

**FCC 47 CFR PART 27 SUBPART L  
&  
INDUSTRY CANADA RSS-139**

**TEST REPORT**

**For**

**Computer**

**FCC Model No.: AIM8I, AIM8Ixxxxxxxxxxxxxx,  
AIM-x5ATxxxxxxxxxxxx**

**(where "x" may be any alphanumeric character, "-" or blank for  
marketing purpose and no impact safety related critical components  
and constructions)**

**IC Model No.: AIM8I, AIM-25AT, AIM-35AT, AIM-55AT, AIM-65AT,  
AIM-75AT**

**Trade Name: ADVANTECH**

*Issued to*

**Advantech Co.Ltd.  
No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District, Taipei 114,  
Taiwan, R.O.C.**

*Issued by*

**Compliance Certification Services Inc.**

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

**<http://www.ccsrf.com>**

**[service@ccsrf.com](mailto:service@ccsrf.com)**

**Issued Date: May 28, 2017**



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**Revision History**

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	May 28, 2017	Initial Issue	ALL	Angel Cheng
01	July 24, 2017	1. Added peak to average power ratio	P.26-28	Angel Cheng

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## 1 TEST RESULT CERTIFICATION

**Applicant:** Advantech Co.Ltd.  
No.1, Alley 20, Lane 26, Rueiguang Road,  
Neihu District, Taipei 114, Taiwan, R.O.C.

**Manufacturer:** Advantech Co.Ltd.  
No.1, Alley 20, Lane 26, Rueiguang Road,  
Neihu District, Taipei 114, Taiwan, R.O.C.

**Equipment Under Test:** Computer

**Trade Name:** ADVANTECH

**FCC Model No.:** AIM8I, AIM8Ixxxxxxxxxxxxxx, AIM-x5ATxxxxxxxxxxxx  
(where "x" may be any alphanumeric character, "-" or  
blank for marketing purpose and no impact safety related  
critical components and constructions)

**IC Model No.:** AIM8I, AIM-25AT, AIM-35AT, AIM-55AT, AIM-65AT,  
AIM-75AT

**Date of Test:** March 28 ~ April 12, 2017

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR PART 27 SUBPART L & RSS-139 Issue 3 July 2015	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 ANSI C63.26:2015  
and the energy emitted by the sample EUT tested as described in this report is in  
compliance with radiated emission limits of IC RSS-139 Issue 3.

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 radiated emission limits of FCC Rule FCC PART 27 Subpart L.

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

Approved by:



Tested by:



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Sam Chuang  
Manager  
Compliance Certification Services Inc.

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Timmy Wang  
Engineer  
Compliance Certification Services Inc.

## 2 EUT DESCRIPTION

<b>Product</b>	Computer
<b>FCC Model No.</b>	AIM8I, AIM8Ixxxxxxxxxxxxxx, AIM-x5ATxxxxxxxxxx (where "x" may be any alphanumeric character, "-" or blank for marketing purpose and no impact safety related critical components and constructions)
<b>IC Model No.</b>	AIM8I, AIM-25AT, AIM-35AT, AIM-55AT, AIM-65AT, AIM-75AT
<b>Model Discrepancy</b>	All models are electrically identical, different model names are for marketing purpose
<b>Trade Name</b>	ADVANTECH
<b>Received Date</b>	March 28, 2017
<b>Power Supply</b>	1. VDC from Power Adapter Chicony / A16-018N1A I/P: 100-240Vac, 1A, 50-60Hz O/P: 5.15Vdc, 3A, 9.1Vdc, 2A, 18W 2. Battery ADVANTECH / AIM-BAT-8 Rating: 3.8V, 4900, 18.62Wh
<b>Frequency Range</b>	WCDMA / HSDPA / HSUPA Band IV: 1712.4-1752.6 MHz
<b>Transmit Power (ERP &amp; EIRP Power)</b>	WCDMA 12.2k RMC Band IV: 27.63 dBm
<b>Antenna Gain</b>	PIFA Antenna WCDMA band IV: -2.67 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

### **3 TEST METHODOLOGY**

Both conducted and radiated testing were performed according to the procedures document on ANSI C63.10: 2013, TIA/EIA-603-C: 2004 and FCC CFR 47, Part 27 Subpart L.

Both conducted and radiated testing were performed according to the procedures document on ANSI C63.26: 2015 and RSS-139.

#### **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 had been tested under operating condition.

EUT staying in continuous transmitting mode was programmed.

After verification, all tests carried out are with the worst-case test modes as shown below except radiated spurious emission below 1GHz and power line conducted emissions below 30MHz, which worst case was in normal link mode and receiving radiated spurious emission above 1GHz, which worst case was in CH Mid mode only.

WCDMA Band IV:

Channel Low (CH1312), Channel Mid (CH1413) and Channel High (CH1513) were chosen for full testing.

HSDPA Band IV:

Channel Low (CH1312), Channel Mid (CH1413) and Channel High (CH1513) were chosen for full testing.

HSUPA Band IV:

Channel Low (CH1312), Channel Mid (CH1413) and Channel High (CH1513) were chosen for full testing.

### 3.2.1 The worst mode of measurement

Radiated Emission Measurement	
<b>Test Condition</b>	Band edge, Emission for Unwanted and Fundamental
<b>Voltage/Hz</b>	120V/60Hz
<b>Test Mode</b>	<b>Mode 1:EUT power by AC adapter via power cable.</b> <b>Mode 2:EUT power by Battery.</b>
<b>Worst Mode</b>	<input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4
<b>Position</b>	<input type="checkbox"/> Placed in fixed position. <input type="checkbox"/> Placed in fixed position at X-Plane (E2-Plane) <input type="checkbox"/> Placed in fixed position at Y-Plane (E1-Plane) <input checked="" type="checkbox"/> Placed in fixed position at Z-Plane (H-Plane)

Radiated Emission Measurement Below 1G	
<b>Test Condition</b>	Radiated Emission Below 1G
<b>Voltage/Hz</b>	120V/60Hz
<b>Test Mode</b>	<b>Mode 1:EUT power by AC adapter via power cable.</b> <b>Mode 2:EUT power by Battery.</b>
<b>Worst Mode</b>	<input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4

*Remark:*

1. The worst mode was record in this test report.
2. The EUT pre-scanned in three axis ,X, Y, Z for radiated measurement. The worst cases (Z-Plane) were recorded in this report.
3. AC power line conducted emission and for below 1G radiation emission were performed the EUT transmit at the highest output power channel as worse case.

## 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 and Loop Antenna is scheduled for calibration once three years.

Conducted Emissions Test Site					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Power Meter	Anritsu	ML2495A	1012009	07/04/2016	07/03/2017
Power Sensor	Anritsu	MA2411B	917072	07/04/2016	07/03/2017
Base Station	R&S	CMU 200	101245	07/29/2016	07/28/2017
Base Station	Anritsu	MT-8820C	6200938900	07/26/2016	07/25/2017
Spectrum Analyzer	R&S	FSV 40	101073	10/05/2016	10/04/2017

Wugu 966 Chamber A					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Signal Analyzer	Agilent	E4407B	MY44212686	04/07/2017	04/06/2018
Pre-Amplifier	HP	8449B	3008A00965	07/02/2016	07/01/2017
Bilog Antenna	Sunol Sciences	JB1	A052609	03/17/2017	03/16/2018
Horn Antenna	SCHWARZBECK	BBHA 9120D	779	03/08/2017	03/07/2018
Pre-Amplifier	Anritsu	MH648A	M89145	05/03/2016	05/02/2017
Horn Antenna	ETC	MCTD 1209	DRH13M02003	09/02/2016	09/01/2017
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
Base Station	R&S	CMU 200	101245	07/29/2016	07/28/2017
Base Station	Anritsu	MT-8820C	6200938900	07/26/2016	07/25/2017
Software	EZ-EMC (CCS-3A1RE)				

## 4.3 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
Powerline Conducted Emission	+/-1.2159
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

All measurement facilities used to collect the measurement data are located at

- 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., Luchu Hsiang, Taoyuan Hsien 338, Taiwan  
Tel: 886-3-324-0332 / Fax: 886-3-324-5235

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.10: 2013 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 LABORATORY ACCREDITATIONS AND LISTING

The test facilities used to perform radiated and conducted emissions tests are accredited by American Association for Laboratory Accreditation Program for the specific scope accreditation under Lab Code: 0824-01 to perform Electromagnetic Interference tests according to FCC Part 15 and CISPR 22 requirements. In addition, the test facilities are listed with Industry Canada, Certification and Engineering Bureau, IC 2324G-1 for 3M Semi Anechoic Chamber A, 2324G-2 for 3M Semi Anechoic Chamber B.

## 5.4 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	 FCC MRA: TW1039
Taiwan	TAF	LP0002, RTTE01, FCC Method-47 CFR Part 15 Subpart C, D, E, RSS-210, RSS-310 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 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 FCC Method -47 CFR Part 15 Subpart B IEC / EN 61000-3-2, IEC / EN 61000-3-3, IEC / EN 61000-4-2/3/4/5/6/8/11	 Testing Laboratory 1309
Canada	Industry Canada	3M Semi Anechoic Chamber (IC 2324G-1 / IC 2324G-2) to perform	 IC 2324G-1 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 II 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
	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 27 REQUIREMENTS & INDUSTRY CANADA RSS-139**

### **7.1 AVERAGE POWER**

#### **LIMIT**

For reporting purposes only.

#### **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.

#### **TEST RESULTS**

No non-compliance noted.

## TEST DATA

### Test Data

#### WCDMA 12.2K RMC

Band	Mode	UL/DL Channel No.	Frequency(MHz)	Average power(dBm)	Output Power (W)
WCDMA Band IV	Rel 99	1312/1537	1712.4	23.0	0.19953
		1413/1638	1732.6	23.2	0.20893
		1513/1738	1752.6	23.0	0.19953

#### HSDPA

#### Band IV

Band	Mode	UL/DL Channel No.	Frequency(MHz)	Average power(dBm)	Output Power (W)
HSDPA IV	1	1312/1537	1712.4	22.9	0.19634
		1413/1638	1732.6	23.2	0.20654
		1513/1738	1752.6	23.0	0.19953
	2	1312/1537	1712.4	22.5	0.17579
		1413/1638	1732.6	22.7	0.18621
		1513/1738	1752.6	22.5	0.17906
	3	1312/1537	1712.4	21.9	0.15631
		1413/1638	1732.6	22.2	0.16482
		1513/1738	1752.6	22.0	0.15922
	4	1312/1537	1712.4	22.0	0.15668
		1413/1638	1732.6	22.2	0.16406
		1513/1738	1752.6	22.0	0.15922

**HSUPA****Band IV**

Band	Mode	UL/DL Channel No.	Frequency(MHz)	Average power(dBm)	Output Power (W)
HSUPA IV	1	1312/1537	1712.4	22.9	0.19634
		1413/1638	1732.6	23.2	0.20941
		1513/1738	1752.6	23.0	0.19724
	2	1312/1537	1712.4	21.0	0.12445
		1413/1638	1732.6	21.3	0.13490
		1513/1738	1752.6	21.1	0.12912
	3	1312/1537	1712.4	22.1	0.16218
		1413/1638	1732.6	22.2	0.16711
		1513/1738	1752.6	22.2	0.16406
	4	1312/1537	1712.4	21.0	0.12445
		1413/1638	1732.6	21.2	0.13213
		1513/1738	1752.6	21.0	0.12677
	5	1312/1537	1712.4	22.9	0.19588
		1413/1638	1732.6	23.2	0.20749
		1513/1738	1752.6	22.9	0.19498

## 7.2 ERP & EIRP MEASUREMENT

### LIMIT

#### FCC Part 27.50(d)(4)

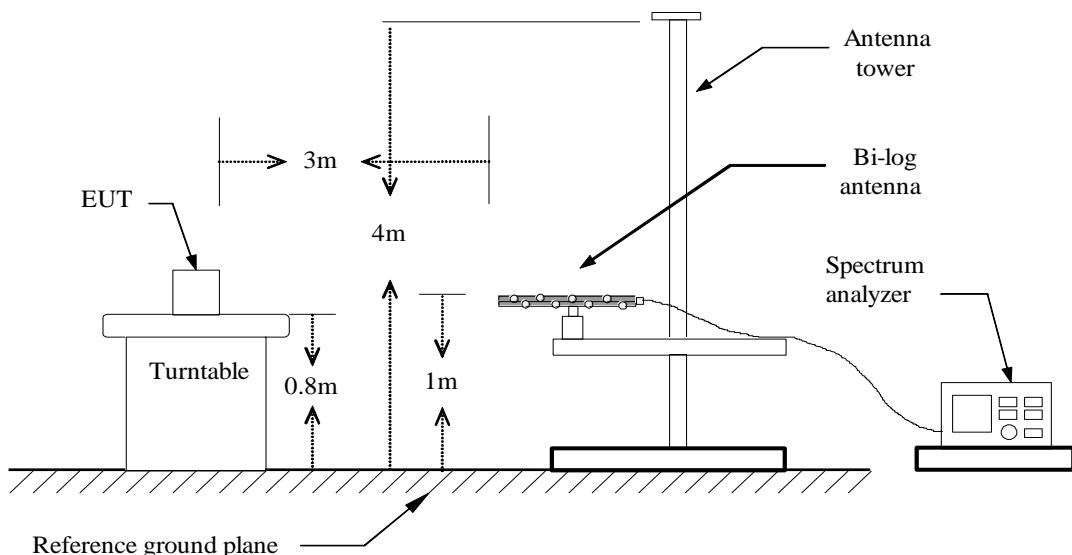
Fixed, mobile, and portable (handheld) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

#### RSS-139 section 6.5

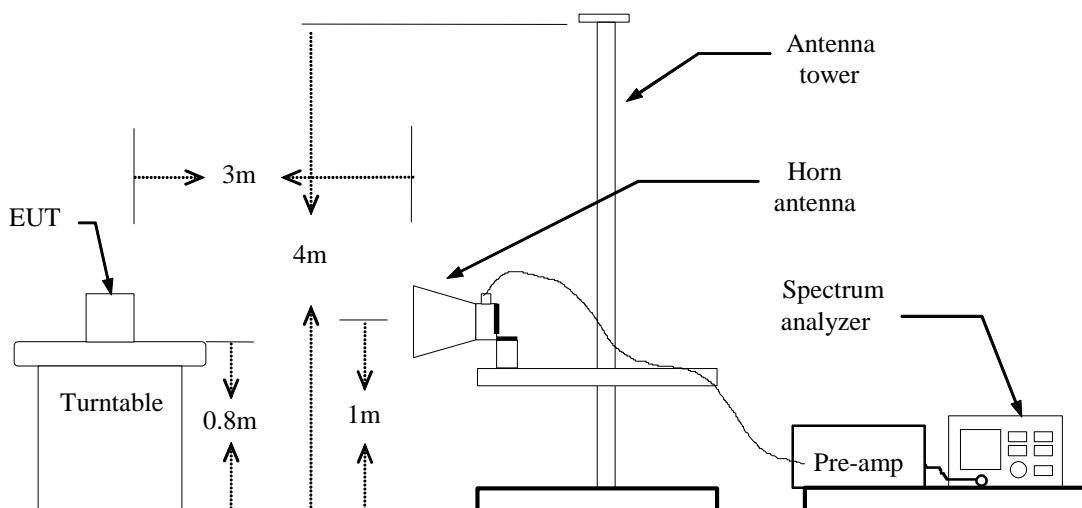
The equivalent isotropically radiated power (e.i.r.p.) for mobile and portable transmitters shall not exceed one watt. The e.i.r.p. for fixed and base stations in the band 1710-1780 MHz shall not exceed 1 watt..

### Test Configuration

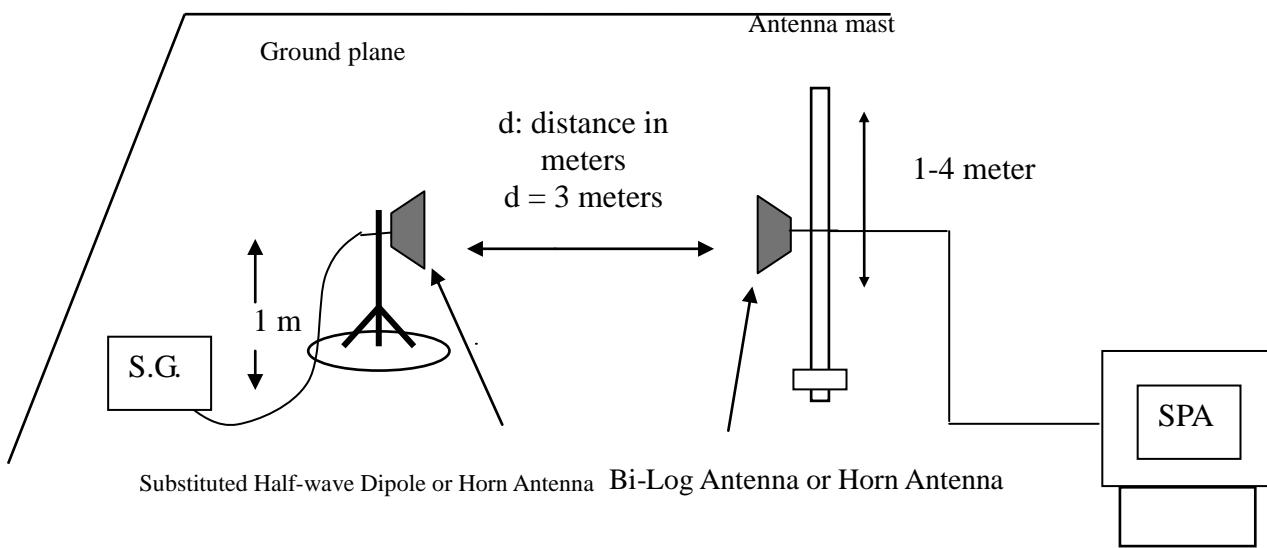
#### Below 1 GHz



#### Above 1 GHz



## For Substituted Method Test Set-UP



## TEST PROCEDURE

The EUT was placed on a non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer.

During the measurement of the EUT, the resolution bandwidth was set 1% to 5% of the OBW and not to exceed 1 MHz. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna. The reading was recorded and the field strength (E in dBuV/m) was calculated.

EIRP in frequency band 1712-1752MHz were measured using a substitution method. The EUT was replaced by half-wave dipole (1712-1752MHz) connected to a signal generator. The spectrum analyzer reading was recorded and EIRP was calculated as follows:

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

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

## TEST RESULTS

*No non-compliance noted.*

## TEST DATA

### WCDMA 12.2K RMC

Test Mode	Channel	Vertical		Horizontal	
		EIRP(dBm)	EIRP(W)	EIRP(dBm)	EIRP(W)
WCDMA 12.2K RMC (Band IV)	Lowest	20.91	0.12331	23.59	0.22856
	Middle	24.05	0.25410	26.56	0.45290
	Highest	27.63	0.57943	25.73	0.37411

## 7.3 OCCUPIED BANDWIDTH MEASUREMENT

### LIMIT

For Reporting purpose only.

### TEST PROCEDURE

KDB 971168 v02r02 - Section 4.2

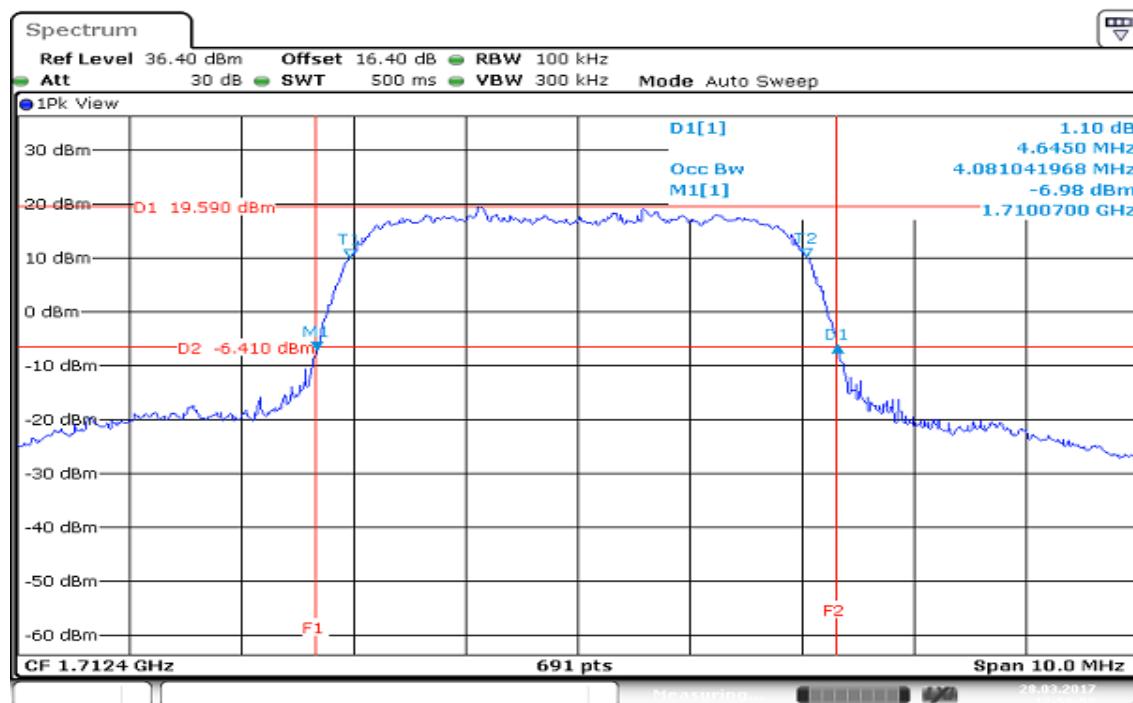
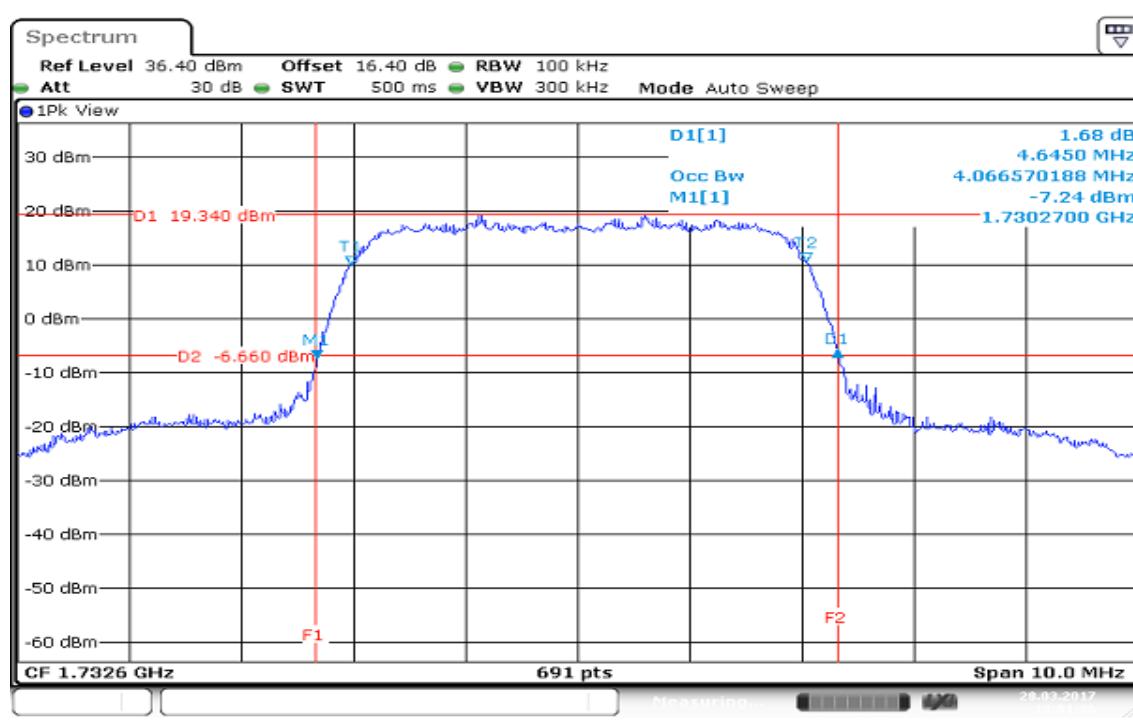
1. The occupied bandwidth was measured with the spectrum analyzer at the lowest, middle and highest channels in each band and different modulation. The 99% and -26dB bandwidth was measured and recorded.
2. RBW = 1-5% of the expected OBW
3. VBW  $\geq$  3 x RBW
4. Detector = Peak
5. Trace mode = max.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

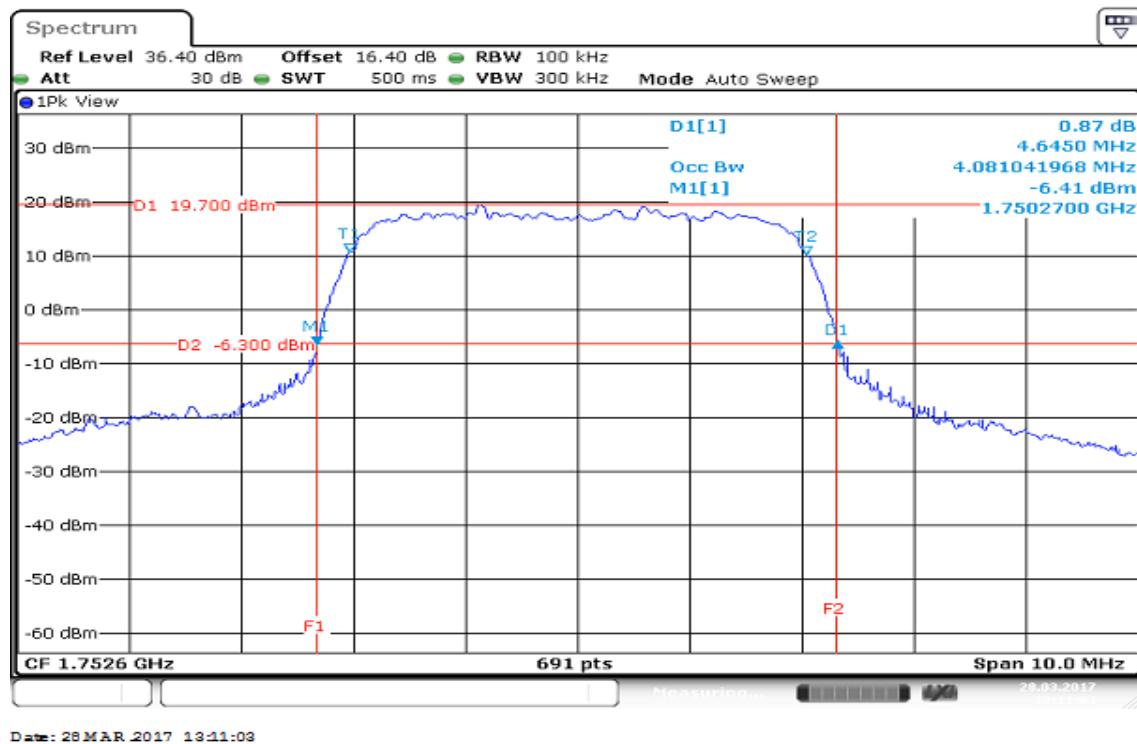
### TEST RESULTS

No non-compliance noted

#### Test Data

Test Mode	CH	Frequency (MHz)	99% Bandwidth (MHz)	26 dB Bandwidth (MHz)
WCDMA 12.2k RMC (Band IV)	Lowest	1712.4	4.08104	4.64500
	Middle	1732.6	4.06657	4.64500
	Highest	1752.6	4.08104	4.64500

**Test Plot****WCDMA 12.2k RMC (Band IV)****Low CH****Mid CH**

**High CH**

## 7.4 CONDUCTED BAND EDGE MEASUREMENT

### Limit

#### FCC §27.53 (h)

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log_{10} (P)$  dB.

#### RSS-139 section 6.6

The mean power of emission must be attenuated below the mean power of the non-modulated carrier (P) on any frequency twice or more than twice the fundamental frequency by at least  $43 + 10 \log P$  dB.

### TEST PROCEDURE

According to KDB 971168 D01, section 6.0

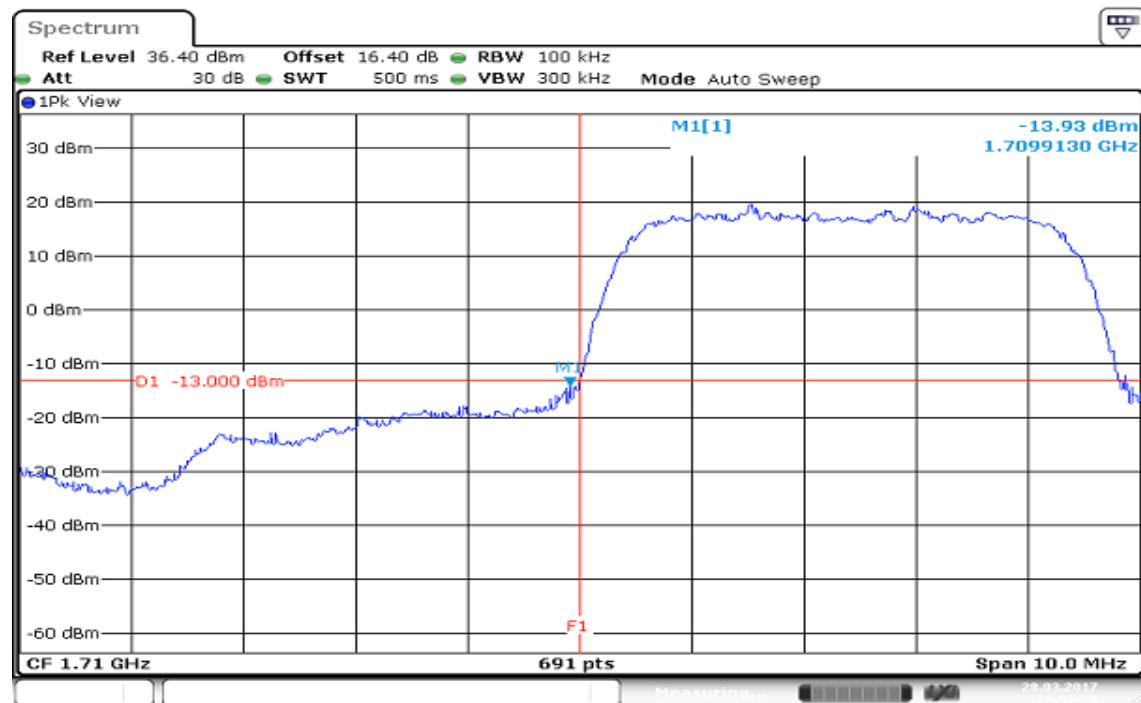
1. The EUT was connected to spectrum analyzer and call box.
2. The RF output of EUT was connected to the spectrum analyzer.
3. Start and stop frequency were set such that the band edge would be placed in the center of the plot
4. Span was set large enough so as to capture all out of band emissions near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

### TEST RESULTS

*No non-compliance noted.*

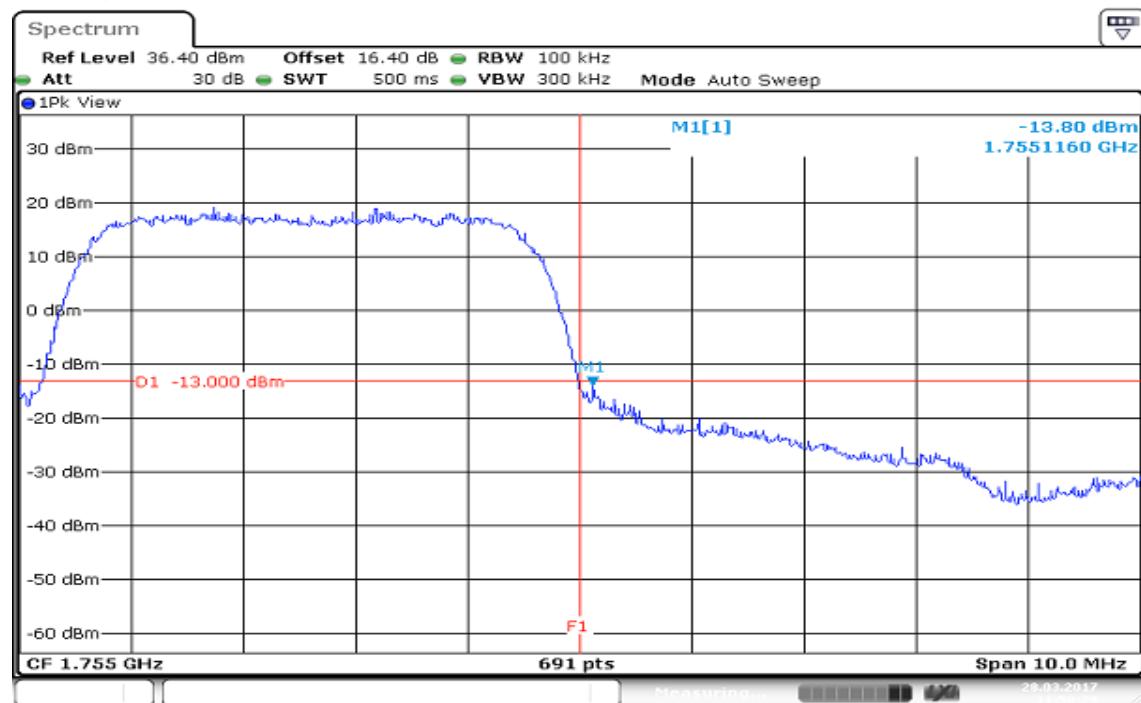
**Test Plot****WCDMA 12.2K RMC (BAND IV)**

CH Low



Date: 28 MAR 2017 12:58:00

CH High



Date: 28 MAR 2017 11:58:30

## **7.5 CONDUCTED SPURIOUS EMISSIONS LIMIT**

### **FCC §27.53 (h)**

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log_{10} (P)$  dB.

### **RSS-139 section 6.6**

The mean power of emission must be attenuated below the mean power of the non-modulated carrier (P) on any frequency twice or more than twice the fundamental frequency by 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. 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.

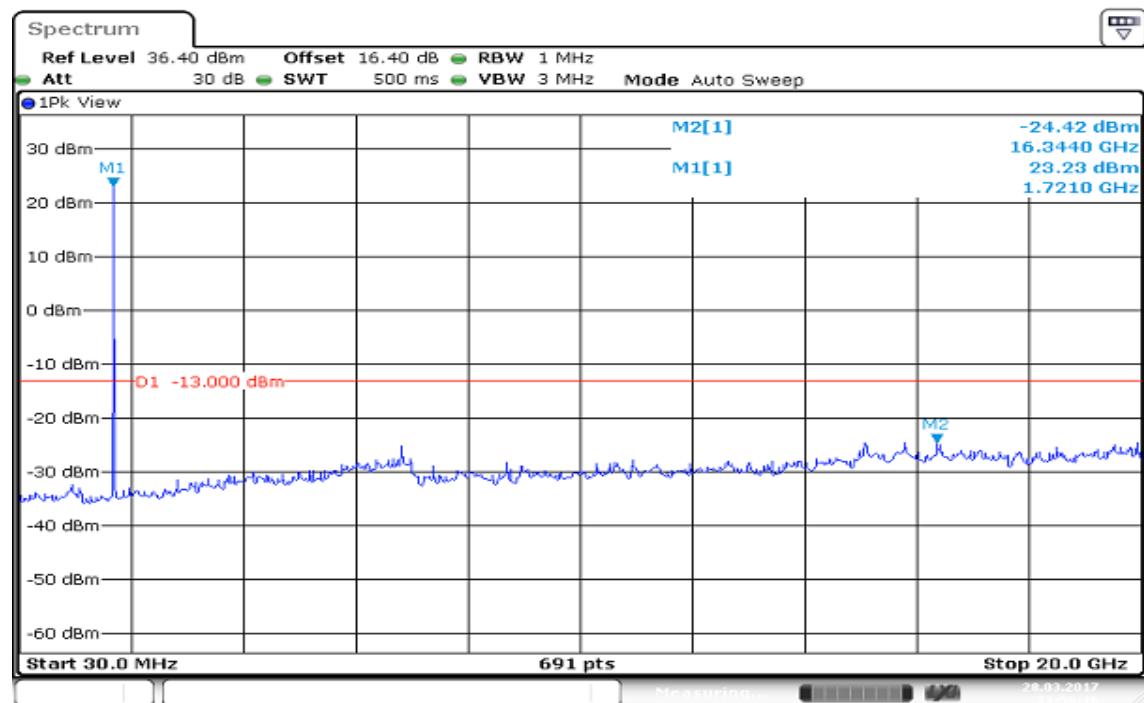
## **TEST RESULTS**

*No non-compliance noted.*

## Test Data

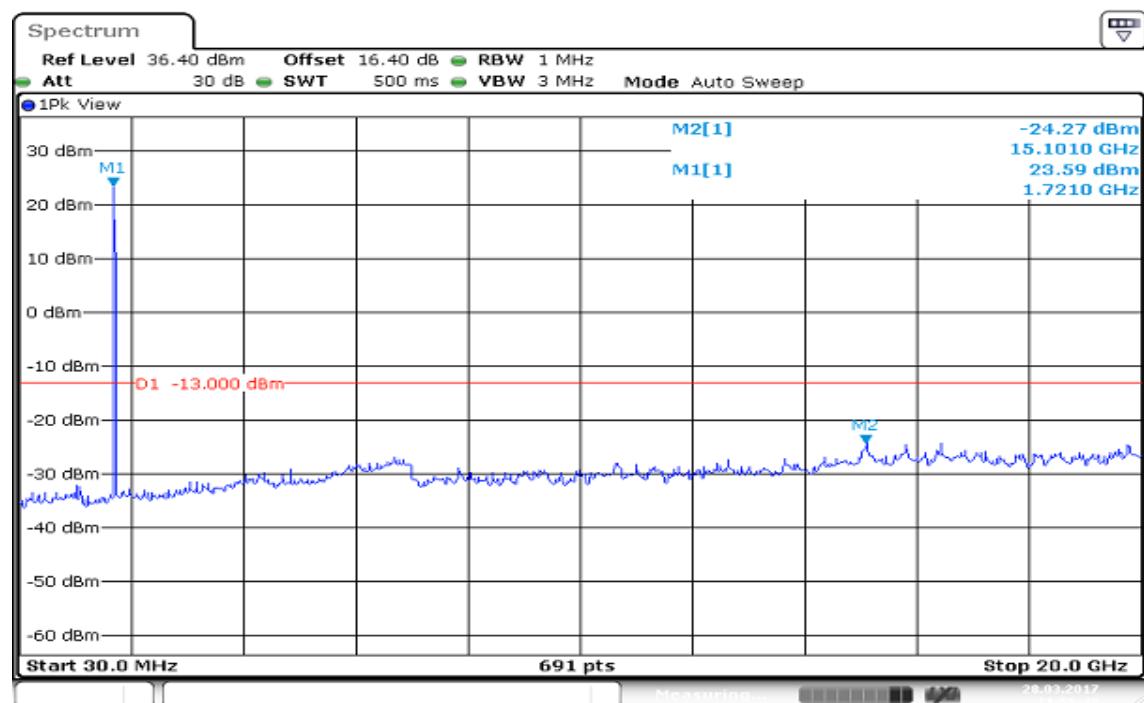
### WCDMA 12.2K RMC (BAND IV)

CH Low



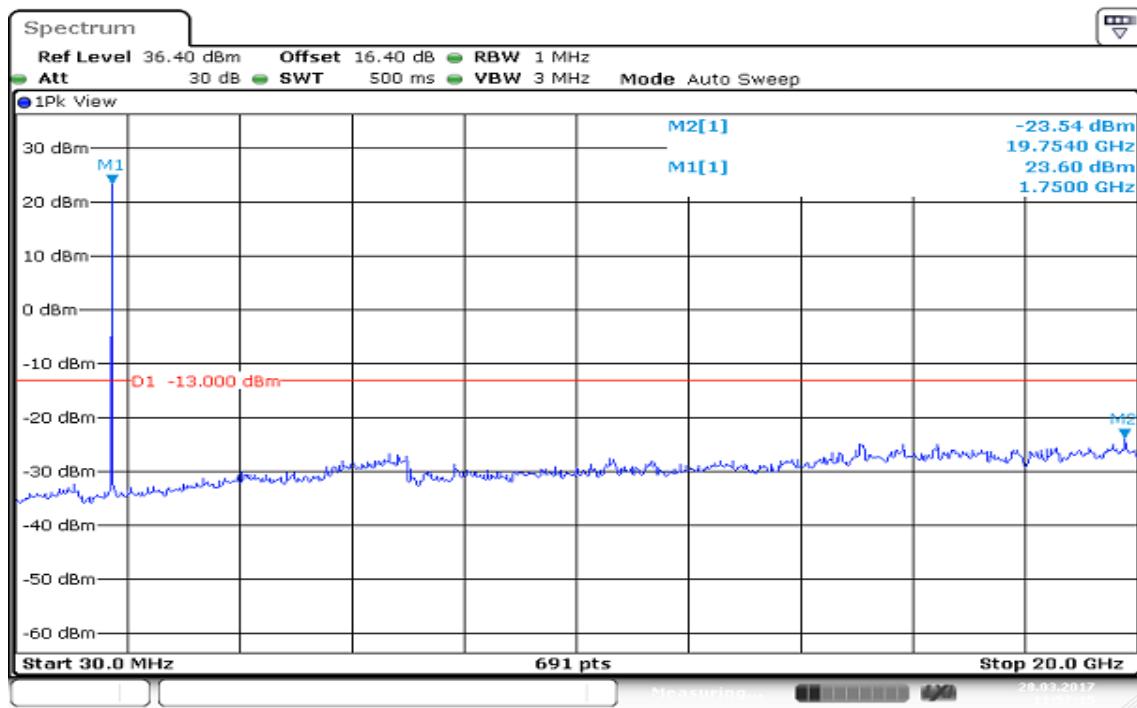
Date: 28 MAR 2017 11:56:16

CH Mid



Date: 28 MAR 2017 11:56:48

## CH High



## 7.6 PEAK TO AVERAGE POWER RATIO

### Limit

#### **FCC §27.50(a)**

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

#### **RSS-139 section 6.5**

The peak to average power ratio (PAPR) of the equipment shall not exceed 13 dB for more than 0.1% of the time, using a signal that corresponds to the highest PAPR during periods of continuous transmission.

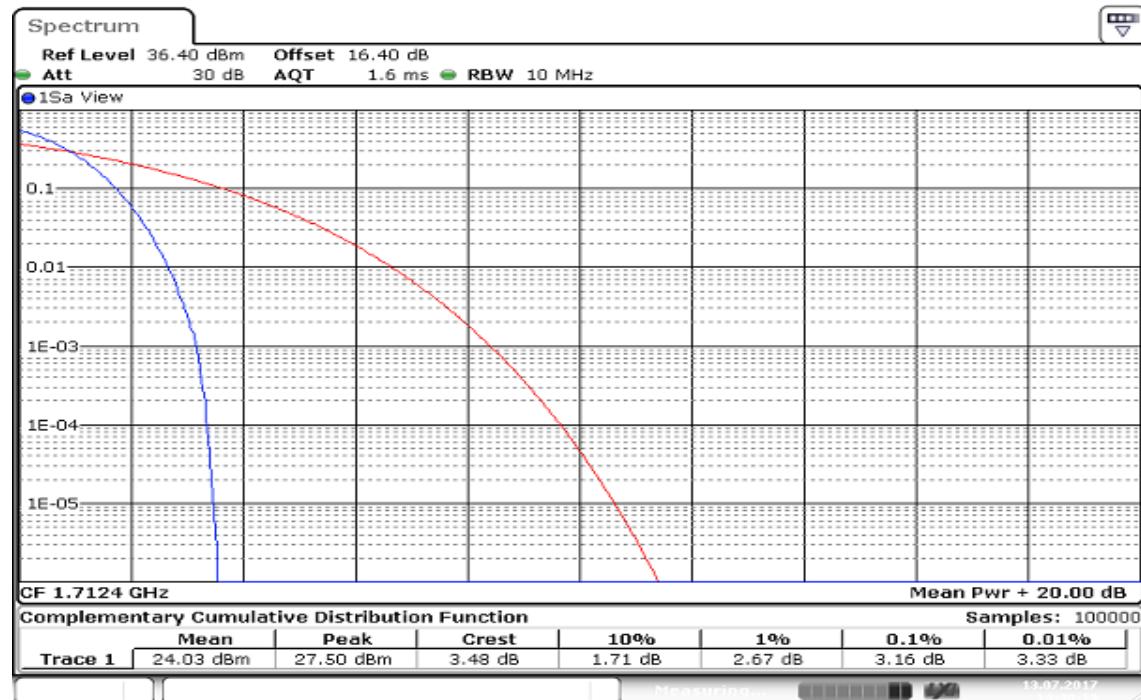
### Test Procedures

1. According to KDB 971168D01, photograph 5.7.1
2. The EUT was connect to spectrum analyzer and call box.
3. Set the CCDF function in spectrum analyzer.
4. The highest RF output power were measured and recorded the maximum PAPR level associated with a probability of 0.1%.
5. Record the Peak to Average Power Ratio.

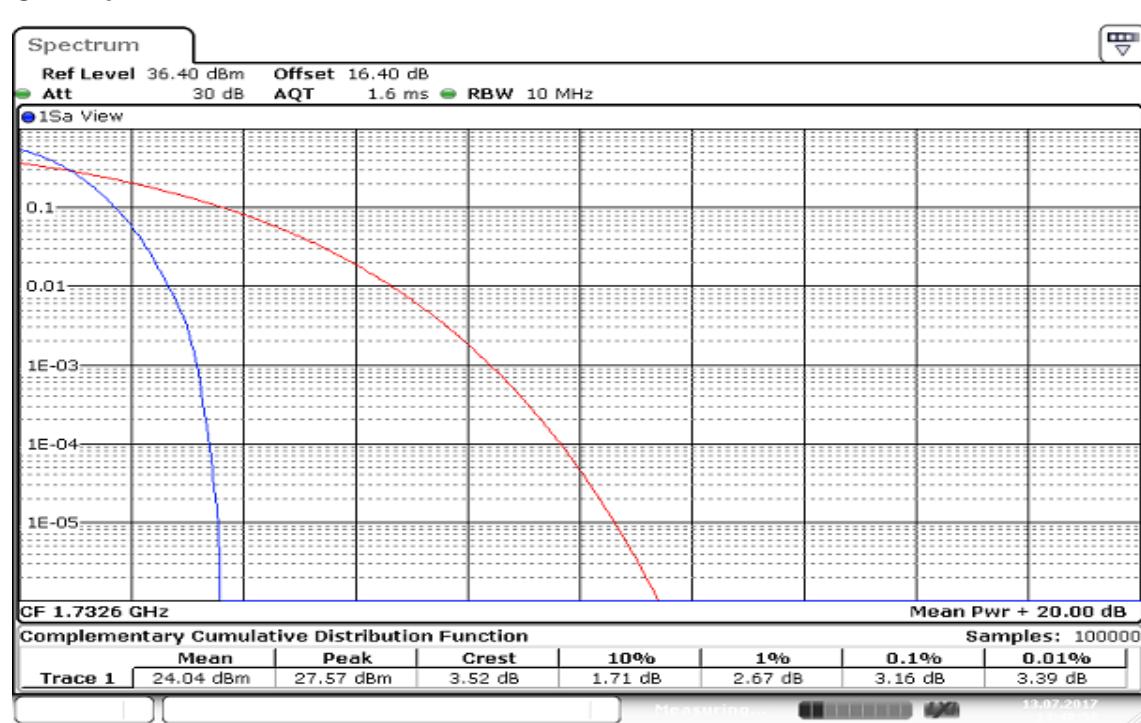
## Test Data

### **WCDMA 12.2K RMC (BAND IV)**

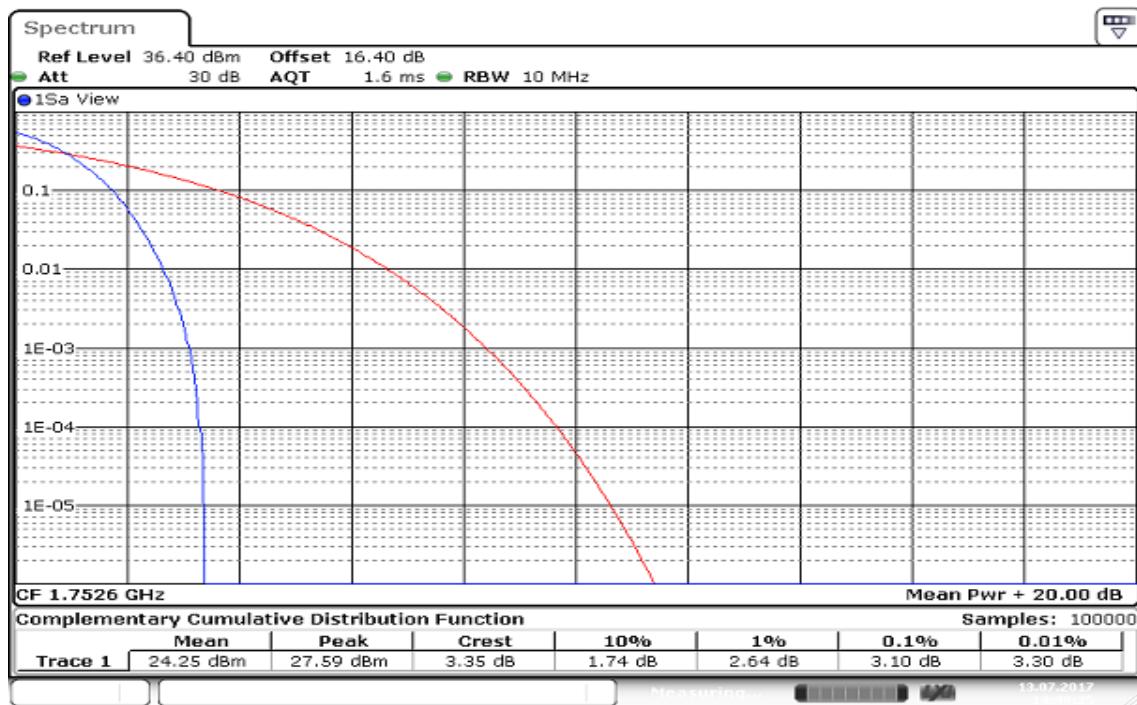
CH Low



CH Mid



CH High



## 7.7 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

### LIMIT

#### FCC §27.53 (h)

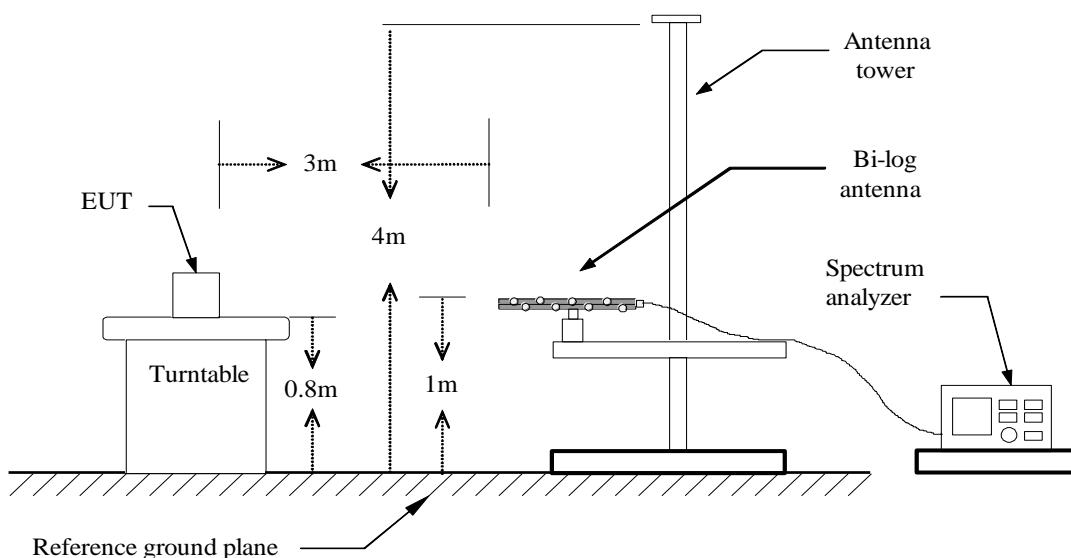
The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log_{10} (P)$  dB.

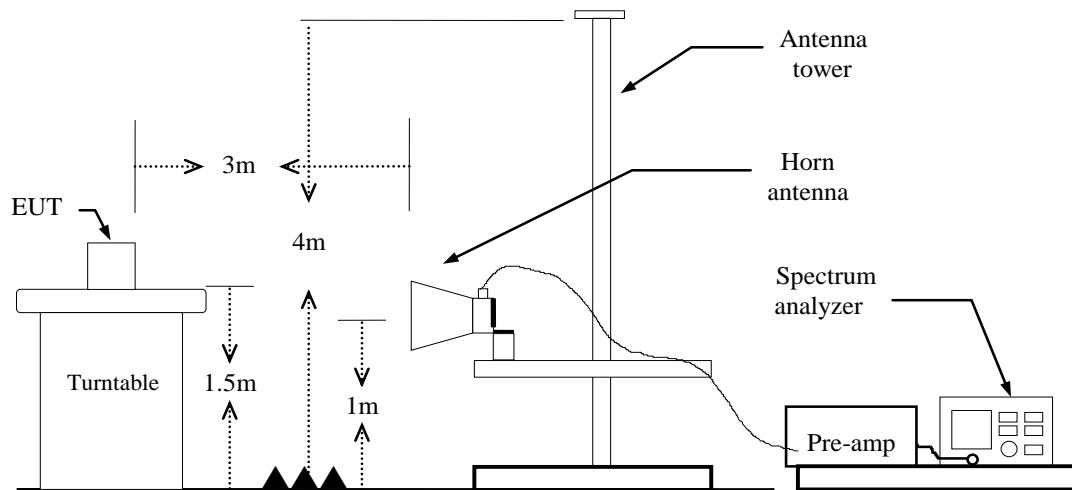
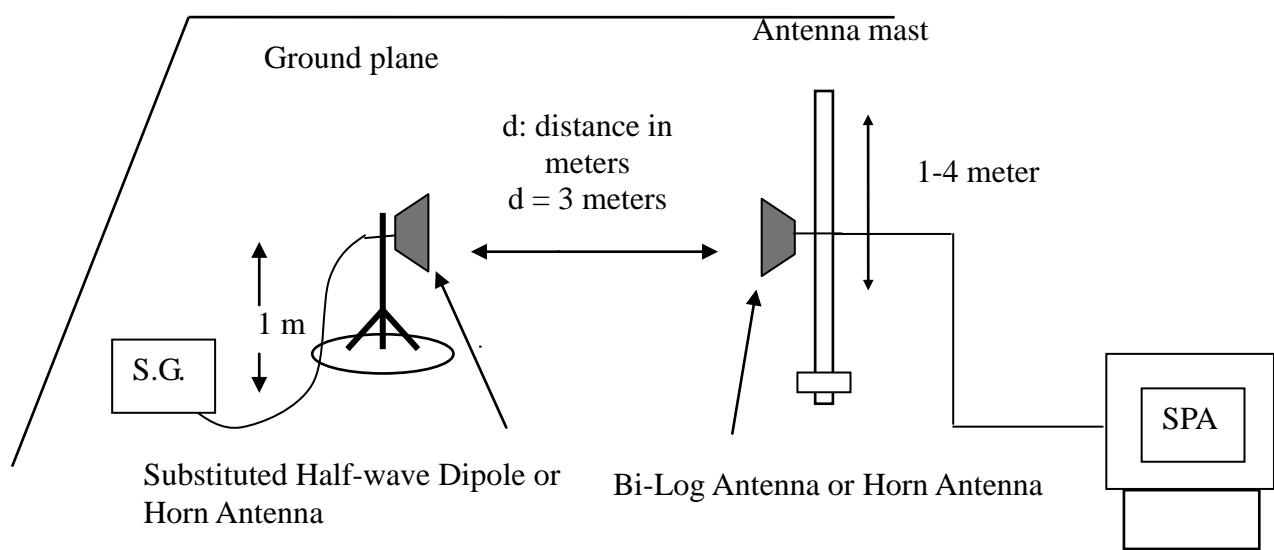
#### RSS-139 section 6.6

The mean power of emission must be attenuated below the mean power of the non-modulated carrier (P) on any frequency twice or more than twice the fundamental frequency by 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.  
According to RSS-139 section 6.6
2. The EUT was placed on a turntable
  - (1) Below 1G : 0.8m
  - (2) Above 1G : 1.5m
  - (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)

Limit Line: -13dBm

## **TEST RESULTS**

*Refer to the attached tabular data sheets.*

**Operation Mode:** WCDMA 12.2k RMC Band IV / TX / CH 1413

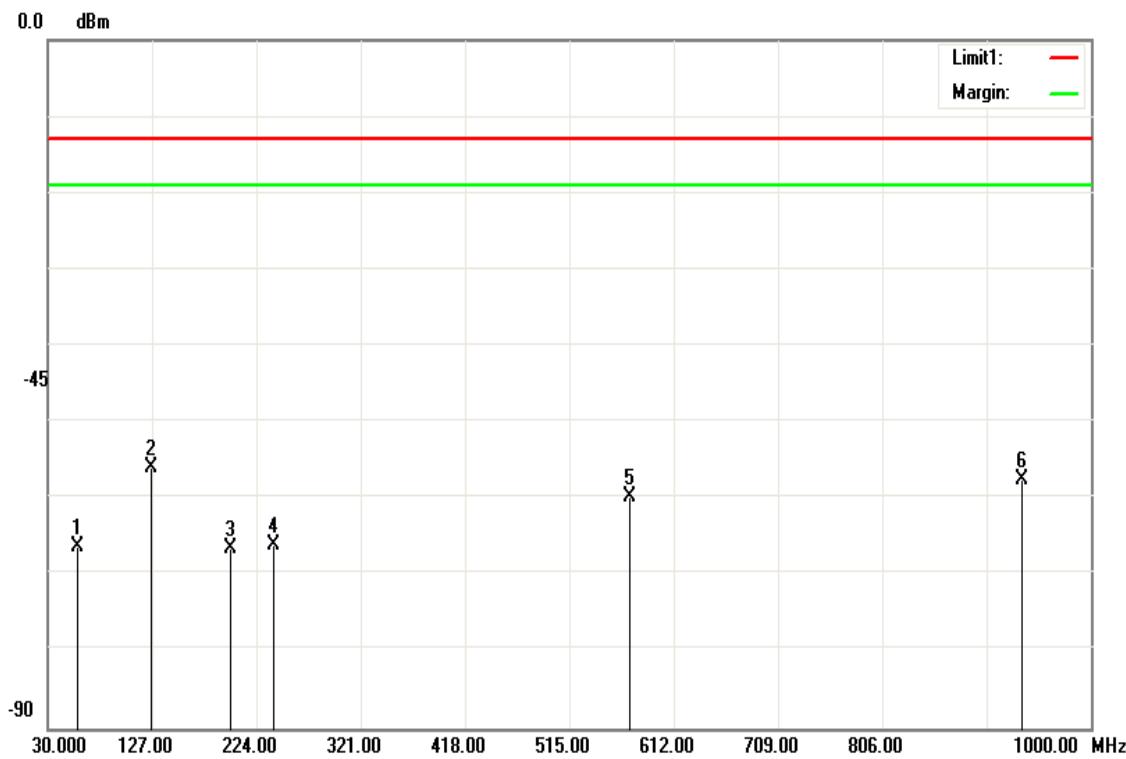
**Test Date:** April 12, 2017

**Temperature:** 22.6°C

**Tested by:** Timmy Wang

**Humidity:** 57.2 % RH

**Polarity:** Ver.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
57.1600	-64.59	-1.58	-66.17	-13.00	-53.17	V
126.0300	-56.81	0.99	-55.82	-13.00	-42.82	V
199.7500	-70.48	4.1	-66.38	-13.00	-53.38	V
240.4900	-72.83	6.77	-66.06	-13.00	-53.06	V
571.2600	-63.09	3.27	-59.82	-13.00	-46.82	V
935.9800	-58.82	1.35	-57.47	-13.00	-44.47	V

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

**Operation Mode:** WCDMA 12.2k RMC Band IV / TX / CH 1413

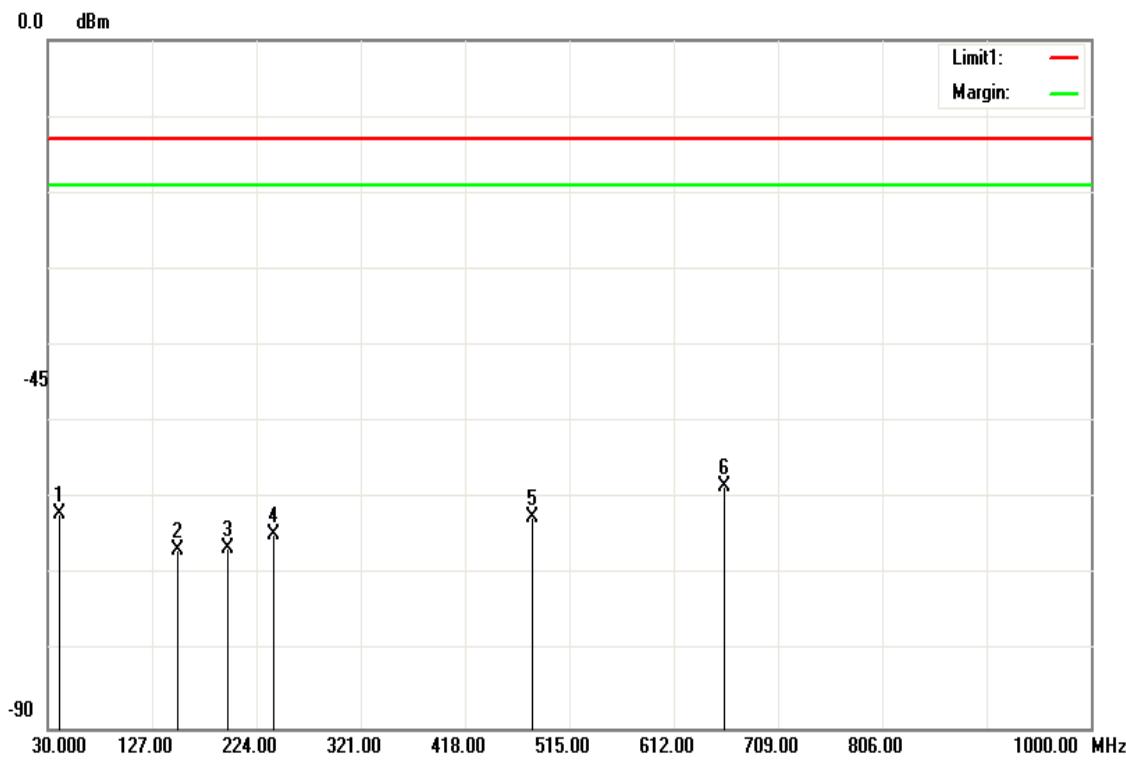
**Test Date:** April 12, 2017

**Temperature:** 22.6°C

**Tested by:** Timmy Wang

**Humidity:** 57.2 % RH

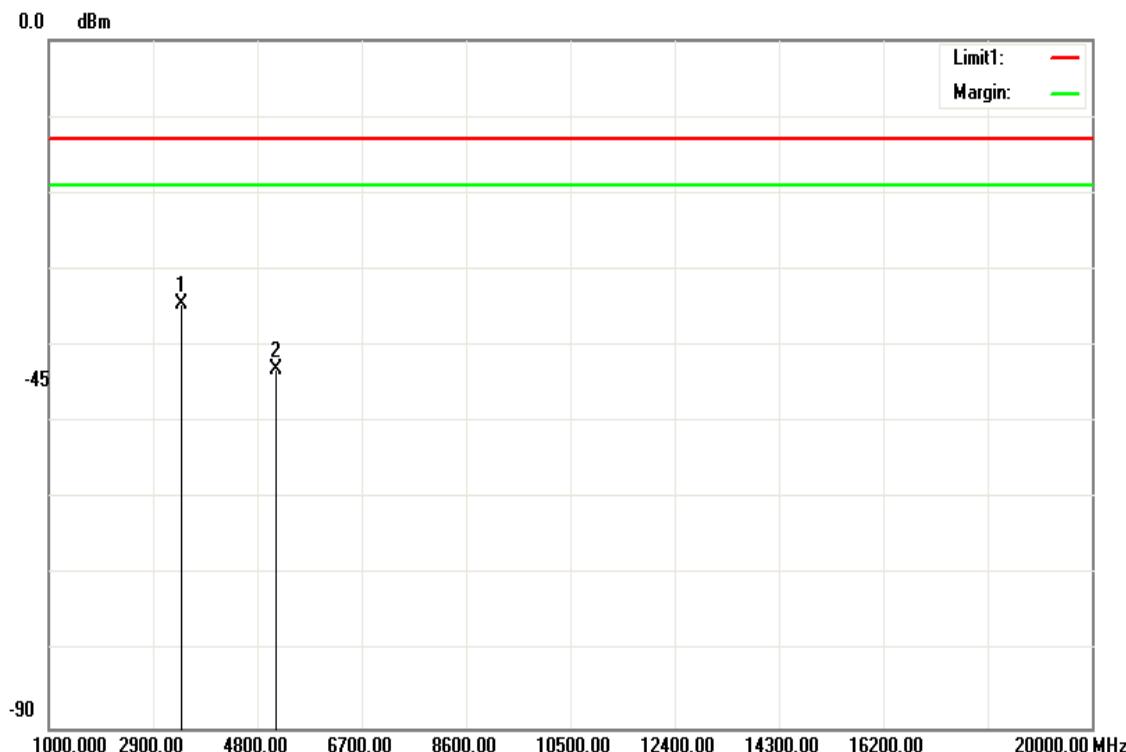
**Polarity:** Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
40.6700	-56.34	-5.71	-62.05	-13.00	-49.05	H
150.2800	-66.97	0.27	-66.70	-13.00	-53.70	H
197.8100	-70.53	4.1	-66.43	-13.00	-53.43	H
240.4900	-71.36	6.77	-64.59	-13.00	-51.59	H
481.0500	-69.27	6.89	-62.38	-13.00	-49.38	H
658.5600	-59.88	1.42	-58.46	-13.00	-45.46	H

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

**Above 1GHz****Operation Mode:** WCDMA 12.2k RMC Band IV / TX / CH 1312**Test Date:** April 12, 2017**Temperature:** 22.6°C**Tested by:** Timmy Wang**Humidity:** 57.2 % RH**Polarity:** Ver.

Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3429.000	-46.97	12.32	-34.65	-13.00	-21.65	V
5137.000	-55.65	12.61	-43.04	-13.00	-30.04	V
N/A						

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

**Operation Mode:** WCDMA 12.2k RMC Band IV / TX / CH 1312

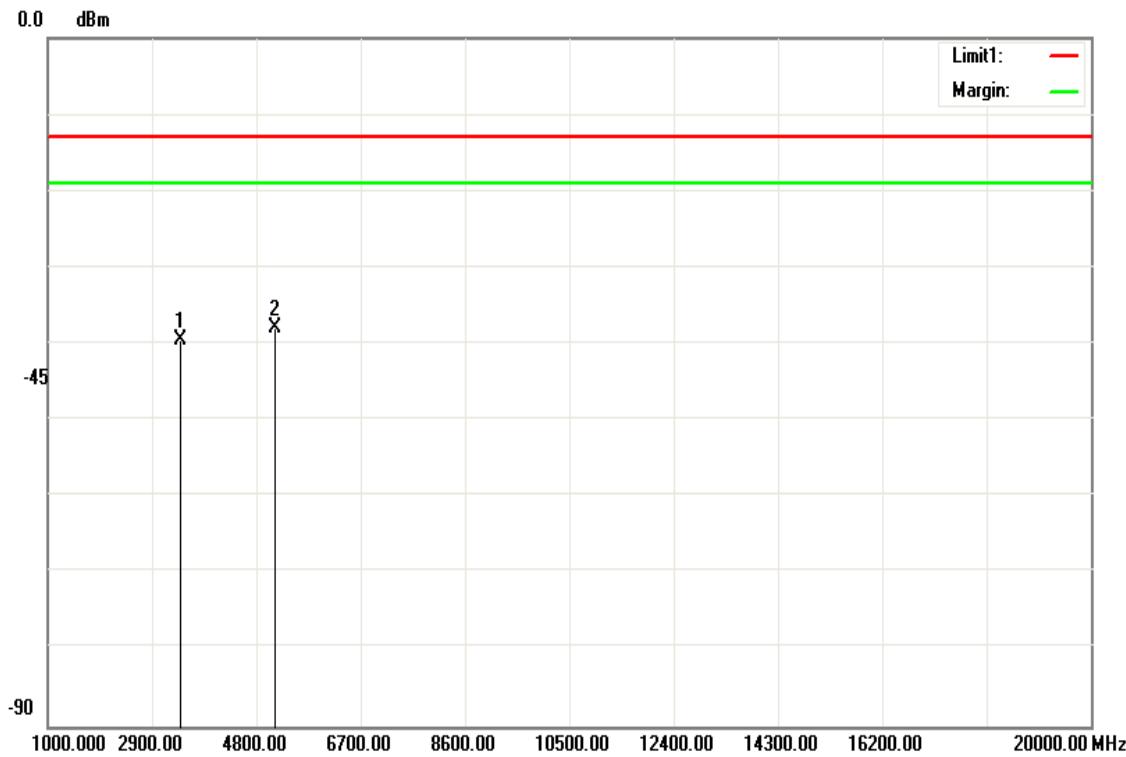
**Test Date:** April 12, 2017

**Temperature:** 22.6°C

**Tested by:** Timmy Wang

**Humidity:** 57.2 % RH

**Polarity:** Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3422.000	-51.73	12.3	-39.43	-13.00	-26.43	H
5137.000	-50.51	12.61	-37.90	-13.00	-24.90	H
N/A						

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

**Operation Mode:** WCDMA 12.2k RMC Band IV / TX / CH 1413

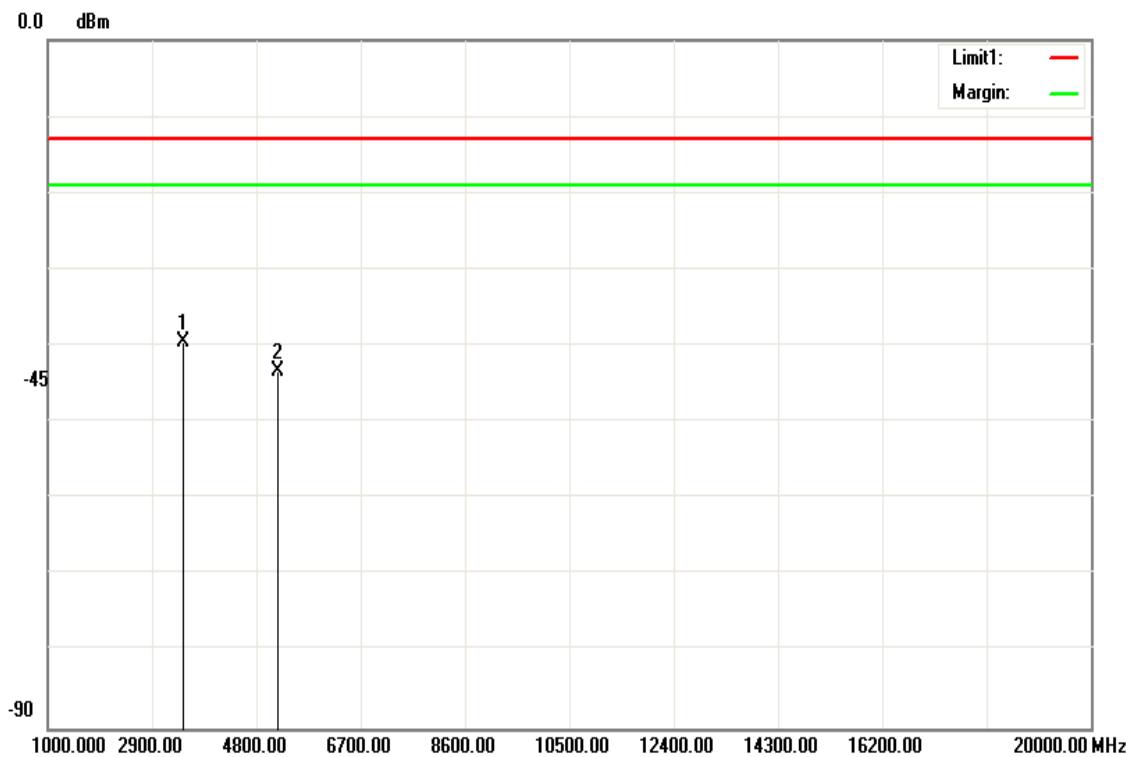
**Test Date:** April 12, 2017

**Temperature:** 22.6°C

**Tested by:** Timmy Wang

**Humidity:** 57.2 % RH

**Polarity:** Ver.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3464.000	-51.97	12.41	-39.56	-13.00	-26.56	V
5200.000	-55.94	12.66	-43.28	-13.00	-30.28	V
N/A						

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.

**Operation Mode:** WCDMA 12.2k RMC Band IV / TX / CH 1413

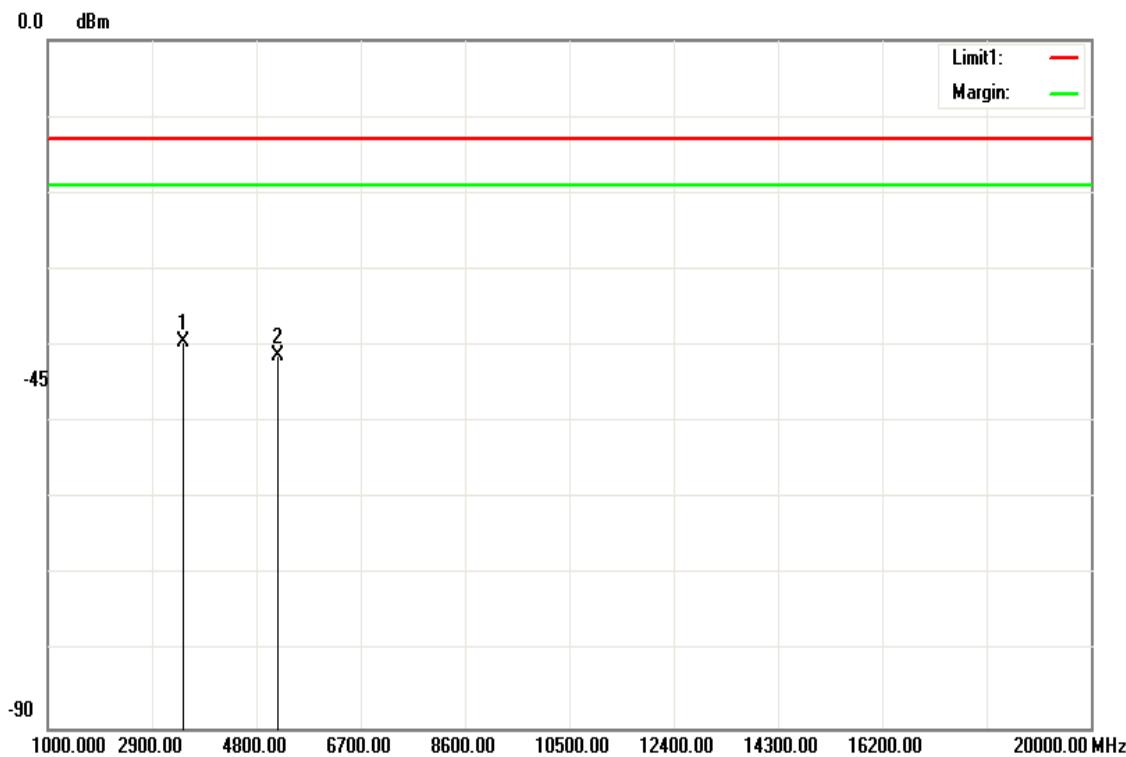
**Test Date:** April 12, 2017

**Temperature:** 22.6°C

**Tested by:** Timmy Wang

**Humidity:** 57.2 % RH

**Polarity:** Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3464.000	-51.82	12.41	-39.41	-13.00	-26.41	H
5200.000	-53.95	12.66	-41.29	-13.00	-28.29	H
N/A						

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.

**Operation Mode:** WCDMA 12.2k RMC Band IV / TX / CH 1513

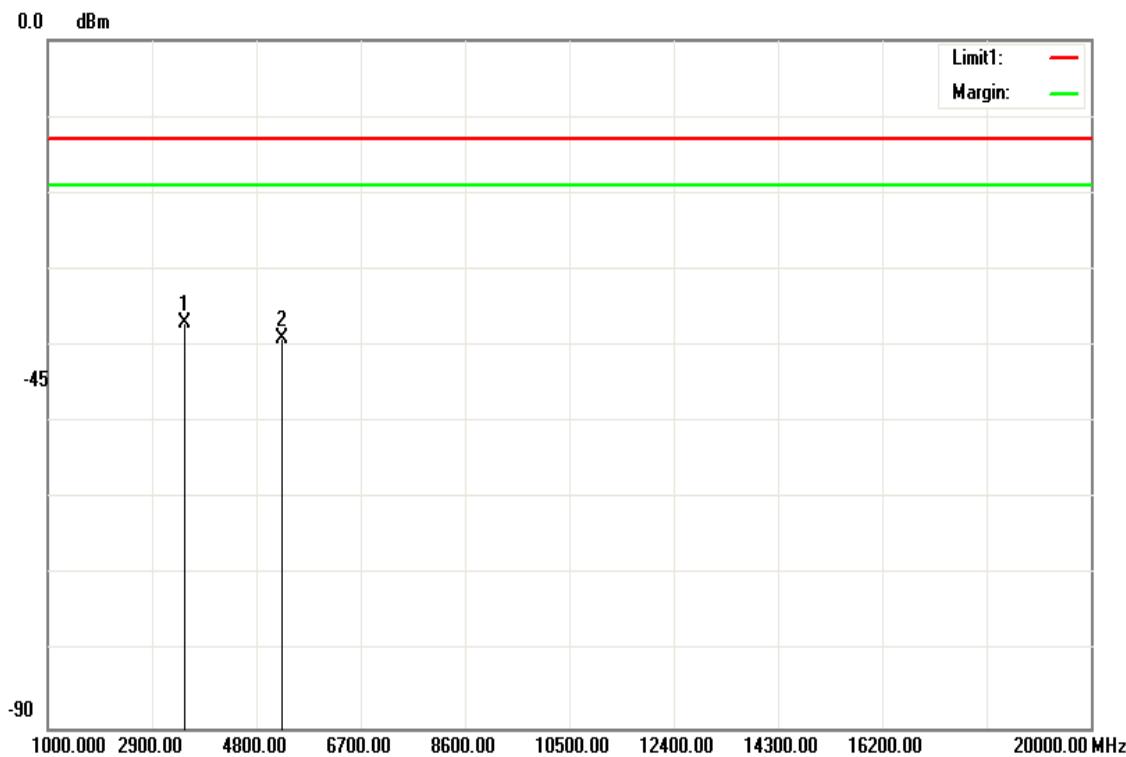
**Test Date:** April 12, 2017

**Temperature:** 22.6°C

**Tested by:** Timmy Wang

**Humidity:** 57.2 % RH

**Polarity:** Ver.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3506.000	-49.48	12.5	-36.98	-13.00	-23.98	V
5256.000	-51.65	12.7	-38.95	-13.00	-25.95	V
N/A						

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

**Operation Mode:** WCDMA 12.2k RMC Band IV / TX / CH 1513

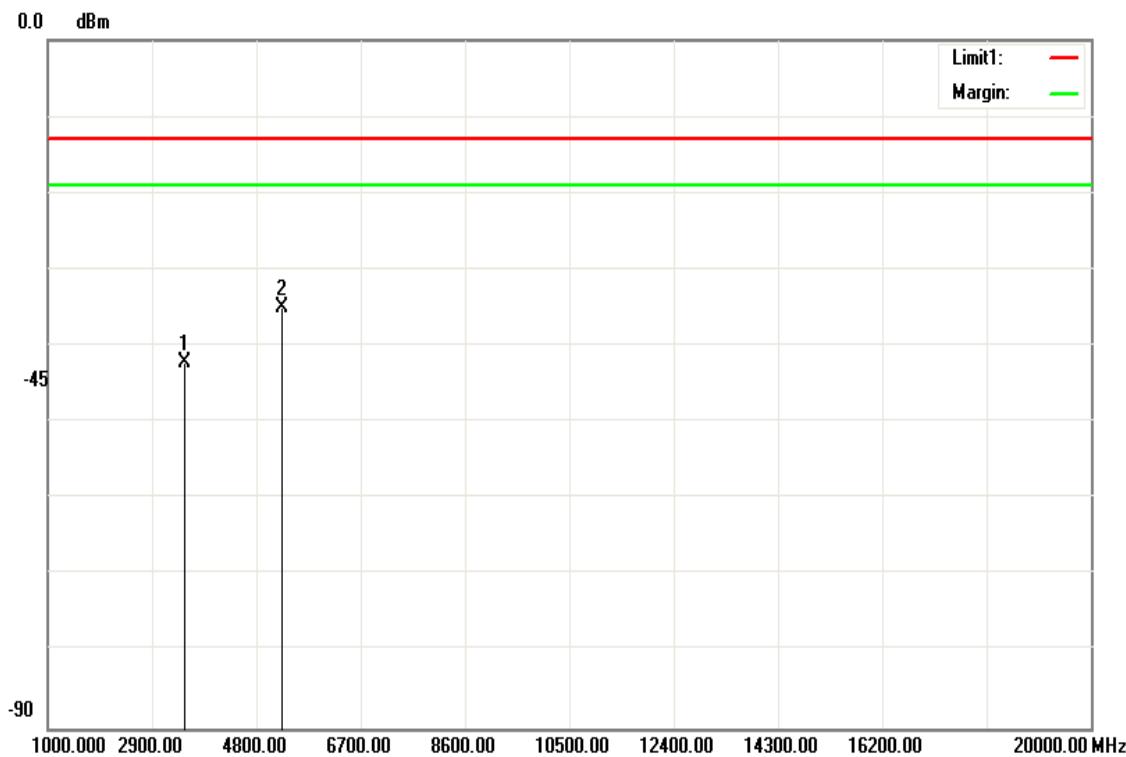
**Test Date:** April 12, 2017

**Temperature:** 22.6°C

**Tested by:** Timmy Wang

**Humidity:** 57.2 % RH

**Polarity:** Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3506.000	-54.77	12.5	-42.27	-13.00	-29.27	H
5256.000	-47.64	12.7	-34.94	-13.00	-21.94	H
N/A						

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

## 7.8 FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT

### LIMIT

According to the FCC part 27.54 & RSS-139 section 6.4

shall be tested the frequency stability. The rule is defined that" The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

### 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.

**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 IV Low Channel 1712.4 MHz				
Limit: $\pm 2.5$ ppm = 4281 Hz				
Power Supply (Vac)	Environment Temperature (°C)	BW: 20M Frequency Error(Hz)	Frequency Error (ppm)	Limit (ppm)
120	50	4.00	0.0023	+/- 2.5
120	40	-2.00	-0.0012	
120	30	1.00	0.0006	
120	20	-3.00	-0.0018	
120	10	2.00	0.0012	
120	0	-1.00	-0.0006	
120	-10	2.00	0.0012	
120	-20	-3.00	-0.0018	

Reference Frequency: WCDMA 12.2k RMC Band IV Mid Channel 1732.6 MHz				
Limit: $\pm 2.5$ ppm = 4331.5 Hz				
Power Supply (Vac)	Environment Temperature (°C)	BW: 20M Frequency Error(Hz)	Frequency Error (ppm)	Limit (ppm)
120	50	3.00	0.0017	+/- 2.5
120	40	-2.00	-0.0012	
120	30	1.00	0.0006	
120	20	-1.00	-0.0006	
120	10	2.00	0.0012	
120	0	-1.00	-0.0006	
120	-10	-2.00	-0.0012	
120	-20	-4.00	-0.0023	

Reference Frequency: WCDMA 12.2k RMC Band IV High Channel 1752.6 MHz				
Limit: $\pm 2.5$ ppm = 4381.5 Hz				
Power Supply (Vac)	Environment Temperature (°C)	BW: 20M Frequency Error(Hz)	Frequency Error (ppm)	Limit (ppm)
120	50	-4.00	-0.0023	+/- 2.5
120	40	2.00	0.0011	
120	30	-3.00	-0.0017	
120	20	0.00	0.0000	
120	10	2.00	0.0011	
120	0	-3.00	-0.0017	
120	-10	-1.00	-0.0006	
120	-20	-3.00	-0.0017	

## 7.9 FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT

### LIMIT

According to the FCC part 27.54 & RSS-139 section 6.4

shall be tested the frequency stability. The rule is defined that" The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

### 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.

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

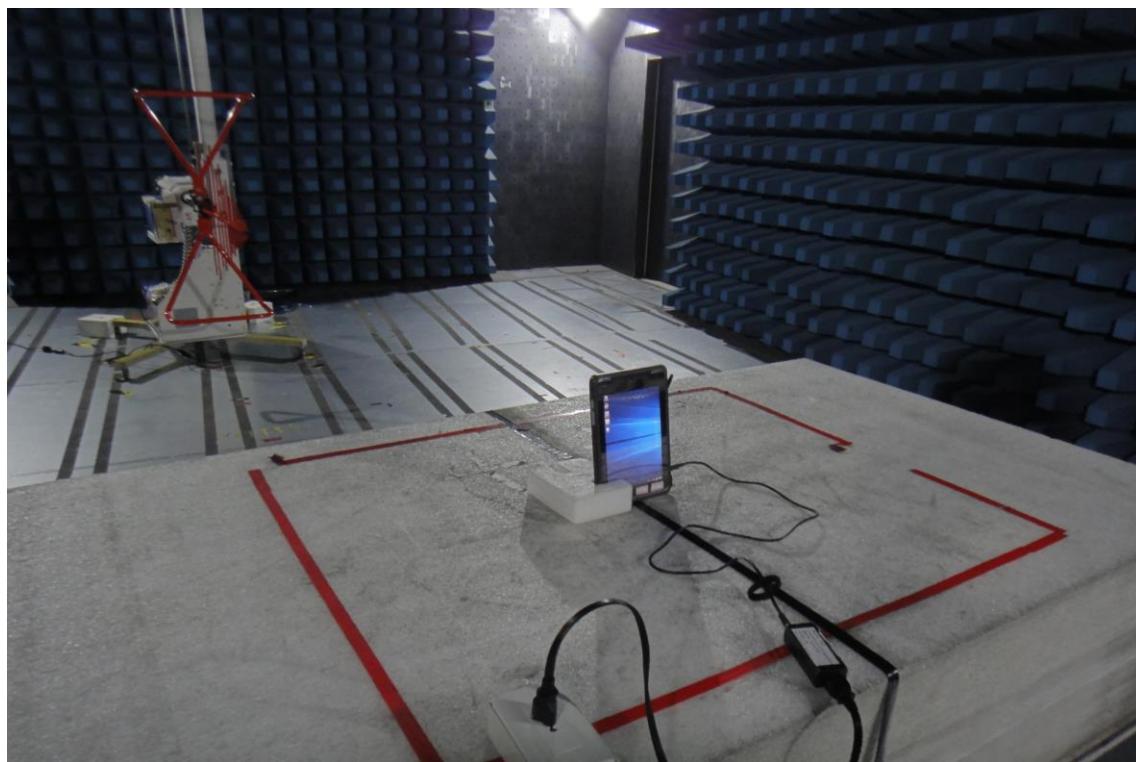
### TEST RESULTS

No non-compliance noted.

Reference Frequency: WCDMA 12.2k RMC Band IV Low Channel 1712.4 MHz				
Limit: $\pm 2.5$ ppm = 4281Hz				
Power Supply (Vac)	Environment Temperature (°C)	BW: 20M Frequency Error(Hz)	Frequency Error (ppm)	Limit (ppm)
102	20	-1.00	-0.0006	+/- 2.5
120		-3.00	-0.0018	
138		-3.00	-0.0018	

Reference Frequency: WCDMA 12.2k RMC Band IV Mid Channel 1732.6 MHz				
Limit: $\pm 2.5$ ppm = 4331.5Hz				
Power Supply (Vac)	Environment Temperature (°C)	BW: 20M Frequency Error(Hz)	Frequency Error (ppm)	Limit (ppm)
102	20	-2.00	-0.0012	+/- 2.5
120		-1.00	-0.0006	
138		-1.00	-0.0006	

Reference Frequency: WCDMA 12.2k RMC Band IV High Channel 1752.6 MHz				
Limit: $\pm 2.5$ ppm = 4381.5Hz				
Power Supply (Vac)	Environment Temperature (°C)	BW: 20M Frequency Error(Hz)	Frequency Error (ppm)	Limit (ppm)
102	20	-1.00	-0.0006	+/- 2.5
120		0.00	0.0000	
138		2.00	0.0011	

**Radiated Emission Set up Photos****Below 1 GHz****Above 1 GHz**