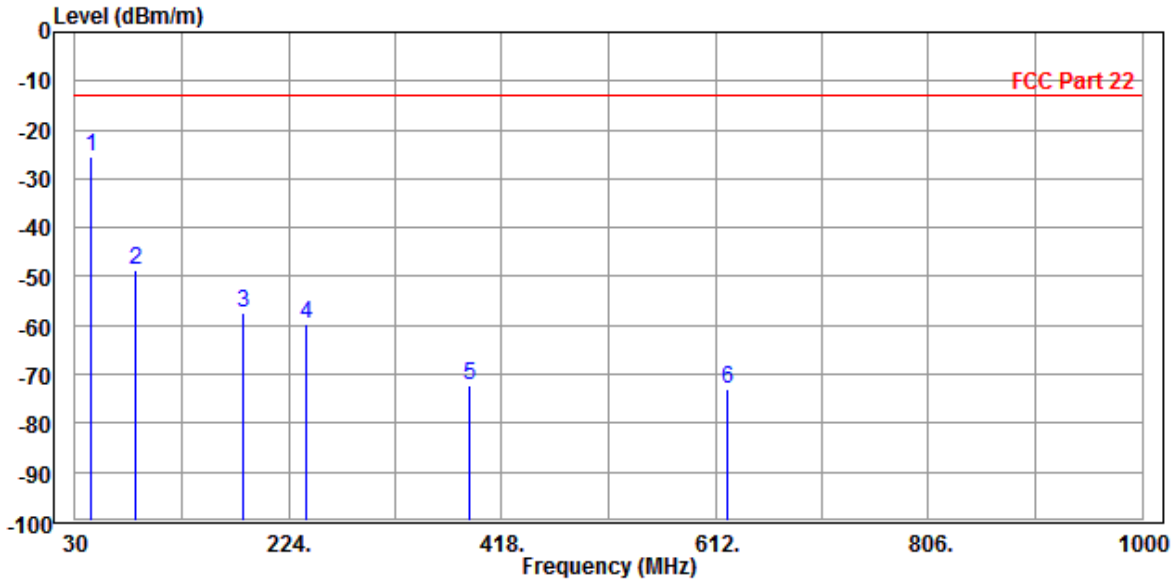
4.7.5 Test Results

**BELOW 1GHz WORST-CASE DATA**

**GSM 850:**

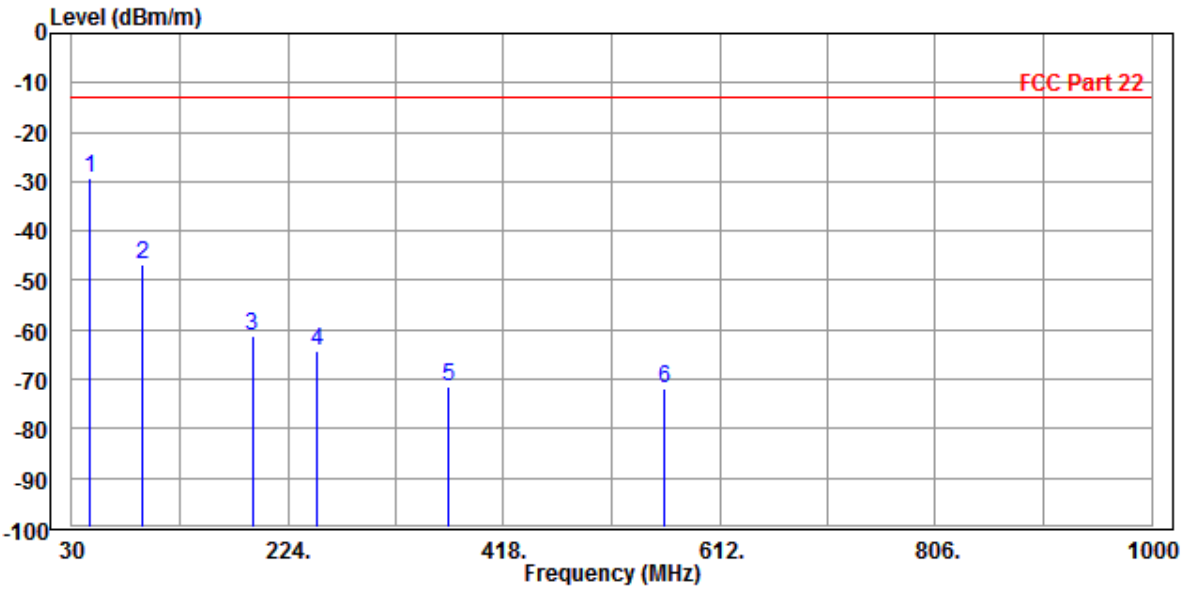
| | | | |
|---|---|---|---|
| **MODE** | TX channel 189 | **FREQUENCY RANGE** | Below 1000MHz |
| **ENVIRONMENTAL CONDITIONS** | 26deg. C, 56%RH | **INPUT POWER** | DC 5V from adapter |
| **TESTED BY** | Alex Chen | | |
| **ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M** | | | |

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 PP | 43.580 | -25.66 | -34.60 | -13.00 | -12.66 | 8.94 | Peak | Horizontal |
| 2 | 85.290 | -48.83 | -40.45 | -13.00 | -35.83 | -8.38 | Peak | Horizontal |
| 3 | 183.260 | -57.58 | -39.90 | -13.00 | -44.58 | -17.68 | Peak | Horizontal |
| 4 | 240.490 | -59.70 | -43.24 | -13.00 | -46.70 | -16.46 | Peak | Horizontal |
| 5 | 388.900 | -72.25 | -61.42 | -13.00 | -59.25 | -10.83 | Peak | Horizontal |
| 6 | 622.670 | -72.91 | -64.97 | -13.00 | -59.91 | -7.94 | Peak | Horizontal |



| MODE | TX channel 189 | FREQUENCY RANGE | Below 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 5V from adapter |
| TESTED BY | Alex Chen | | |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | |

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 PP | 45.520 | -29.09 | -25.75 | -13.00 | -16.09 | -3.34 | Peak | Vertical |
| 2 | 93.050 | -46.92 | -36.34 | -13.00 | -33.92 | -10.58 | Peak | Vertical |
| 3 | 191.990 | -61.36 | -49.71 | -13.00 | -48.36 | -11.65 | Peak | Vertical |
| 4 | 250.190 | -64.33 | -52.81 | -13.00 | -51.33 | -11.52 | Peak | Vertical |
| 5 | 368.530 | -71.46 | -60.41 | -13.00 | -58.46 | -11.05 | Peak | Vertical |
| 6 | 562.530 | -71.98 | -64.68 | -13.00 | -58.98 | -7.30 | Peak | Vertical |

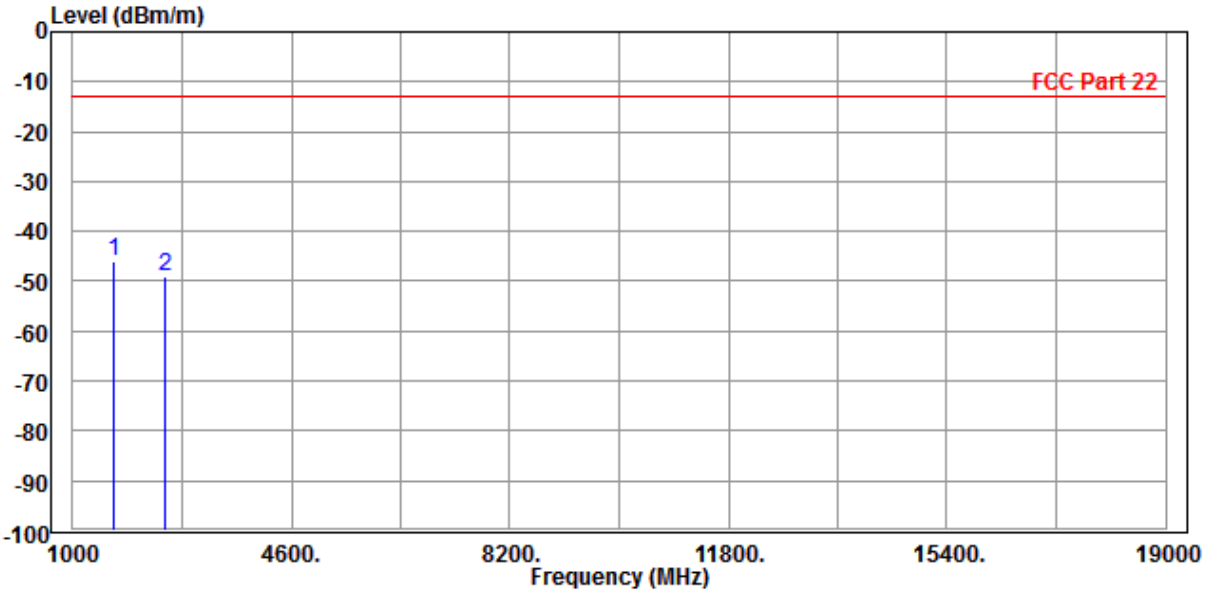


## ABOVE 1GHz DATA

**GSM 850:**

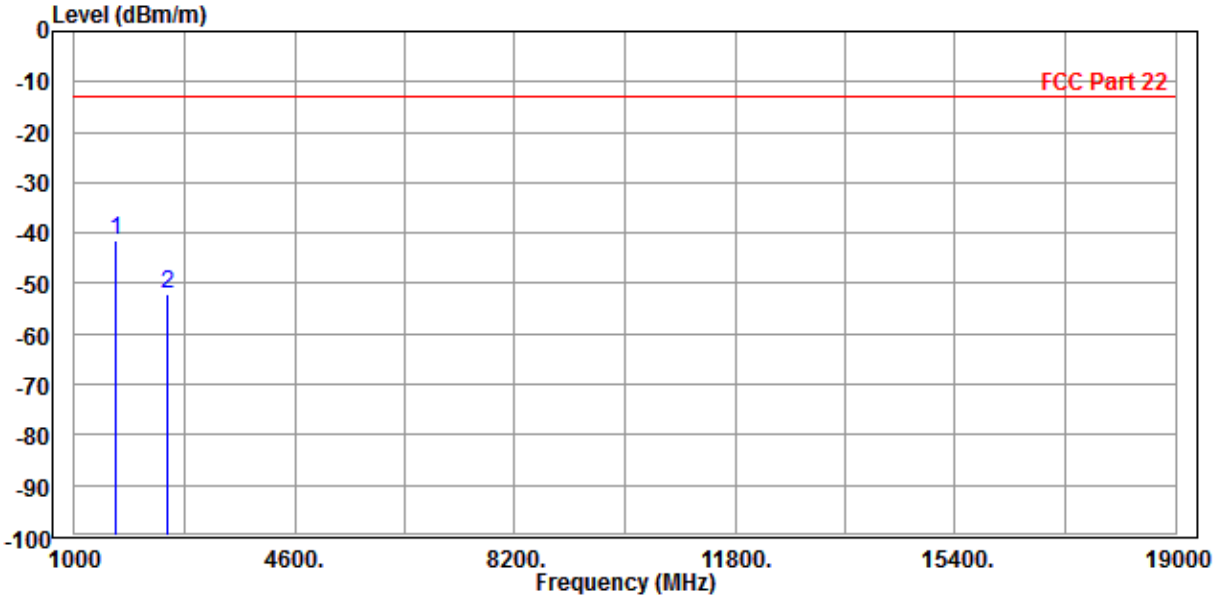
| | | | |
|---|---|---|---|
| **MODE** | TX channel 189 | **FREQUENCY RANGE** | Above 1000MHz |
| **ENVIRONMENTAL CONDITIONS** | 26deg. C, 56%RH | **INPUT POWER** | DC 5V from adapter |
| **TESTED BY** | Alex Chen | | |
| **ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M** | | | |

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 PP | 1666.000 | -46.02 | -41.20 | -13.00 | -33.02 | -4.82 | Peak | Horizontal |
| 2 | 2512.000 | -49.03 | -47.44 | -13.00 | -36.03 | -1.59 | Peak | Horizontal |



| | | | |
|---|---|---|---|
| **MODE** | TX channel 189 | **FREQUENCY RANGE** | Above 1000MHz |
| **ENVIRONMENTAL CONDITIONS** | 26deg. C, 56%RH | **INPUT POWER** | DC 5V from adapter |
| **TESTED BY** | Alex Chen | | |
| **ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M** | | | |

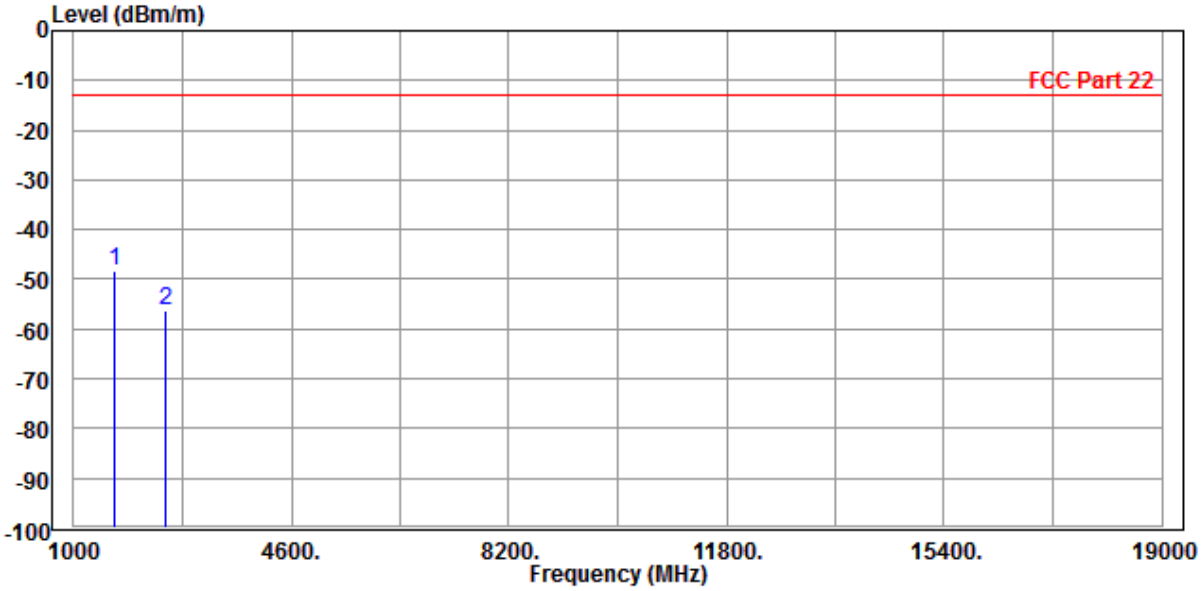
| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 PP | 1666.000 | -41.52 | -38.14 | -13.00 | -28.52 | -3.38 | Peak | Vertical |
| 2 | 2512.000 | -52.21 | -52.09 | -13.00 | -39.21 | -0.12 | Peak | Vertical |



**EDGE 850:**

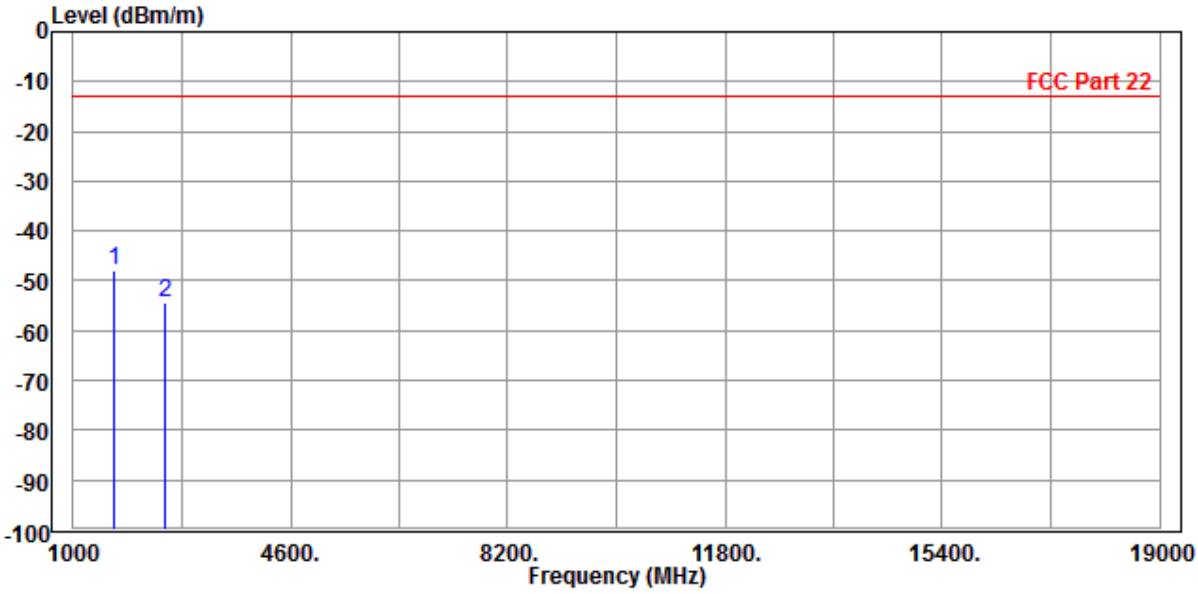
| MODE | TX channel 189 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 5V from adapter |
| TESTED BY | Alex Chen | | |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | |

| | | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | PP | 1666.000 | -48.47 | -43.65 | -13.00 | -35.47 | -4.82 | Peak | Horizontal |
| 2 | | 2512.000 | -56.37 | -54.78 | -13.00 | -43.37 | -1.59 | Peak | Horizontal |



| MODE | TX channel 189 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 5V from adapter |
| TESTED BY | Alex Chen | | |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | |

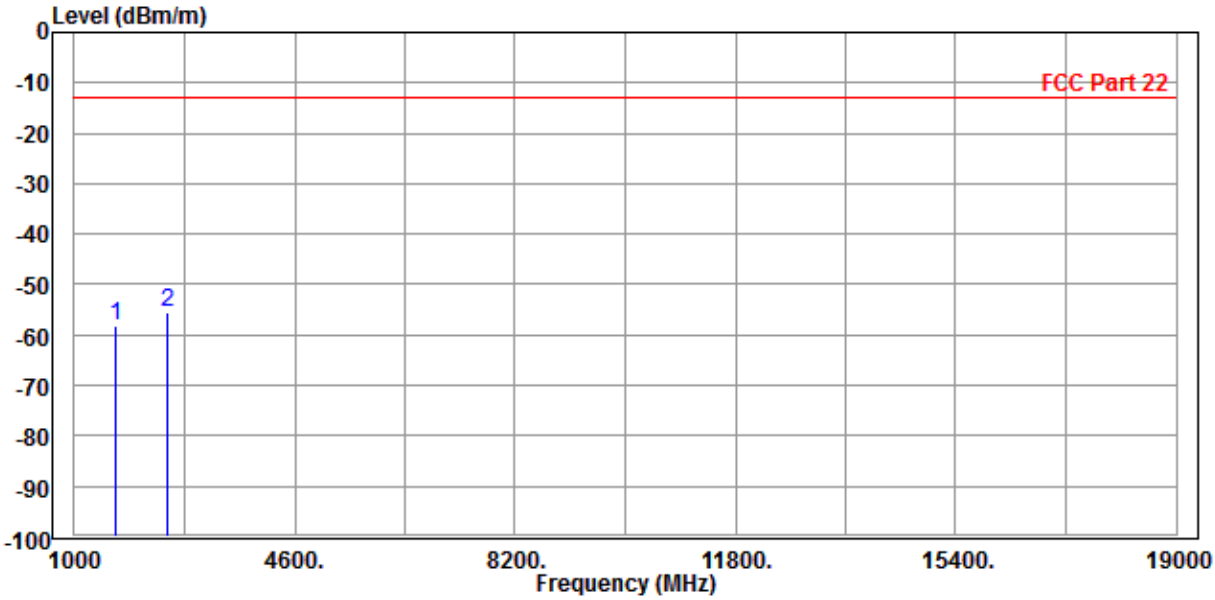
| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | PP 1666.000 | -47.79 | -44.41 | -13.00 | -34.79 | -3.38 | Peak | Vertical |
| 2 | 2512.000 | -54.38 | -54.26 | -13.00 | -41.38 | -0.12 | Peak | Vertical |



**WCDMA Band V:**

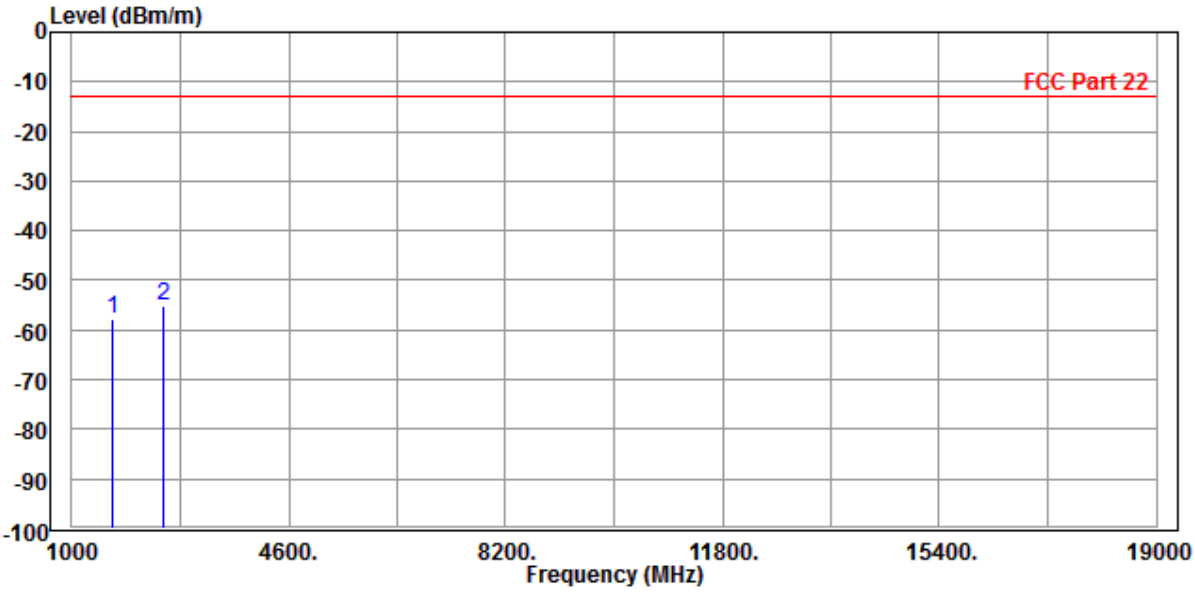
| MODE | TX channel 4182 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 5V from adapter |
| TESTED BY | Alex Chen | | |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | |

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | 1666.000 | -58.31 | -53.49 | -13.00 | -45.31 | -4.82 | Peak | Horizontal |
| 2 PP | 2512.000 | -55.39 | -53.80 | -13.00 | -42.39 | -1.59 | Peak | Horizontal |



| | | | |
|---|---|---|---|
| **MODE** | TX channel 4182 | **FREQUENCY RANGE** | Above 1000MHz |
| **ENVIRONMENTAL CONDITIONS** | 26deg. C, 56%RH | **INPUT POWER** | DC 5V from adapter |
| **TESTED BY** | Alex Chen | | |
| **ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M** | | | |

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | 1666.000 | -57.78 | -54.40 | -13.00 | -44.78 | -3.38 | Peak | Vertical |
| 2 PP | 2512.000 | -55.30 | -55.18 | -13.00 | -42.30 | -0.12 | Peak | Vertical |

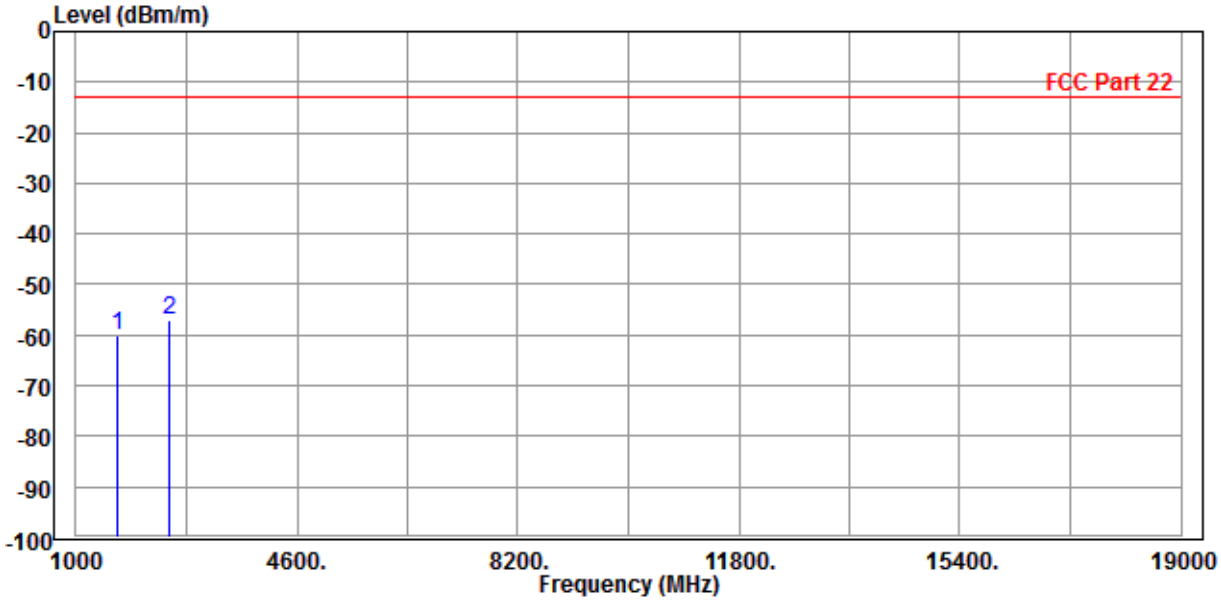


## LTE Band 5

### CHANNEL BANDWIDTH: 1.4MHz / QPSK

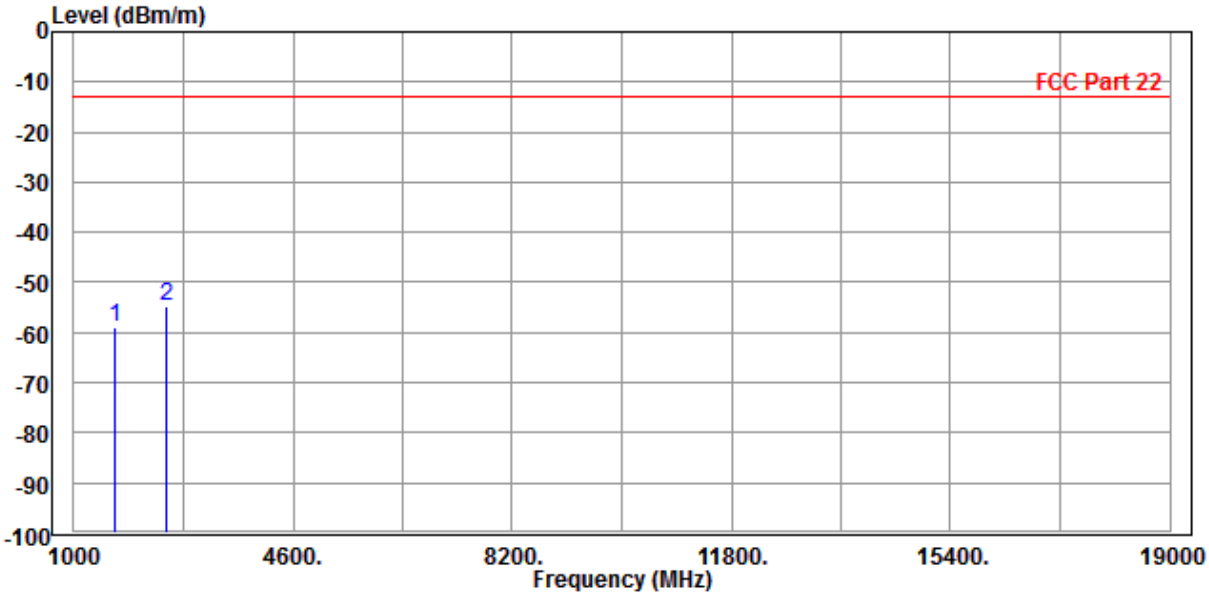
| MODE | TX channel 20525 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 5V from adapter |
| TESTED BY | Alex Chen | | |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | |

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | 1666.000 | -59.96 | -55.14 | -13.00 | -46.96 | -4.82 | Peak | Horizontal |
| 2 PP | 2512.000 | -57.13 | -55.54 | -13.00 | -44.13 | -1.59 | Peak | Horizontal |



| MODE | TX channel 20525 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 5V from adapter |
| TESTED BY | Alex Chen | | |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | |

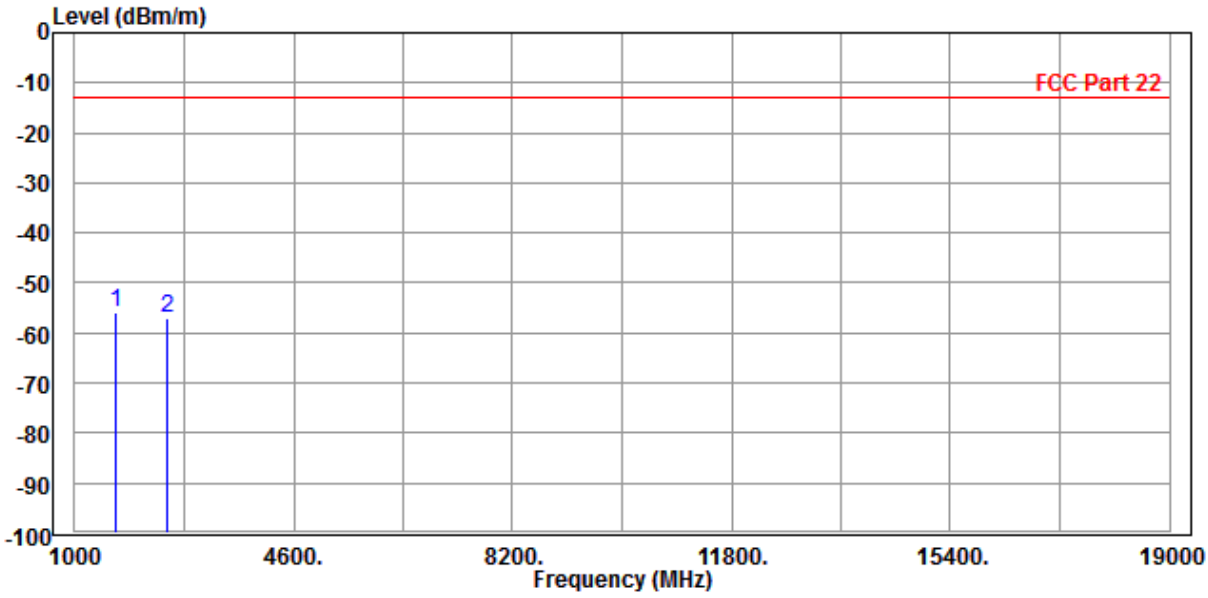
| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | 1666.000 | -58.85 | -55.47 | -13.00 | -45.85 | -3.38 | Peak | Vertical |
| 2 PP | 2512.000 | -54.62 | -54.50 | -13.00 | -41.62 | -0.12 | Peak | Vertical |



## CHANNEL BANDWIDTH: 3MHz / QPSK

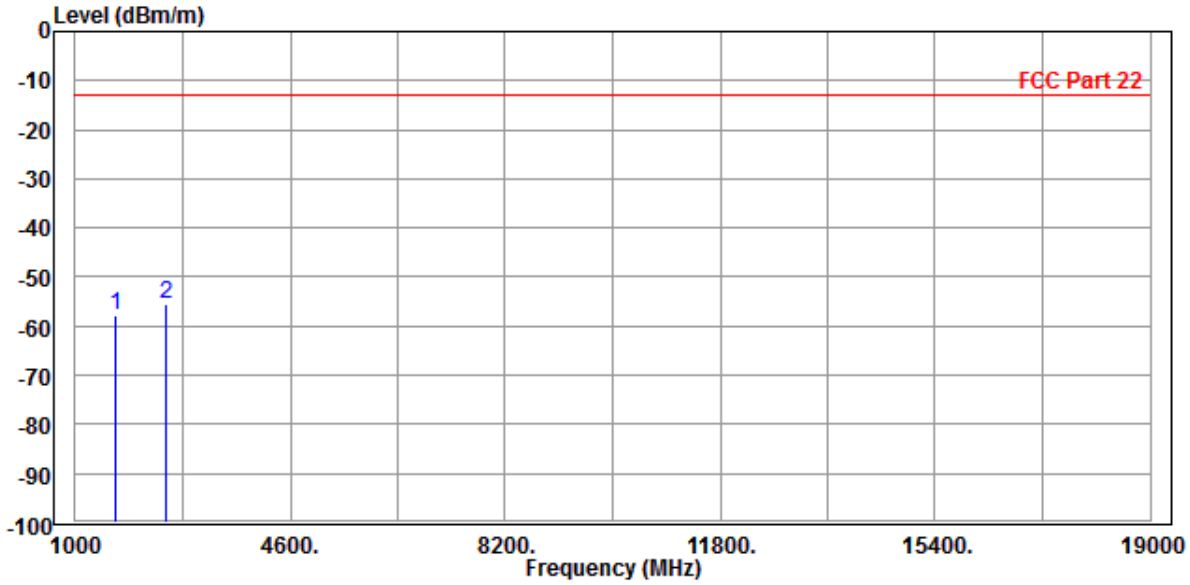
| MODE | TX channel 20525 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 5V from adapter |
| TESTED BY | Alex Chen | | |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | |

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | PP 1666.000 | -55.93 | -51.11 | -13.00 | -42.93 | -4.82 | Peak | Horizontal |
| 2 | 2512.000 | -56.89 | -55.30 | -13.00 | -43.89 | -1.59 | Peak | Horizontal |



| MODE | TX channel 20525 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 5V from adapter |
| TESTED BY | Alex Chen | | |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | |

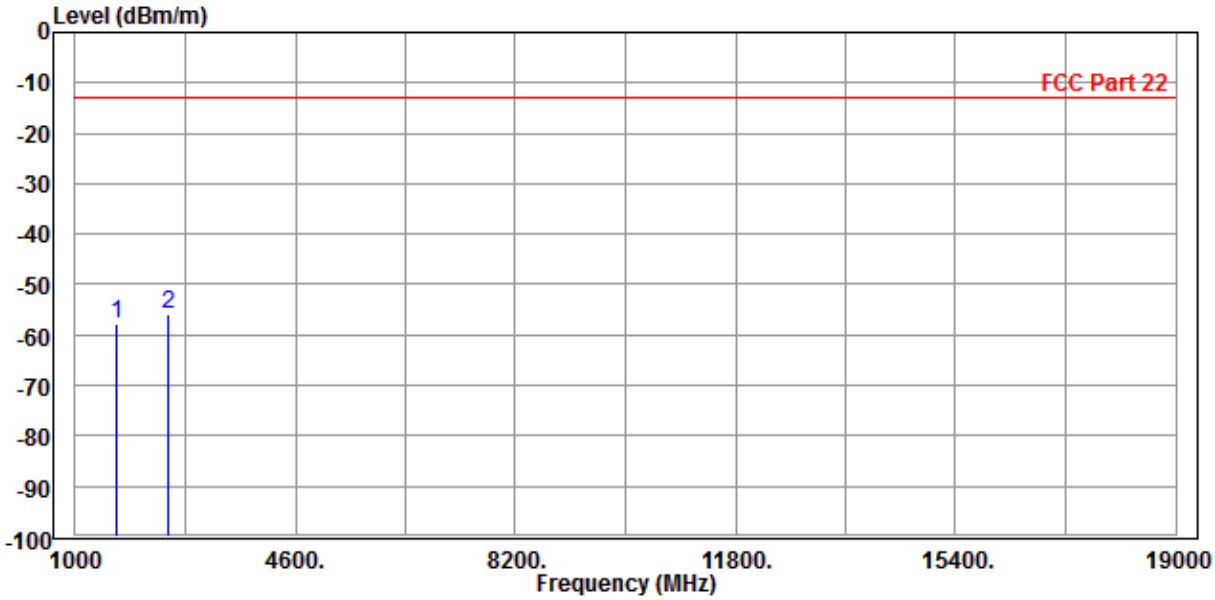
| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | 1666.000 | -57.89 | -54.51 | -13.00 | -44.89 | -3.38 | Peak | Vertical |
| 2 PP | 2512.000 | -55.39 | -55.27 | -13.00 | -42.39 | -0.12 | Peak | Vertical |



## CHANNEL BANDWIDTH: 5MHz / QPSK

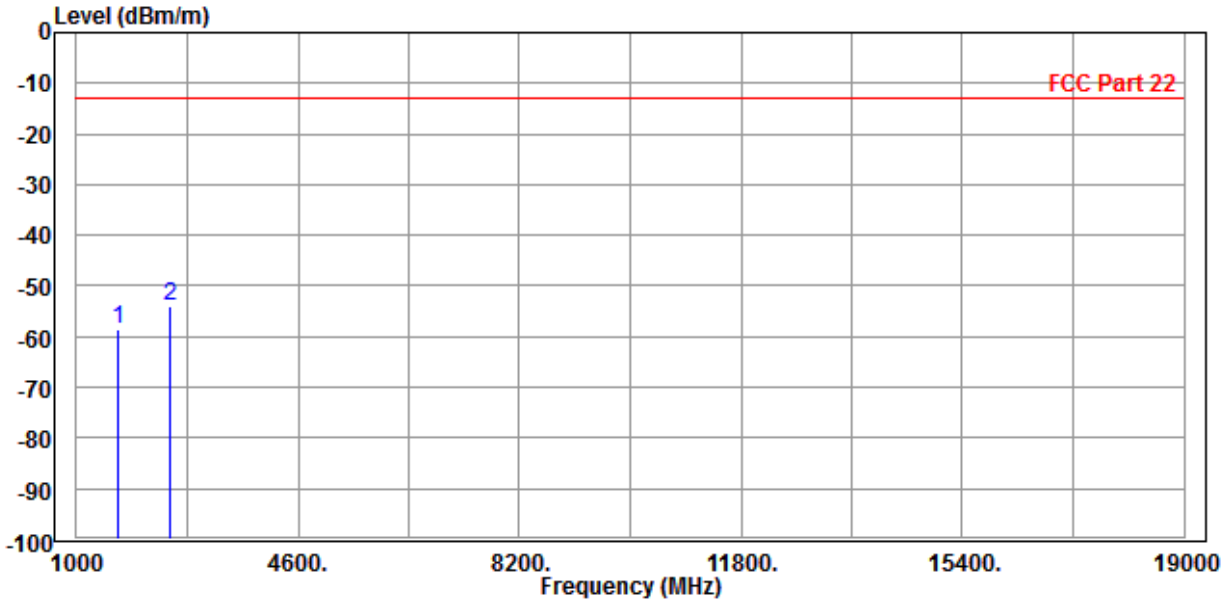
| MODE | TX channel 20525 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 5V from adapter |
| TESTED BY | Alex Chen | | |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | |

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | 1666.000 | -57.98 | -53.16 | -13.00 | -44.98 | -4.82 | Peak | Horizontal |
| 2 PP | 2512.000 | -55.96 | -54.37 | -13.00 | -42.96 | -1.59 | Peak | Horizontal |



| MODE | TX channel 20525 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 5V from adapter |
| TESTED BY | Alex Chen | | |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | |

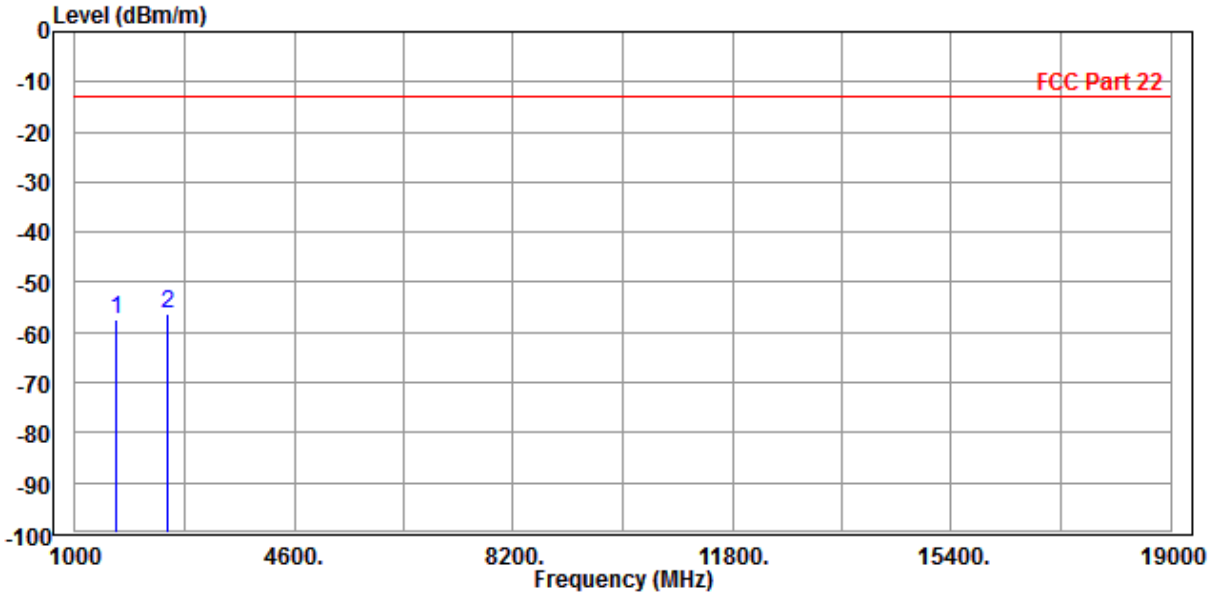
| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | 1666.000 | -58.58 | -55.20 | -13.00 | -45.58 | -3.38 | Peak | Vertical |
| 2 PP | 2512.000 | -54.05 | -53.93 | -13.00 | -41.05 | -0.12 | Peak | Vertical |



## CHANNEL BANDWIDTH: 10MHz / QPSK

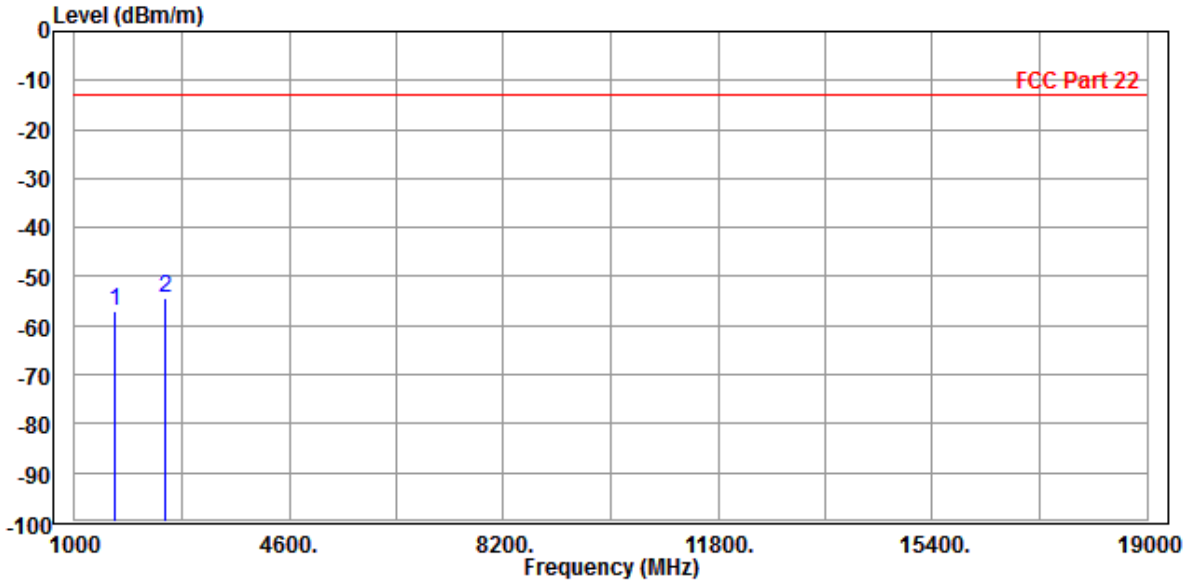
| MODE | TX channel 20525 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 5V from adapter |
| TESTED BY | Alex Chen | | |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | |

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | 1666.000 | -57.30 | -52.48 | -13.00 | -44.30 | -4.82 | Peak | Horizontal |
| 2 PP | 2512.000 | -56.46 | -54.87 | -13.00 | -43.46 | -1.59 | Peak | Horizontal |



| MODE | TX channel 20525 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 5V from adapter |
| TESTED BY | Alex Chen | | |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | |

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | 1666.000 | -56.85 | -53.47 | -13.00 | -43.85 | -3.38 | Peak | Vertical |
| 2 PP | 2512.000 | -54.55 | -54.43 | -13.00 | -41.55 | -0.12 | Peak | Vertical |



## 5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

**Appendix – Information on the Testing Laboratories**

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:


**Linko EMC/RF Lab**
Tel: 886-2-26052180
Fax: 886-2-26051924

**Hsin Chu EMC/RF Lab/Telecom Lab**
Tel: 886-3-5935343
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**Email:** service.adt@tw.bureauveritas.com
**Web Site:** www.bureauveritas-adt.com


The address and road map of all our labs can be found in our web site also.

**--- END ---**