

**FCC 47 CFR PART 22 SUBPART H AND PART 24 SUBPART E**

**TEST REPORT**

**For**

**Zonar Connect**

**Model: 20081**

**Trade Name: ZONAR**

*Issued to*

**Zonar Systems Inc  
18200 Cascade Ave South Suite 200  
Seattle Washington United States**

*Issued by*

**Compliance Certification Services Inc.  
No.11, Wugong 6th Rd., Wugu Dist.,  
New Taipei City 24891, Taiwan. (R.O.C.)  
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Issued Date: October 28, 2016**



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**Revision History**

| Rev. |  | Issue<br>Date    |  | Revisions     | Effect<br>Page | Revised<br>By |
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| 00   |  | October 28, 2016 |  | Initial Issue | ALL            | Doris Chu     |

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## 1. TEST RESULT CERTIFICATION

**Applicant:** Zonar Systems Inc  
18200 Cascade Ave South Suite 200  
Seattle Washington United States

**Manufacturer:** First International Computer  
8F, No.300, Yang Guang St., NeiHu, Taipei, Taiwan 114

**Equipment Under Test:** Zonar Connect

**Trade Name:** ZONAR

**Model Number:** 20081

**Date of Test:** September 13 ~ October 27, 2016

| APPLICABLE STANDARDS                                |                         |
|-----------------------------------------------------|-------------------------|
| STANDARD                                            | TEST RESULT             |
| FCC 47 CFR Part 22 Subpart H &<br>Part 24 Subpart E | No non-compliance noted |

### We hereby certify that:

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in TIA/EIA-603-D: 2010 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rule FCC PART 22 Subpart H and PART 24 Subpart E

The test results of this report relate only to the tested sample identified in this report.

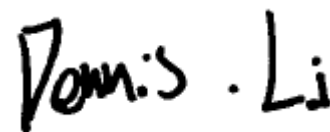
Approved by:




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Sam Chuang  
Manager  
Compliance Certification Services Inc.

Tested by:




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Dennis Li  
Engineer  
Compliance Certification Services Inc.

## 2. EUT DESCRIPTION

|                        |                                                                                                                |
|------------------------|----------------------------------------------------------------------------------------------------------------|
| <b>Product</b>         | Zonar Connect                                                                                                  |
| <b>Trade Name</b>      | ZONAR                                                                                                          |
| <b>Model Number</b>    | 20081                                                                                                          |
| <b>Received Date</b>   | April 15, 2016                                                                                                 |
| <b>Power Supply</b>    | VDC from Power Adapter<br>DARFON / B112-51(SOY-0500250US)<br>I/P: 100-240Vac, 0.4A, 50-60Hz<br>O/P: 5Vdc, 2.5A |
| <b>Frequency Range</b> | WCDMA / HSDPA / HSUPA Band II: 1852.4 ~ 1907.6 MHz<br>WCDMA / HSDPA / HSUPA Band V: 826.4 ~ 846.6MHz           |
| <b>Antenna Gain</b>    | Dipole Antenna<br>WCDMA band II: -0.19 dBi<br>WCDMA band V: 0.13 dBi                                           |

**Remark:**

1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.
2. For test mode WCDMA, HSUPA and HSDPA were pretest. The worst case was WCDMA in this test report

| Emission Designator |      |                      |                               |                 |                  |
|---------------------|------|----------------------|-------------------------------|-----------------|------------------|
| System              | Band | Frequency Range(MHz) | Emission Designator (99% OBW) | Maximum ERP (W) | Maximum EIRP (W) |
| WCDMA<br>12.2K RMC  | II   | 1852.4MHz ~1907.6MHz | 4M13F9W                       | N/A             | 0.356            |
|                     | V    | 826.4MHz ~ 846.6MHz  | 4M13F9W                       | 0.099           | N/A              |

### **3. TEST METHODOLOGY**

Both conducted and radiated testing were performed according to TIA/EIA-603-D: 2010 and FCC CFR 47, Part 2, Part 22 Subpart H and Part 24 Subpart E

#### **3.1 EUT CONFIGURATION**

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

### 3.2 DESCRIPTION OF TEST MODES

The EUT (model: 20081) had been tested under operating condition.

The EUT be set in maximum power transmission via call box during testing.

#### 3.2.1 The worst mode of measurement

| Radiated Emission Measurement |                                                                                                                                                                                                                                                                                               |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Condition                | Band edge, Emission for Unwanted and Fundamental                                                                                                                                                                                                                                              |
| Voltage/Hz                    | 120V/60Hz                                                                                                                                                                                                                                                                                     |
| Test Mode                     | Mode 1: Adapter Mode<br>Mode 2: USB Charge Mode(Link NB)                                                                                                                                                                                                                                      |
| Worst Mode                    | <input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2                                                                                                                                                                                                                    |
| Position                      | <input type="checkbox"/> Placed in fixed position.<br><input checked="" type="checkbox"/> Placed in fixed position at X-Plane (E2-Plane)<br><input type="checkbox"/> Placed in fixed position at Y-Plane (E1-Plane)<br><input type="checkbox"/> Placed in fixed position at Z-Plane (H-Plane) |

Remark: The worst mode was record in this test report.

## 4. INSTRUMENT CALIBRATION

### 4.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

### 4.2 MEASUREMENT EQUIPMENT USED

#### Equipment Used for Emissions Measurement

**Remark:** Each piece of equipment is scheduled for calibration once a year.

| Conducted Emissions Test Site |              |          |               |                  |                 |
|-------------------------------|--------------|----------|---------------|------------------|-----------------|
| Name of Equipment             | Manufacturer | Model    | Serial Number | Calibration Date | Calibration Due |
| Spectrum Analyzer             | R&S          | FSV 40   | 101073        | 2015/10/04       | 2016/10/03      |
| Spectrum Analyzer             | R&S          | FSV 40   | 0229          | 2016/05/11       | 2017/05/10      |
| Communication Analyzer        | Anritsu      | MT-8820C | 6201240043    | 2016/2/18        | 2017/2/17       |

| Wugu 966 Chamber A     |                    |                                  |               |                  |                 |
|------------------------|--------------------|----------------------------------|---------------|------------------|-----------------|
| Name of Equipment      | Manufacturer       | Model                            | Serial Number | Calibration Date | Calibration Due |
| Signal Analyzer        | Agilent            | E4407B                           | MY44212686    | 2016/4/9         | 2017/4/8        |
| Pre-Amplifier          | MITEQ              | AFS44-00102<br>650-42-10P-4<br>4 | 1042473       | 2016/7/6         | 2017/7/5        |
| Bilog Antenna          | Sunol Sciences     | JB1                              | A052609       | 2016/3/20        | 2017/3/21       |
| Horn Antenna           | SCHWARZBECK        | BBHA 9120D                       | 779           | 2016/3/9         | 2017/3/8        |
| Pre-Amplifier          | MITEQ              | AMF-6F-2604<br>00-40-8P          | 985646        | 2016/1/14        | 2017/1/13       |
| Horn Antenna           | EMCO               | 3116                             | 26370         | 2016/1/15        | 2017/1/14       |
| Antenna Tower          | CCS                | CC-A-1F                          | N/A           | N.C.R            | N.C.R           |
| Controller             | CCS                | CC-C-1F                          | N/A           | N.C.R            | N.C.R           |
| Turn Table             | CCS                | CC-T-1F                          | N/A           | N.C.R            | N.C.R           |
| Communication Analyzer | Anritsu            | MT-8820C                         | 6201240043    | 2016/2/18        | 2017/2/17       |
| Software               | EZ-EMC (CCS-3A1RE) |                                  |               |                  |                 |

### 4.3 MEASUREMENT UNCERTAINTY

| PARAMETER                             | UNCERTAINTY |
|---------------------------------------|-------------|
| 3M Semi Anechoic Chamber / 30M~200M   | +/- 4.0138  |
| 3M Semi Anechoic Chamber / 200M~1000M | +/- 3.9483  |
| 3M Semi Anechoic Chamber / 1G~8G      | +/- 2.5975  |
| 3M Semi Anechoic Chamber / 8G~18G     | +/- 2.6112  |
| 3M Semi Anechoic Chamber / 18G~26G    | +/- 2.7389  |
| 3M Semi Anechoic Chamber / 26G~40G    | +/- 2.9683  |

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

## 5. FACILITIES AND ACCREDITATIONS

### 5.1 FACILITIES

☐ No.199, Chunghsen Road, Hsintien City, Taipei Hsien, Taiwan, R.O.C.

Tel: 886-2-2217-0894 / Fax: 886-2-2217-1029

☒ No.11, Wugong 6th Rd., Wugu Dist., New Taipei City 24891, Taiwan. (R.O.C.)

Tel: 886-2-2299-9720 / Fax: 886-2-2298-4045

☐ No.81-1, Lane 210, Bade 2nd Rd., Lujhu Township, Taoyuan County 33841, TAIWAN, R.O.C.

Tel: 886-3-324-0332 / Fax: 886-3-324-5235

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

### 5.2 EQUIPMENT

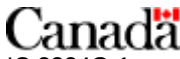
Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

### 5.3 TABLE OF ACCREDITATIONS AND LISTINGS

| Country | Agency          | Scope of Accreditation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Logo                                                                                                            |
|---------|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| USA     | FCC             | 3M Semi Anechoic Chamber (FCC MRA: TW1039) to perform FCC Part 15 measurements                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <br>FCC MRA: TW1039          |
| Taiwan  | TAF             | LP0002, RTTE01, FCC Method-47 CFR Part 15 Subpart C, D, E, RSS-210, RSS-310<br>IDA TS SRD, AS/NZS 4268, AS/NZS 4771, TS 12.1 & 12.2, ETSI EN 300 440-1, ETSI EN 300 440-2, ETSI EN 300 328, ETSI EN 300 220-1, ETSI EN 300 220-2, ETSI EN 301 893, ETSI EN 301 489-1/3/7/17<br>FCC OET Bulletin 65 + Supplement C, EN 50360, EN 50361, EN 50371, RSS 102, EN 50383, EN 50385, EN 50392, IEC 62209, CNS 14958-1, CNS 14959<br>FCC Method -47 CFR Part 15 Subpart B<br>IEC / EN 61000-3-2, IEC / EN 61000-3-3, IEC / EN 61000-4-2/3/4/5/6/8/11 |                              |
| Canada  | Industry Canada | 3M Semi Anechoic Chamber (IC 2324G-1 / IC 2324G-2) to perform                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <br>IC 2324G-1<br>IC 2324G-2 |

\* No part of this report may be used to claim or imply product endorsement by A2LA or any agency of the US Government.

## 6. SETUP OF EQUIPMENT UNDER TEST

### 6.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix I for the actual connections between EUT and support equipment.

### 6.2 SUPPORT EQUIPMENT

| No | Equipment          | Brand | Model | Series No. | FCC ID | Data Cable | Power Cord |
|----|--------------------|-------|-------|------------|--------|------------|------------|
| 1  | Zonar Connect Dock | ZONAR | 20082 | N/A        | N/A    | N/A        | N/A        |

**Remark:**

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

## 7. FCC PART 22 & 24 REQUIREMENTS

### 7.1 AVERAGE POWER

#### Test Procedures

##### CONDUCTED POWER MEASUREMENT:

1. The transmitter output power was connected to the call box.
2. Set EUT at maximum output power via call box.
3. Set Call box at lowest, middle and highest channels for each band and modulation.

*No non-compliance noted.*

#### Test Data

##### WCDMA 12.2K RMC

| Band | Mode               | Frequency<br>(MHz) | CH   | AVG Power<br>(dBm) | Output Power<br>(W) |
|------|--------------------|--------------------|------|--------------------|---------------------|
| II   | WCDMA 12.2K<br>RMC | 1852.4             | 9262 | 22.7               | 0.186               |
|      |                    | 1880.0             | 9400 | 23.2               | 0.209               |
|      |                    | 1907.6             | 9538 | 23.1               | 0.204               |
| V    |                    | 826.4              | 4132 | 22.6               | 0.182               |
|      |                    | 836.4              | 4183 | 22.9               | 0.195               |
|      |                    | 846.6              | 4233 | 22.7               | 0.186               |

## HSDPA

### Band II

| Band | Mode      | Frequency (MHz) | CH   | AVG Power (dBm) | Output Power (W) |
|------|-----------|-----------------|------|-----------------|------------------|
| II   | Subtest 1 | 1852.4          | 9262 | 22.6            | 0.182            |
|      |           | 1880.0          | 9400 | 23.1            | 0.204            |
|      |           | 1907.6          | 9538 | 23.0            | 0.200            |
|      | Subtest 2 | 1852.4          | 9262 | 22.5            | 0.178            |
|      |           | 1880.0          | 9400 | 22.8            | 0.191            |
|      |           | 1907.6          | 9538 | 22.7            | 0.186            |
|      | Subtest 3 | 1852.4          | 9262 | 22.1            | 0.162            |
|      |           | 1880.0          | 9400 | 22.5            | 0.178            |
|      |           | 1907.6          | 9538 | 22.3            | 0.170            |
|      | Subtest 4 | 1852.4          | 9262 | 22.1            | 0.162            |
|      |           | 1880.0          | 9400 | 22.5            | 0.178            |
|      |           | 1907.6          | 9538 | 22.1            | 0.162            |

### Band V

| Band | Mode      | Frequency (MHz) | CH   | AVG Power (dBm) | Output Power (W) |
|------|-----------|-----------------|------|-----------------|------------------|
| V    | Subtest 1 | 826.4           | 1312 | 22.6            | 0.182            |
|      |           | 836.4           | 1413 | 22.8            | 0.191            |
|      |           | 846.6           | 1513 | 22.7            | 0.186            |
|      | Subtest 2 | 826.4           | 1312 | 22.3            | 0.170            |
|      |           | 836.4           | 1413 | 22.6            | 0.182            |
|      |           | 846.6           | 1513 | 22.3            | 0.170            |
|      | Subtest 3 | 826.4           | 1312 | 22.1            | 0.162            |
|      |           | 836.4           | 1413 | 22.2            | 0.166            |
|      |           | 846.6           | 1513 | 22.1            | 0.162            |
|      | Subtest 4 | 826.4           | 1312 | 22.1            | 0.162            |
|      |           | 836.4           | 1413 | 22.2            | 0.166            |
|      |           | 846.6           | 1513 | 22.1            | 0.162            |

**HSUPA****Band II**

| Band | Mode      | Frequency(MHz) | CH   | AVG Power(dBm) | Output Power(W) |
|------|-----------|----------------|------|----------------|-----------------|
| II   | Subtest 1 | 1852.4         | 9262 | 22.6           | 0.182           |
|      |           | 1880.0         | 9400 | 23.1           | 0.204           |
|      |           | 1907.6         | 9538 | 23.0           | 0.200           |
|      | Subtest 2 | 1852.4         | 9262 | 21.2           | 0.132           |
|      |           | 1880.0         | 9400 | 21.5           | 0.141           |
|      |           | 1907.6         | 9538 | 21.4           | 0.138           |
|      | Subtest 3 | 1852.4         | 9262 | 22.1           | 0.162           |
|      |           | 1880.0         | 9400 | 22.5           | 0.178           |
|      |           | 1907.6         | 9538 | 22.3           | 0.170           |
|      | Subtest 4 | 1852.4         | 9262 | 21.3           | 0.135           |
|      |           | 1880.0         | 9400 | 21.5           | 0.141           |
|      |           | 1907.6         | 9538 | 21.4           | 0.138           |
|      | Subtest 5 | 1852.4         | 9262 | 22.6           | 0.182           |
|      |           | 1880.0         | 9400 | 23.1           | 0.204           |
|      |           | 1907.6         | 9538 | 23.0           | 0.200           |

**Band V**

| Band | Mode      | Frequency(MHz) | CH   | AVG Power(dBm) | Output Power(W) |
|------|-----------|----------------|------|----------------|-----------------|
| V    | Subtest 1 | 826.4          | 1312 | 22.6           | 0.182           |
|      |           | 836.4          | 1413 | 22.8           | 0.191           |
|      |           | 846.6          | 1513 | 22.7           | 0.186           |
|      | Subtest 2 | 826.4          | 1312 | 21.1           | 0.129           |
|      |           | 836.4          | 1413 | 21.1           | 0.129           |
|      |           | 846.6          | 1513 | 21.1           | 0.129           |
|      | Subtest 3 | 826.4          | 1312 | 22.1           | 0.162           |
|      |           | 836.4          | 1413 | 22.2           | 0.166           |
|      |           | 846.6          | 1513 | 22.1           | 0.162           |
|      | Subtest 4 | 826.4          | 1312 | 21.1           | 0.129           |
|      |           | 836.4          | 1413 | 21.1           | 0.129           |
|      |           | 846.6          | 1513 | 21.1           | 0.129           |
|      | Subtest 5 | 826.4          | 1312 | 22.6           | 0.182           |
|      |           | 836.4          | 1413 | 22.8           | 0.191           |
|      |           | 846.6          | 1513 | 22.7           | 0.186           |

**Remark:** The value of factor includes both the loss of cable and external attenuator.

## 7.2 ERP & EIRP MEASUREMENT

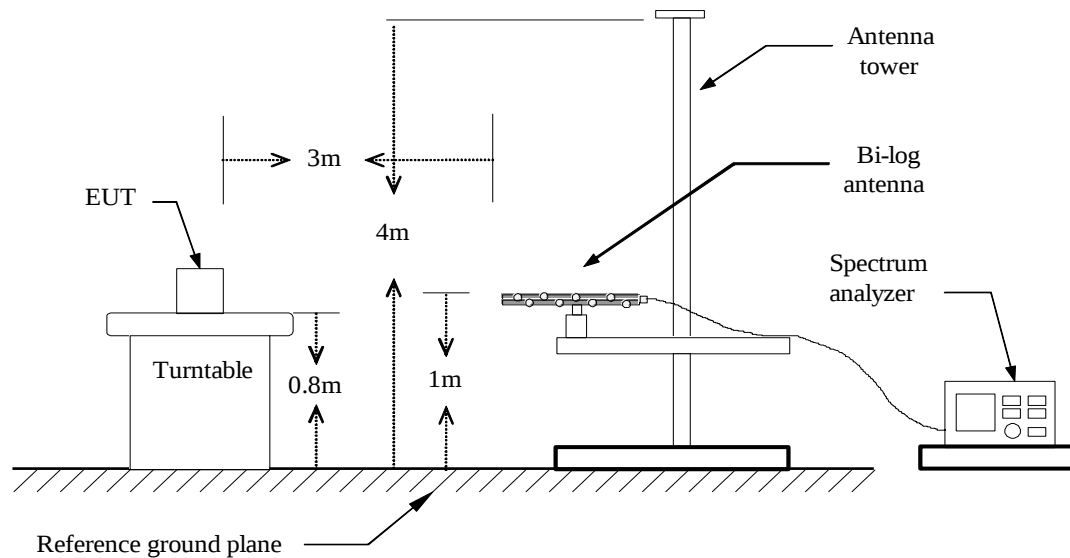
### LIMIT

According to FCC 22.913(a): The Effective Radiated Power (ERP) of mobile transmitters must not exceed 7 Watts.

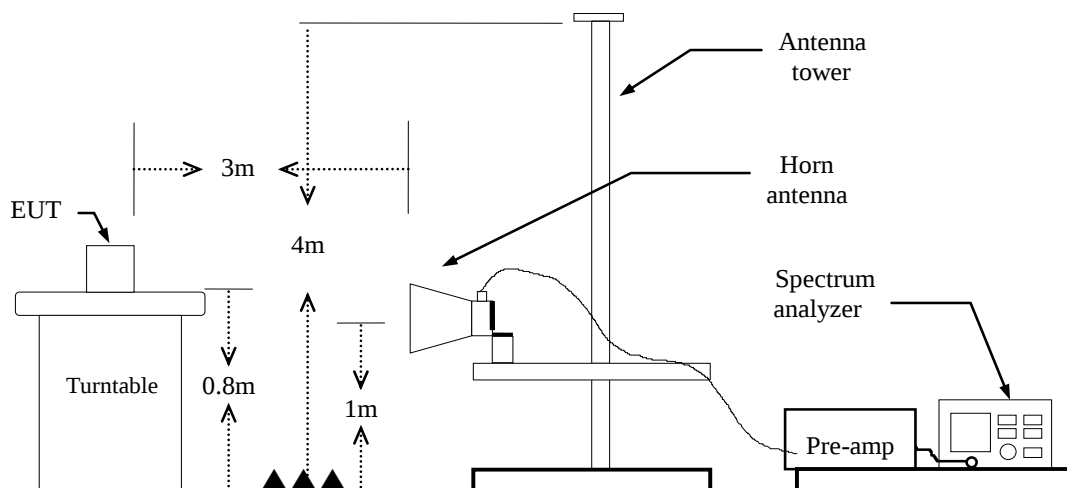
According to FCC 24.232(b): The equivalent Isotropic Radiated Power (EIRP) must not exceed 2 Watts.

### Test Configuration

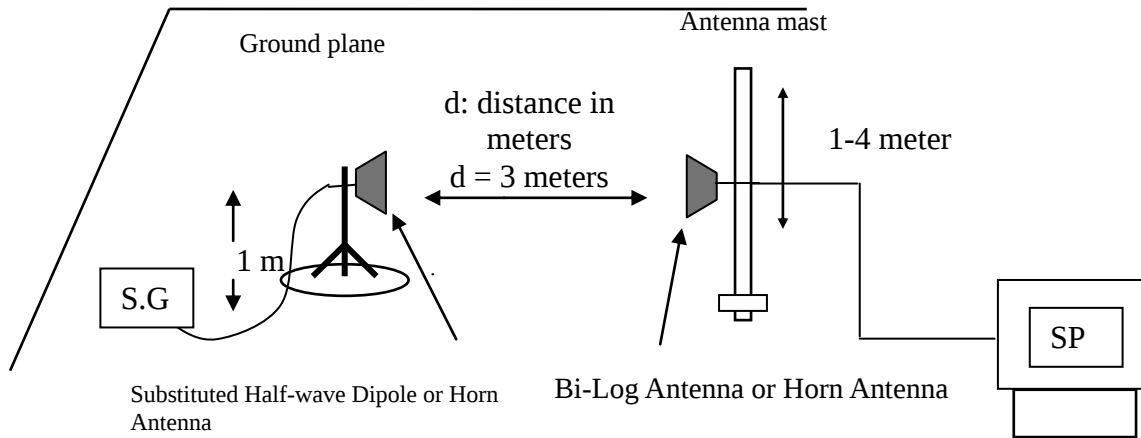
#### Below 1 GHz



#### Above 1 GHz



## For Substituted Method Test Set-UP



## TEST PROCEDURE

1. The EUT was placed on a non-conductive rotating platform (0.8m for below 1G and above 1G) in a semi-chamber. The radiated emission at the fundamental frequency was measured at 3m and SA with RMS detector per section 5, KDB 971168 D01.
2. During the measurement, the call box parameters were set to get the maximum output power of the EUT. The maximum emission was recorded from spectrum analyzer power level (LVL) from 360 degrees rotation of turntable and the test antenna raised and lowered over a range from 1m to 4m in both horizontally and vertically polarized orientations.
3. EIRP was measured method according to TIA/EIA-603-D:2010. The EUT was replaced by the substitution antenna at same location, and then record the maximum Analyzer reading through raised and lowered the test antenna.

$$\text{ERP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable (dB)} - 2.15$$

$$\text{EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable (dB)}$$

## TEST RESULTS

*No non-compliance noted.*

### WCDMA 12.2K RMC

| Test Mode                 | Channel | Vertical  |         | Horizontal |         |
|---------------------------|---------|-----------|---------|------------|---------|
|                           |         | EIRP(dBm) | EIRP(W) | EIRP(dBm)  | EIRP(W) |
| WCDMA 12.2K RMC (Band II) | Lowest  | 25.08     | 0.322   | 24.73      | 0.297   |
|                           | Middle  | 25.51     | 0.356   | 24.98      | 0.315   |
|                           | Highest | 25.45     | 0.351   | 23.77      | 0.238   |

| Test Mode                | Channel | Vertical |        | Horizontal |        |
|--------------------------|---------|----------|--------|------------|--------|
|                          |         | ERP(dBm) | ERP(W) | ERP(dBm)   | ERP(W) |
| WCDMA 12.2K RMC (Band V) | Lowest  | 19.54    | 0.090  | 15.24      | 0.033  |
|                          | Middle  | 19.97    | 0.099  | 17.80      | 0.060  |
|                          | Highest | 19.91    | 0.098  | 15.38      | 0.035  |

## 7.3 OCCUPIED BANDWIDTH MEASUREMENT

### Limits

For Reporting purpose only.

### TEST PROCEDURES

KDB 971168 v02r02 - Section 4.2

1. The occupied bandwidth was measured with the spectrum analyzer at the lowest, middle and highest channels in each band and different modulation. The 99% and -26dB bandwidth was measured and recorded.
2. RBW = 1-5% of the expected OBW
3. VBW  $\geq 3 \times$  RBW
4. Detector = Peak
5. Trace mode = max. hold

### TEST RESULTS

*No non-compliance noted*

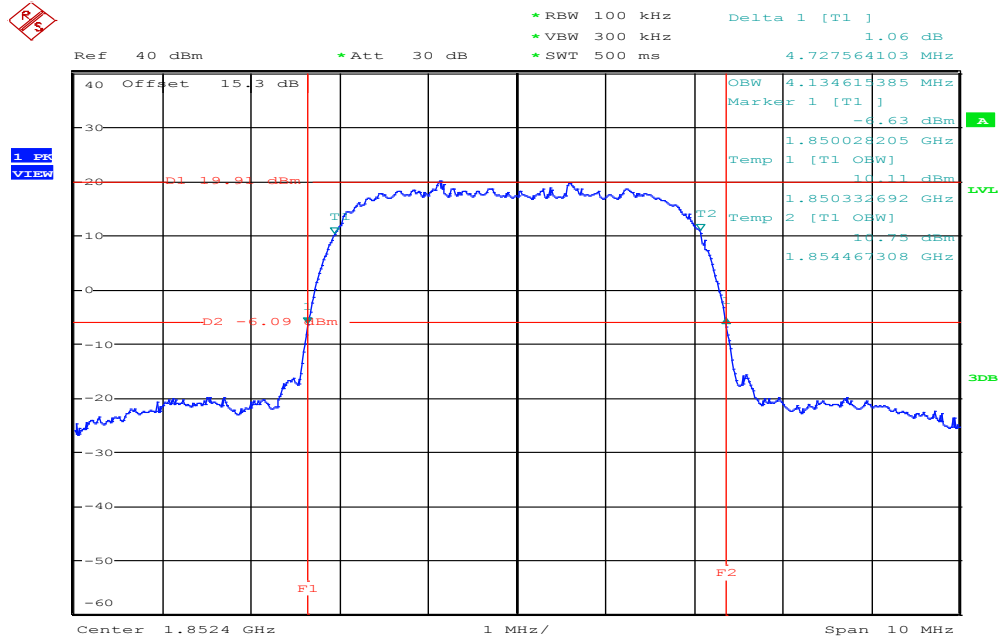
#### Test Data

| Test Mode                 | CH      | Frequency (MHz) | 99% Bandwidth (MHz) | 26 dB Bandwidth (MHz) |
|---------------------------|---------|-----------------|---------------------|-----------------------|
| WCDMA 12.2k RMC (Band II) | Lowest  | 1852.4          | 4.13461             | 4.72756               |
|                           | Middle  | 1880.0          | 4.13461             | 4.72756               |
|                           | Highest | 1907.6          | 4.11858             | 4.72756               |
| WCDMA 12.2k RMC (Band V)  | Lowest  | 826.4           | 4.11858             | 4.72756               |
|                           | Middle  | 836.4           | 4.11858             | 4.77564               |
|                           | Highest | 846.6           | 4.13461             | 4.72756               |

## Test Plot

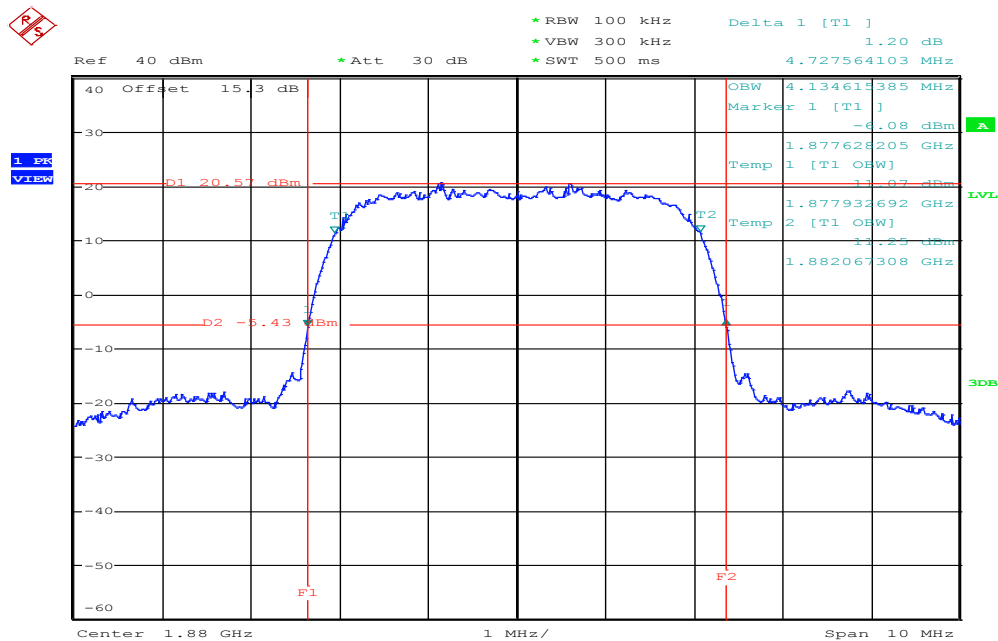
### WCDMA 12.2k RMC (Band II)

### Low CH



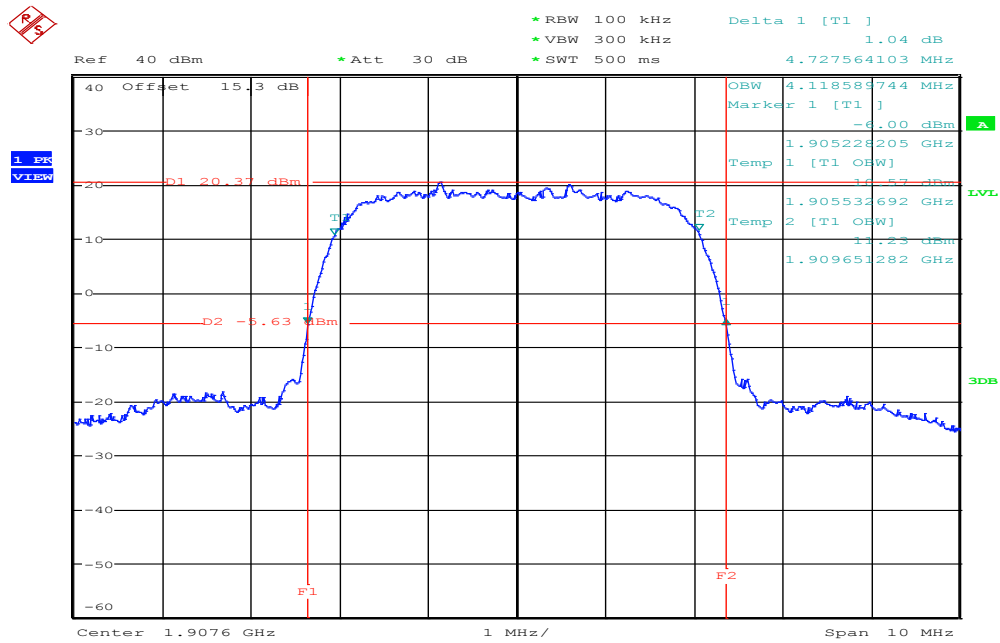
Date: 27.OCT.2016 22:03:57

### Mid CH



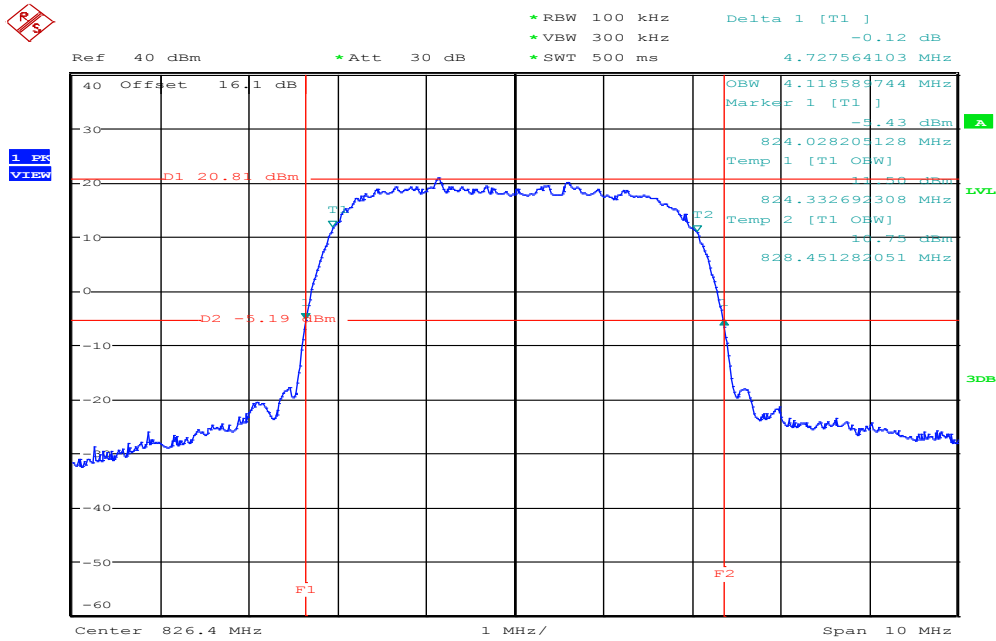
Date: 27.OCT.2016 21:59:21

## High CH



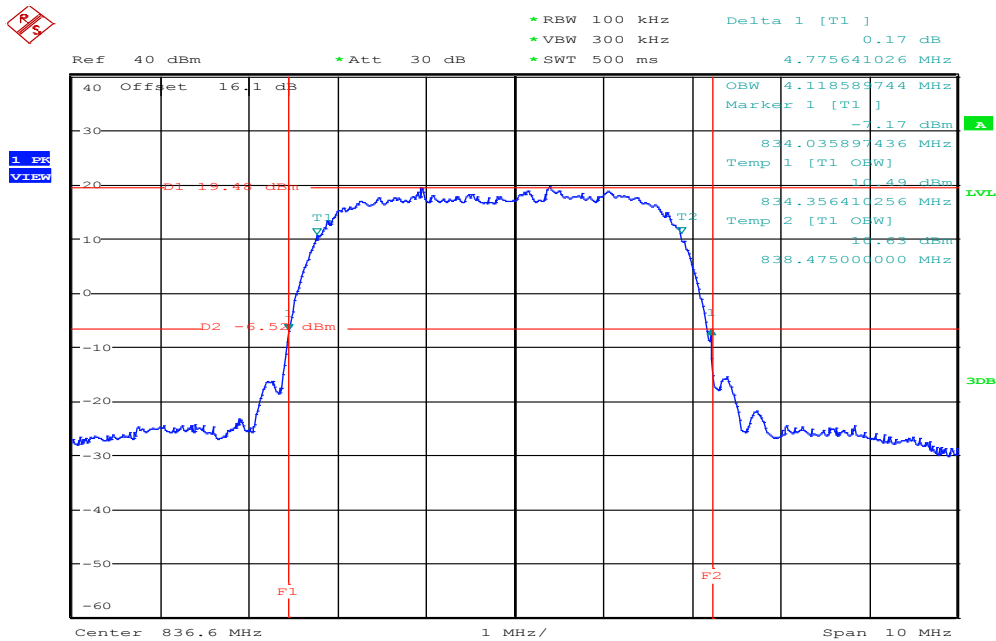
Date: 27.OCT.2016 22:07:17

## Low CH



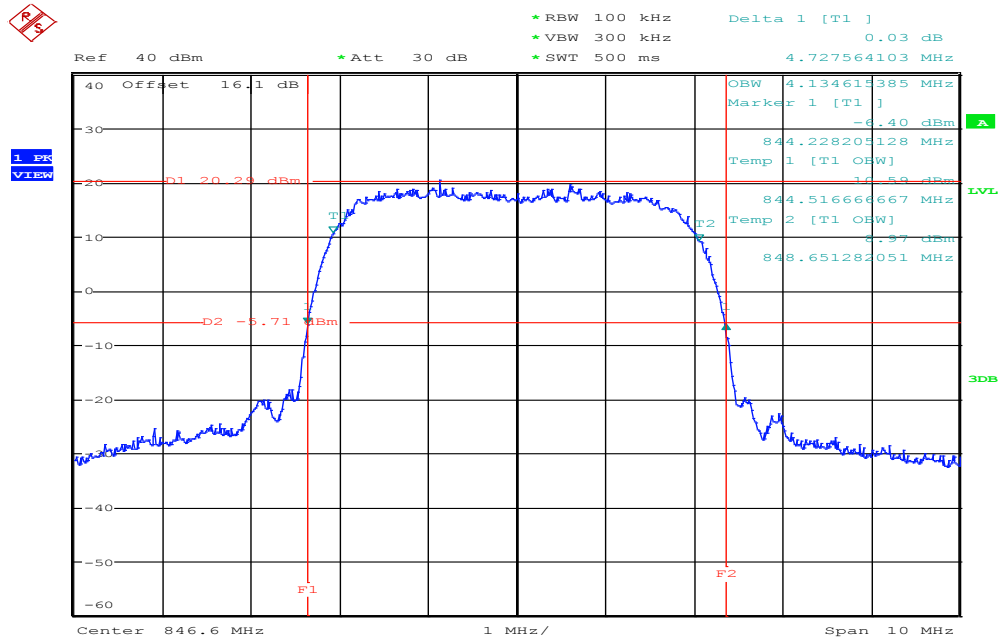
Date: 27.OCT.2016 22:35:56

## Mid CH



Date: 27.OCT.2016 22:32:50

## High CH



Date: 27.OCT.2016 22:38:44

## **7.4 CONDUCTED BANDEDGR MEASUREMENT**

### **Limit**

#### **FCC §22.917(a), Band 5**

For operations in the 824-849 MHz band, out of band emissions. 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.

#### **FCC §24.238(a), Band 2**

For operations in the 1850-1910 and 1930-1950 MHz band, out of band emissions. 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.

### **TEST PROCEDURE**

According to KDB 971168 D01, section 6.0

1. The EUT was connected to spectrum analyzer and call box.
2. The RF output of EUT was connected to the spectrum analyzer.
3. Start and stop frequency were set such that the band edge would be placed in the center of the plot
4. Span was set large enough so as to capture all out of band emissions near the band edge
5. Set the spectrum analyzer, RBW=100kHz, VBW=300kHz.
6. Record the Band edge emission.

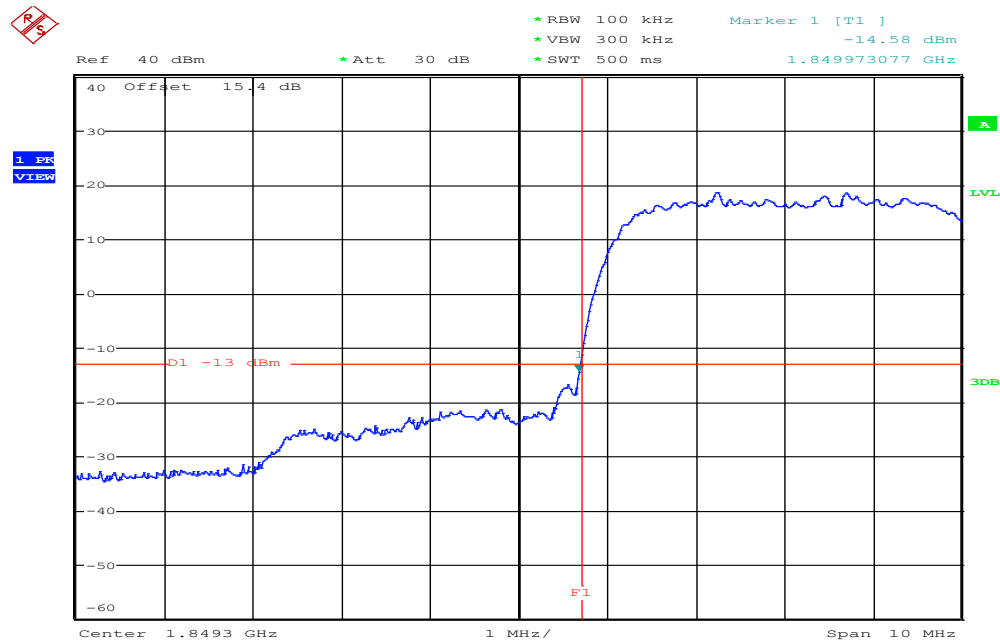
### **TEST RESULTS**

*No non-compliance noted.*

## Test Data

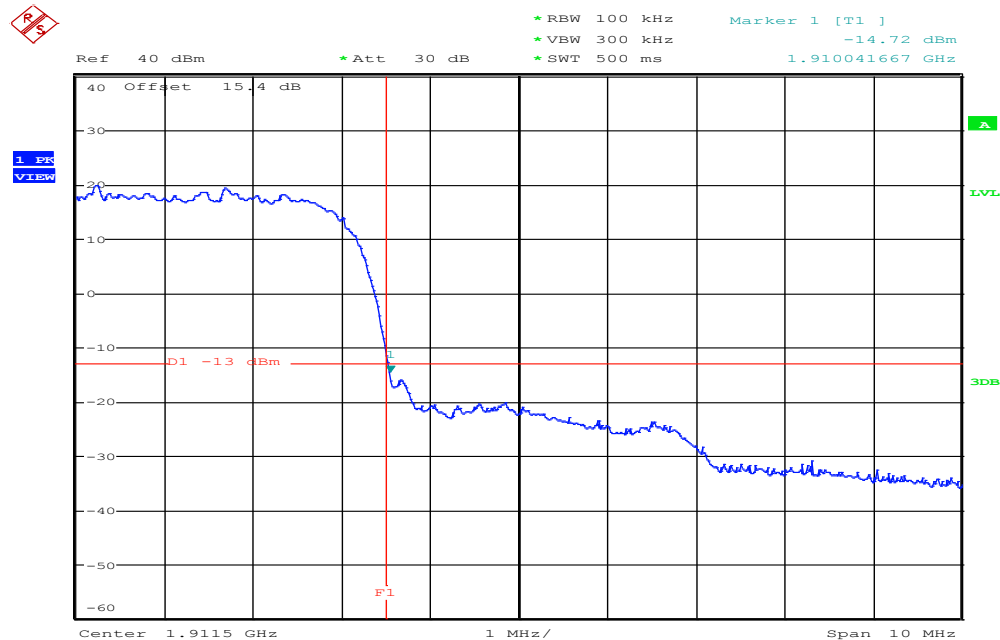
### WCDMA 12.2k RMC (Band II)

#### Low CH



Date: 13.SEP.2016 15:52:07

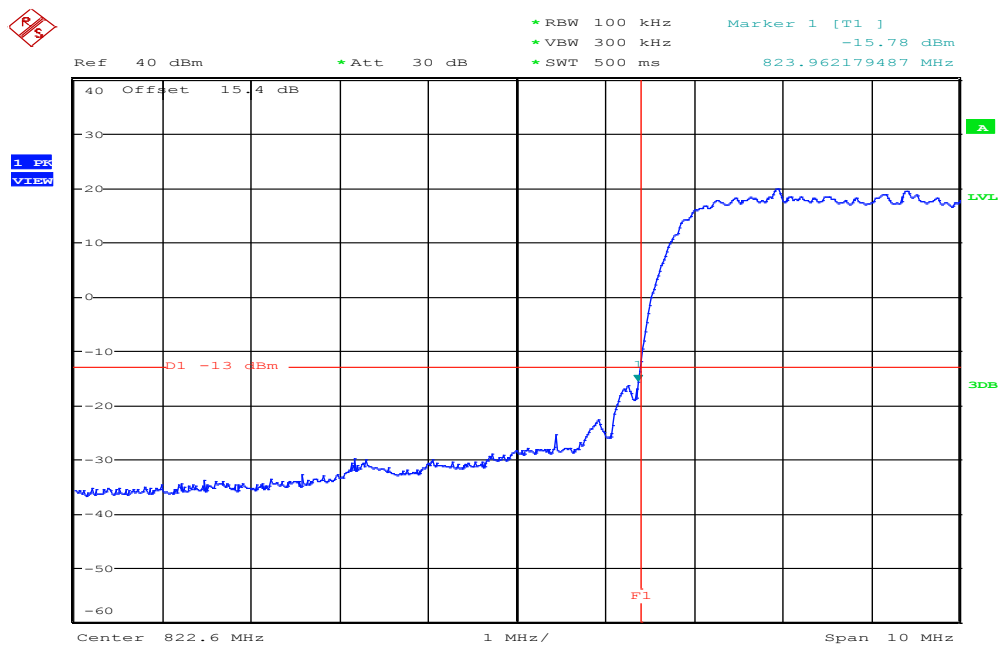
#### High CH



Date: 13.SEP.2016 16:05:33

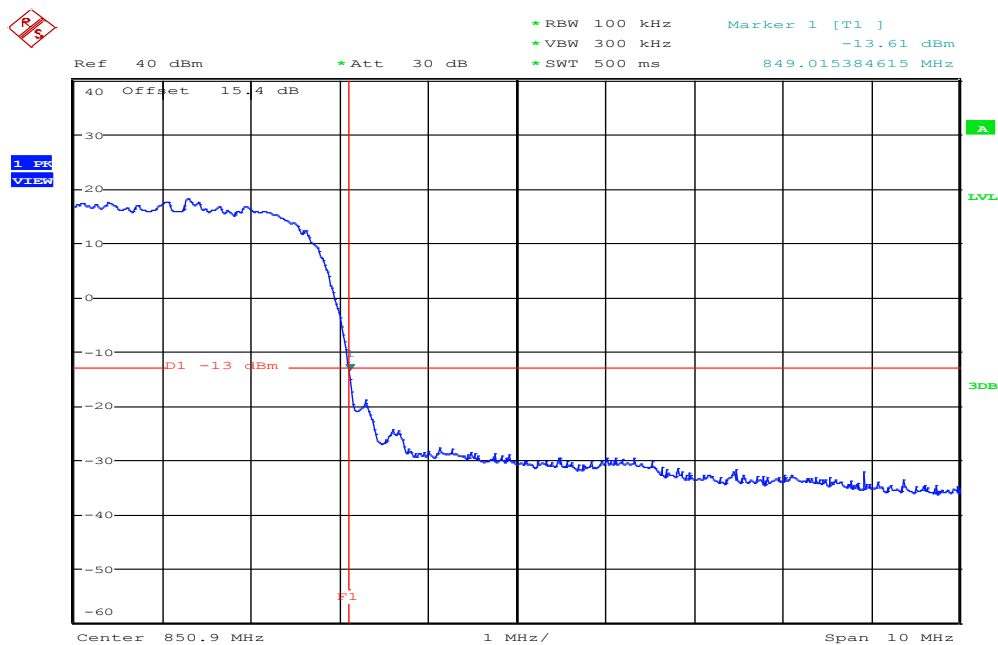
## WCDMA 12.2k RMC (Band V)

### Low CH



Date: 13.SEP.2016 16:08:49

### High CH



Date: 13.SEP.2016 16:13:58

## **7.5 CONDUCTED SPURIOUS EMISSIONS**

### **Limit**

#### **FCC §22.917(a), Band 5**

For operations in the 824-849 MHz band, out of band emissions. 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.

#### **FCC §24.238(a), Band 2**

For operations in the 1850-1910 and 1930-1950 MHz band, out of band emissions. 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.

### **Test Procedures**

According to KDB 971168 D01, section 6.0

1. The EUT was connected to spectrum analyzer and call box.
2. The RF output of EUT was connected to the spectrum analyzer.
3. Set the spectrum analyzer, RBW=1MHz, VBW=3MHz.
4. Record the maximum spurious emission.
5. The fundamental frequency should be excluded against the limit in operating band.

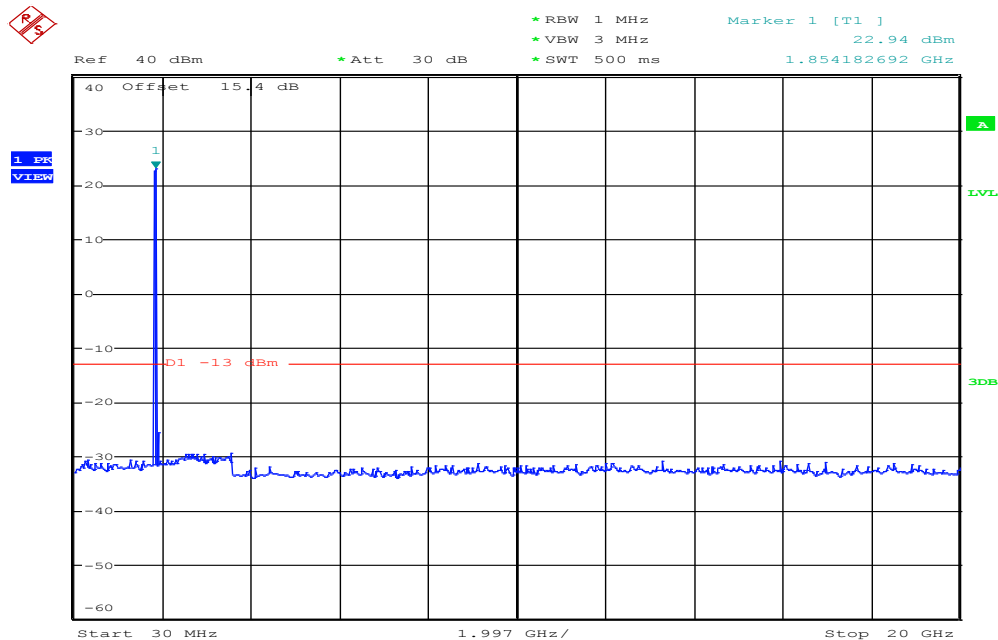
## **TEST RESULTS**

*No non-compliance noted*

## Test Data

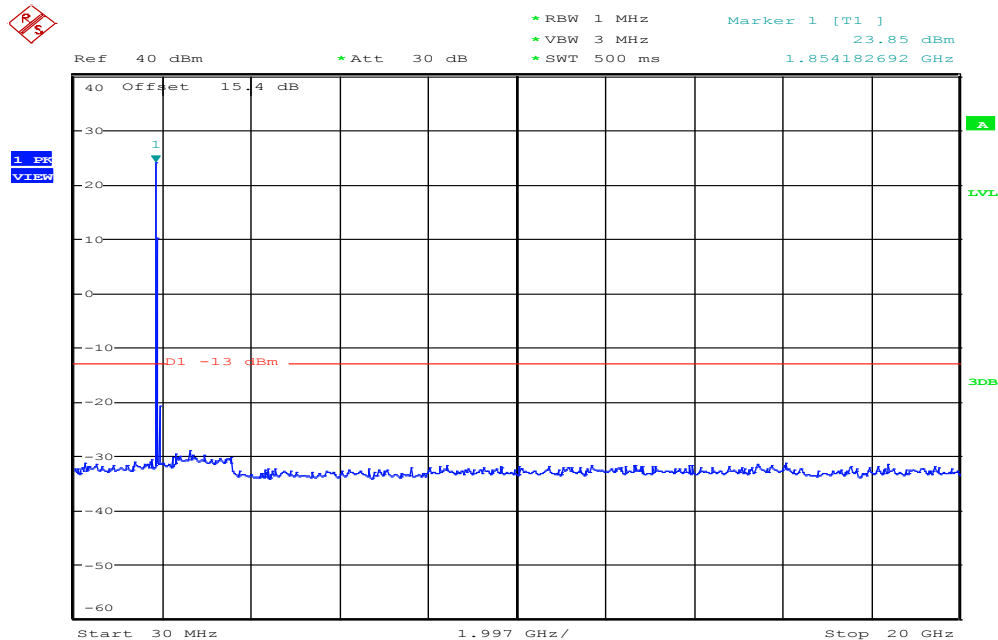
### WCDMA 12.2k RMC (Band II)

#### Low CH



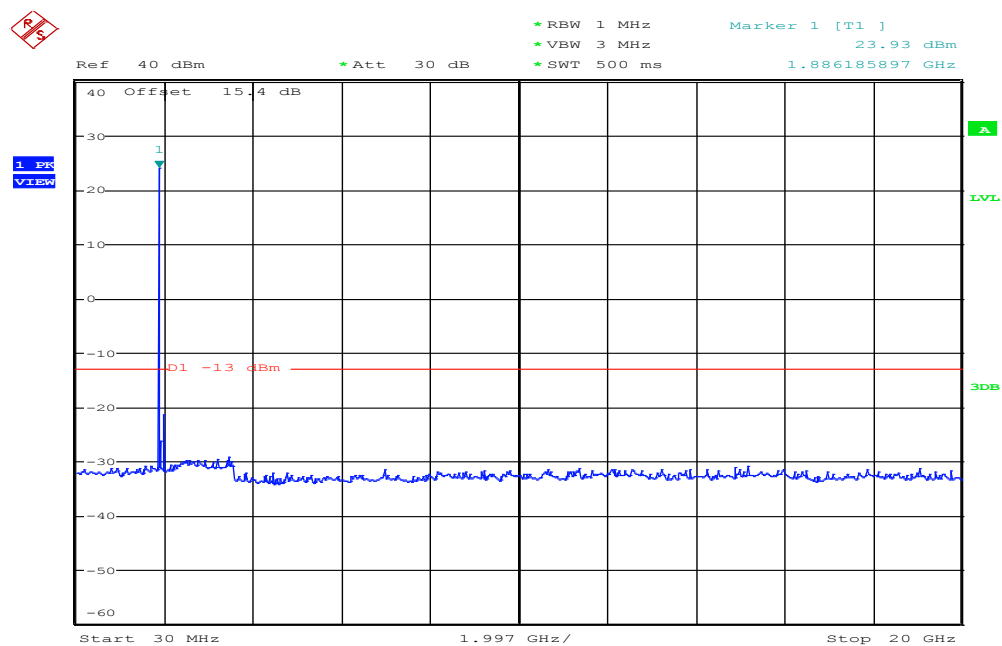
Date: 13.SEP.2016 14:40:30

#### Mid CH



Date: 13.SEP.2016 14:39:24

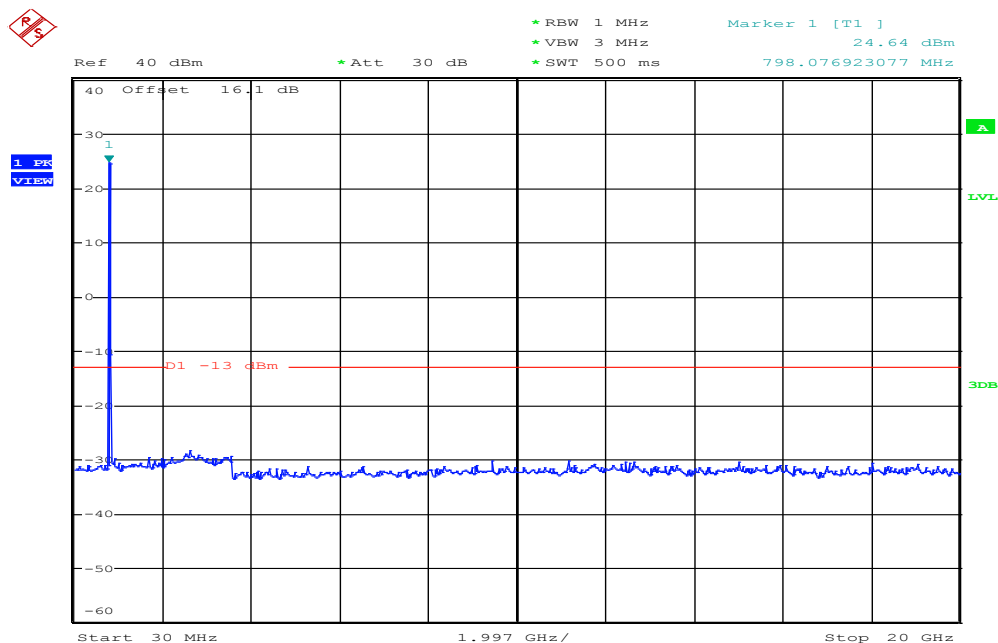
## High CH



Date: 13.SEP.2016 14:41:32

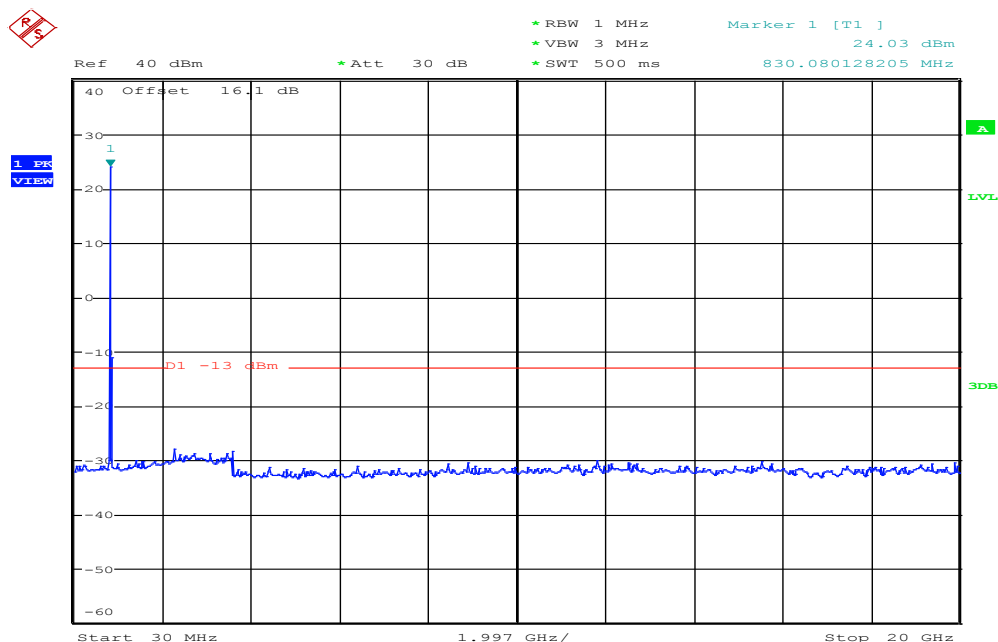
## WCDMA 12.2k RMC (Band V)

### Low CH



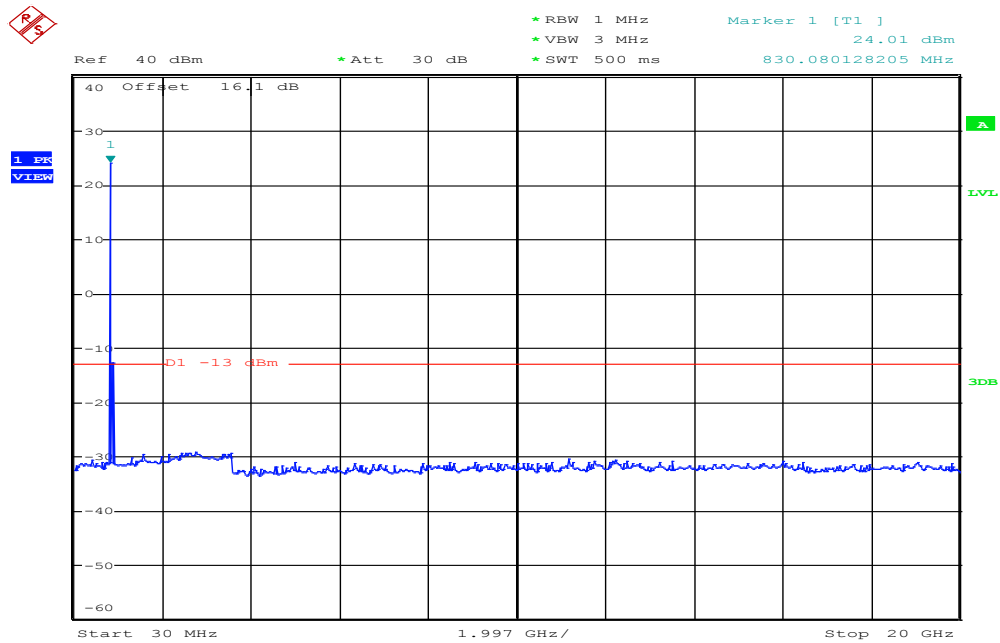
Date: 13.SEP.2016 14:32:53

### Mid CH



Date: 13.SEP.2016 14:30:27

## High CH



Date: 13.SEP.2016 14:31:43

## 7.6 SPURIOUS RADIATION MEASUREMENT

### Limit

#### **FCC §22.917(a), Band 5**

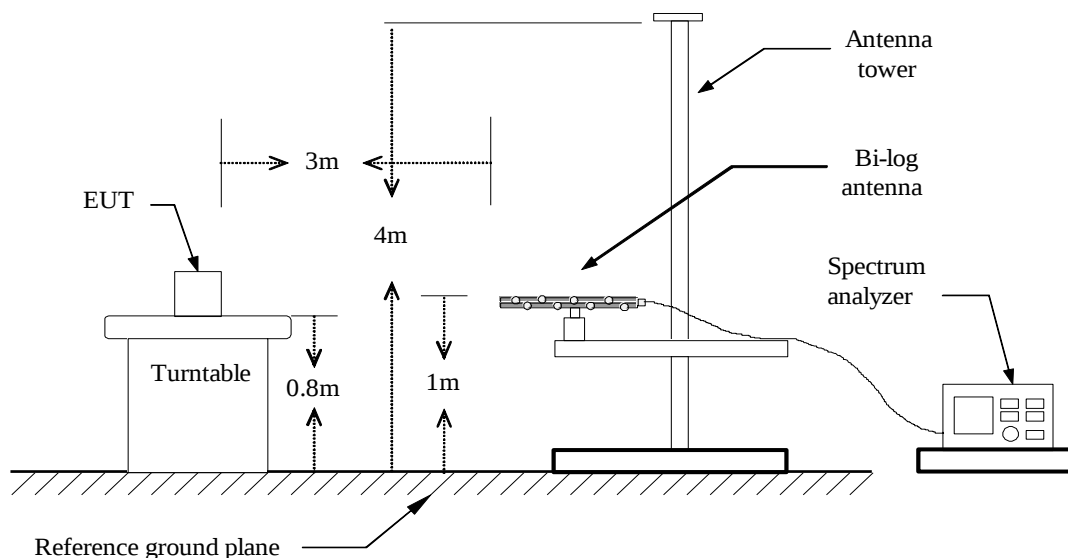
For operations in the 824-849 MHz band, out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

#### **FCC §24.238(a), Band 2**

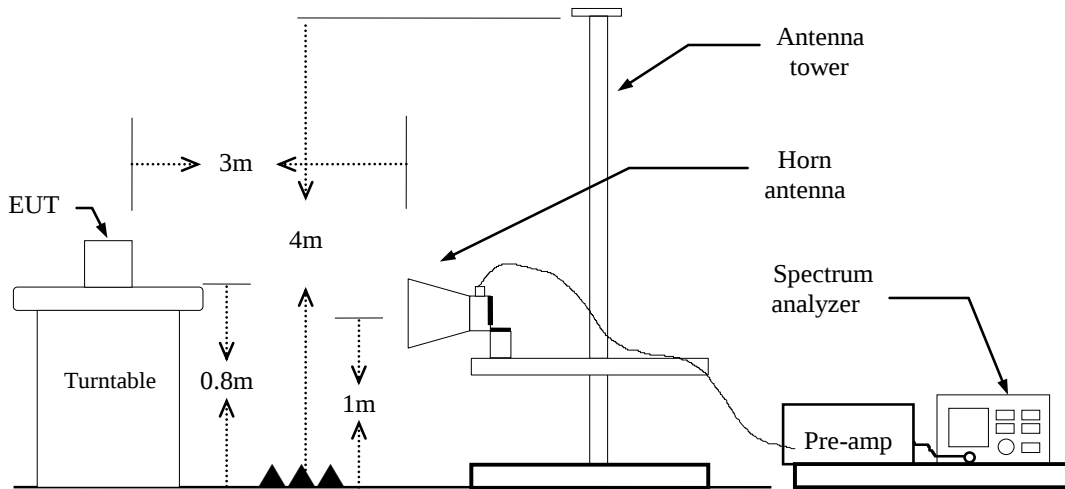
For operations in the 1850-1910 and 1930-1950 MHz band, out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

### Test Configuration

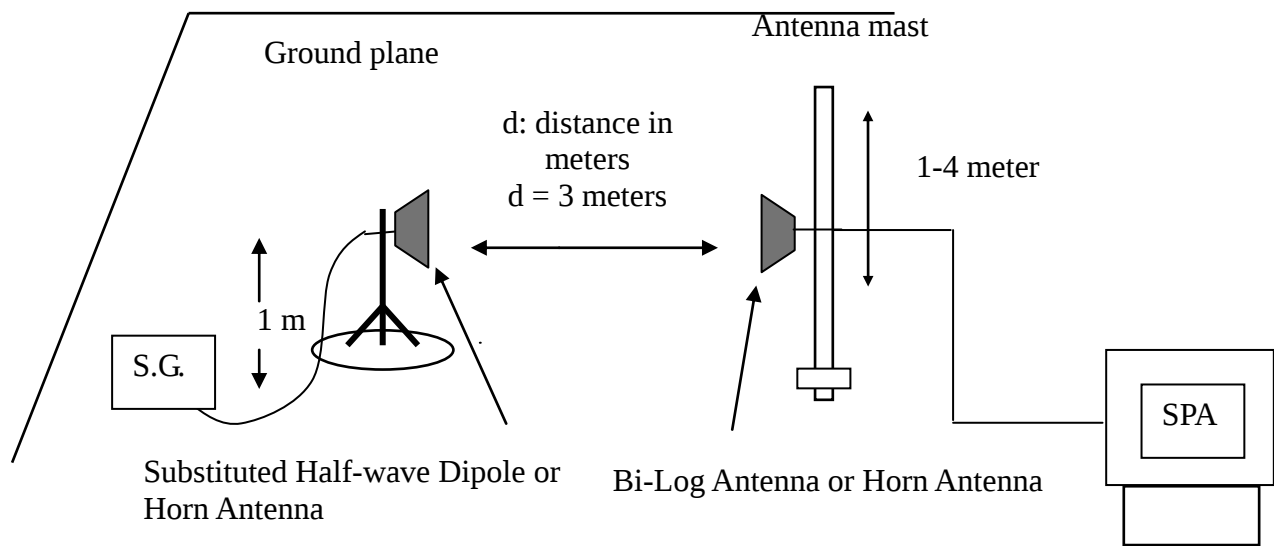
#### **Below 1 GHz**



## Above 1 GHz



## Substituted Method Test Set-up



## **TEST PROCEDURE**

1. According to KDB 971168 D01. section 5.8 and TIA-603-D:2010 section 2.2.12.
2. The EUT was placed on a turntable
  - (1) Below 1G : 0.8m
  - (2) Above 1G : 0.8m
  - (3) EUT set 3m from the receiving antenna
  - (4) The table was rotated 360 degrees of the highest spurious emission to determine the position.
3. Set the spectrum analyzer , RBW=1MHz, VBW=3MHz.
4. A horn antenna was driven by a signal generator.
5. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission

ERP = S.G. output (dBm) + Antenna Gain (dBd) – Cable (dB)

EIRP = S.G. output (dBm) + Antenna Gain (dBi) – Cable (dB)

## **TEST RESULTS**

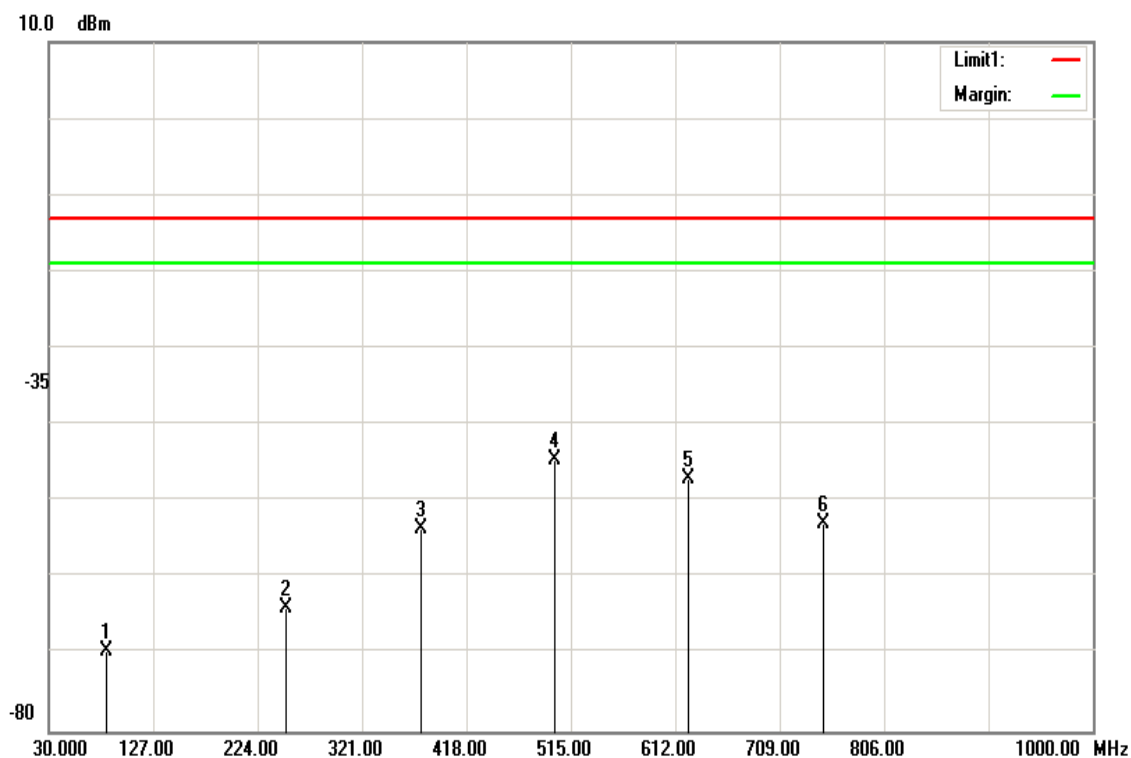
*Refer to the attached tabular data sheets.*

## Radiated Spurious Emission Measurement Result / Below 1GHz

**Operation Mode:** WCDMA 12.2k RMC  
Band II / TX /Mid CH      **Test Date:** September 23, 2016

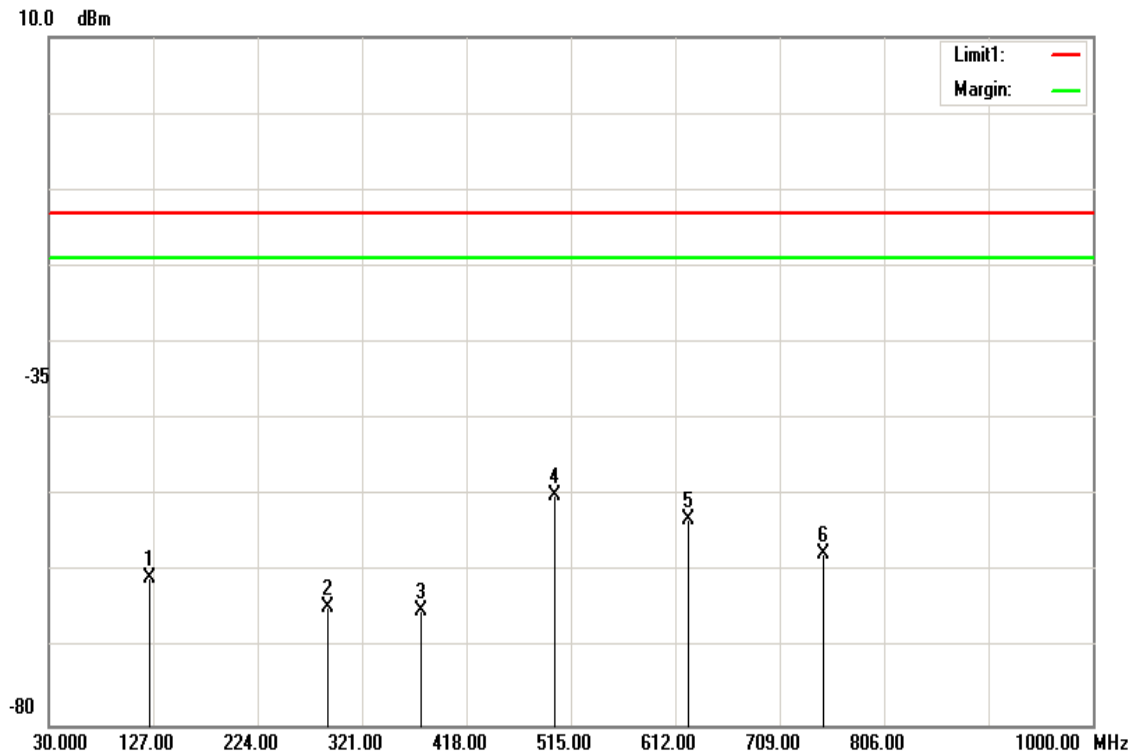
**Temperature:** 22.6°C      **Tested by:** Dennis Li

**Humidity:** 57.2 % RH      **Polarity:** Ver.



| Frequency (MHz) | S.G. (dBm) | Cable loss (dB) | Ant.Gain (dBi) | Emission level (dBm) | Limit (dBm) | Margin (dB) | Antenna Polarization (V/H) |
|-----------------|------------|-----------------|----------------|----------------------|-------------|-------------|----------------------------|
| 83.3500         | -81.34     | 0.98            | 12.87          | -69.45               | -13.00      | -56.45      | V                          |
| 250.1900        | -79.48     | 1.68            | 17.31          | -63.85               | -13.00      | -50.85      | V                          |
| 375.3200        | -72.34     | 2.05            | 20.81          | -53.58               | -13.00      | -40.58      | V                          |
| 500.4500        | -65.51     | 2.36            | 23.3           | -44.57               | -13.00      | -31.57      | V                          |
| 624.6100        | -69.37     | 2.64            | 24.99          | -47.02               | -13.00      | -34.02      | V                          |
| 749.7400        | -76.8      | 2.89            | 26.7           | -52.99               | -13.00      | -39.99      | V                          |

|                        |                                         |                   |                    |
|------------------------|-----------------------------------------|-------------------|--------------------|
| <b>Operation Mode:</b> | WCDMA 12.2k RMC<br>Band II / TX /Mid CH | <b>Test Date:</b> | September 23, 2016 |
| <b>Temperature:</b>    | 22.6°C                                  | <b>Tested by:</b> | Dennis Li          |
| <b>Humidity:</b>       | 57.2 % RH                               | <b>Polarity:</b>  | Hor.               |



| Frequency (MHz) | S.G. (dBm) | Cable loss (dB) | Ant.Gain (dBi) | Emission level (dBm) | Limit (dBm) | Margin (dB) | Antenna Polarization (V/H) |
|-----------------|------------|-----------------|----------------|----------------------|-------------|-------------|----------------------------|
| 123.1200        | -78.65     | 1.24            | 19.13          | -60.76               | -13.00      | -47.76      | H                          |
| 288.9900        | -81.68     | 1.8             | 18.91          | -64.57               | -13.00      | -51.57      | H                          |
| 375.3200        | -83.71     | 2.05            | 20.81          | -64.95               | -13.00      | -51.95      | H                          |
| 500.4500        | -70.9      | 2.36            | 23.3           | -49.96               | -13.00      | -36.96      | H                          |
| 624.6100        | -75.45     | 2.64            | 24.99          | -53.10               | -13.00      | -40.10      | H                          |
| 749.7400        | -81.46     | 2.89            | 26.7           | -57.65               | -13.00      | -44.65      | H                          |

**Operation Mode:** WCDMA 12.2k RMC  
Band V / TX /Mid CH

**Test Date:**

September 23, 2016

**Temperature:** 22.6°C

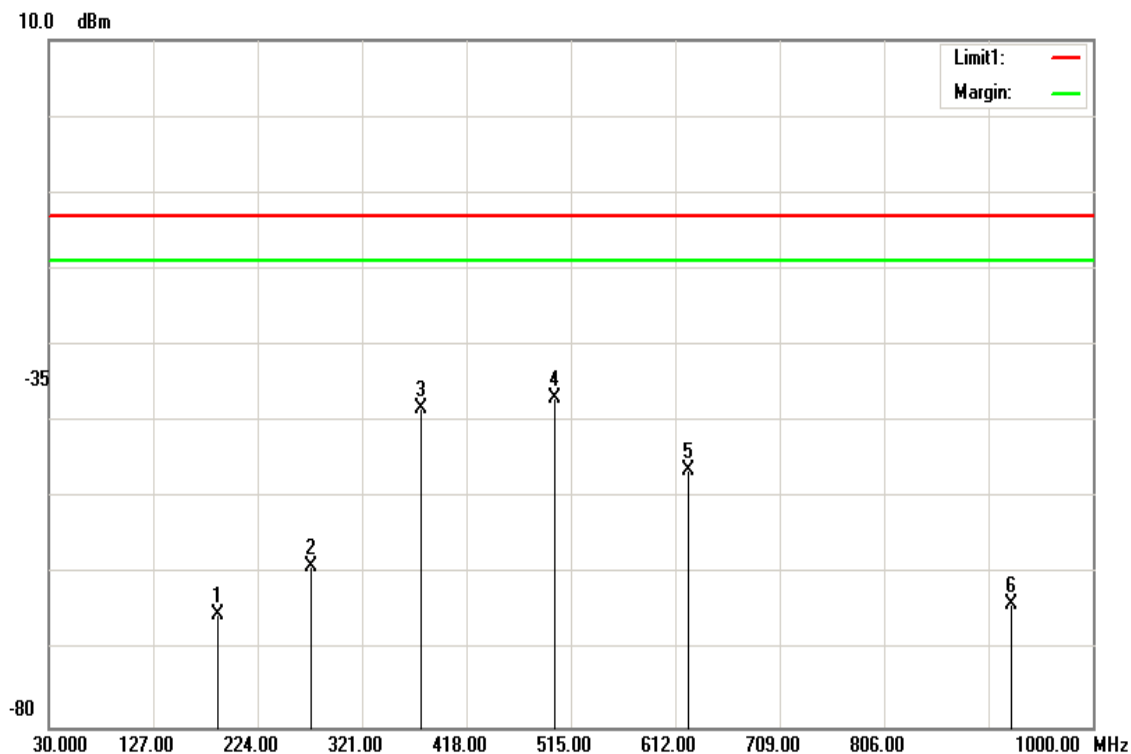
**Tested by:**

Dennis Li

**Humidity:** 57.2 % RH

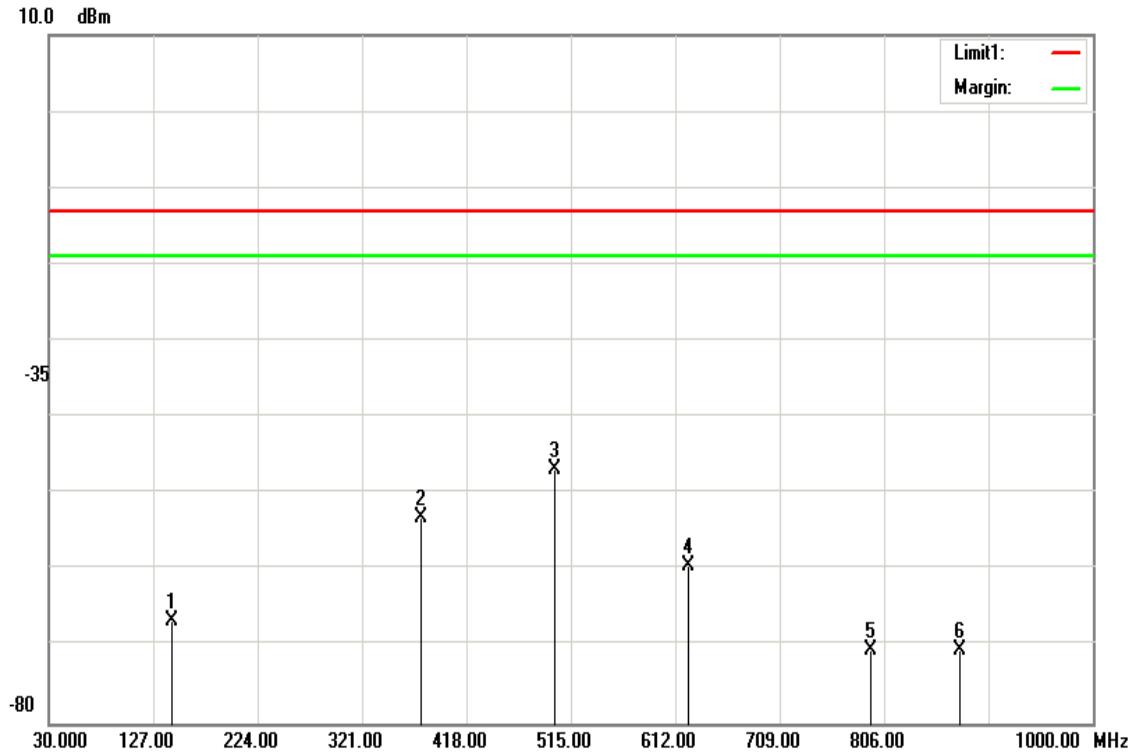
**Polarity:**

Ver.



| Frequency (MHz) | S.G. (dBm) | Cable loss (dB) | Ant.Gain (dBi) | Emission level (dBm) | Limit (dBm) | Margin (dB) | Antenna Polarization (V/H) |
|-----------------|------------|-----------------|----------------|----------------------|-------------|-------------|----------------------------|
| 187.1400        | -80.91     | 1.45            | 17.16          | -65.20               | -13.00      | -52.20      | V                          |
| 273.4700        | -75.97     | 1.75            | 18.87          | -58.85               | -13.00      | -45.85      | V                          |
| 375.3200        | -57.1      | 2.05            | 20.81          | -38.34               | -13.00      | -25.34      | V                          |
| 500.4500        | -57.9      | 2.36            | 23.3           | -36.96               | -13.00      | -23.96      | V                          |
| 624.6100        | -68.71     | 2.64            | 24.99          | -46.36               | -13.00      | -33.36      | V                          |
| 924.3400        | -88.98     | 3.21            | 28.34          | -63.85               | -13.00      | -50.85      | V                          |

|                        |                                        |                   |                    |
|------------------------|----------------------------------------|-------------------|--------------------|
| <b>Operation Mode:</b> | WCDMA 12.2k RMC<br>Band V / TX /Mid CH | <b>Test Date:</b> | September 23, 2016 |
| <b>Temperature:</b>    | 22.6°C                                 | <b>Tested by:</b> | Dennis Li          |
| <b>Humidity:</b>       | 57.2 % RH                              | <b>Polarity:</b>  | Hor.               |



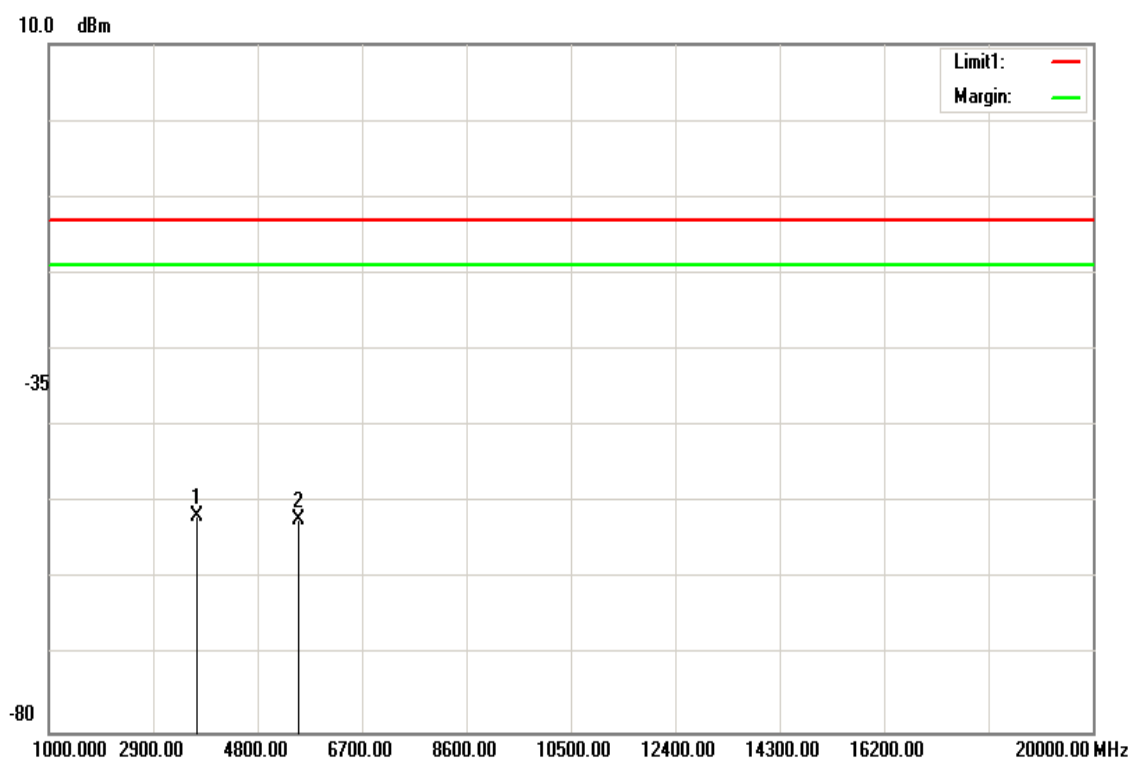
| Frequency (MHz) | S.G. (dBm) | Cable loss (dB) | Ant.Gain (dBi) | Emission level (dBm) | Limit (dBm) | Margin (dB) | Antenna Polarization (V/H) |
|-----------------|------------|-----------------|----------------|----------------------|-------------|-------------|----------------------------|
| 144.4600        | -83.56     | 1.28            | 18.28          | -66.56               | -13.00      | -53.56      | H                          |
| 375.3200        | -71.97     | 2.05            | 20.81          | -53.21               | -13.00      | -40.21      | H                          |
| 500.4500        | -67.65     | 2.36            | 23.3           | -46.71               | -13.00      | -33.71      | H                          |
| 624.6100        | -81.71     | 2.64            | 24.99          | -59.36               | -13.00      | -46.36      | H                          |
| 793.3900        | -94.57     | 2.98            | 27.13          | -70.42               | -13.00      | -57.42      | H                          |
| 876.8100        | -95.25     | 3.13            | 27.91          | -70.47               | -13.00      | -57.47      | H                          |

## Above 1GHz

**Operation Mode:** WCDMA 12.2k RMC  
Band II / TX / Low CH **Test Date:** September 23, 2016

**Temperature:** 22.6°C **Tested by:** Dennis Li

**Humidity:** 57.2 % RH **Polarity:** Ver.

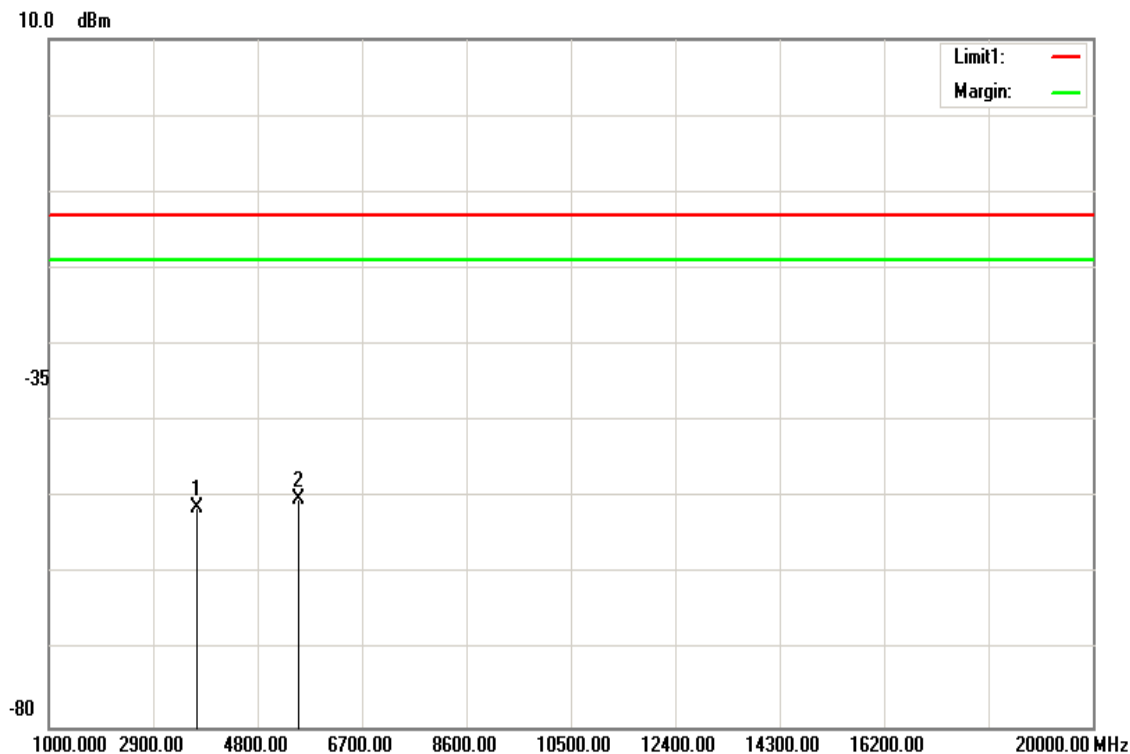


| Frequency (MHz) | S.G. (dBm) | Cable loss (dB) | Ant.Gain (dBi) | Emission level (dBm) | Limit (dBm) | Margin (dB) | Antenna Polarization (V/H) |
|-----------------|------------|-----------------|----------------|----------------------|-------------|-------------|----------------------------|
| 3704.000        | -57.37     | 6.9             | 12.54          | -51.73               | -13.00      | -38.73      | V                          |
| 5557.000        | -56.44     | 8.62            | 12.88          | -52.18               | -13.00      | -39.18      | V                          |
| N/A             |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |

### **Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

**Operation Mode:** WCDMA 12.2k RMC  
Band II / TX / Low CH **Test Date:** September 23, 2016  
**Temperature:** 22.6°C **Tested by:** Dennis Li  
**Humidity:** 57.2 % RH **Polarity:** Hor.

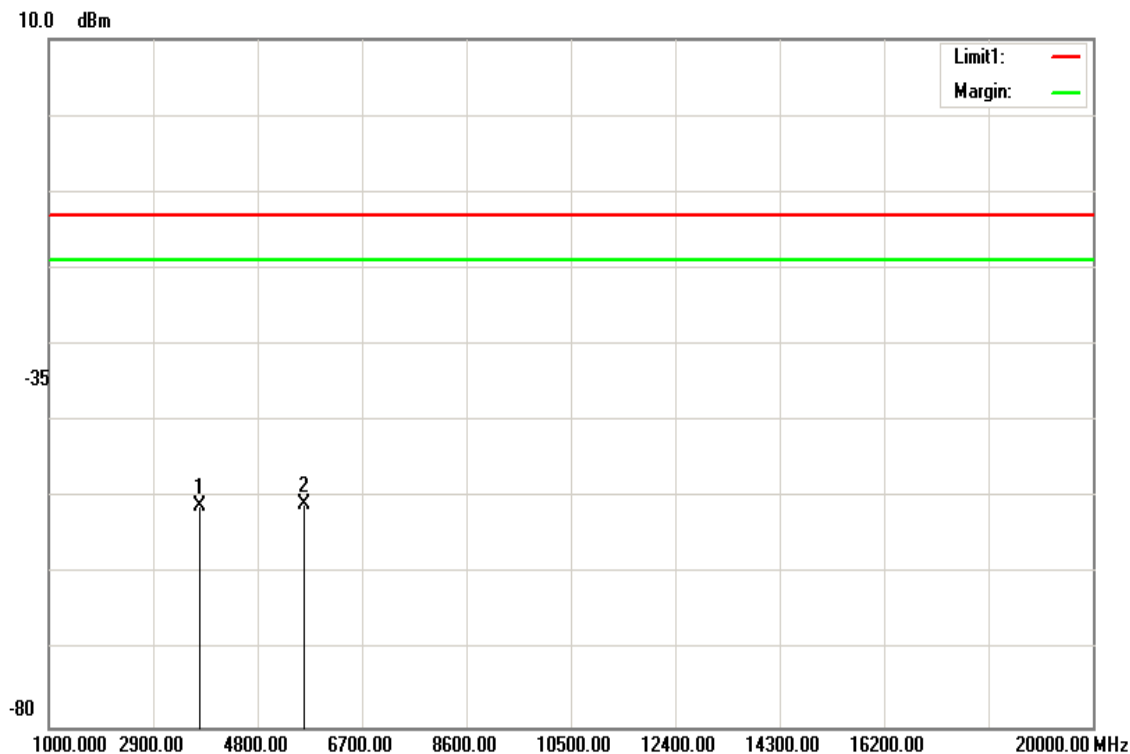


| Frequency (MHz) | S.G. (dBm) | Cable loss (dB) | Ant.Gain (dBi) | Emission level (dBm) | Limit (dBm) | Margin (dB) | Antenna Polarization (V/H) |
|-----------------|------------|-----------------|----------------|----------------------|-------------|-------------|----------------------------|
| 3704.000        | -56.91     | 6.9             | 12.54          | -51.27               | -13.00      | -38.27      | H                          |
| 5557.000        | -54.44     | 8.62            | 12.88          | -50.18               | -13.00      | -37.18      | H                          |
| N/A             |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

**Operation Mode:** WCDMA 12.2k RMC  
Band II / TX / Mid CH **Test Date:** September 23, 2016  
**Temperature:** 22.6°C **Tested by:** Dennis Li  
**Humidity:** 57.2 % RH **Polarity:** Ver.

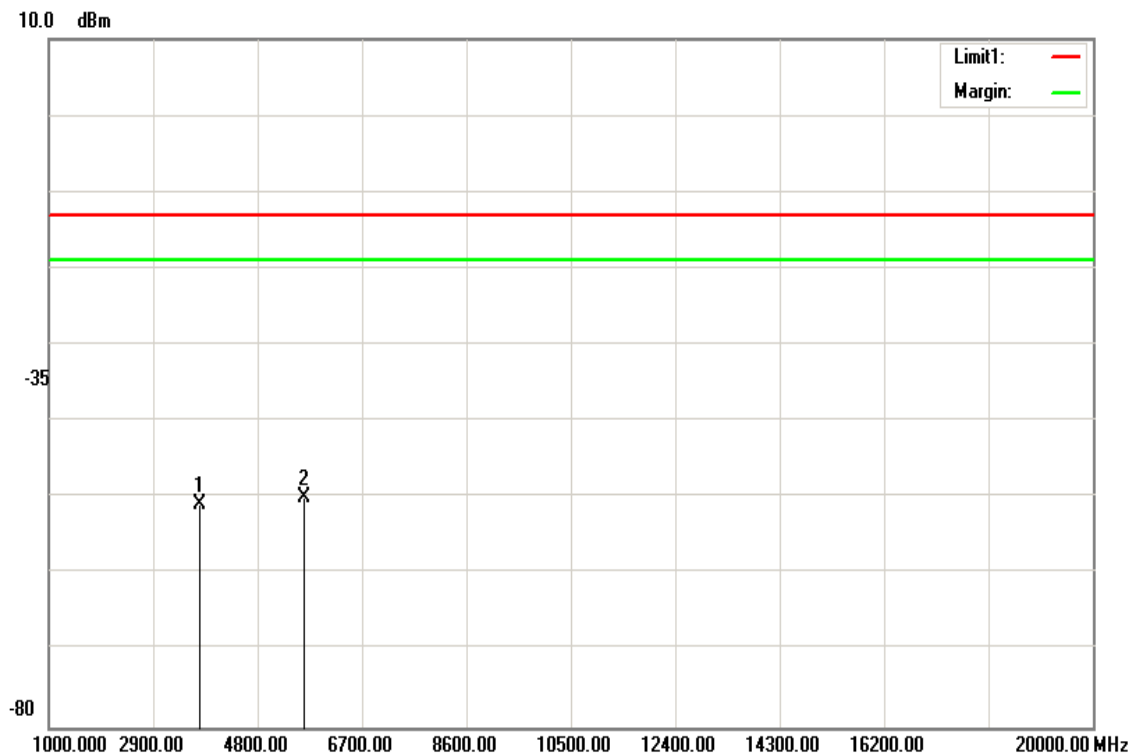


| Frequency (MHz) | S.G. (dBm) | Cable loss (dB) | Ant.Gain (dBi) | Emission level (dBm) | Limit (dBm) | Margin (dB) | Antenna Polarization (V/H) |
|-----------------|------------|-----------------|----------------|----------------------|-------------|-------------|----------------------------|
| 3760.000        | -56.63     | 6.96            | 12.55          | -51.04               | -13.00      | -38.04      | V                          |
| 5640.000        | -55.09     | 8.69            | 12.84          | -50.94               | -13.00      | -37.94      | V                          |
| N/A             |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

**Operation Mode:** WCDMA 12.2k RMC  
Band II / TX / Mid CH **Test Date:** September 23, 2016  
**Temperature:** 22.6°C **Tested by:** Dennis Li  
**Humidity:** 57.2 % RH **Polarity:** Hor.

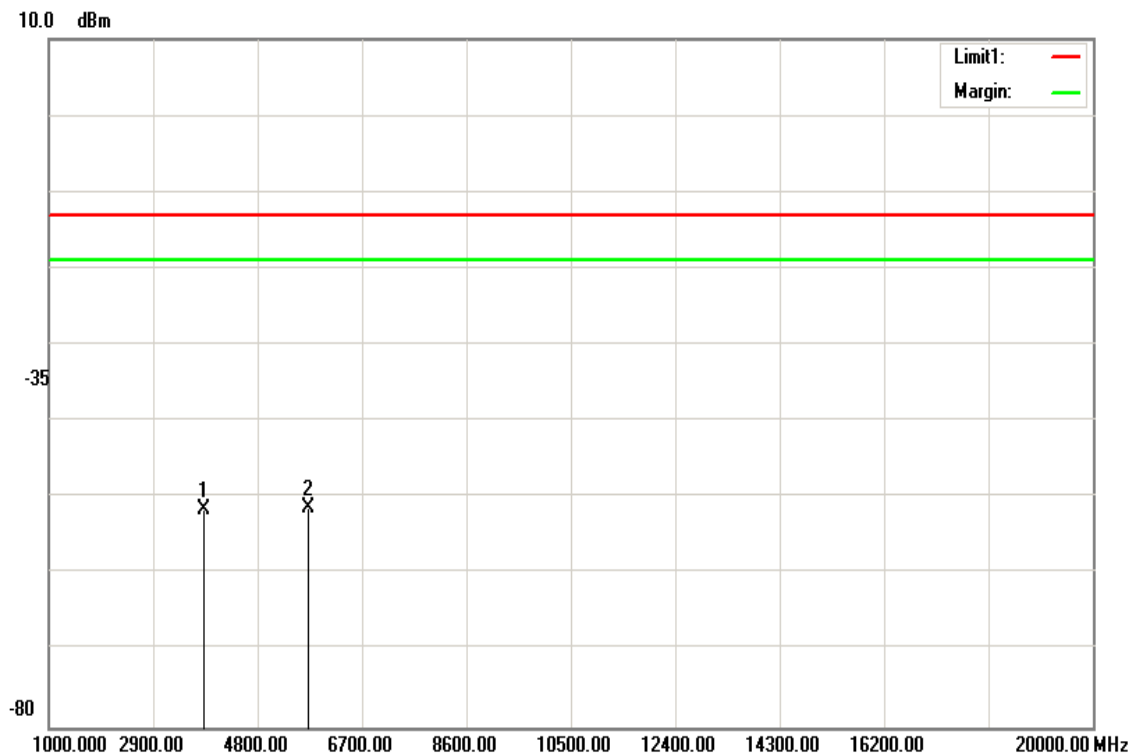


| Frequency (MHz) | S.G. (dBm) | Cable loss (dB) | Ant.Gain (dBi) | Emission level (dBm) | Limit (dBm) | Margin (dB) | Antenna Polarization (V/H) |
|-----------------|------------|-----------------|----------------|----------------------|-------------|-------------|----------------------------|
| 3760.000        | -56.42     | 6.96            | 12.55          | -50.83               | -13.00      | -37.83      | H                          |
| 5640.000        | -54.02     | 8.69            | 12.84          | -49.87               | -13.00      | -36.87      | H                          |
| N/A             |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

**Operation Mode:** WCDMA 12.2k RMC  
Band II / TX / High CH **Test Date:** September 23, 2016  
**Temperature:** 22.6°C **Tested by:** Dennis Li  
**Humidity:** 57.2 % RH **Polarity:** Ver.

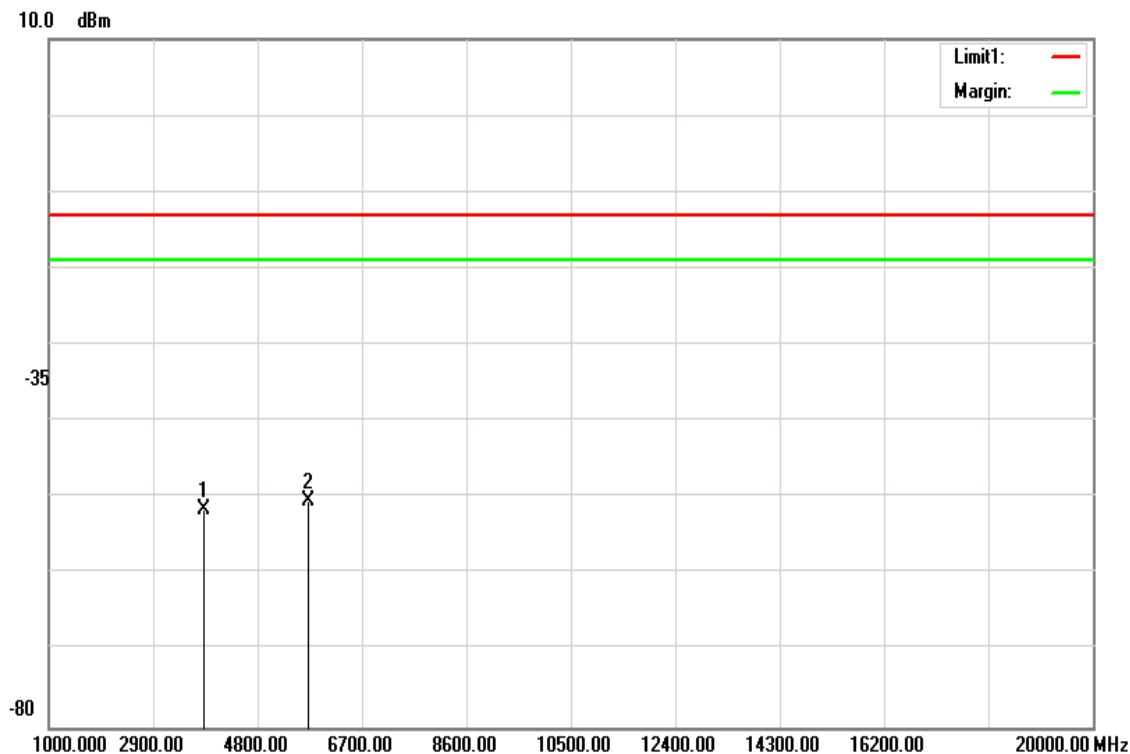


| Frequency (MHz) | S.G. (dBm) | Cable loss (dB) | Ant.Gain (dBi) | Emission level (dBm) | Limit (dBm) | Margin (dB) | Antenna Polarization (V/H) |
|-----------------|------------|-----------------|----------------|----------------------|-------------|-------------|----------------------------|
| 3814.000        | -57.08     | 7.01            | 12.56          | -51.53               | -13.00      | -38.53      | V                          |
| 5721.000        | -55.28     | 8.75            | 12.81          | -51.22               | -13.00      | -38.22      | V                          |
| N/A             |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

**Operation Mode:** WCDMA 12.2k RMC  
Band II / TX / High CH **Test Date:** September 23, 2016  
**Temperature:** 22.6°C **Tested by:** Dennis Li  
**Humidity:** 57.2 % RH **Polarity:** Hor.

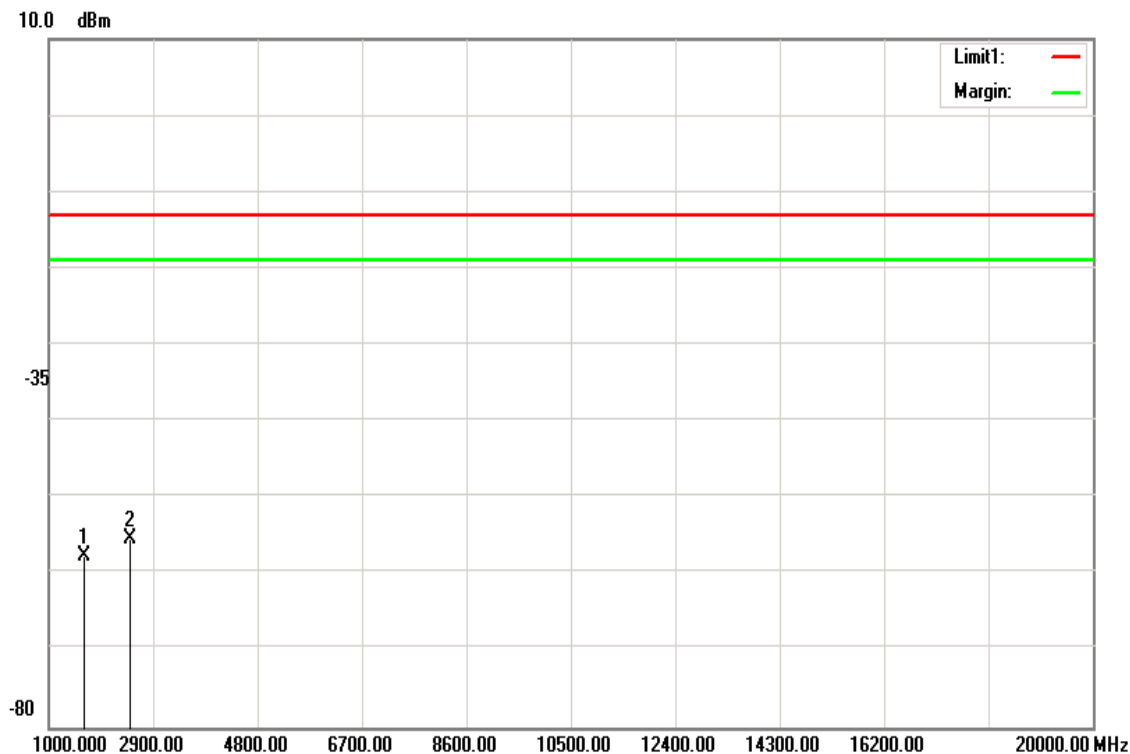


| Frequency (MHz) | S.G. (dBm) | Cable loss (dB) | Ant.Gain (dBi) | Emission level (dBm) | Limit (dBm) | Margin (dB) | Antenna Polarization (V/H) |
|-----------------|------------|-----------------|----------------|----------------------|-------------|-------------|----------------------------|
| 3814.000        | -57.03     | 7.01            | 12.56          | -51.48               | -13.00      | -38.48      | H                          |
| 5721.000        | -54.57     | 8.75            | 12.81          | -50.51               | -13.00      | -37.51      | H                          |
| N/A             |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

**Operation Mode:** WCDMA 12.2k RMC  
Band V / TX / Low CH **Test Date:** September 23, 2016  
**Temperature:** 22.6°C **Tested by:** Dennis Li  
**Humidity:** 57.2 % RH **Polarity:** Ver.

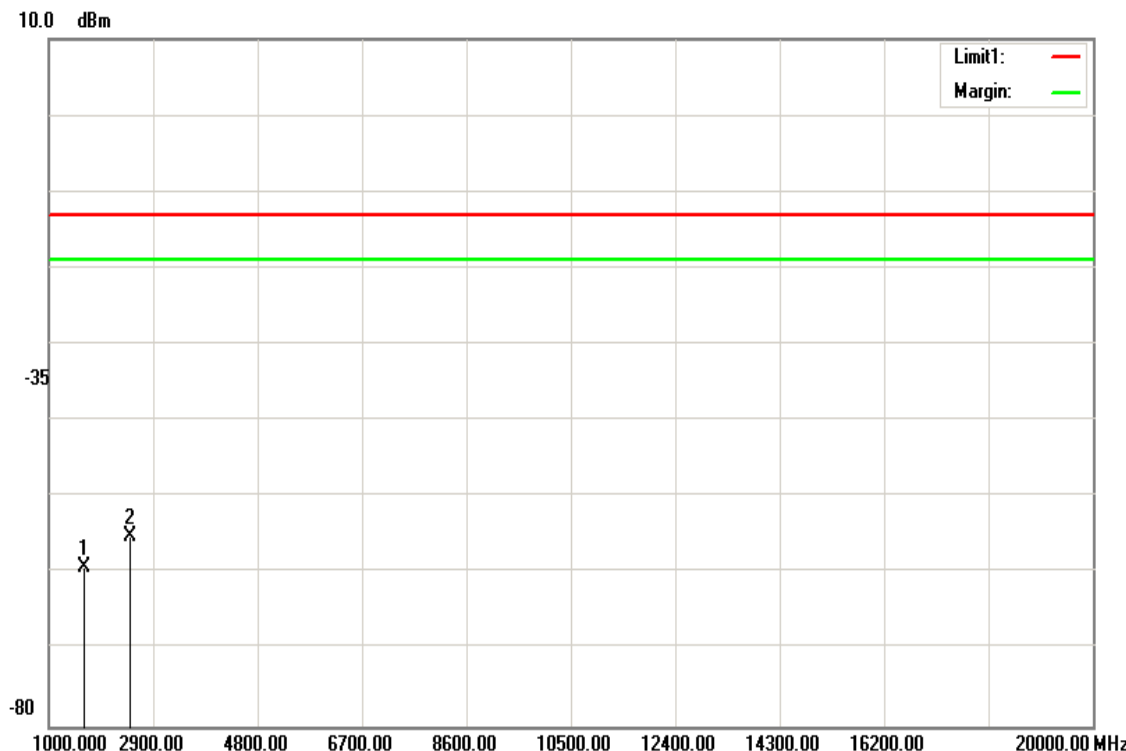


| Frequency (MHz) | S.G. (dBm) | Cable loss (dB) | Ant.Gain (dBi) | Emission level (dBm) | Limit (dBm) | Margin (dB) | Antenna Polarization (V/H) |
|-----------------|------------|-----------------|----------------|----------------------|-------------|-------------|----------------------------|
| 1652.000        | -62.4      | 4.49            | 9.33           | -57.56               | -13.00      | -44.56      | V                          |
| 2479.000        | -60.57     | 5.56            | 10.68          | -55.45               | -13.00      | -42.45      | V                          |
| N/A             |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

**Operation Mode:** WCDMA 12.2k RMC  
Band V / TX / Low CH **Test Date:** September 23, 2016  
**Temperature:** 22.6°C **Tested by:** Dennis Li  
**Humidity:** 57.2 % RH **Polarity:** Hor.

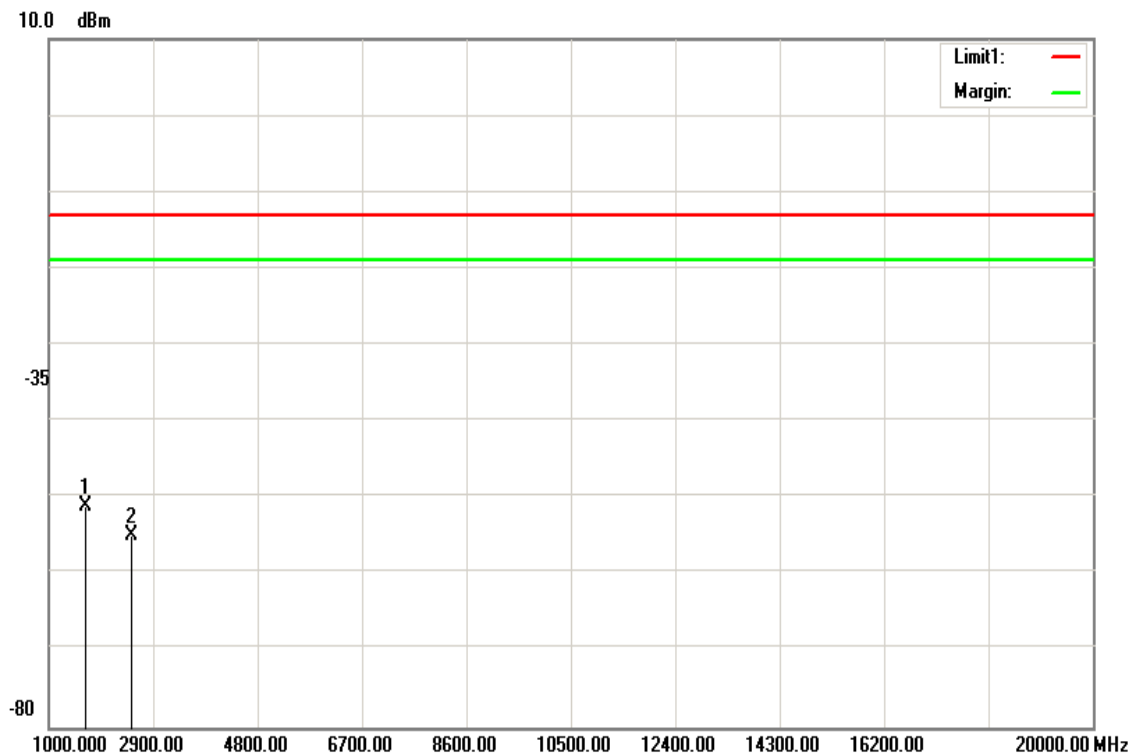


| Frequency (MHz) | S.G. (dBm) | Cable loss (dB) | Ant.Gain (dBi) | Emission level (dBm) | Limit (dBm) | Margin (dB) | Antenna Polarization (V/H) |
|-----------------|------------|-----------------|----------------|----------------------|-------------|-------------|----------------------------|
| 1652.000        | -64.03     | 4.49            | 9.33           | -59.19               | -13.00      | -46.19      | H                          |
| 2479.000        | -60.33     | 5.56            | 10.68          | -55.21               | -13.00      | -42.21      | H                          |
| N/A             |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

**Operation Mode:** WCDMA 12.2k RMC  
Band V / TX / Mid CH **Test Date:** September 23, 2016  
**Temperature:** 22.6°C **Tested by:** Dennis Li  
**Humidity:** 57.2 % RH **Polarity:** Ver.

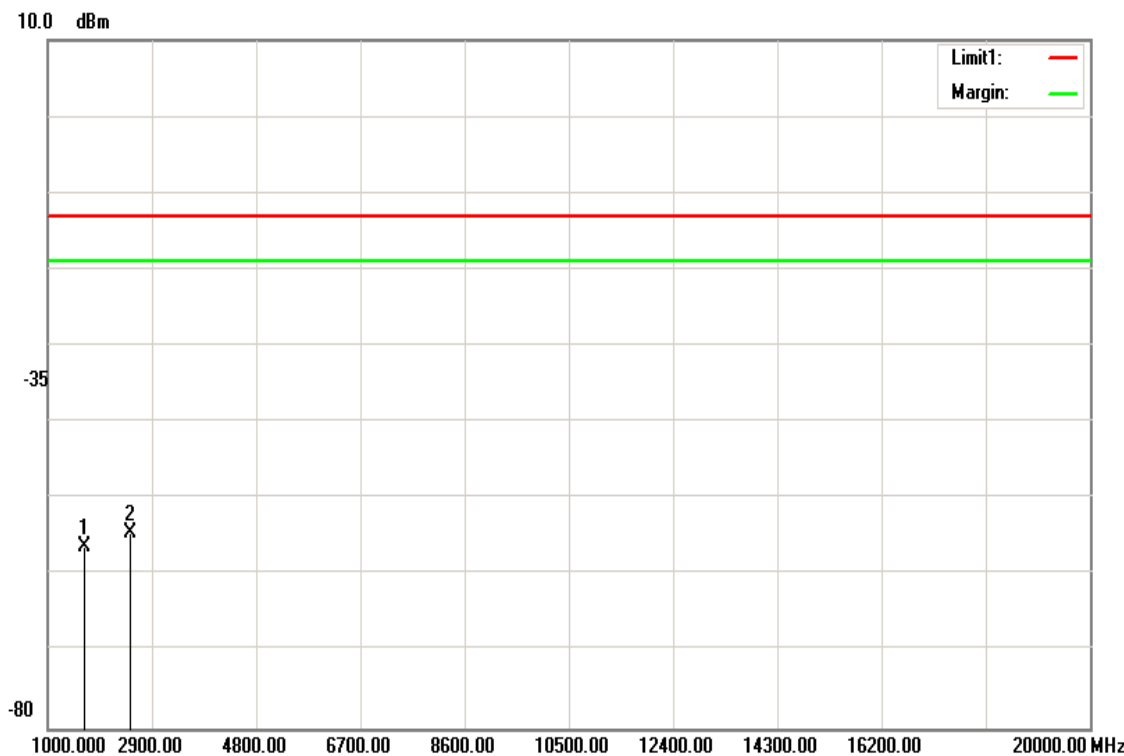


| Frequency (MHz) | S.G. (dBm) | Cable loss (dB) | Ant.Gain (dBi) | Emission level (dBm) | Limit (dBm) | Margin (dB) | Antenna Polarization (V/H) |
|-----------------|------------|-----------------|----------------|----------------------|-------------|-------------|----------------------------|
| 1672.000        | -55.85     | 4.52            | 9.38           | -50.99               | -13.00      | -37.99      | V                          |
| 2509.000        | -60.06     | 5.6             | 10.71          | -54.95               | -13.00      | -41.95      | V                          |
| N/A             |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

**Operation Mode:** WCDMA 12.2k RMC  
Band V / TX / Mid CH 4182  
**Test Date:** September 23, 2016  
**Temperature:** 22.6°C  
**Tested by:** Dennis Li  
**Humidity:** 57.2 % RH  
**Polarity:** Hor.

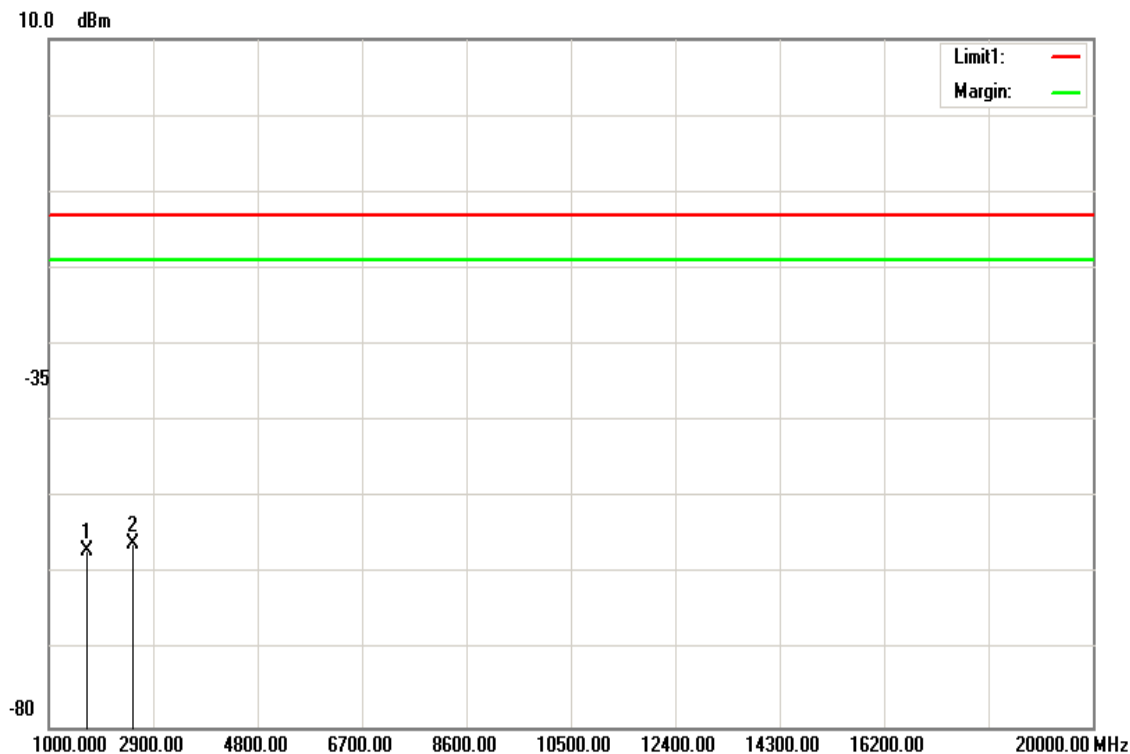


| Frequency (MHz) | S.G. (dBm) | Cable loss (dB) | Ant.Gain (dBi) | Emission level (dBm) | Limit (dBm) | Margin (dB) | Antenna Polarization (V/H) |
|-----------------|------------|-----------------|----------------|----------------------|-------------|-------------|----------------------------|
| 1672.000        | -61.13     | 4.52            | 9.38           | -56.27               | -13.00      | -43.27      | H                          |
| 2509.000        | -59.64     | 5.6             | 10.71          | -54.53               | -13.00      | -41.53      | H                          |
| N/A             |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

**Operation Mode:** WCDMA 12.2k RMC  
Band V / TX /High CH **Test Date:** September 23, 2016  
**Temperature:** 22.6°C **Tested by:** Dennis Li  
**Humidity:** 57.2 % RH **Polarity:** Ver.

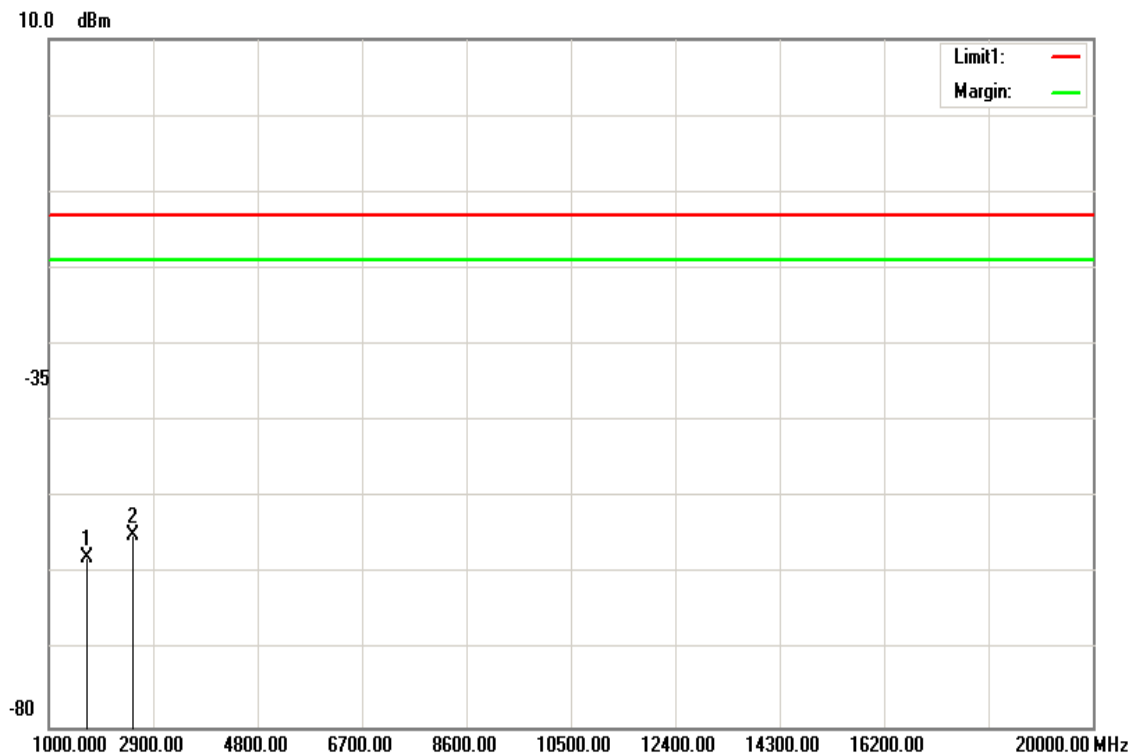


| Frequency (MHz) | S.G. (dBm) | Cable loss (dB) | Ant.Gain (dBi) | Emission level (dBm) | Limit (dBm) | Margin (dB) | Antenna Polarization (V/H) |
|-----------------|------------|-----------------|----------------|----------------------|-------------|-------------|----------------------------|
| 1693.000        | -61.83     | 4.55            | 9.44           | -56.94               | -13.00      | -43.94      | V                          |
| 2539.000        | -61.18     | 5.63            | 10.74          | -56.07               | -13.00      | -43.07      | V                          |
| N/A             |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

**Operation Mode:** WCDMA 12.2k RMC  
Band V / TX /High CH **Test Date:** September 23, 2016  
**Temperature:** 22.6°C **Tested by:** Dennis Li  
**Humidity:** 57.2 % RH **Polarity:** Hor.



| Frequency (MHz) | S.G. (dBm) | Cable loss (dB) | Ant.Gain (dBi) | Emission level (dBm) | Limit (dBm) | Margin (dB) | Antenna Polarization (V/H) |
|-----------------|------------|-----------------|----------------|----------------------|-------------|-------------|----------------------------|
| 1693.000        | -62.73     | 4.55            | 9.44           | -57.84               | -13.00      | -44.84      | H                          |
| 2539.000        | -60.1      | 5.63            | 10.74          | -54.99               | -13.00      | -41.99      | H                          |
| N/A             |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

## 7.7 FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT

### LIMIT

According to FCC §2.1055, FCC §22.355, .FCC §24.235.

### Test Procedure

Use Anritsu 8820 with frequency Error measurement capability.

Temp = -30 to +50°C ,Voltage= 85% to 115% of the nominal value for AC powered equipment. Frequency Tolerance: 2.5 ppm

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

### TEST RESULTS

No non-compliance noted.

| Reference Frequency: WCDMA 12.2k RMC Band II Mid Channel 1880 MHz at 20(°C) |                              |                             |                       |             |
|-----------------------------------------------------------------------------|------------------------------|-----------------------------|-----------------------|-------------|
| Limit: $\pm 2.5$ ppm = 2091.5 Hz                                            |                              |                             |                       |             |
| Power Supply (Vac)                                                          | Environment Temperature (°C) | BW: 20M Frequency Error(Hz) | Frequency Error (ppm) | Limit (ppm) |
| 120                                                                         | 50                           | 2.00                        | 0.0011                | +/- 2.5     |
| 120                                                                         | 40                           | 2.00                        | 0.0011                |             |
| 120                                                                         | 30                           | 1.00                        | 0.0005                |             |
| 120                                                                         | 20                           | -3.00                       | -0.0016               |             |
| 120                                                                         | 10                           | 3.00                        | 0.0016                |             |
| 120                                                                         | 0                            | -1.00                       | -0.0005               |             |
| 120                                                                         | -10                          | -3.00                       | -0.0016               |             |
| 120                                                                         | -20                          | -3.00                       | -0.0016               |             |
| 120                                                                         | -30                          | 2.00                        | 0.0011                |             |

| Reference Frequency: WCDMA 12.2k RMC Band V Mid Channel 836.6 MHz at 20(°C) |                              |                             |                       |             |
|-----------------------------------------------------------------------------|------------------------------|-----------------------------|-----------------------|-------------|
| Limit: $\pm 2.5$ ppm = 2091.5 Hz                                            |                              |                             |                       |             |
| Power Supply (Vac)                                                          | Environment Temperature (°C) | BW: 20M Frequency Error(Hz) | Frequency Error (ppm) | Limit (ppm) |
| 120                                                                         | 50                           | 5.00                        | 0.0060                | +/- 2.5     |
| 120                                                                         | 40                           | 3.00                        | 0.0036                |             |
| 120                                                                         | 30                           | 4.00                        | 0.0048                |             |
| 120                                                                         | 20                           | -2.00                       | -0.0024               |             |
| 120                                                                         | 10                           | 1.00                        | 0.0012                |             |
| 120                                                                         | 0                            | 7.00                        | 0.0084                |             |
| 120                                                                         | -10                          | 5.00                        | 0.0060                |             |
| 120                                                                         | -20                          | 2.00                        | 0.0024                |             |
| 120                                                                         | -30                          | 5.00                        | 0.0060                |             |

**FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT:**

| Reference Frequency: WCDMA 12.2k RMC Band II Mid Channel 1880 MHz at 20(°C) |                              |                             |                       |             |
|-----------------------------------------------------------------------------|------------------------------|-----------------------------|-----------------------|-------------|
| Limit: $\pm 2.5$ ppm = 2091.25Hz                                            |                              |                             |                       |             |
| Power Supply (Vac)                                                          | Environment Temperature (°C) | BW: 20M Frequency Error(Hz) | Frequency Error (ppm) | Limit (ppm) |
| 138                                                                         | 20                           | -5.00                       | -0.0027               | +/- 2.5     |
| 120                                                                         |                              | -3.00                       | -0.0016               |             |
| 102                                                                         |                              | -2.00                       | -0.0011               |             |

| Reference Frequency: WCDMA 12.2k RMC Band V Mid Channel 836.6 MHz at 20(°C) |                              |                             |                       |             |
|-----------------------------------------------------------------------------|------------------------------|-----------------------------|-----------------------|-------------|
| Limit: $\pm 2.5$ ppm = 2091.25Hz                                            |                              |                             |                       |             |
| Power Supply (Vac)                                                          | Environment Temperature (°C) | BW: 20M Frequency Error(Hz) | Frequency Error (ppm) | Limit (ppm) |
| 138                                                                         | 20                           | 1.00                        | 0.0012                | +/- 2.5     |
| 120                                                                         |                              | -2.00                       | -0.0024               |             |
| 102                                                                         |                              | -3.00                       | -0.0036               |             |