

**FCC 47 CFR PART 27 SUBPART L**

**TEST REPORT**

**For**

**Computer**

**Model: DMS-SJ03**

**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.  
(Hsinchu Lab)  
No.989-1, Wenshan Rd., Shangshan Village, Qionglin Township,  
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Issued Date: September 21, 2017**



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**Revision History**

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	September 21, 2017	Initial Issue	ALL	Allison Chen
01	November 14, 2017	1. Revise section 3	P.6	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

**Model:** DMS-SJ03

**Date of Test:** August 10 ~ 15, 2017

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR PART 27 SUBPART L	No non-compliance noted

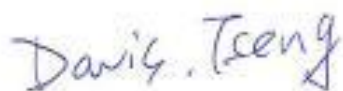
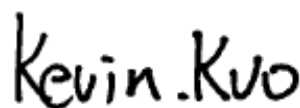
### We hereby certify that:

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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Davis Tseng  
Sr. Engineer  
Compliance Certification Services Inc.

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Kevin Kuo  
Engineer  
Compliance Certification Services Inc.

## 2 EUT DESCRIPTION

<b>Product</b>	Computer
<b>Model No.</b>	DMS-SJ03
<b>Model Discrepancy</b>	N/A
<b>Trade Name</b>	ADVANTECH
<b>Received Date</b>	May 5, 2017
<b>Power Supply</b>	Powered from host device: DC 12V
<b>Frequency Range</b>	WCDMA Band IV: 1712.4-1752.6 MHz
<b>Transmit Power (ERP &amp; EIRP Power)</b>	WCDMA 12.2k RMC Band IV: 23.24dBm
<b>Antenna Gain</b>	PIFA Antenna WCDMA band IV: 2.97dBi

**Remark:** 1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.

### 3 TEST METHODOLOGY

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

#### 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: DMS-SJ03) 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.

##### 3.2.1 The worst mode of measurement

Radiated Emission Measurement	
<b>Test Condition</b>	<b>Band edge, Emission for Unwanted and Fundamental</b>
<b>Voltage/Hz</b>	DC 12V
<b>Test Mode</b>	Mode 1: EUT power by DC Source via cable.
<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 checked="" type="checkbox"/> Placed in fixed position at Y-Plane (E1-Plane) <input type="checkbox"/> Placed in fixed position at Z-Plane (H-Plane)

Remark:

1. The worst mode was record in this test report.
2. The EUT pre-scanned in three axis ,X, Y, Z and two polarity, Horizontal and Vertical for radiated measurement. The worst case (Y-Plane) were recorded in this 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 and Loop Antenna is scheduled for calibration once three years.

Conducted Emissions Test Site					
Name of Equipment	Manufacturer	Model	Serial Number	Cal Date	Cal Due
Base Station	R&S	CMU 200	101245	07/29/2017	07/25/2018
Spectrum Analyzer	R&S	FSV 40	101073	10/05/2016	10/04/2017
Spectrum Analyzer	R&S	FSU 20Hz....26.5GHz	100258	07/27/2017	07/26/2018

Wugu 966 Chamber A					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Base Station	Agilent	8960/E5515C	MY48363204	07/26/2017	07/25/2018
Bi-Log Antenna	TESEQ	CBL 6112D	35404	08/07/2017	08/06/2018
Double Ridged BroadBand Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-285	04/25/2017	04/24/2018
Horn Antenna	COM-POWER	AH-840	03077	12/02/2016	12/01/2017
Pre-Amplifier	EMCI	EMC001625	980243	04/11/2017	04/10/2018
Pre-Amplifier	COM-POWER	PAM-118A	551043	04/11/2017	04/10/2018
PSA Series Spectrum Analyzer	Agilent	E4446A	MY48250064	04/20/2017	04/19/2018

### 4.3 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
Powerline Conducted Emission	N/A
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, Chungsen Road, Hsintien City, Taipei Hsien, Taiwan, R.O.C.
- No.11, Wugong 6th Rd., Wugu Dist., New Taipei City 24891, Taiwan, R.O.C
- No.81-1, Lane 210, Bade 2nd Rd., Lujhu Township, Taoyuan County 33841, Taiwan, R.O.C
- No.989-1, Wenshan Rd., Shangshan Village, Qionglin Township, Hsinchu County 30741, Taiwan, R.O.C

### 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."

## 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
1	DC Power Source	Agilent	E3640A	N/A	N/A	DC Cable 1.5m shielding
2	NB(D)	ASUS	A8J	R31018	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 27 REQUIREMENTS

### 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

#### 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	22.99	0.19907
		1413/1638	1732.6	23.24	0.21086
		1513/1738	1752.6	23.01	0.19999

## 7.2 ERP & EIRP MEASUREMENT

### LIMIT

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

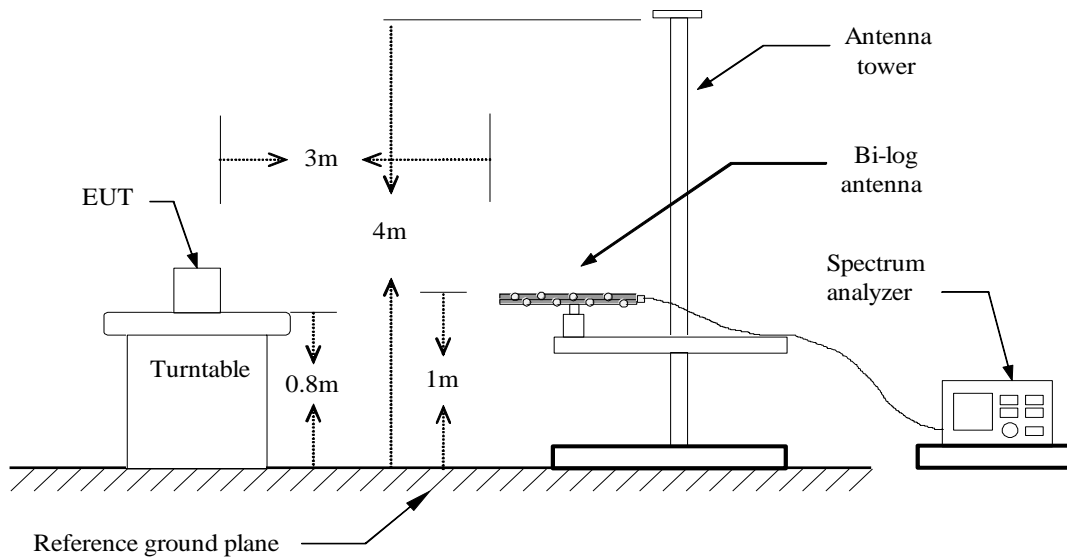
Fixed, mobile, and portable (handheld) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

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

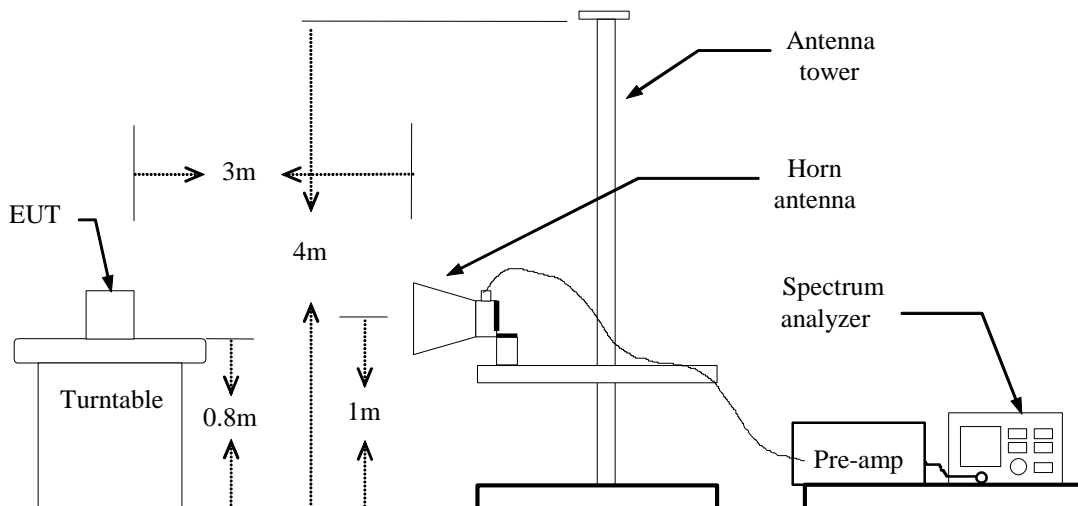
The equivalent isotropically radiated power (e.i.r.p.) for mobile and portable transmitters shall not exceed one watt. The e.i.r.p. for fixed and base stations in the band 1710-1780 MHz shall not exceed 1 watt..

### Test Configuration

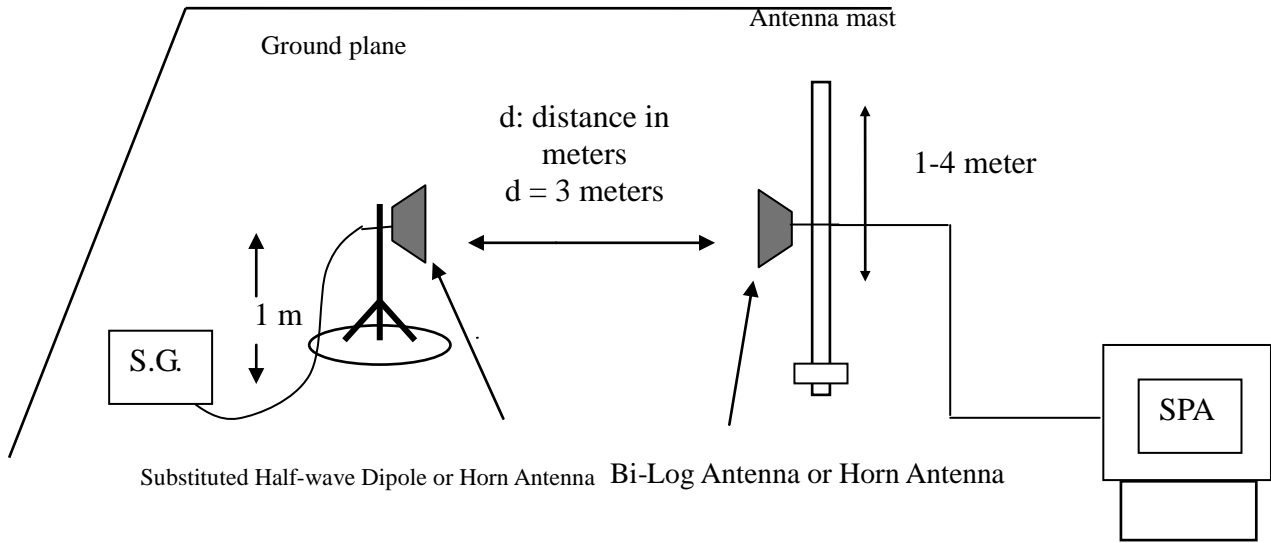
#### **Below 1 GHz**



#### **Above 1 GHz**



**For Substituted Method Test Set-UP**



**TEST PROCEDURE**

The EUT was placed on an 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:

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

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

**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	26.25	0.421	21.76	0.149
	Middle	25.90	0.389	20.54	0.113
	Highest	23.42	0.219	21.99	0.158

## 7.3 OCCUPIED BANDWIDTH MEASUREMENT

### LIMIT

### 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

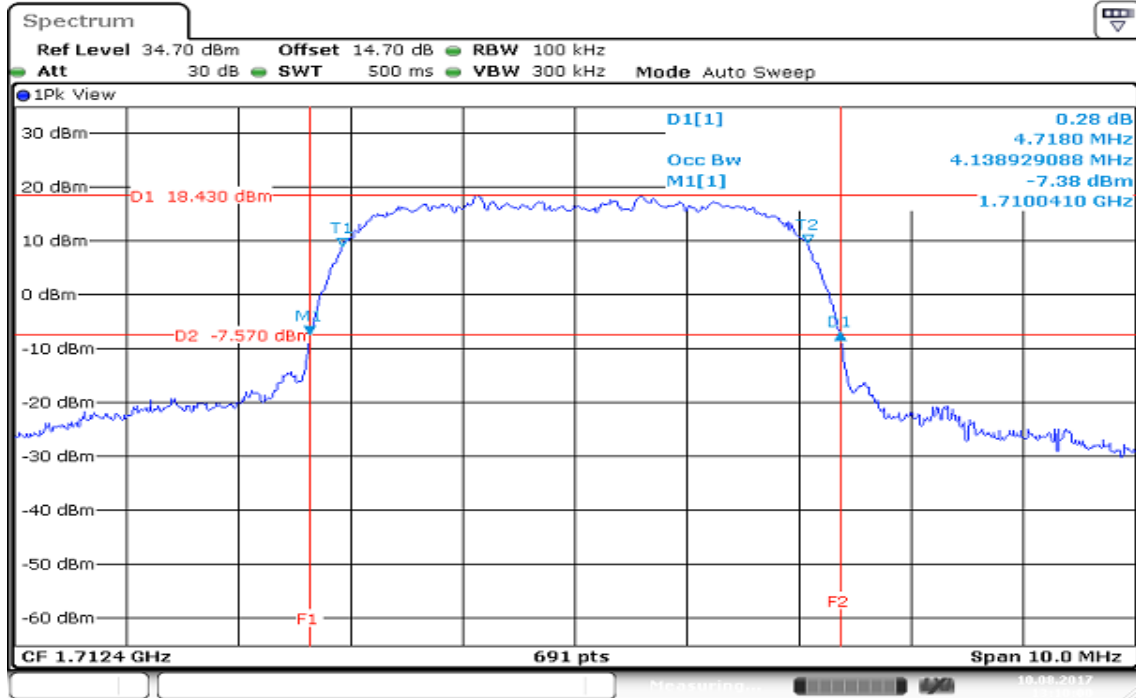
#### Test Data

Test Mode	CH	Frequency (MHz)	99% Bandwidth (MHz)	26 dB Bandwidth (MHz)
WCDMA 12.2k RMC (Band IV)	Lowest	1712.4	4.1389	4.7180
	Middle	1732.6	4.1244	4.7030
	Highest	1752.6	4.1389	4.7030

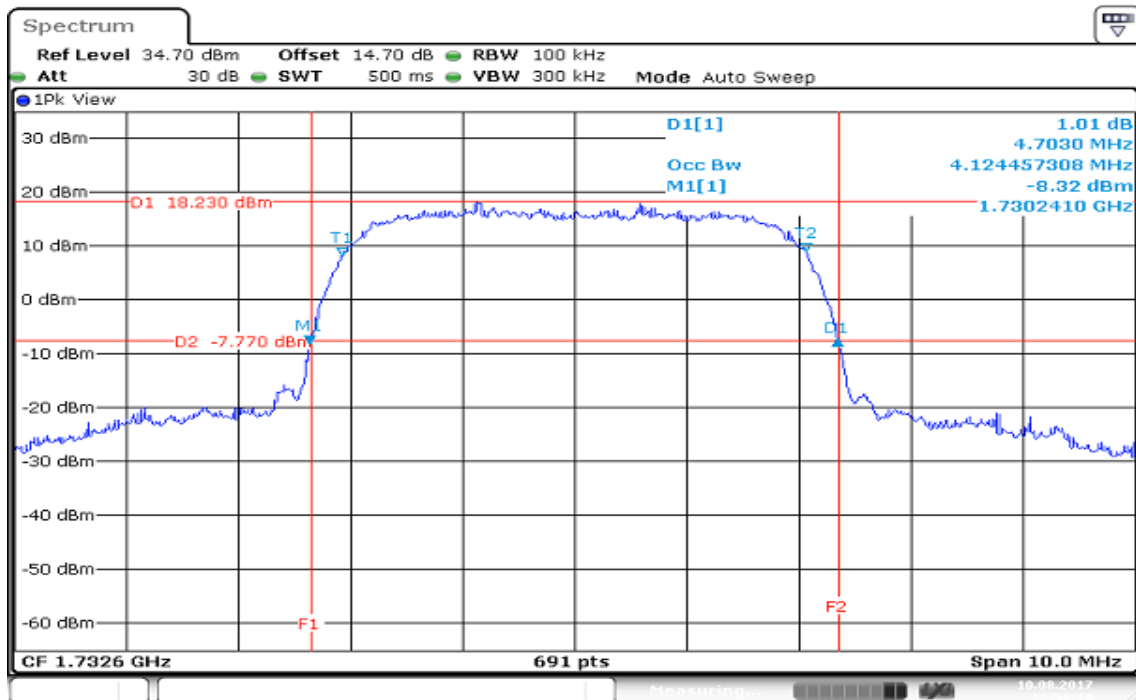
**Test Plot**

**WCDMA 12.2k RMC (Band IV)**

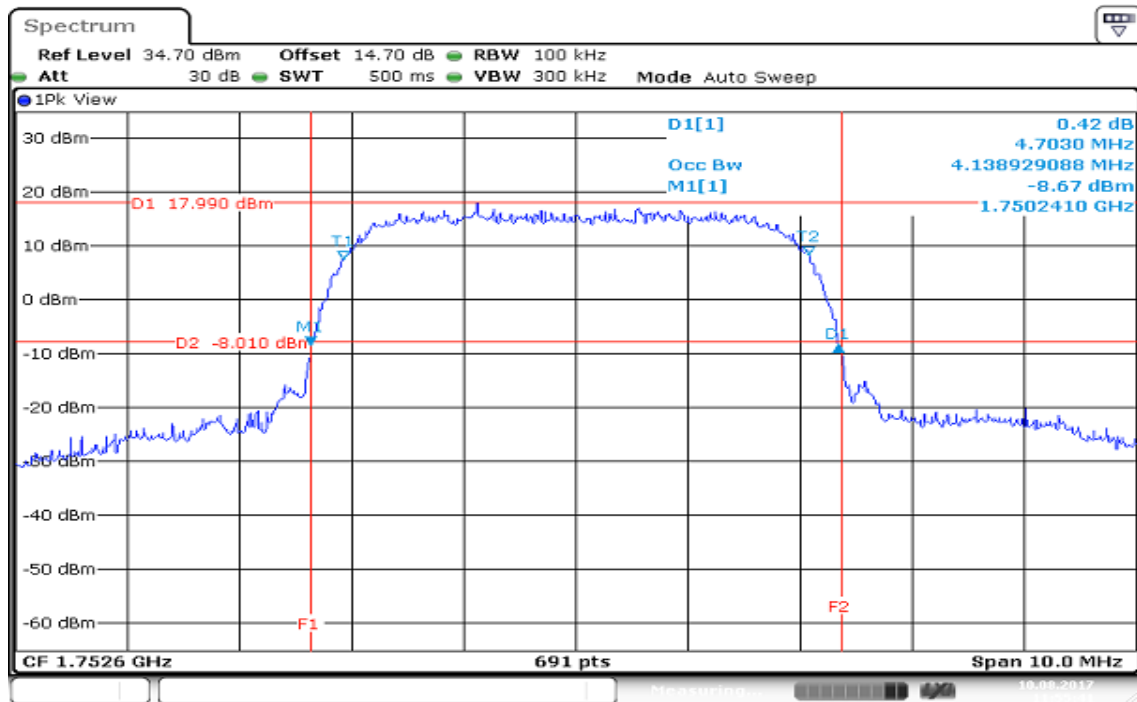
**Low CH**



**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.

### **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.

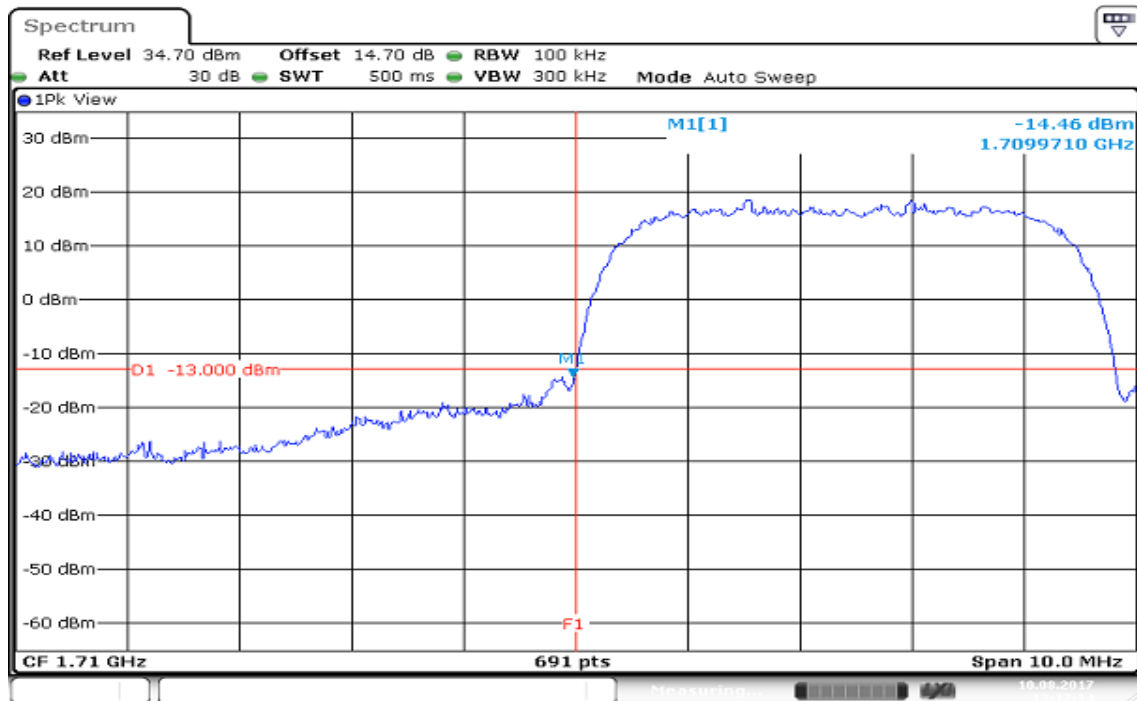
### **TEST RESULTS**

*No non-compliance noted.*

### Test Plot

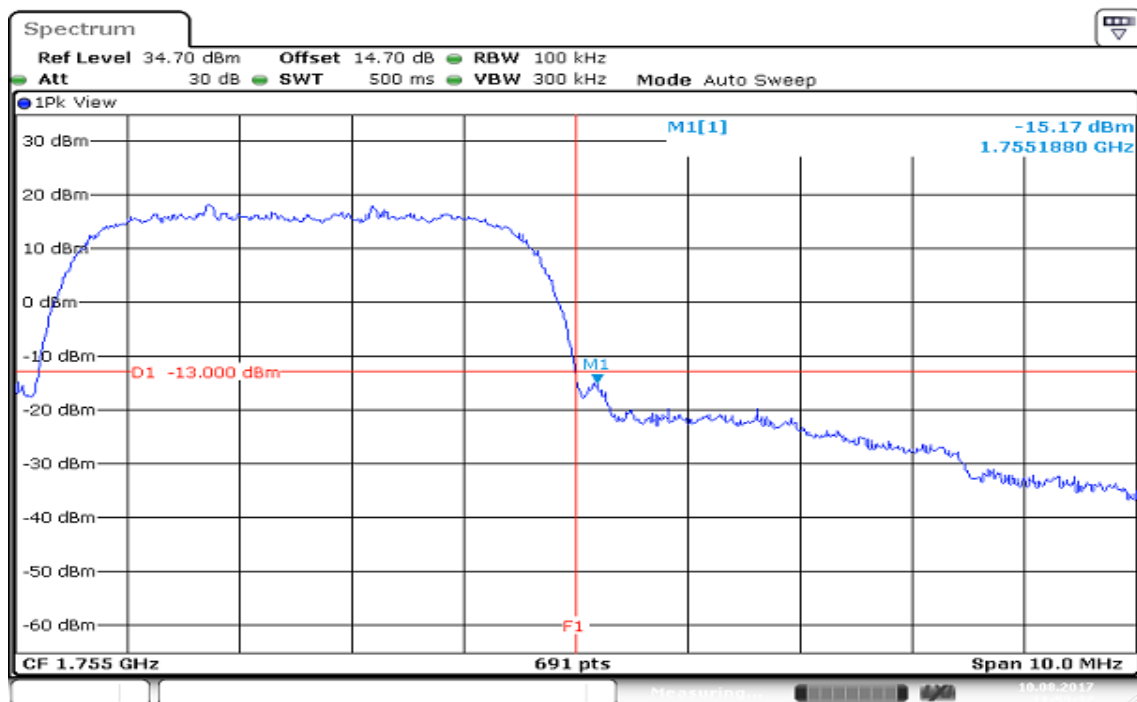
## WCDMA 12.2K RMC (BAND IV)

### CH Low



Date: 10 AUG 2017 13:12:15

### CH High



Date: 10 AUG 2017 11:53:33

## **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.

### **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.

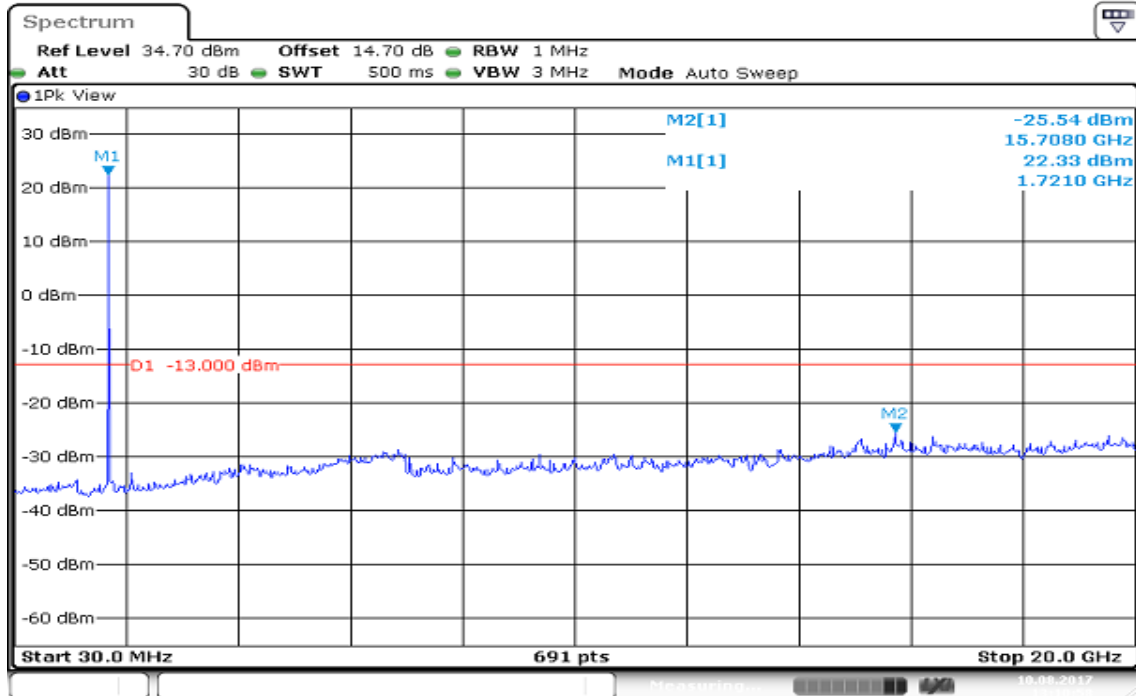
### **TEST RESULTS**

*No non-compliance noted.*

## Test Data

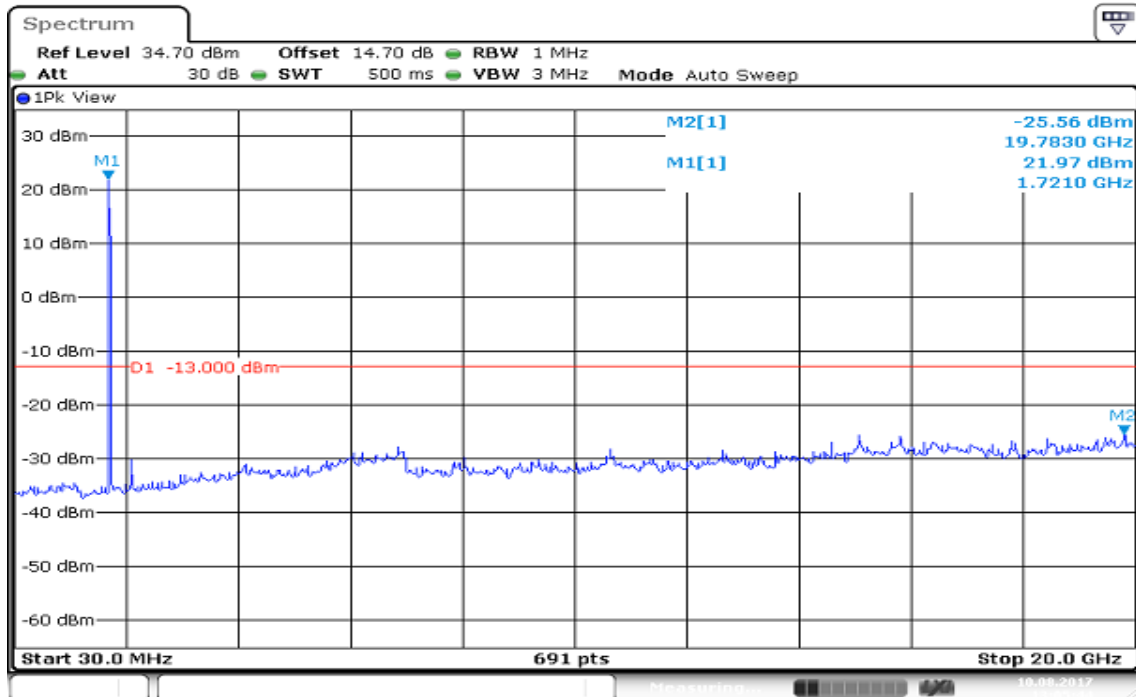
### WCDMA 12.2K RMC (BAND IV)

#### CH Low



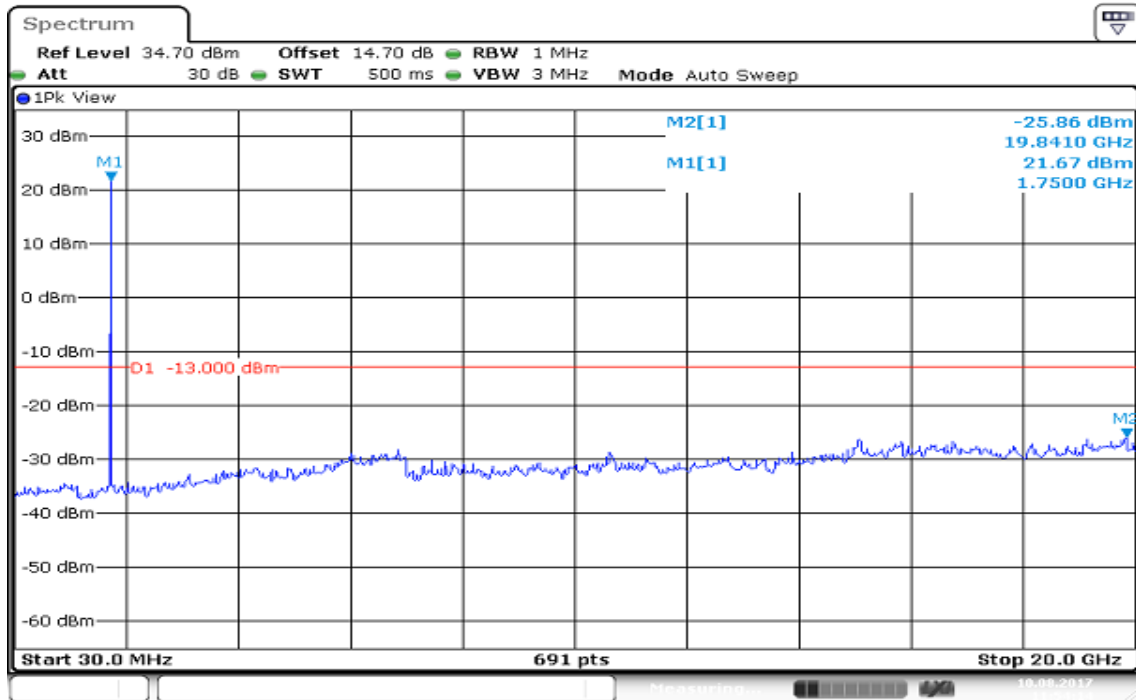
Date: 10 AUG 2017 13:10:59

#### CH Mid



Date: 10 AUG 2017 13:05:44

### CH High



Date: 10.AUG.2017 11:54:14

## **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.

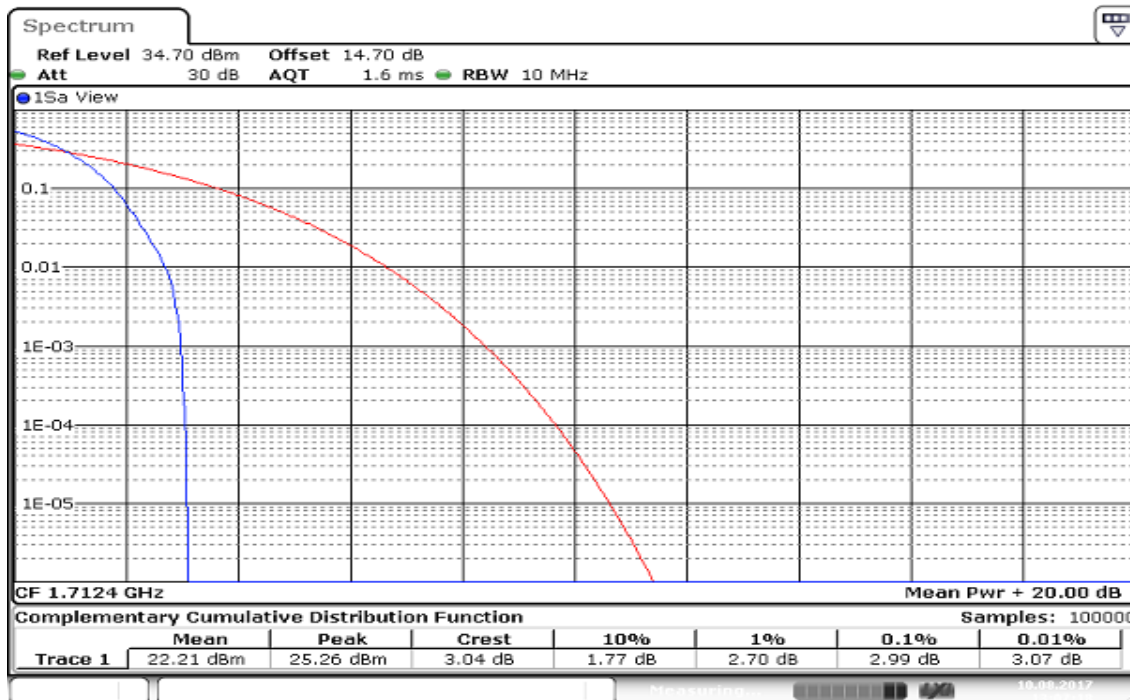
### **Test Procedures**

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

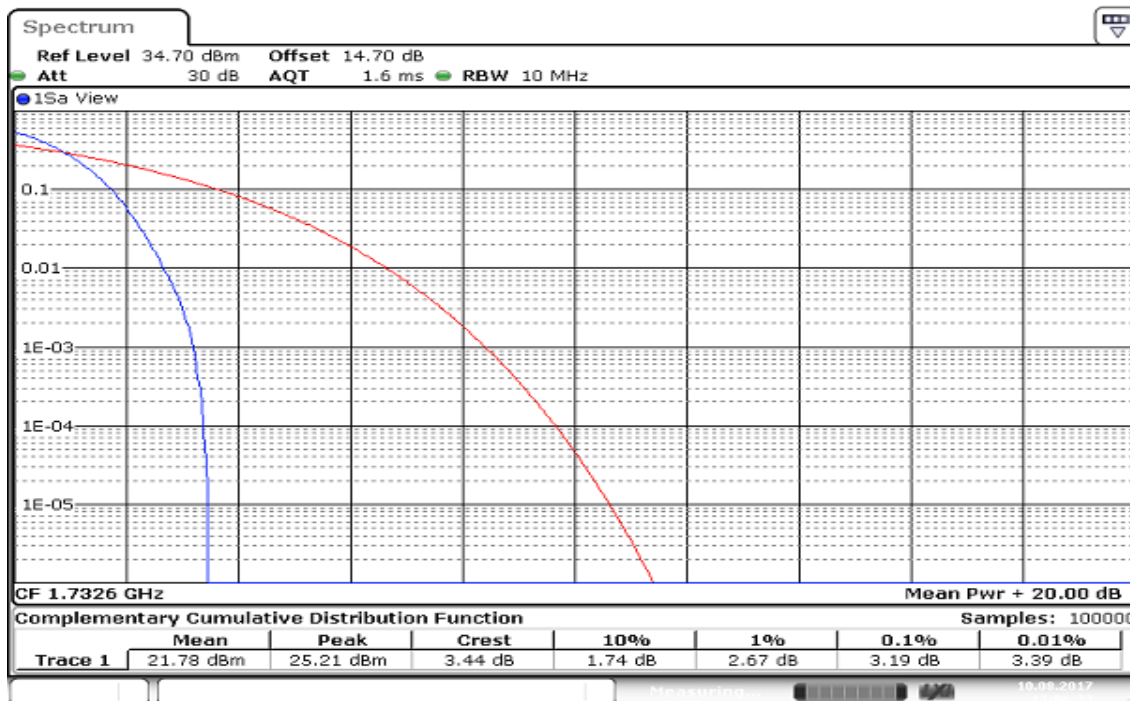
### WCDMA 12.2K RMC (BAND IV)

#### CH Low



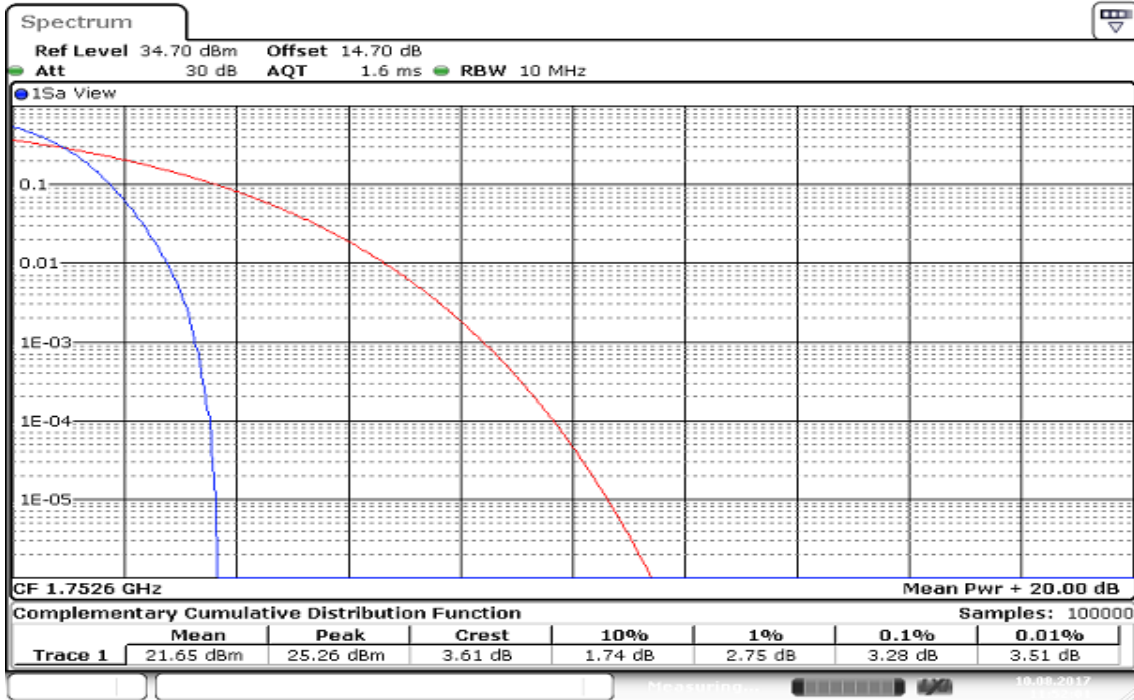
Date: 10 AUG 2017 13:07:18

#### CH Mid



Date: 10 AUG 2017 13:06:23

**CH High**



Date: 10 AUG 2017 11:52:01



## 7.7 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

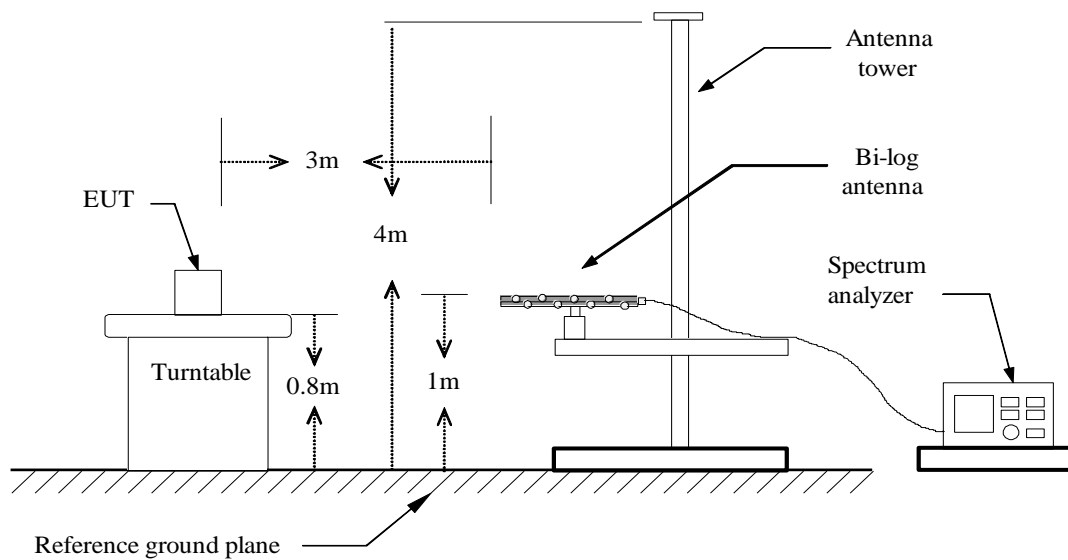
### LIMIT

#### FCC §27.53 (h)

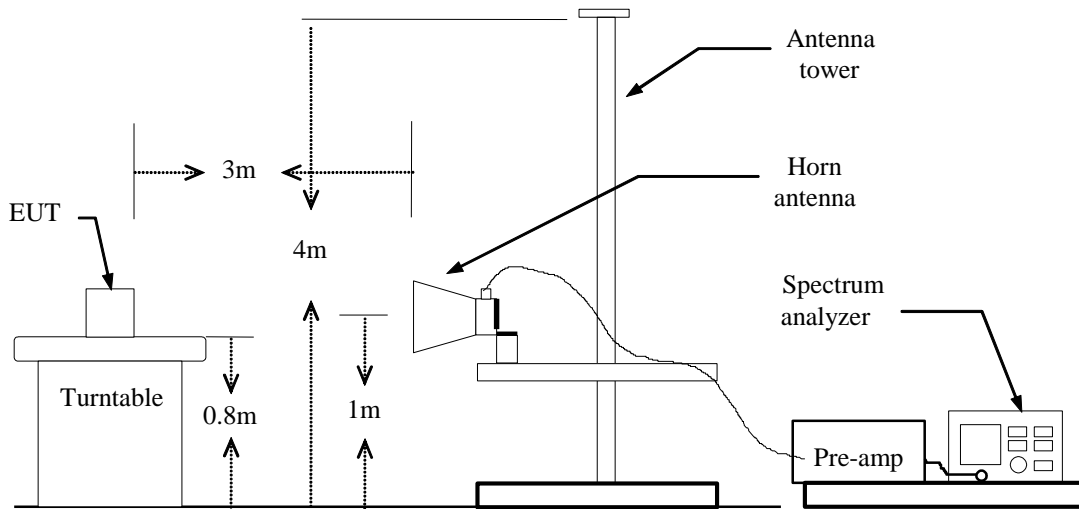
The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log_{10} (P)$  dB.

### Test Configuration

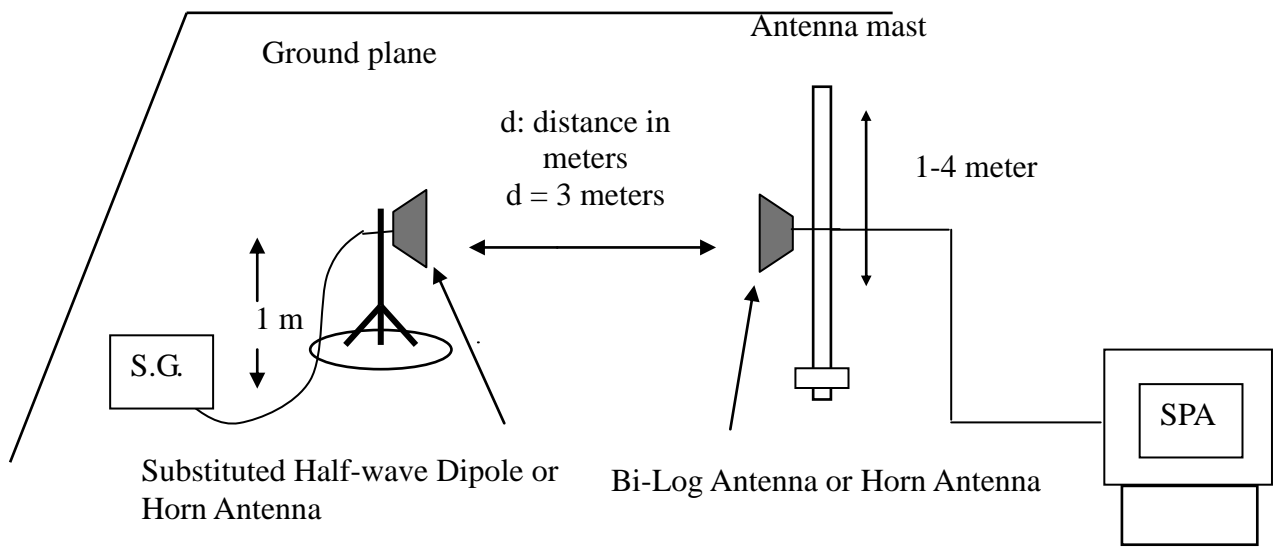
#### Below 1 GHz



**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 : 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.*

**Below 1GHz**

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

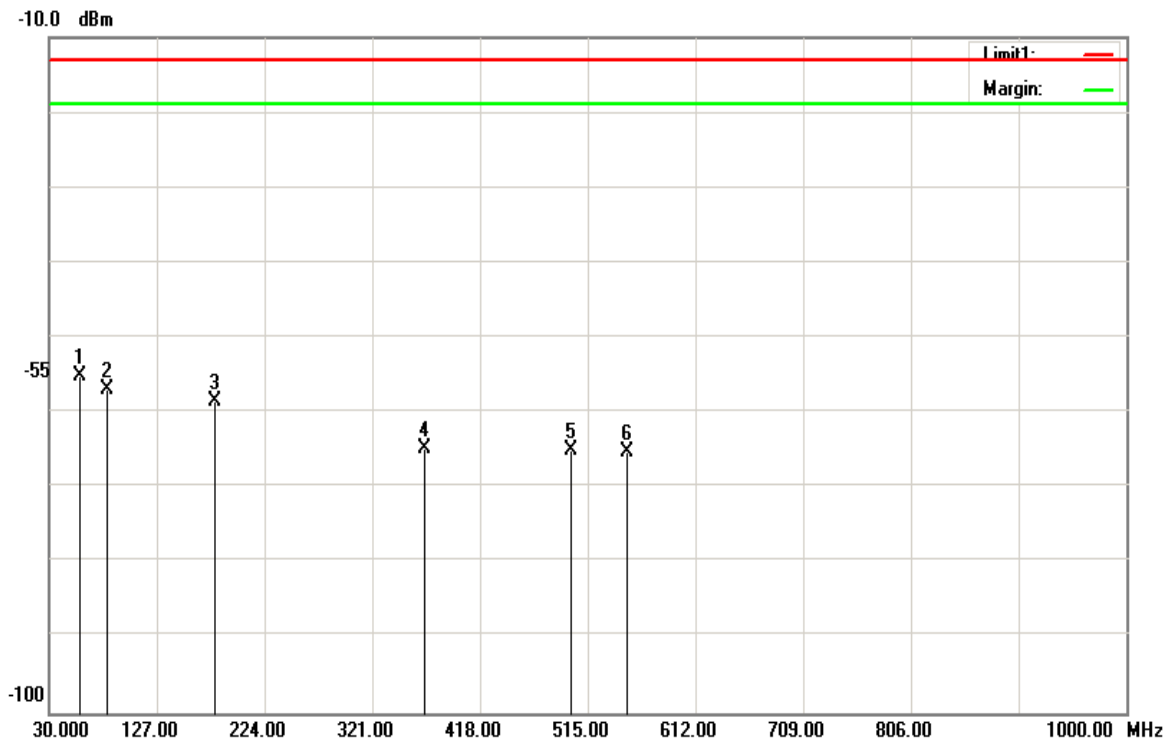
**Test Date:** August 14, 2017

**Temperature:** 21 °C

**Tested by:** Kevin Kuo

**Humidity:** 52 % RH

**Polarity:** Ver.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
57.1600	-53.54	-1.58	-55.12	-13.00	-42.12	V
82.3800	-57.33	0.45	-56.88	-13.00	-43.88	V
179.3800	-62.36	3.95	-58.41	-13.00	-45.41	V
368.5300	-71.96	7.17	-64.79	-13.00	-51.79	V
500.4500	-71.73	6.8	-64.93	-13.00	-51.93	V
549.9200	-72.06	6.85	-65.21	-13.00	-52.21	V

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

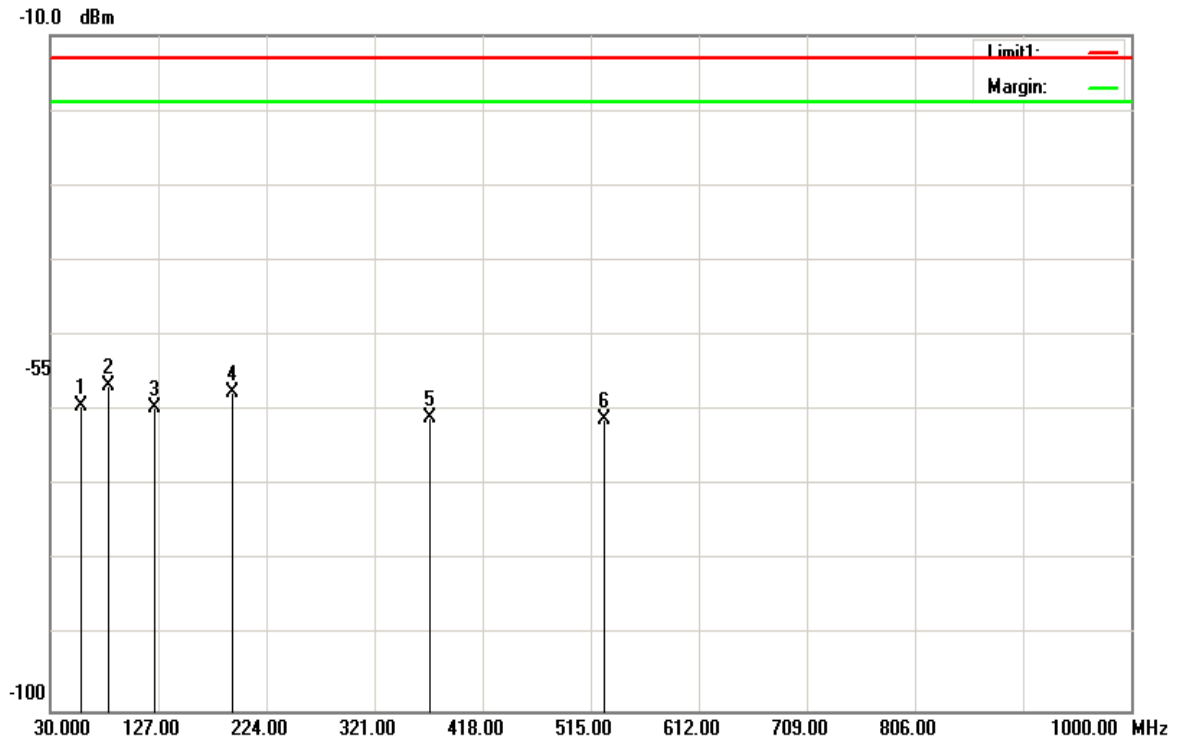
**Test Date:** August 14, 2017

**Temperature:** 21 °C

**Tested by:** Kevin Kuo

**Humidity:** 52 % RH

**Polarity:** Hor.



Frequency (MHz)	S.G. (dBm)	Ant. Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
57.1600	-57.8	-1.58	-59.38	-13.00	-46.38	H
82.3800	-57.11	0.45	-56.66	-13.00	-43.66	H
124.0900	-60.68	0.96	-59.72	-13.00	-46.72	H
192.9600	-61.75	4.1	-57.65	-13.00	-44.65	H
370.4700	-68.06	7.18	-60.88	-13.00	-47.88	H
527.6100	-68.01	6.83	-61.18	-13.00	-48.18	H

**Above 1GHz**

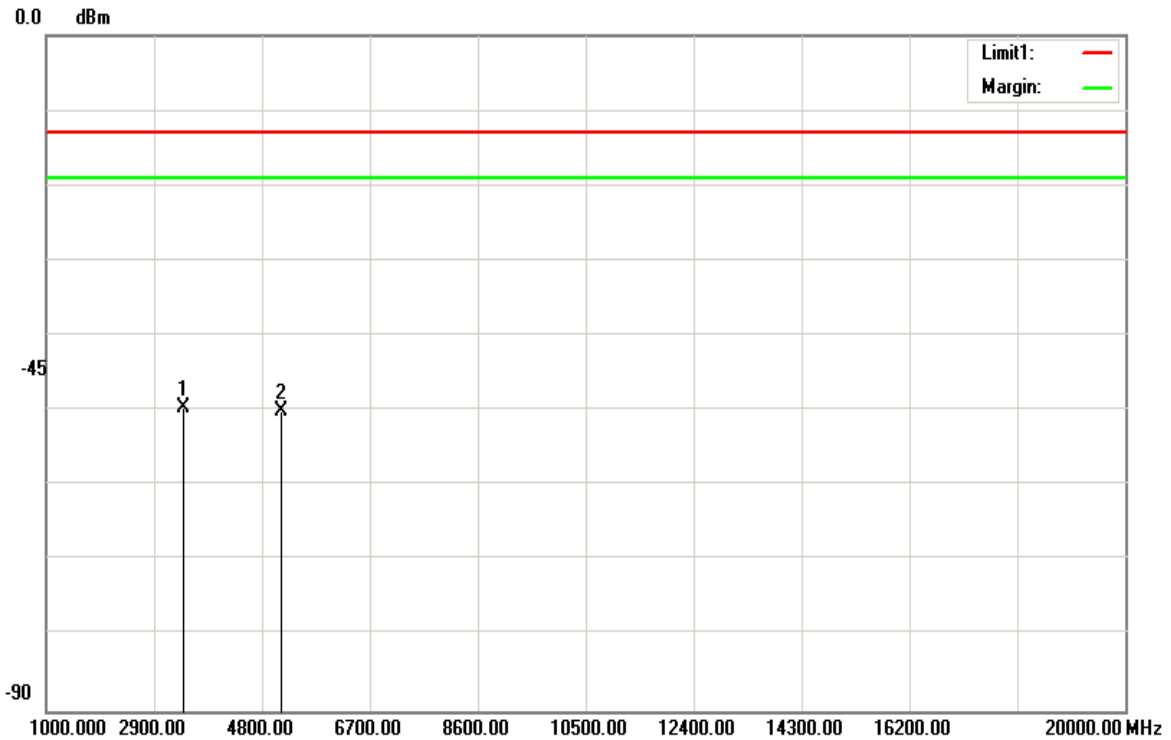
**Operation Mode:** WCDMA 12.2k RMC Band IV / TX /Low CH **Test Date:** August 14, 2017

**Temperature:** 21°C

**Tested by:** Kevin Kuo

**Humidity:** 52 % RH

**Polarity:** Ver.

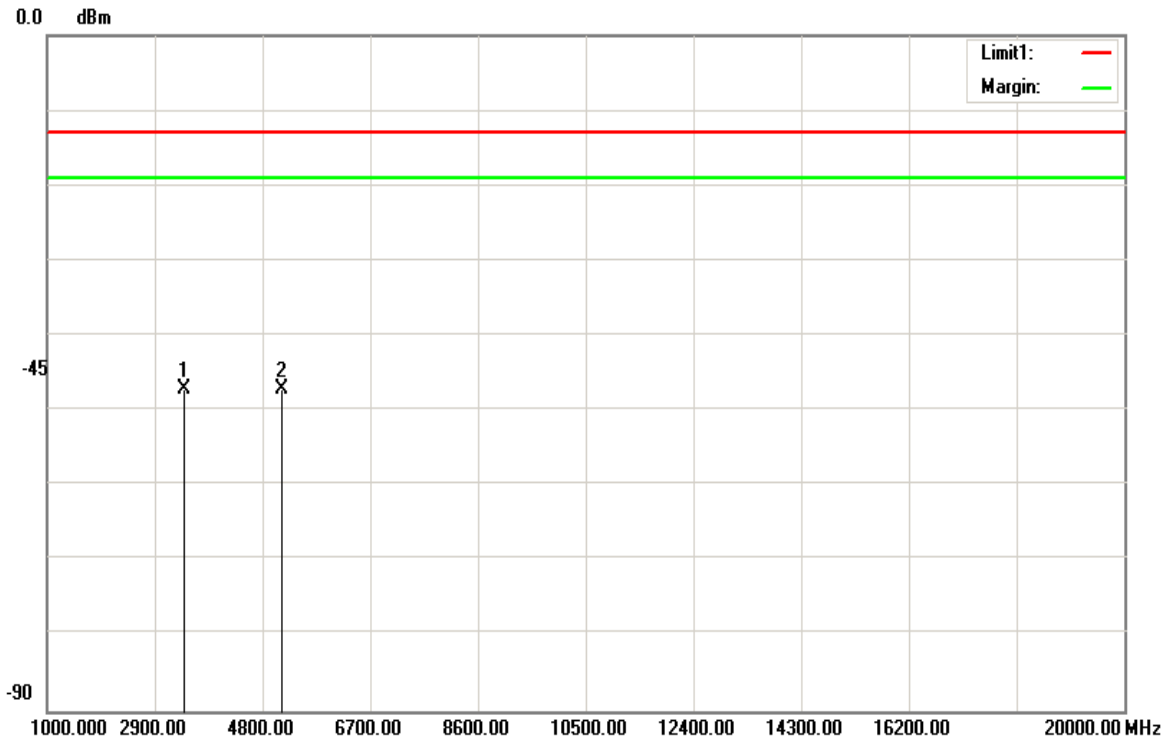


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3424.000	-61.8	12.3	-49.50	-13.00	-36.50	V
5137.000	-62.57	12.61	-49.96	-13.00	-36.96	V
N/A						

**Remark:**

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

**Operation Mode:** WCDMA 12.2k RMC Band IV / TX /Low CH      **Test Date:** August 14, 2017  
**Temperature:** 21°C      **Tested by:** Kevin Kuo  
**Humidity:** 52 % RH      **Polarity:** Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3424.000	-59.37	12.3	-47.07	-13.00	-34.07	H
5137.000	-59.67	12.61	-47.06	-13.00	-34.06	H
N/A						

**Remark:**

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

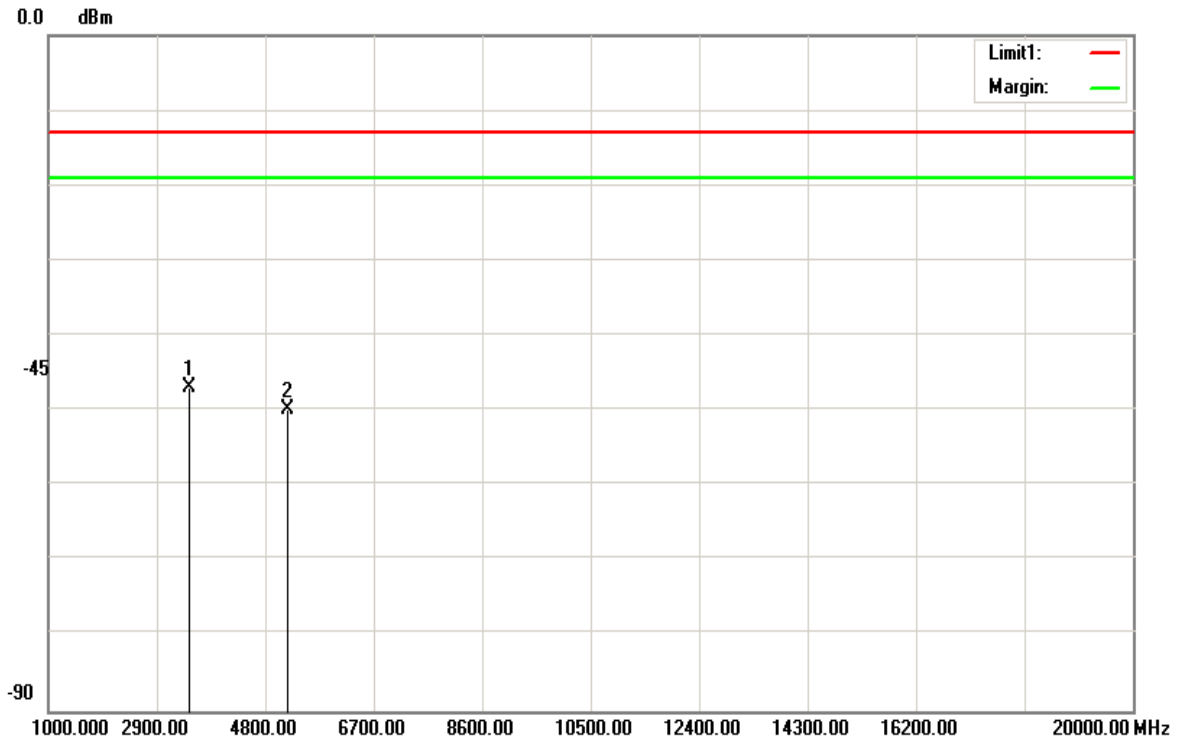
**Operation Mode:** WCDMA 12.2k RMC Band IV / TX/Mid CH **Test Date:** August 14, 2017

**Temperature:** 21°C

**Tested by:** Kevin Kuo

**Humidity:** 52 % RH

**Polarity:** Ver.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3465.000	-59.3	12.41	-46.89	-13.00	-33.89	V
5197.000	-62.41	12.66	-49.75	-13.00	-36.75	V
N/A						

**Remark:**

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



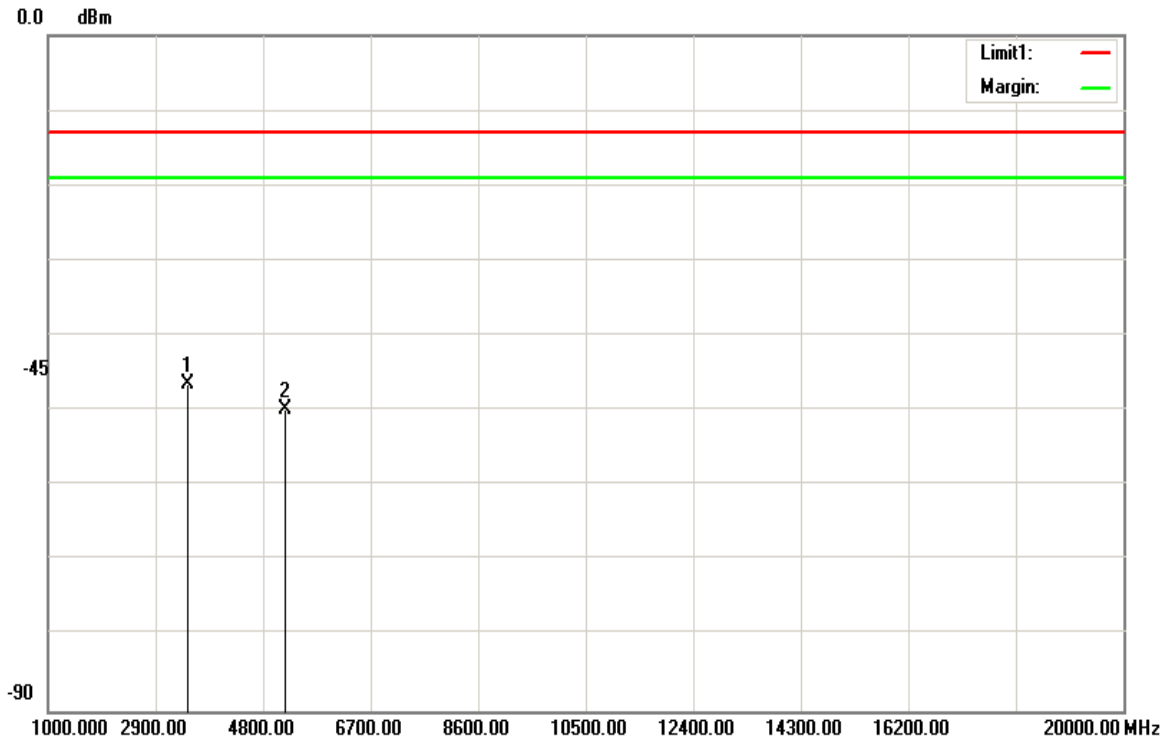
**Operation Mode:** WCDMA 12.2k RMC Band IV / TX/Mid CH **Test Date:** August 14, 2017

**Temperature:** 21°C

**Tested by:** Kevin Kuo

**Humidity:** 52 % RH

**Polarity:** Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3465.000	-58.76	12.41	-46.35	-13.00	-33.35	H
5197.000	-62.49	12.66	-49.83	-13.00	-36.83	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 IV / TX /High CH

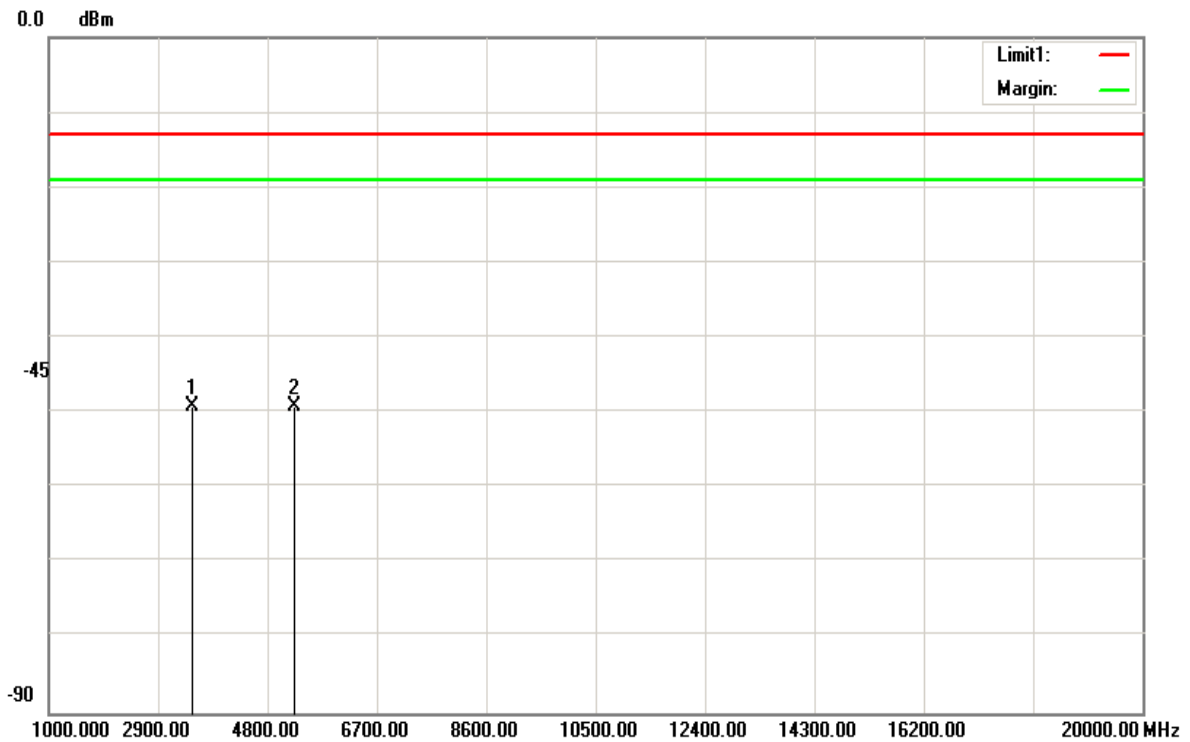
**Test Date:** August 14, 2017

**Temperature:** 21°C

**Tested by:** Kevin Kuo

**Humidity:** 52 % RH

**Polarity:** Ver.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3505.000	-61.59	12.5	-49.09	-13.00	-36.09	V
5257.000	-61.91	12.71	-49.20	-13.00	-36.20	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 IV / TX /High CH

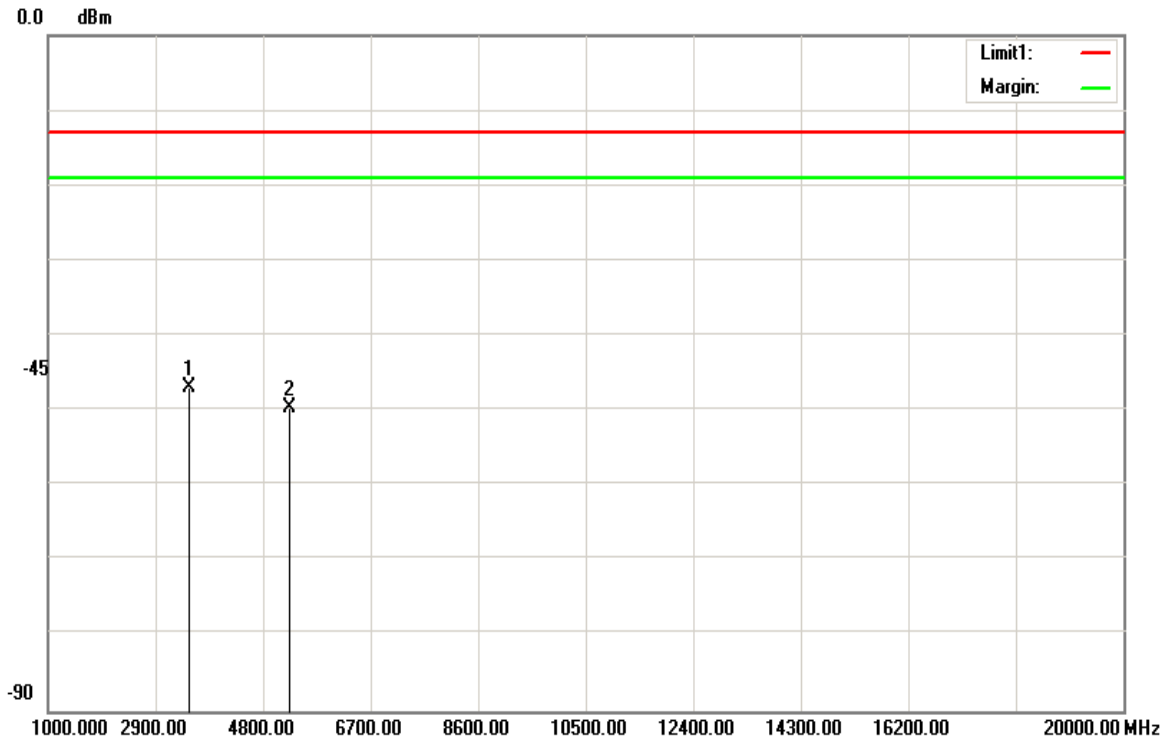
**Test Date:** August 14, 2017

**Temperature:** 21°C

**Tested by:** Kevin Kuo

**Humidity:** 52 % RH

**Polarity:** Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3505.000	-59.48	12.5	-46.98	-13.00	-33.98	H
5257.000	-62.27	12.71	-49.56	-13.00	-36.56	H
N/A						

**Remark:**

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

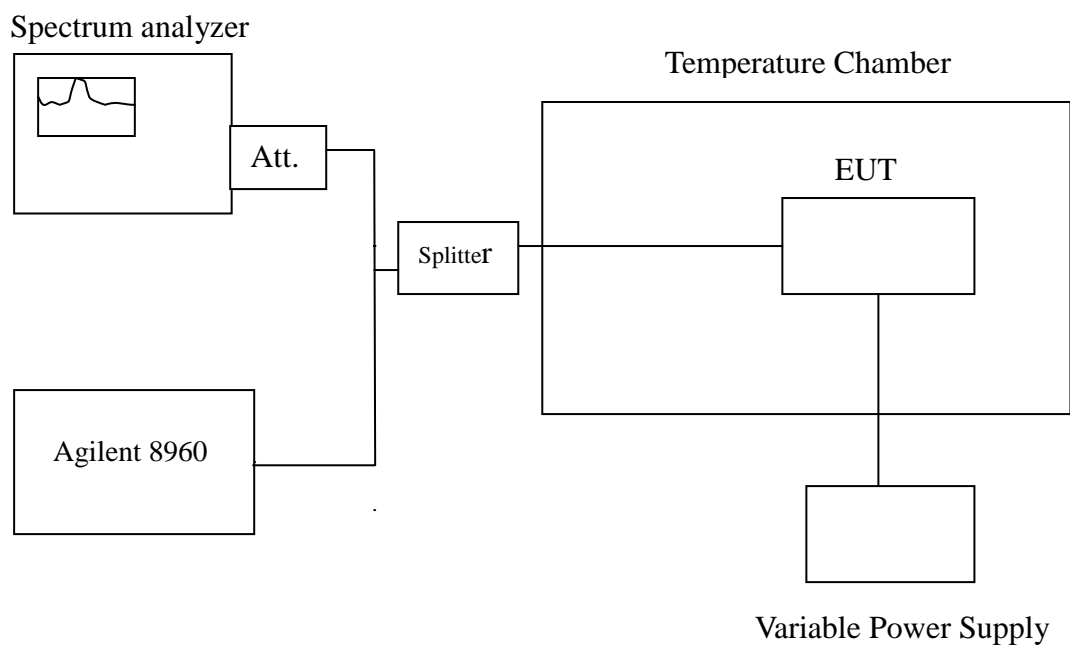
## 7.8 FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT

### LIMIT

According to FCC §2.1055, FCC§27.54.

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

### Test Configuration



**Remark:** Measurement setup for testing on Antenna connector

**TEST PROCEDURE**

The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -30°C. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.

**TEST RESULTS**

*No non-compliance noted.*

Reference Frequency: WCDMA 12.2k RMC Band IV Low Channel 1712.4 MHz				
Limit: 2.5 ppm = 4281 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	BW: 20M Frequency Error(Hz)	Frequency Error (ppm)	Limit (ppm)
12	50	3.00	0.0018	+/- 2.5
12	40	2.00	0.0012	
12	30	4.00	0.0023	
12	20	6.00	0.0035	
12	10	2.00	0.0012	
12	0	8.00	0.0047	
12	-10	6.00	0.0035	
12	-20	5.00	0.0029	

Reference Frequency: WCDMA 12.2k RMC Band IV Mid Channel 1732.6 MHz				
Limit: 2.5 ppm = 4331.5 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	BW: 20M Frequency Error(Hz)	Frequency Error (ppm)	Limit (ppm)
12	50	4.00	0.0023	+/- 2.5
12	40	4.00	0.0023	
12	30	5.00	0.0029	
12	20	5.00	0.0029	
12	10	4.00	0.0023	
12	0	2.00	0.0012	
12	-10	1.00	0.0006	
12	-20	5.00	0.0029	

Reference Frequency: WCDMA 12.2k RMC Band IV High Channel 1752.6 MHz				
Limit: 2.5 ppm = 4381.5 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	BW: 20M Frequency Error(Hz)	Frequency Error (ppm)	Limit (ppm)
12	50	-16.00	-0.0091	+/- 2.5
12	40	-10.00	-0.0057	
12	30	-12.00	-0.0068	
12	20	-13.00	-0.0074	
12	10	-12.00	-0.0068	
12	0	-10.00	-0.0057	
12	-10	-14.00	-0.0080	
12	-20	-12.00	-0.0068	

## 7.9 FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT

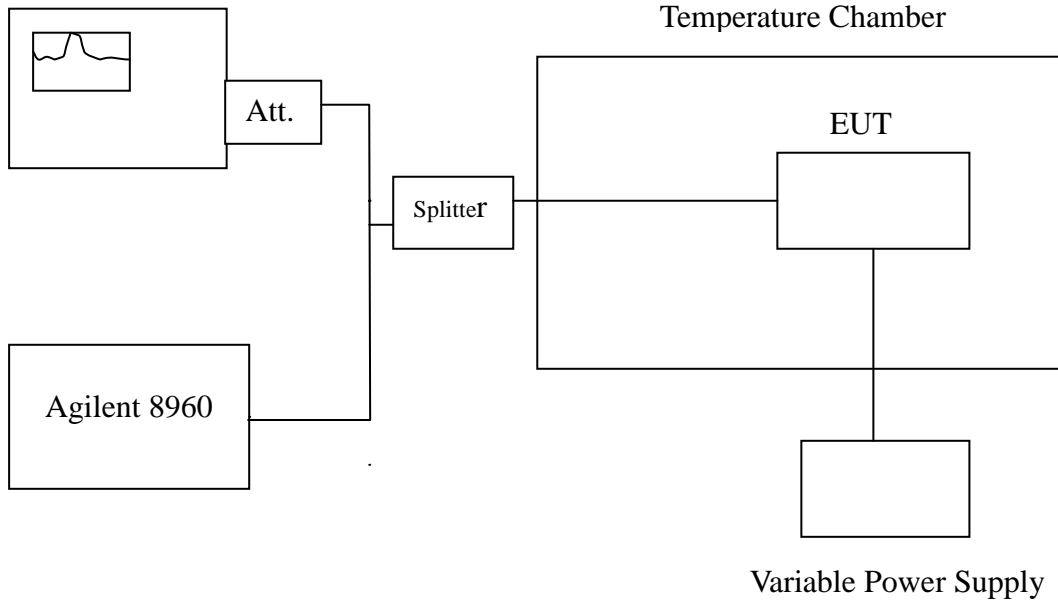
### LIMIT

According to FCC §2.1055, FCC§27.54.

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

### Test Configuration

Spectrum analyzer



**Remark:** Measurement setup for testing on Antenna connector.

## TEST PROCEDURE

Set chamber temperature to 20°C. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.

Reduce the input voltage to specify extreme voltage variation ( $\pm 15\%$ ) and endpoint, record the maximum frequency change.

## TEST RESULTS

*No non-compliance noted.*

Reference Frequency: WCDMA 12.2k RMC Band IV Low Channel 1712.4 MHz				
Limit: 2.5 ppm = 4281Hz				
Power Supply (Vdc)	Environment Temperature (°C)	BW: 20M Frequency Error(Hz)	Frequency Error (ppm)	Limit (ppm)
10.2	20	6.00	0.0035	+/- 2.5
12		6.00	0.0035	
13.8		5.00	0.0029	

Reference Frequency: WCDMA 12.2k RMC Band IV Mid Channel 1732.6 MHz				
Limit: 2.5 ppm = 4331.5Hz				
Power Supply (Vdc)	Environment Temperature (°C)	BW: 20M Frequency Error(Hz)	Frequency Error (ppm)	Limit (ppm)
10.2	20	4.00	0.0023	+/- 2.5
12		5.00	0.0029	
13.8		4.00	0.0023	

Reference Frequency: WCDMA 12.2k RMC Band IV High Channel 1752.6 MHz				
Limit: 2.5 ppm = 4381.5Hz				
Power Supply (Vdc)	Environment Temperature (°C)	BW: 20M Frequency Error(Hz)	Frequency Error (ppm)	Limit (ppm)
10.2	20	-12.00	-0.0068	+/- 2.5
12		-13.00	-0.0074	
13.8		-13.00	-0.0074	