

## FCC Test Report

### (PART 22)

**Report No.:** RF151026C18

**FCC ID:** YA7-ATVT-1543

**Test Model:** AL7

**Received Date:** Oct. 26, 2015

**Test Date:** Nov. 02, 2015 ~ Dec. 08, 2015

**Issued Date:** Dec. 08, 2015

**Applicant:** Atrack Technology Inc.

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(R.O.C.)

**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

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33383, Taiwan, R.O.C.



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### Release Control Record

| Issue No.   | Description      | Date Issued   |
|-------------|------------------|---------------|
| RF151026C18 | Original Release | Dec. 08, 2015 |

## 1 Certificate of Conformity

**Product:** Tracker

**Brand:** ATrack Technology Inc.

**Test Model:** AL7

**Sample Status:** Identical Prototype

**Applicant:** Atrack Technology Inc.

**Test Date:** Nov. 02, 2015 ~ Dec. 08, 2015

**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 :** Rona Chen , **Date:** Dec. 08, 2015  
Rona Chen / Specialist

**Approved by :** David Huang , **Date:** Dec. 08, 2015  
David Huang / Project Engineer

## 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                                 | 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 -24.82 dB at 2509.20 MHz. |

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

## 2.2 Test Site and Instruments

| Description & Manufacturer                     | Model No.      | Serial No.          | Date of Calibration | Due Date of Calibration |
|------------------------------------------------|----------------|---------------------|---------------------|-------------------------|
| Test Receiver<br>Agilent                       | N9038A         | MY51210203          | Jan. 21, 2015       | Jan. 21, 2016           |
| Spectrum Analyzer<br>Agilent                   | N9010A         | MY52220314          | Sep. 03, 2015       | Sep. 02, 2016           |
| Spectrum Analyzer<br>ROHDE & SCHWARZ           | FSU43          | 101261              | Dec. 10, 2014       | Dec. 09, 2015           |
| BILOG Antenna<br>SCHWARZBECK                   | VULB9168       | 9168-472            | Feb. 04, 2015       | Feb. 04, 2016           |
| HORN Antenna<br>SCHWARZBECK                    | BBHA 9120 D    | 9120D-969           | Feb. 09, 2015       | Feb. 09, 2016           |
| HORN Antenna<br>SCHWARZBECK                    | BBHA 9170      | 9170-480            | Feb. 04, 2015       | Feb. 04, 2016           |
| Loop Antenna                                   | EM-6879        | 269                 | Jul. 31, 2015       | Jul. 30, 2016           |
| Preamplifier<br>EMCI                           | EMC 012645     | 980115              | Dec. 12, 2014       | Dec. 11, 2015           |
| Preamplifier<br>EMCI                           | EMC 184045     | 980116              | Jan. 09, 2015       | Jan. 08, 2016           |
| Preamplifier<br>EMCI                           | EMC 330H       | 980112              | Dec. 27, 2014       | Dec. 26, 2015           |
| Power Meter<br>Anritsu                         | ML2495A        | 1232002             | Sep. 21, 2015       | Sep. 20, 2016           |
| Power Sensor<br>Anritsu                        | MA2411B        | 1207325             | Sep. 21, 2015       | Sep. 20, 2016           |
| RF signal cable<br>HUBER+SUHNNER               | SUCOFLEX 104   | 309219/4<br>2950114 | Oct. 12, 2015       | Oct. 11, 2016           |
| RF signal cable<br>HUBER+SUHNNER               | SUCOFLEX 104   | 250130/4            | Oct. 12, 2015       | Oct. 11, 2016           |
| RF Coaxial Cable<br>Worken                     | 8D-FB          | Cable-Ch10-01       | Oct. 12, 2015       | Oct. 11, 2016           |
| Software<br>BV ADT                             | E3<br>6.120103 | NA                  | NA                  | NA                      |
| Antenna Tower<br>MF                            | MFA-440H       | NA                  | NA                  | NA                      |
| Turn Table<br>MF                               | MFT-201SS      | NA                  | NA                  | NA                      |
| Antenna Tower & Turn<br>Table Controller<br>MF | MF-7802        | NA                  | NA                  | NA                      |
| Radio Communication<br>Analyzer                | MT8820C        | 6201300640          | Aug. 10, 2015       | Aug. 09, 2017           |

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 test was performed in HwaYa Chamber 10.

3. The horn antenna and preamplifier (model: EMC 184045) are used only for the measurement of emission frequency above 1 GHz if tested.

4. The FCC Site Registration No. is 690701.

5. The IC Site Registration No. is IC7450F-10.

### 3 General Information

#### 3.1 General Description of EUT

|                            |                                                                                                   |                   |
|----------------------------|---------------------------------------------------------------------------------------------------|-------------------|
| <b>Product</b>             | Tracker                                                                                           |                   |
| <b>Brand</b>               | ATrack Technology Inc.                                                                            |                   |
| <b>Test Model</b>          | AL7                                                                                               |                   |
| <b>Status of EUT</b>       | Identical Prototype                                                                               |                   |
| <b>Power Supply Rating</b> | 5.0Vdc (Host equipment)<br>3.7Vdc (Li-ion battery)<br>12 or 24Vdc (Car Battery / DC Power Supply) |                   |
| <b>Modulation Type</b>     | GSM/GPRS                                                                                          | GMSK              |
|                            | EDGE                                                                                              | GMSK, 8PSK        |
|                            | WCDMA                                                                                             | BPSK              |
| <b>Frequency Range</b>     | GSM/GPRS/EDGE                                                                                     | 824.2 ~ 848.8 MHz |
|                            | WCDMA                                                                                             | 826.4 ~ 846.6 MHz |
| <b>Max. ERP Power</b>      | GSM/GPRS                                                                                          | 662.22 mW         |
|                            | EDGE                                                                                              | 176.60 mW         |
|                            | WCDMA                                                                                             | 69.82 mW          |
| <b>Emission Designator</b> | GSM/GPRS                                                                                          | 246KGXW           |
|                            | EDGE                                                                                              | 247KG7W           |
|                            | WCDMA                                                                                             | 4M08F9W           |
| <b>Antenna Type</b>        | Fixed Internal Antenna                                                                            |                   |
| <b>Accessory Device</b>    | Refer to Note as below                                                                            |                   |
| <b>Data Cable Supplied</b> | Refer to Note as below                                                                            |                   |

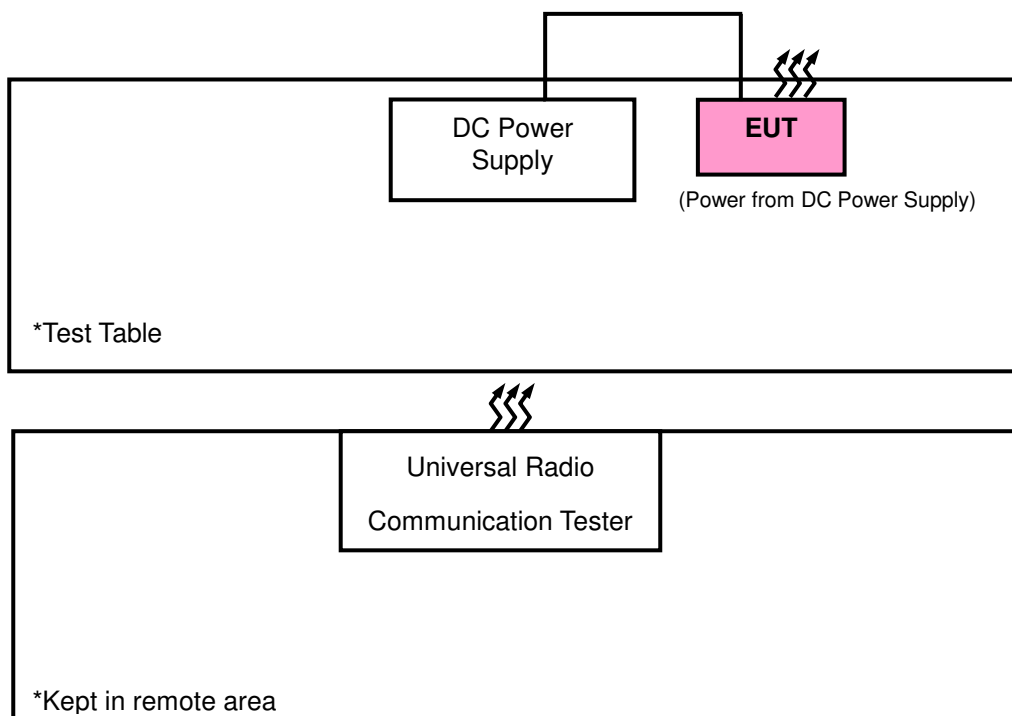
Note:

1. The EUT contains following accessory devices.

| Product   | Brand                     | Model | Description                      |
|-----------|---------------------------|-------|----------------------------------|
| Battery   | JOULES MILES CO., LTD.    | AT-01 | 3.7Vdc, 920mAh                   |
| USB Cable | Kaen Technology Co., LTD. | N/A   | 1.2m non-shielded cable w/o core |

2. 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.

### 3.2 Configuration of System under 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.  | Communications Tester-Wireless | Agilent | 8960 Series 10 | MY53201073 | NA     |
| 2.  | DC Power Supply                | Topward | 33010D         | 807748     | N/A    |

| No. | Signal Cable Description Of The Above Support Units |
|-----|-----------------------------------------------------|
| 1.  | N/A                                                 |
| 2.  | 1.2m non-shielded cable w/o core                    |

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Items 1 acted as communication partners to transfer data.

### 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 as the table below. Following channel(s) was (were) selected for the final test as listed below:

| Band  | ERP     | Radiated Emission |
|-------|---------|-------------------|
| GSM   | X-plane | X-axis            |
| EDGE  | X-plane | X-axis            |
| WCDMA | X-plane | X-axis            |

#### GSM

| EUT Configure Mode | Test Item             | Available Channel | Tested Channel | Mode      |
|--------------------|-----------------------|-------------------|----------------|-----------|
| -                  | ERP                   | 128 to 251        | 128, 189, 251  | GSM, EDGE |
| -                  | Frequency Stability   | 128 to 251        | 189            | GSM, EDGE |
| -                  | Occupied Bandwidth    | 128 to 251        | 128, 189, 251  | GSM, EDGE |
| -                  | Band Edge             | 128 to 251        | 128, 251       | GSM, EDGE |
| -                  | Peak to Average Ratio | 128 to 251        | 128, 189, 251  | GSM, EDGE |
| -                  | Conducuted Emission   | 128 to 251        | 189            | GSM, EDGE |
| -                  | Radiated Emission     | 128 to 251        | 189            | GSM, EDGE |

#### WCDMA

| EUT Configure Mode | Test Item             | Available Channel | Tested Channel   | Mode  |
|--------------------|-----------------------|-------------------|------------------|-------|
| -                  | ERP                   | 4132 to 4233      | 4132, 4182, 4233 | WCDMA |
| -                  | Frequency Stability   | 4132 to 4233      | 4182             | WCDMA |
| -                  | Occupied Bandwidth    | 4132 to 4233      | 4132, 4182, 4233 | WCDMA |
| -                  | Band Edge             | 4132 to 4233      | 4132, 4233       | WCDMA |
| -                  | Peak to Average Ratio | 4132 to 4233      | 4132, 4182, 4233 | WCDMA |
| -                  | Conducuted Emission   | 4132 to 4233      | 4182             | WCDMA |
| -                  | Radiated Emission     | 4132 to 4233      | 4182             | WCDMA |

#### **Test Condition:**

| Test Item             | Environmental Conditions | Input Power | Tested By   |
|-----------------------|--------------------------|-------------|-------------|
| ERP                   | 25 deg. C, 65 % RH       | 12 Vdc      | Anson Lin   |
| Frequency Stability   | 25 deg. C, 65 % RH       | 12 Vdc      | Carlos Chen |
| Occupied Bandwidth    | 25 deg. C, 65 % RH       | 12 Vdc      | Carlos Chen |
| Band Edge             | 25 deg. C, 65 % RH       | 12 Vdc      | Carlos Chen |
| Peak to Average Ratio | 25 deg. C, 65 % RH       | 12 Vdc      | Carlos Chen |
| Conducuted Emission   | 25 deg. C, 65 % RH       | 12 Vdc      | Carlos Chen |
| Radiated Emission     | 25 deg. C, 65 % RH       | 12 Vdc      | David Ko    |

### **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**

**ANSI/TIA/EIA-603-C 2004**

**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:**

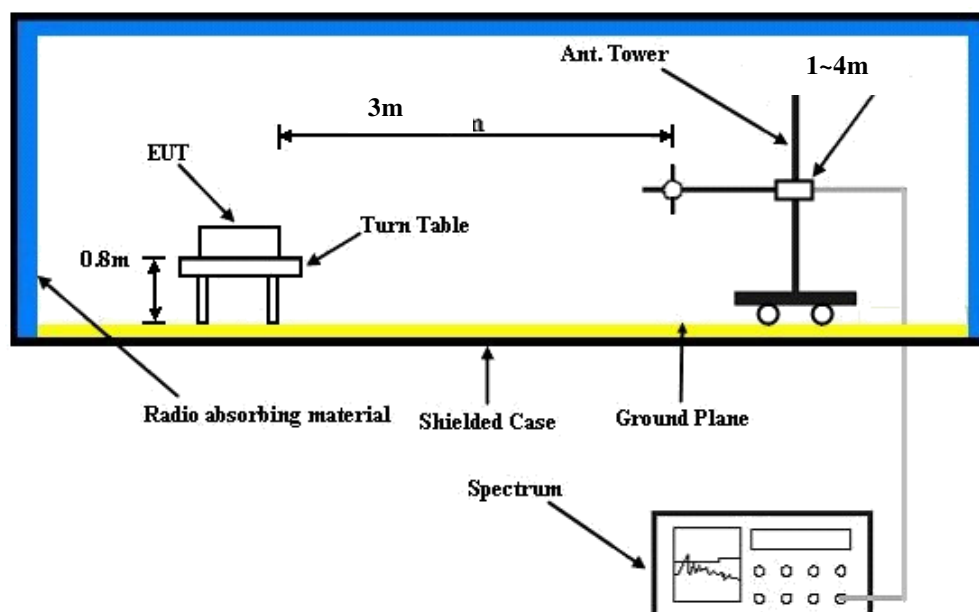
- a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 1 MHz for GSM, GPRS & EDGE, and 5 MHz for WCDMA and CDMA, and 10 MHz for LTE mode.
- b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m height 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 1 m to 4 m 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.  $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$ . E.R.P power can be calculated from E.I.R.P power by subtracting the gain of dipole,  $E.R.P \text{ power} = E.I.P.R \text{ power} - 2.15 \text{ dBi}$ .

##### **Conducted Power Measurement:**

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

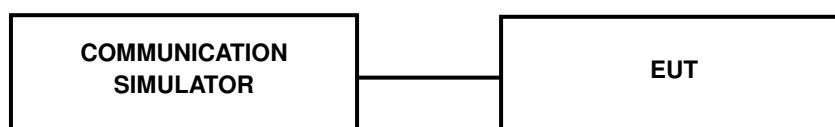
#### 4.1.3 Test Setup

##### ERP Measurement:



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

##### Conducted Power Measurement:



#### 4.1.4 Test Results

##### Conducted Output Power (dBm)

| Band            | GSM850 |       |       |
|-----------------|--------|-------|-------|
| Channel         | 128    | 189   | 251   |
| Frequency (MHz) | 824.2  | 836.4 | 848.8 |
| GPRS 8          | 32.50  | 32.49 | 32.45 |
| GPRS 10         | 32.48  | 32.48 | 32.44 |
| GPRS 11         | 31.65  | 31.66 | 31.62 |
| GPRS 12         | 30.40  | 30.41 | 30.38 |
| EDGE 8          | 27.00  | 27.03 | 27.01 |
| EDGE 10         | 26.98  | 27.01 | 26.99 |
| EDGE 11         | 26.97  | 27.00 | 26.96 |
| EDGE 12         | 26.96  | 26.99 | 26.95 |

| Band            | WCDMA V |       |       |
|-----------------|---------|-------|-------|
| Channel         | 4132    | 4182  | 4233  |
| Frequency (MHz) | 826.4   | 836.4 | 846.6 |
| RMC 12.2K       | 22.43   | 22.72 | 22.45 |

**ERP Power (dBm)**

| GSM   |         |                 |           |                        |           |               |                    |
|-------|---------|-----------------|-----------|------------------------|-----------|---------------|--------------------|
| Plane | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor (dB) | ERP (dBm) | ERP (mW)      | Polarization (H/V) |
| X     | 128     | 824.2           | -2.26     | 32.62                  | 28.21     | <b>662.22</b> | H                  |
|       | 189     | 836.4           | -2.87     | 32.52                  | 27.50     | 562.34        |                    |
|       | 251     | 848.8           | -2.97     | 32.65                  | 27.53     | 566.24        |                    |
|       | 128     | 824.2           | -5.03     | 32.76                  | 25.58     | 361.41        | V                  |
|       | 189     | 836.4           | -5.15     | 32.39                  | 25.09     | 322.85        |                    |
|       | 251     | 848.8           | -5.22     | 32.54                  | 25.17     | 328.85        |                    |

| EDGE  |         |                 |           |                        |           |               |                    |
|-------|---------|-----------------|-----------|------------------------|-----------|---------------|--------------------|
| Plane | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor (dB) | ERP (dBm) | ERP (mW)      | Polarization (H/V) |
| X     | 128     | 824.2           | -8.26     | 32.62                  | 22.21     | 166.34        | H                  |
|       | 189     | 836.4           | -8.18     | 32.52                  | 22.19     | 165.58        |                    |
|       | 251     | 848.8           | -8.03     | 32.65                  | 22.47     | <b>176.60</b> |                    |
|       | 128     | 824.2           | -11.44    | 32.76                  | 19.17     | 82.60         | V                  |
|       | 189     | 836.4           | -11.09    | 32.39                  | 19.15     | 82.22         |                    |
|       | 251     | 848.8           | -10.69    | 32.54                  | 19.70     | 93.33         |                    |

| WCDMA |         |                 |           |                        |           |              |                    |
|-------|---------|-----------------|-----------|------------------------|-----------|--------------|--------------------|
| Plane | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor (dB) | ERP (dBm) | ERP (mW)     | Polarization (H/V) |
| X     | 4132    | 826.4           | -12.03    | 32.62                  | 18.44     | <b>69.82</b> | H                  |
|       | 4182    | 836.4           | -12.26    | 32.52                  | 18.11     | 64.71        |                    |
|       | 4233    | 846.6           | -12.11    | 32.65                  | 18.39     | 69.02        |                    |
|       | 4132    | 826.4           | -15.36    | 32.76                  | 15.25     | 33.50        | V                  |
|       | 4182    | 836.4           | -15.21    | 32.39                  | 15.03     | 31.84        |                    |
|       | 4233    | 846.6           | -15.32    | 32.54                  | 15.07     | 32.14        |                    |

## 4.2 Frequency Stability Measurement

### 4.2.1 Limits of Frequency Stability Measurement

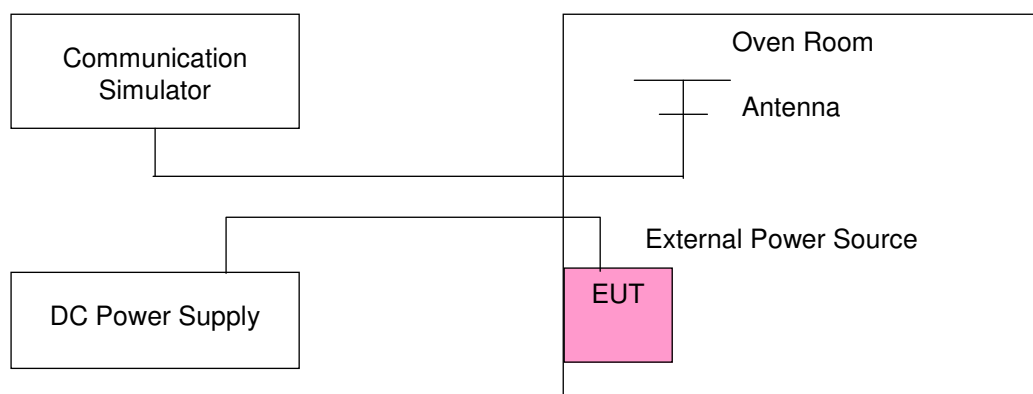
1.5 ppm is for base and fixed station. 2.5 ppm is for mobile station.

### 4.2.2 Test Procedure

- 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.
- 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.
- The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the  $\pm 0.5$  °C 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 |             |
| 12              | 0.003                 | 0.001 | 0.002 | 2.5         |
| 6               | 0.003                 | 0.003 | 0.002 | 2.5         |
| 30              | 0.003                 | 0.003 | 0.002 | 2.5         |

**NOTE:** The applicant defined the normal working voltage of the battery is from 6 Vdc to 30 Vdc.

##### Frequency Error vs. Temperature

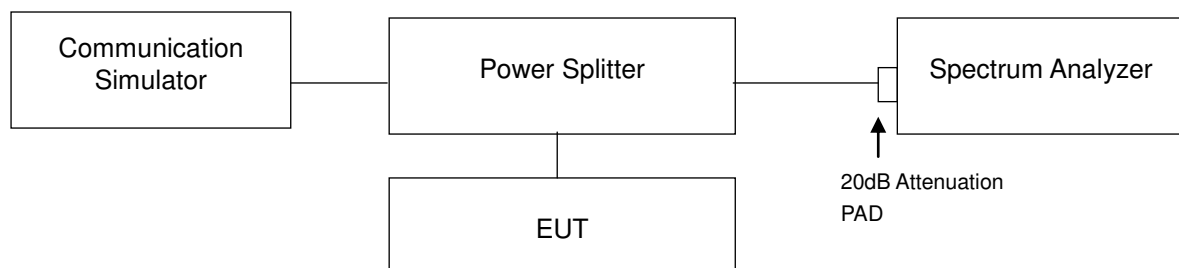
| Temp. (°C) | Frequency Error (ppm) |        |        | Limit (ppm) |
|------------|-----------------------|--------|--------|-------------|
|            | GSM                   | EDGE   | WCDMA  |             |
| -30        | 0.005                 | 0.004  | 0.005  | 2.5         |
| -20        | 0.001                 | 0.001  | 0.004  | 2.5         |
| -10        | 0.004                 | 0.000  | 0.004  | 2.5         |
| 0          | 0.001                 | 0.001  | 0.005  | 2.5         |
| 10         | 0.002                 | 0.001  | 0.003  | 2.5         |
| 20         | 0.004                 | 0.003  | 0.004  | 2.5         |
| 30         | -0.004                | -0.003 | -0.002 | 2.5         |
| 40         | -0.002                | 0.000  | -0.004 | 2.5         |
| 50         | -0.005                | -0.002 | -0.002 | 2.5         |
| 60         | -0.001                | -0.001 | -0.001 | 2.5         |

### 4.3 Occupied Bandwidth Measurement

#### 4.3.1 Test Procedure

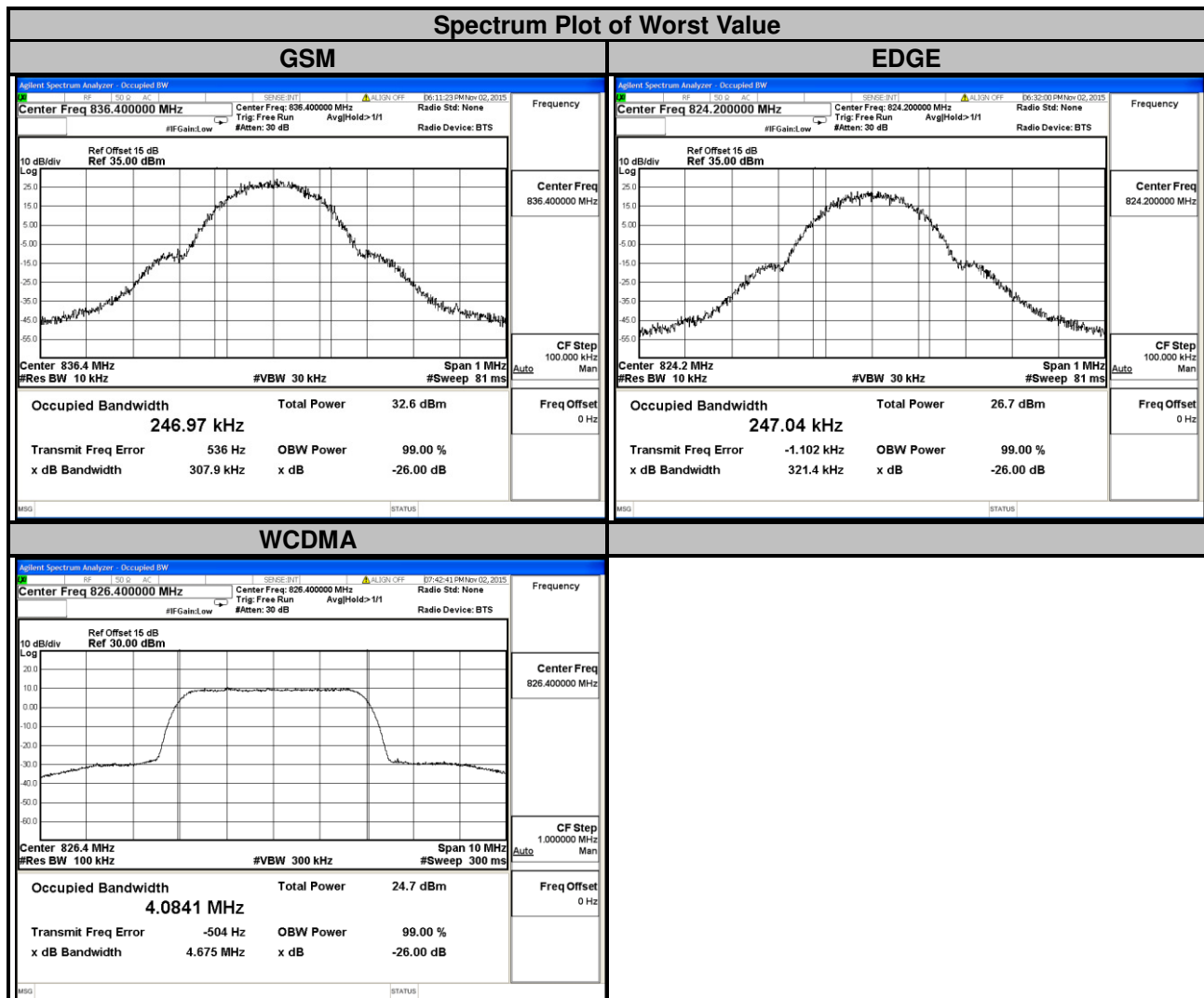
The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function 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 | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) |
|---------|-----------------|-------------------------------|--------|---------|-----------------|-------------------------------|
|         |                 | GSM                           | EDGE   |         |                 |                               |
| 128     | 824.2           | 245.43                        | 247.04 | 4132    | 826.4           | 4.0841                        |
| 189     | 836.4           | 246.97                        | 245.44 | 4182    | 836.4           | 4.0840                        |
| 251     | 848.8           | 243.97                        | 245.72 | 4233    | 846.6           | 4.0768                        |

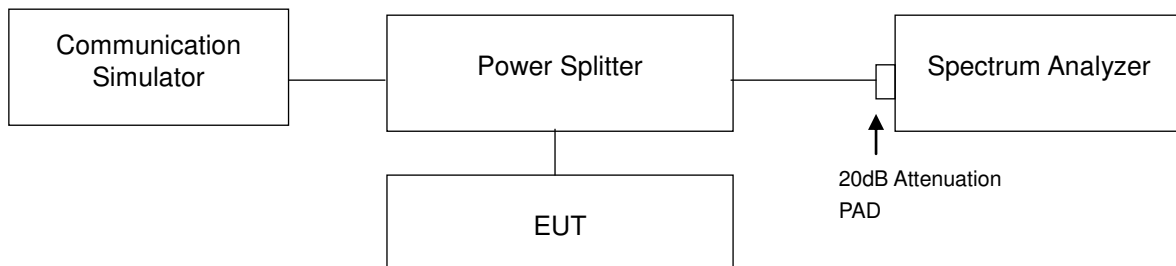


## 4.4 Band Edge Measurement

### 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.

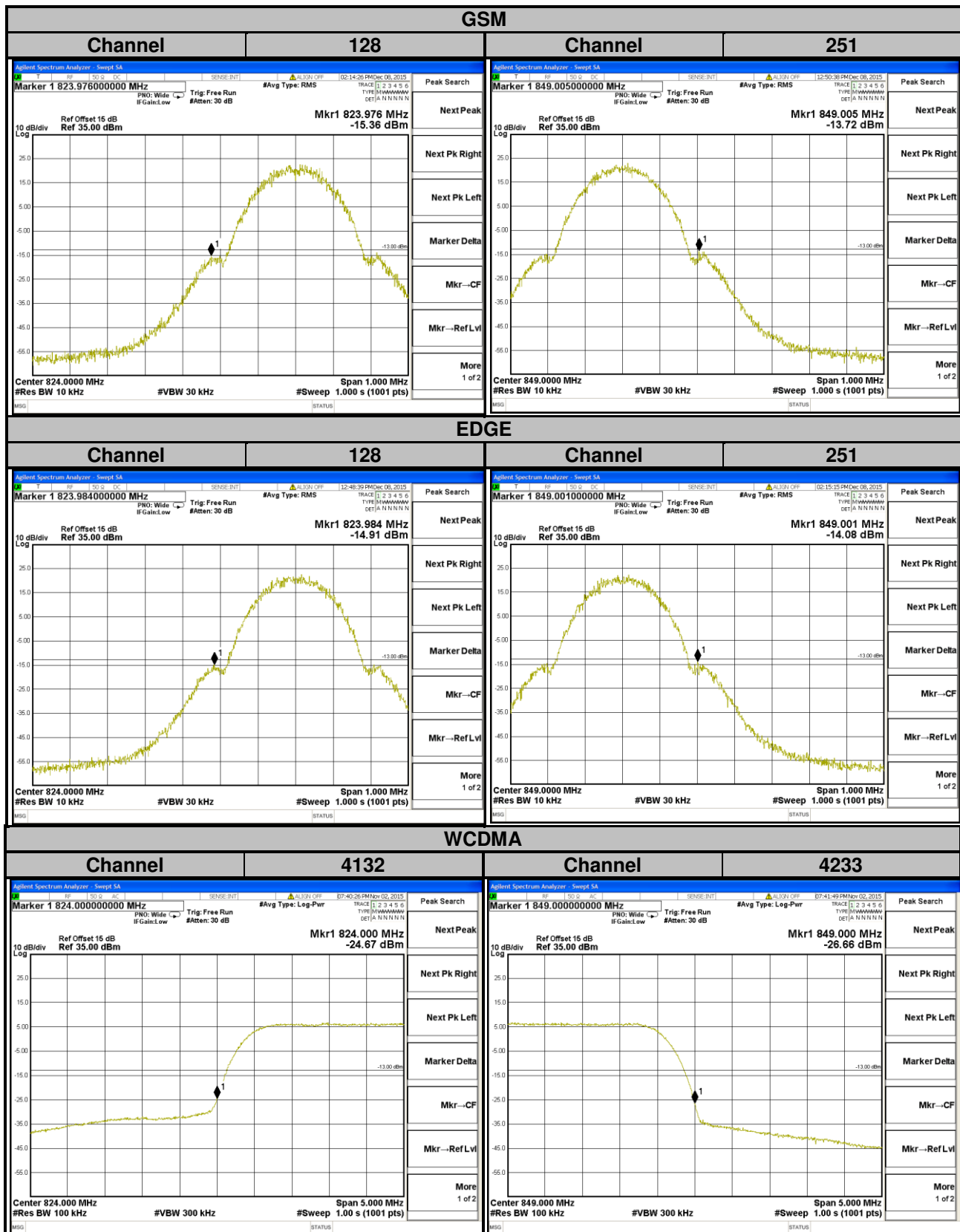
### 4.4.2 Test Setup



### 4.4.3 Test Procedures

- All measurements were done at low and high operational frequency range.
- The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 3.9 kHz and VB of the spectrum is 12 kHz (GSM/GPRS/EDGE).
- The center frequency of spectrum is the band edge frequency and span is 5 MHz. RB of the spectrum is 100 kHz and VB of the spectrum is 300 kHz (WCDMA).
- Record the max trace plot into the test report.

#### 4.4.4 Test Results

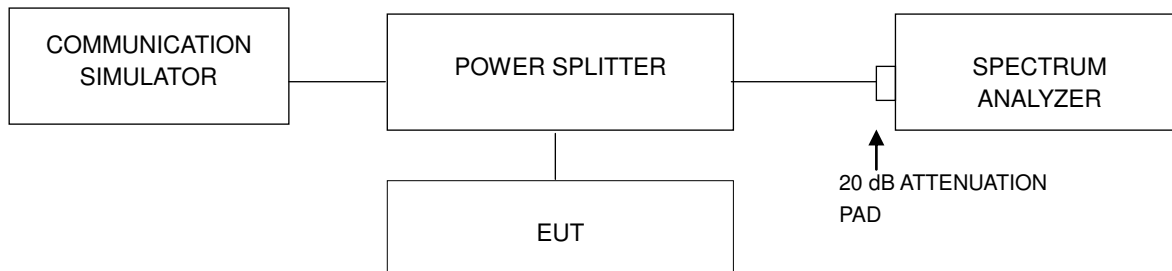


## 4.5 Peak to Average Ratio

### 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

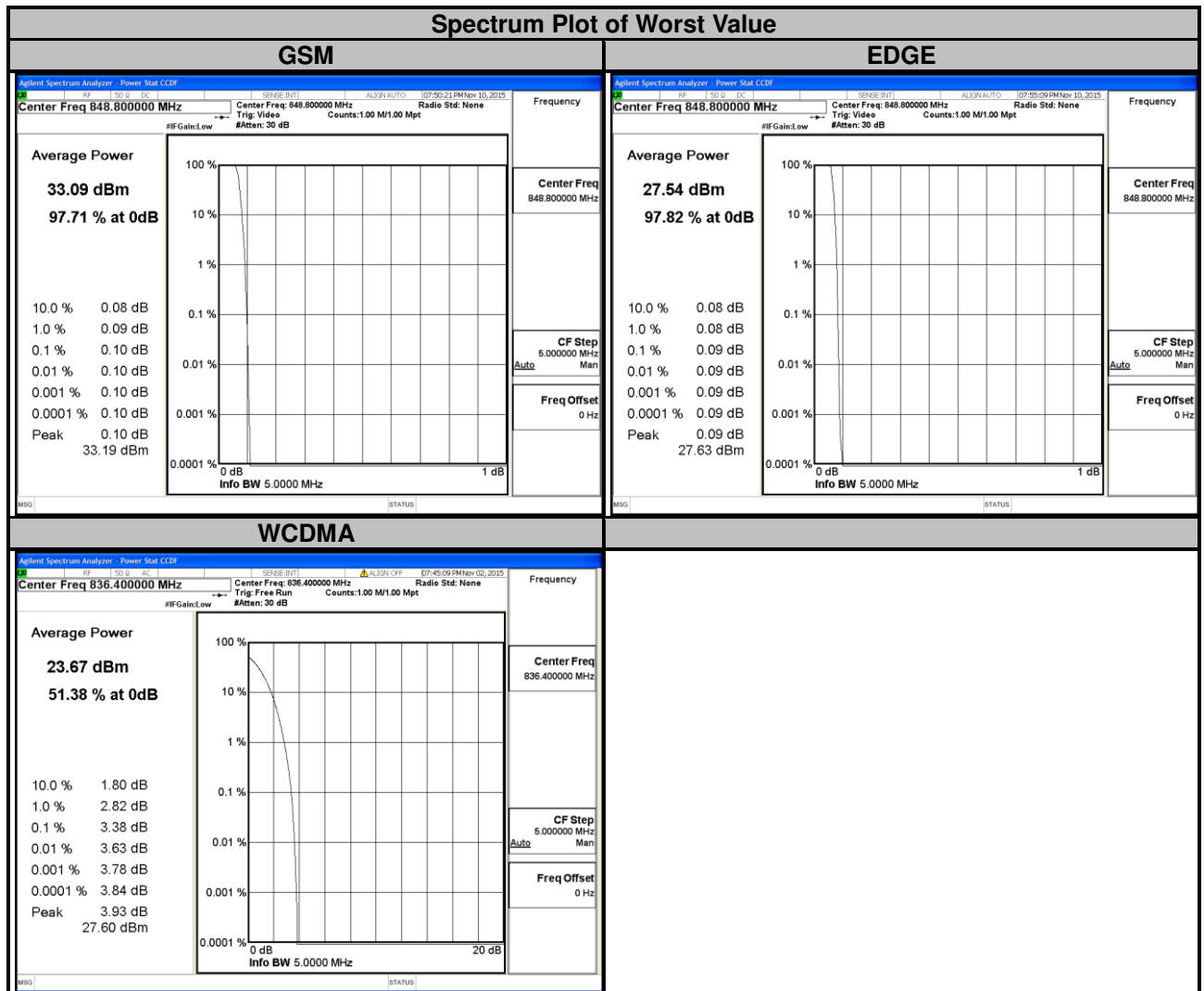


### 4.5.3 Test Procedures

1. Set resolution/measurement bandwidth  $\geq$  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 |         |                 |                            |
| 128     | 824.2           | 0.09                       | 0.08 | 4132    | 826.4           | 3.25                       |
| 189     | 836.4           | 0.09                       | 0.08 | 4182    | 836.4           | 3.38                       |
| 251     | 848.8           | 0.10                       | 0.09 | 4233    | 846.6           | 3.33                       |

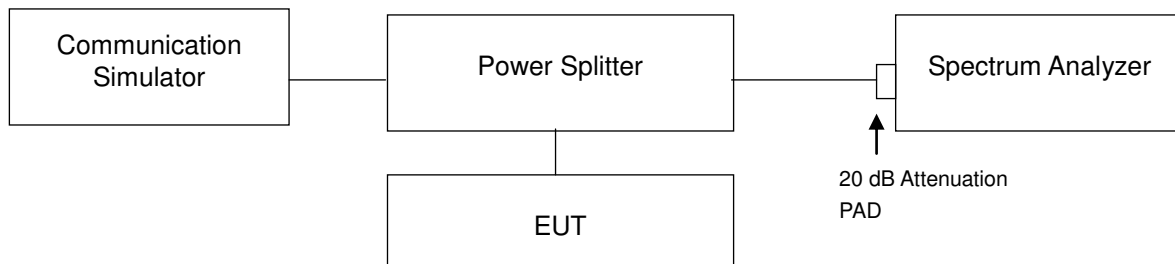


## 4.6 Conducted Spurious Emissions

### 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  $-13$  dBm.

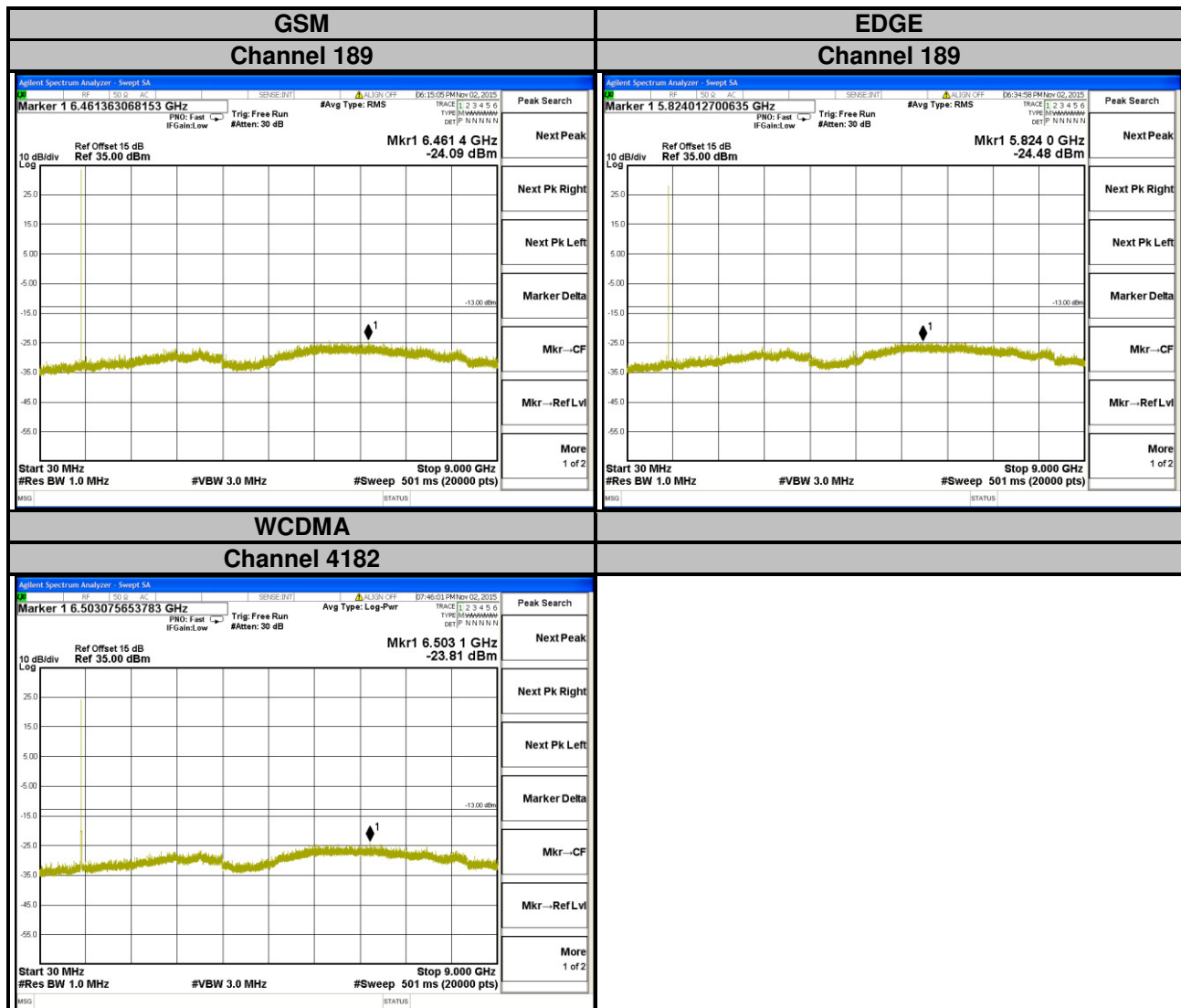
### 4.6.2 Test Setup



### 4.6.3 Test Procedure

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

## 4.6.4 Test Results



## 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 is equal to -13 dBm.

### 4.7.2 Test Procedure

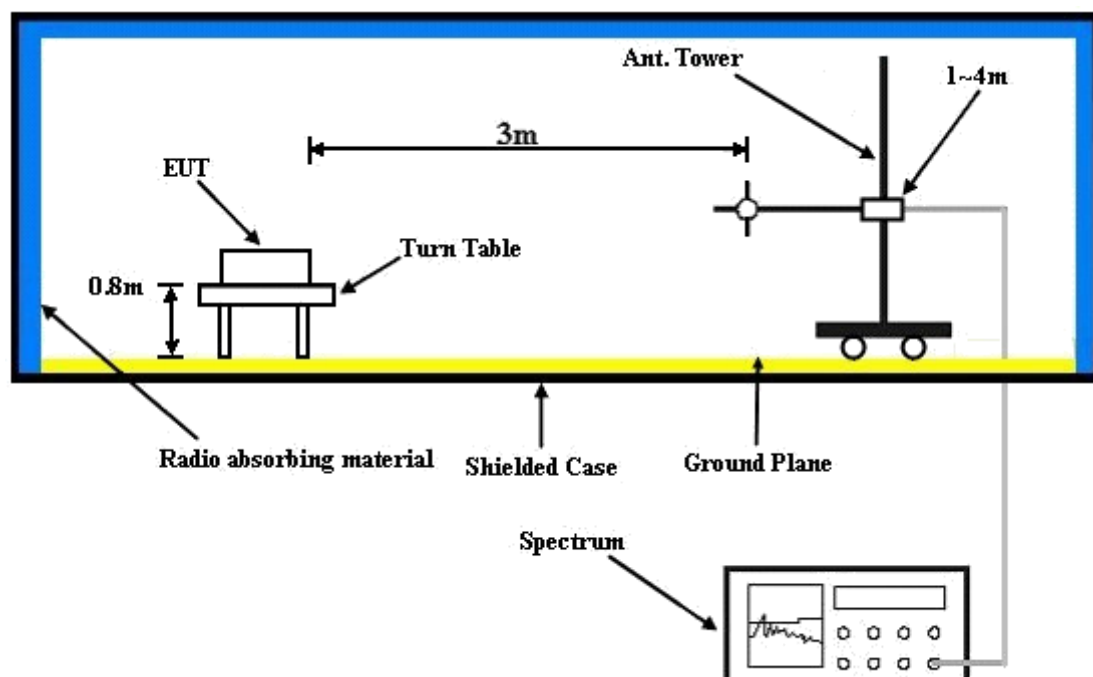
- Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- 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
- 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.P.R power - 2.15 dBi.

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

### 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

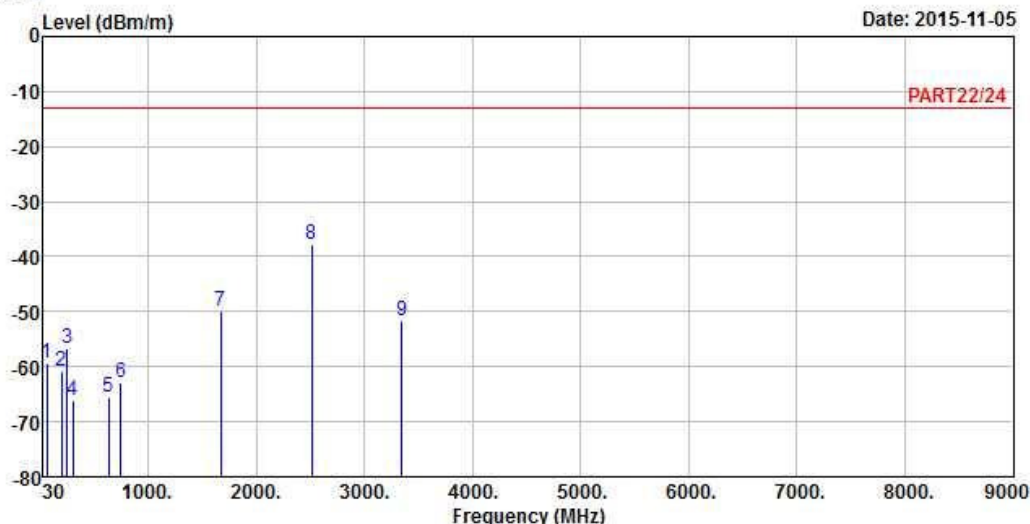
GSM:



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A D T

Data: 7



Site : 966 Chamber 5  
Condition: PART22/24 3m HORIZONTAL  
Remark : GPRS 850  
Tested by: Gavin Wu  
Plane : X

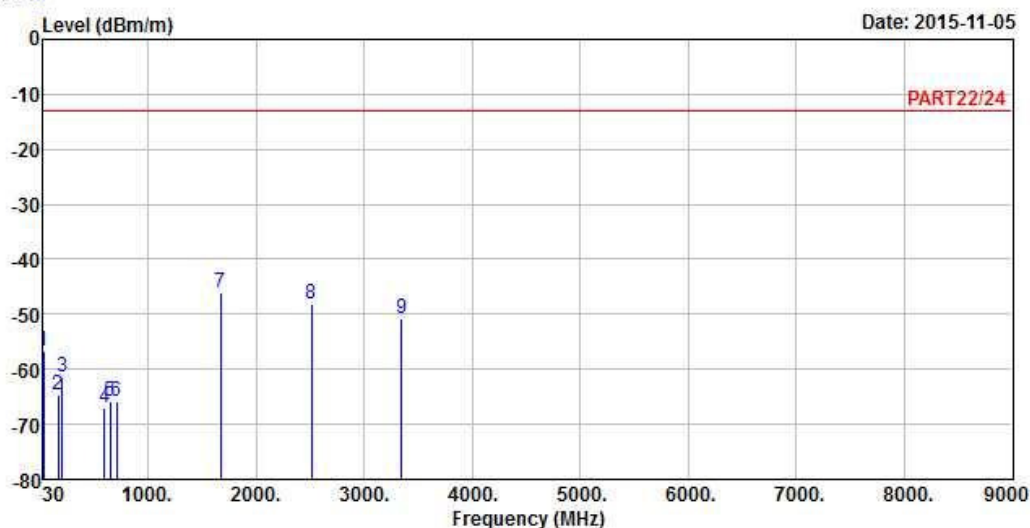
|      | Freq    | Level  | Read Level | Limit Line | Over Limit | Factor | Remark |
|------|---------|--------|------------|------------|------------|--------|--------|
|      | MHz     | dBm/m  | dBm        | dBm/m      | dB         | dB/m   |        |
| 1    | 60.78   | -59.38 | -51.64     | -13.00     | -46.38     | -7.74  | Peak   |
| 2    | 196.59  | -60.81 | -53.07     | -13.00     | -47.81     | -7.74  | Peak   |
| 3    | 252.75  | -56.82 | -50.77     | -13.00     | -43.82     | -6.05  | Peak   |
| 4    | 306.30  | -66.18 | -59.27     | -13.00     | -53.18     | -6.91  | Peak   |
| 5    | 630.40  | -65.56 | -64.73     | -13.00     | -52.56     | -0.83  | Peak   |
| 6    | 747.30  | -62.92 | -63.74     | -13.00     | -49.92     | 0.82   | Peak   |
| 7    | 1672.80 | -49.95 | -35.27     | -13.00     | -36.95     | -14.68 | Peak   |
| 8 pp | 2509.20 | -37.82 | -26.91     | -13.00     | -24.82     | -10.91 | Peak   |
| 9    | 3345.60 | -51.57 | -42.03     | -13.00     | -38.57     | -9.54  | Peak   |



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Data: 8



Site : 966 Chamber 5  
Condition: PART22/24 3m VERTICAL  
Remark : GPRS 850  
Tested by: Gavin Wu  
Plane : X

|      | Freq    | Level  | Read Level | Limit Line | Over Limit | Factor | Remark |
|------|---------|--------|------------|------------|------------|--------|--------|
|      | MHz     | dBm/m  | dBm        | dBm/m      | dB         | dB/m   |        |
| 1    | 32.43   | -56.66 | -55.57     | -13.00     | -43.66     | -1.09  | Peak   |
| 2    | 166.62  | -64.54 | -59.22     | -13.00     | -51.54     | -5.32  | Peak   |
| 3    | 206.58  | -61.55 | -53.80     | -13.00     | -48.55     | -7.75  | Peak   |
| 4    | 596.10  | -66.93 | -66.02     | -13.00     | -53.93     | -0.91  | Peak   |
| 5    | 648.60  | -65.88 | -65.00     | -13.00     | -52.88     | -0.88  | Peak   |
| 6    | 706.70  | -65.75 | -65.79     | -13.00     | -52.75     | 0.04   | Peak   |
| 7 pp | 1672.80 | -45.92 | -31.24     | -13.00     | -32.92     | -14.68 | Peak   |
| 8    | 2509.20 | -48.13 | -37.22     | -13.00     | -35.13     | -10.91 | Peak   |
| 9    | 3345.60 | -50.75 | -41.21     | -13.00     | -37.75     | -9.54  | Peak   |

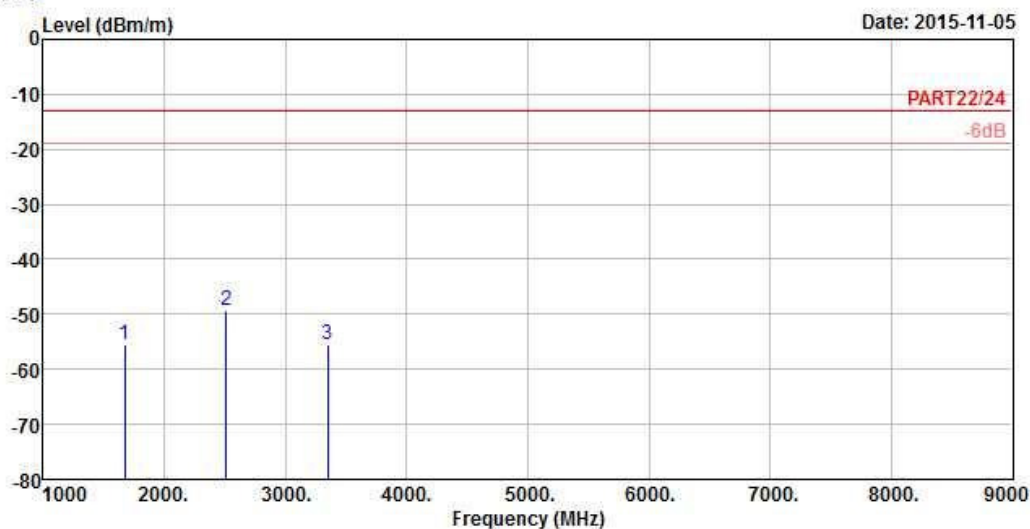
EDGE:



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A D T

Data: 3



Site : 966 Chamber 5  
Condition: PART22/24 3m HORIZONTAL  
Remark : EDGE 850  
Tested by: Gavin Wu  
Plane : X

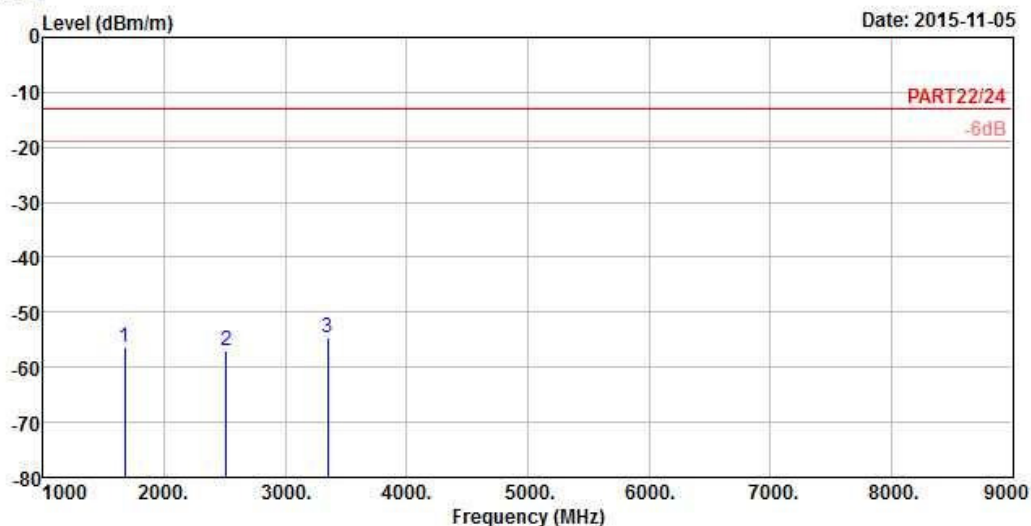
|      | Freq    | Level  | Read Level | Limit Line | Over Limit | Factor | Remark |
|------|---------|--------|------------|------------|------------|--------|--------|
|      | MHz     | dBm/m  | dBm        | dBm/m      | dB         | dB/m   |        |
| 1    | 1672.80 | -55.63 | -40.95     | -13.00     | -42.63     | -14.68 | Peak   |
| 2 pp | 2509.20 | -49.33 | -38.42     | -13.00     | -36.33     | -10.91 | Peak   |
| 3    | 3345.60 | -55.57 | -46.03     | -13.00     | -42.57     | -9.54  | Peak   |



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A D T

Data: 4



Site : 966 Chamber 5  
Condition: PART22/24 3m VERTICAL  
Remark : EDGE 850  
Tested by: Gavin Wu  
Plane : X

|      | Freq    | Level  | Read Level | Limit Line | Over Limit | Factor | Remark |
|------|---------|--------|------------|------------|------------|--------|--------|
|      | MHz     | dBm/m  | dBm        | dBm/m      | dB         | dB/m   |        |
| 1    | 1672.80 | -56.51 | -41.83     | -13.00     | -43.51     | -14.68 | Peak   |
| 2    | 2509.20 | -57.08 | -46.17     | -13.00     | -44.08     | -10.91 | Peak   |
| 3 pp | 3345.60 | -54.70 | -45.16     | -13.00     | -41.70     | -9.54  | Peak   |

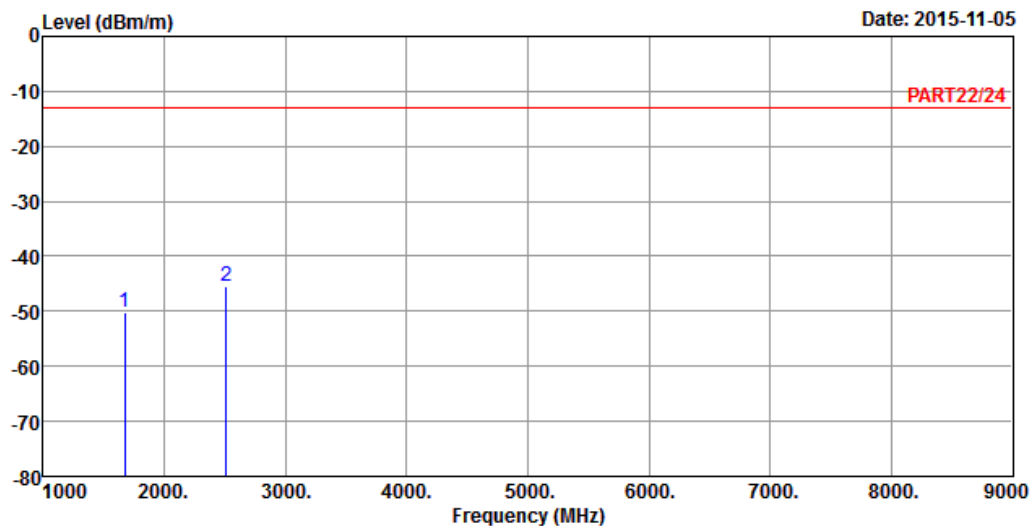
# WCDMA:



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A D T

Data: 3



Site : 966 Chamber 5  
Condition: PART22/24 3m HORIZONTAL  
Remark : WCDMA Band V  
Tested by: Gavin Wu  
Plane : X

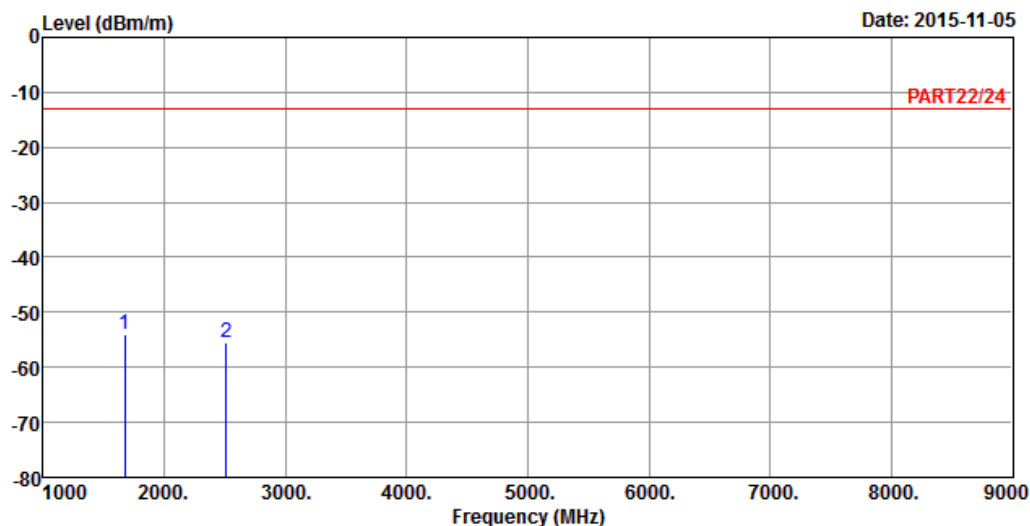
|      |         |        | Read   | Limit  | Over   |        |        |
|------|---------|--------|--------|--------|--------|--------|--------|
|      | Freq    | Level  | Level  | Line   | Limit  | Factor | Remark |
|      | MHz     | dBm/m  | dBm    | dBm/m  | dB     | dB/m   |        |
| 1    | 1672.80 | -50.07 | -35.39 | -13.00 | -37.07 | -14.68 | Peak   |
| 2 pp | 2509.20 | -45.38 | -34.47 | -13.00 | -32.38 | -10.91 | Peak   |



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A D T

Data: 4



Site : 966 Chamber 5  
Condition: PART22/24 3m VERTICAL  
Remark : WCDMA Band V  
Tested by: Gavin Wu  
Plane : X

|   |            |        | Read   | Limit  | Over   |        |        |
|---|------------|--------|--------|--------|--------|--------|--------|
|   | Freq       | Level  | Level  | Line   | Limit  | Factor | Remark |
|   | MHz        | dBm/m  | dBm    | dBm/m  | dB     | dB/m   |        |
| 1 | pp 1672.80 | -54.01 | -39.33 | -13.00 | -41.01 | -14.68 | Peak   |
| 2 | 2509.20    | -55.60 | -44.69 | -13.00 | -42.60 | -10.91 | Peak   |

## 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

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**Web Site:** [www.bureauveritas-adt.com](http://www.bureauveritas-adt.com)

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

--- END ---