

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

TEST REPORT

For

Computer

**FCC Model: AIM8Q, AIM8Qxxxxxxxxxxxxxxxxx,
AIM-x5BTxxxxxxxxxxxxx(where "x" may be any alphanumeric character,
"-" or blank for marketing purpose and no impact safety related critical
components and constructions)**

IC Model: AIM8Q, AIM-25BT, AIM-35BT, AIM-55BT, AIM-65BT, AIM-75BT

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

Issued Date: June 9, 2017



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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	June 9, 2017	Initial Issue	ALL	Angel Cheng
01	July 10, 2017	1. Modify setup photos	P.43	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: AIM8Q, AIM8Qxxxxxxxxxxxxxxxxxx,
 AIM-x5BTxxxxxxxxxxxxx(where "x" may be any alphanumeric
 character, "-" or blank for marketing purpose and no impact
 safety related critical components and constructions)

IC Model: AIM8Q, AIM-25BT, AIM-35BT, AIM-55BT, AIM-65BT, AIM-75BT

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:



Sam Chuang
 Manager
 Compliance Certification Services Inc.

Tested by:



Timmy Wang
 Engineer
 Compliance Certification Services Inc.

2 EUT DESCRIPTION

Product	Computer
FCC Model No.	AIM8Q, AIM8Qxxxxxxxxxxxxxxxx, AIM-x5BTxxxxxxxxxxxx(wher "x" may be any alphanumeric character, "-" or blank for marketing purpose and no impact safety related critical components and constructions)
IC Model No.	AIM8Q, AIM-25BT, AIM-35BT, AIM-55BT, AIM-65BT, AIM-75BT
Model Discrepancy	All models are electrically identical, different model names are for marketing purpose
Trade Name	ADVANTECH
Received Date	April 6, 2017
Power Supply	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, 4900mAh, 18.62Wh
Frequency Range	WCDMA / HSDPA / HSUPA Band IV: 1712.4-1752.6 MHz
Transmit Power (ERP & EIRP Power)	WCDMA 12.2k RMC Band IV: 24.69 dBm
Antenna Gain	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 (model: AIM8Q) 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	
Test Condition	Band edge, Emission for Unwanted and Fundamental
Voltage/Hz	120V/60Hz
Test Mode	Mode 1:EUT power by AC adapter via power cable. Mode 2:EUT power by Battery.
Worst Mode	<input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4
Position	<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	
Test Condition	Radiated Emission Below 1G
Voltage/Hz	120V/60Hz
Test Mode	Mode 1:EUT power by AC adapter via power cable. Mode 2:EUT power by Battery.
Worst Mode	<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	05/02/2017	05/01/2018
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, Chungsen 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	
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	23.2	0.20893
		1413/1638	1732.6	23.0	0.19953
		1513/1738	1752.6	22.9	0.19498

HSDPA

Band IV

Band	Mode	UL/DL Channel No.	Frequency(MHz)	Average power(dBm)	Output Power (W)
HSDPA IV	1	1312/1537	1712.4	22.1	0.16218
		1413/1638	1732.6	22.0	0.15849
		1513/1738	1752.6	22.0	0.15849
	2	1312/1537	1712.4	21.6	0.14454
		1413/1638	1732.6	21.5	0.14125
		1513/1738	1752.6	21.5	0.14125
	3	1312/1537	1712.4	21.1	0.12882
		1413/1638	1732.6	21.0	0.12589
		1513/1738	1752.6	21.0	0.12589
	4	1312/1537	1712.4	21.1	0.12882
		1413/1638	1732.6	21.0	0.12589
		1513/1738	1752.6	21.0	0.12589

HSUPA

Band IV

Band	Mode	UL/DL Channel No.	Frequency(MHz)	Average power(dBm)	Output Power (W)
HSUPA IV	1	1312/1537	1712.4	22.1	0.16218
		1413/1638	1732.6	22.0	0.15849
		1513/1738	1752.6	22.0	0.15849
	2	1312/1537	1712.4	20.1	0.10233
		1413/1638	1732.6	20.0	0.10000
		1513/1738	1752.6	20.0	0.10000
	3	1312/1537	1712.4	21.1	0.12882
		1413/1638	1732.6	21.0	0.12589
		1513/1738	1752.6	21.0	0.12589
	4	1312/1537	1712.4	20.1	0.10233
		1413/1638	1732.6	20.0	0.10000
		1513/1738	1752.6	20.0	0.10000
	5	1312/1537	1712.4	22.1	0.16218
		1413/1638	1732.6	22.0	0.15849
		1513/1738	1752.6	22.0	0.15849

7.2 ERP & EIRP MEASUREMENT

LIMIT

FCC Part 27.50(d)(4)

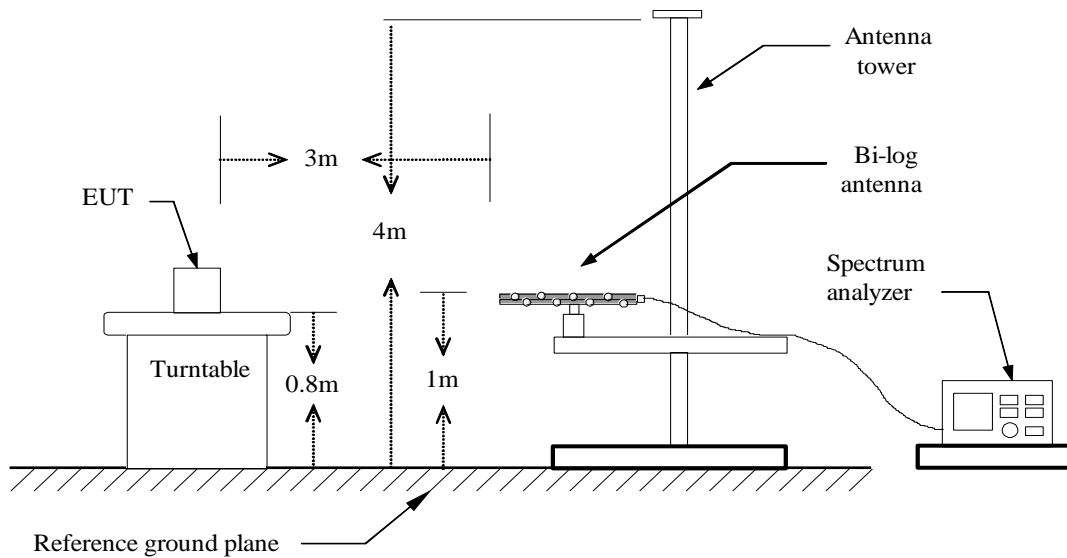
Fixed, mobile, and portable (handheld) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

RSS-139 section 6.5

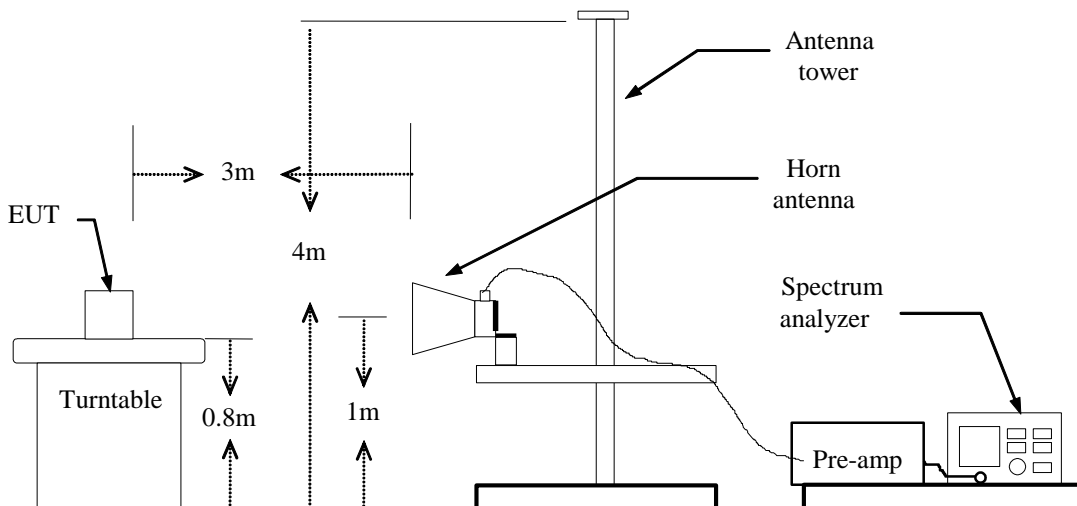
The equivalent isotropically radiated power (e.i.r.p.) for mobile and portable transmitters shall not exceed one watt. The e.i.r.p. for fixed and base stations in the band 1710-1780 MHz shall not exceed 1 watt..

Test Configuration

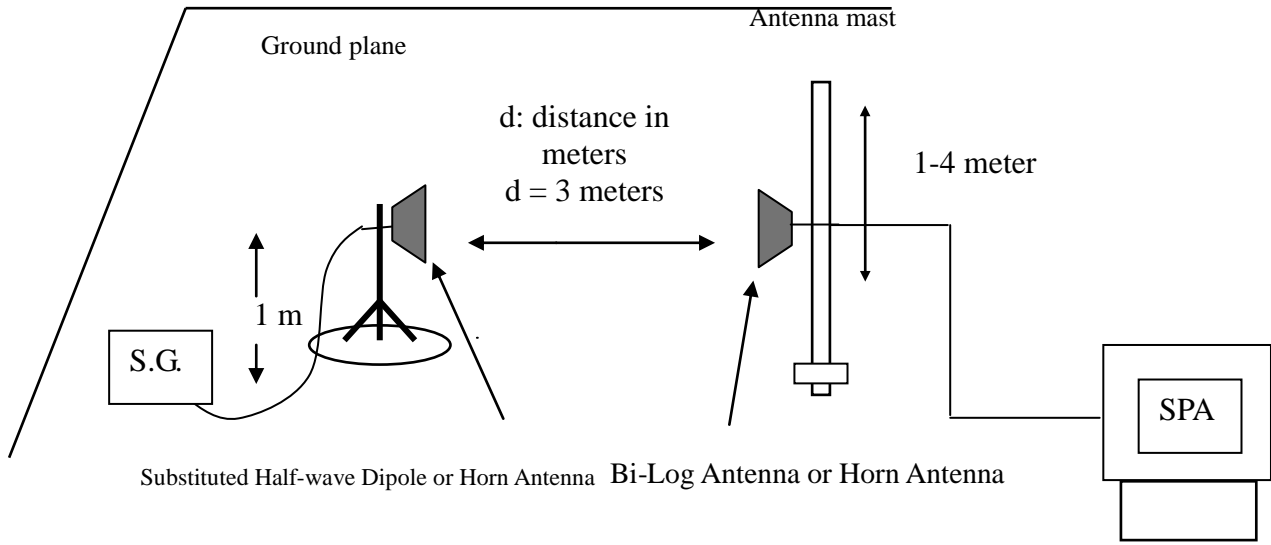
Below 1 GHz



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	23.36	0.216	24.69	0.294
	Middle	22.82	0.191	24.64	0.291
	Highest	22.68	0.185	24.35	0.272

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

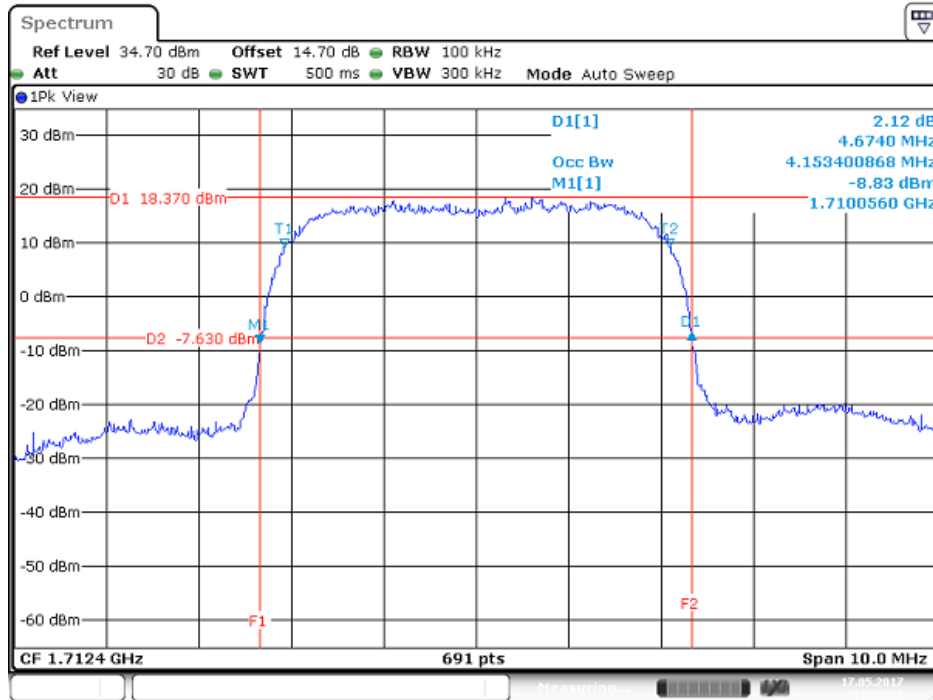
Test Data

Test Mode	CH	Frequency (MHz)	99% Bandwidth (MHz)	26 dB Bandwidth (MHz)
WCDMA 12.2k RMC (Band IV)	Lowest	1712.4	4.1534	4.6740
	Middle	1732.6	4.1534	4.6740
	Highest	1752.6	4.1534	4.6600

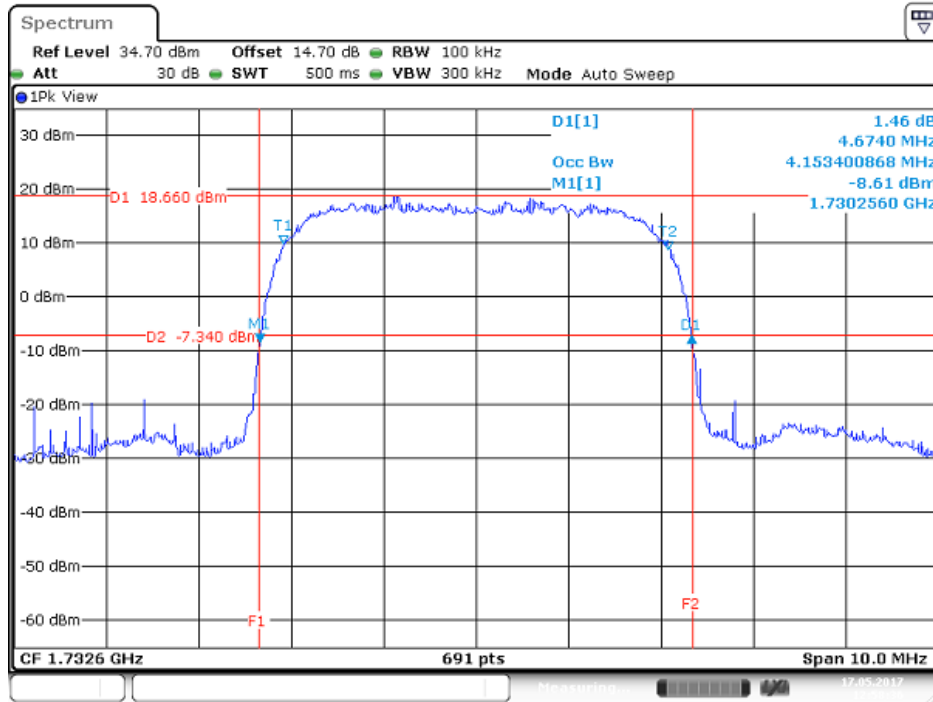
Test Plot

WCDMA 12.2k RMC (Band IV)

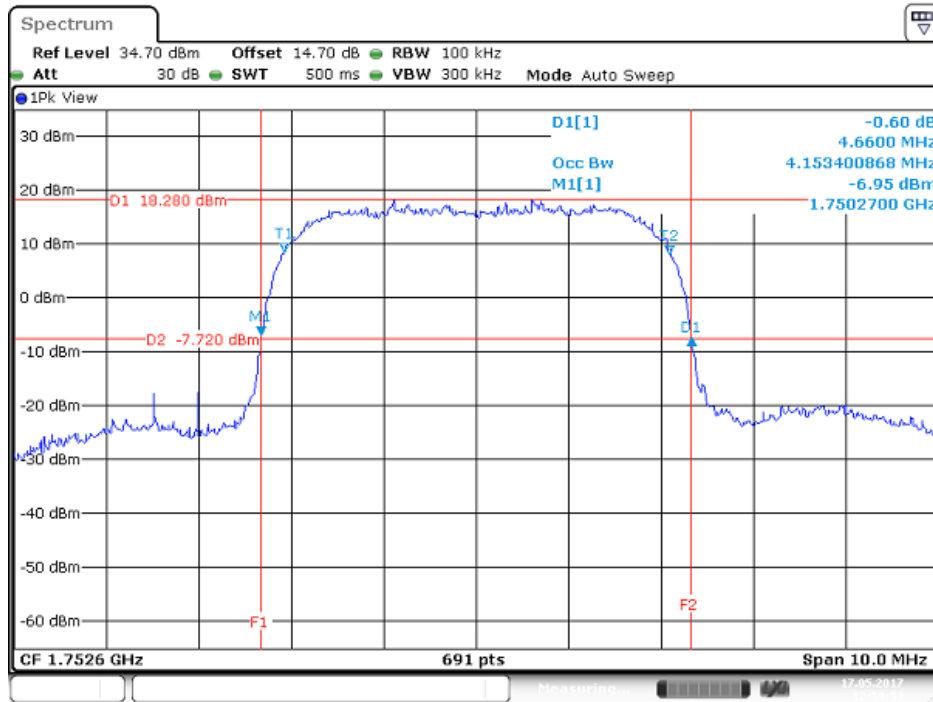
Low CH



Mid CH



High CH



Date: 17 MAY 2017 12:59:53

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.

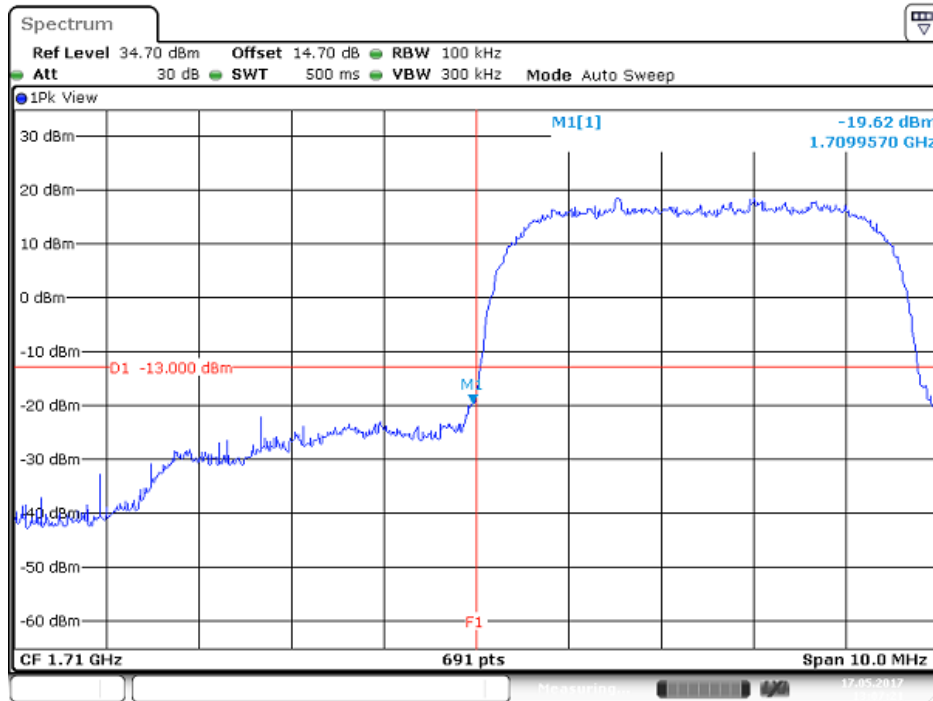
TEST RESULTS

No non-compliance noted.

Test Plot

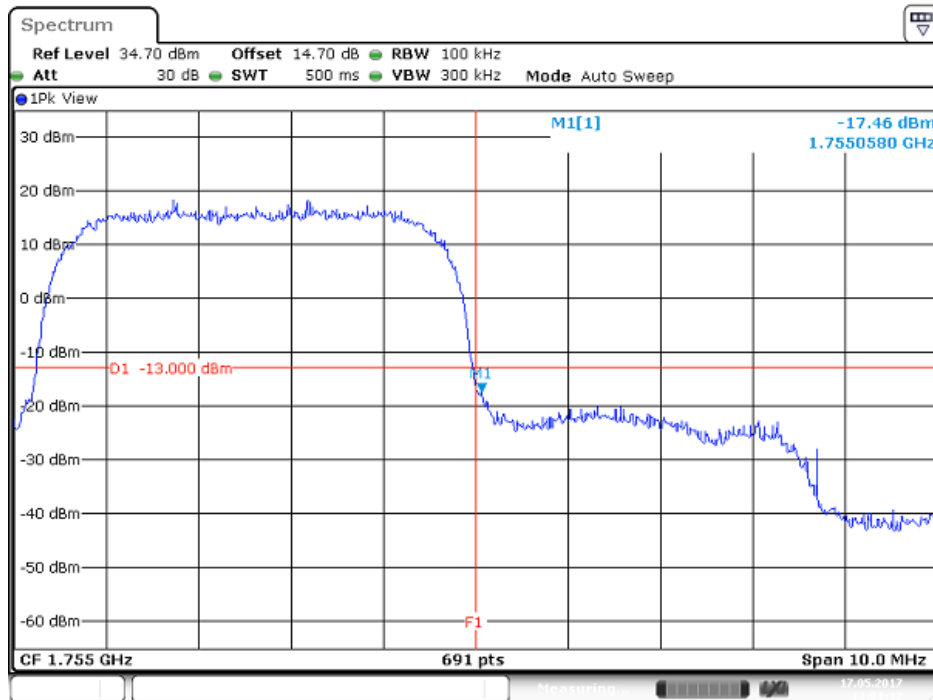
WCDMA 12.2K RMC (BAND IV)

CH Low



Date: 17 MAY 2017 13:07:21

CH High



Date: 17 MAY 2017 13:01:13

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.

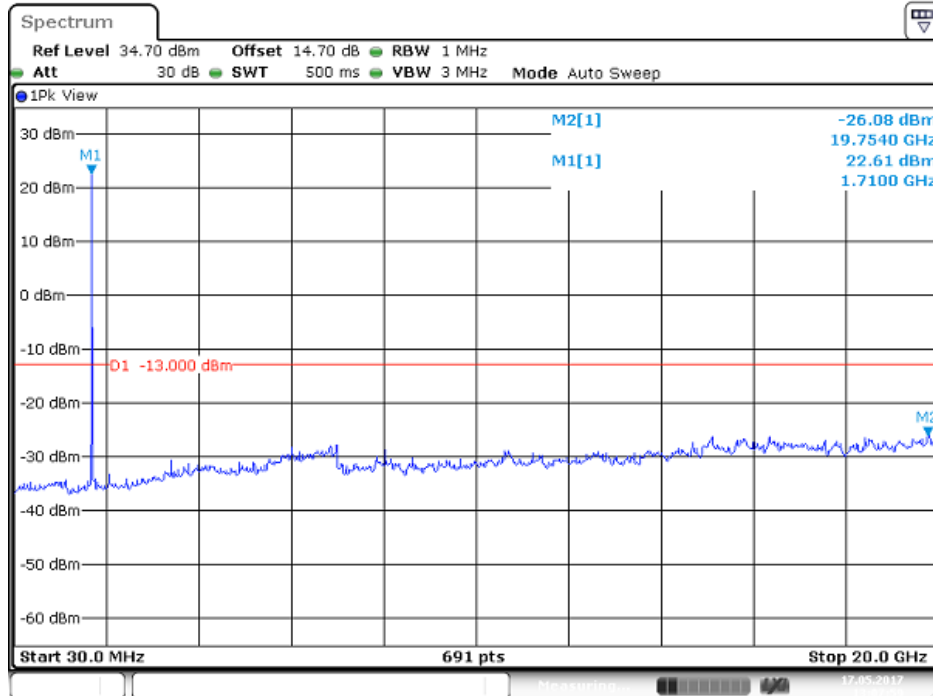
TEST RESULTS

No non-compliance noted.

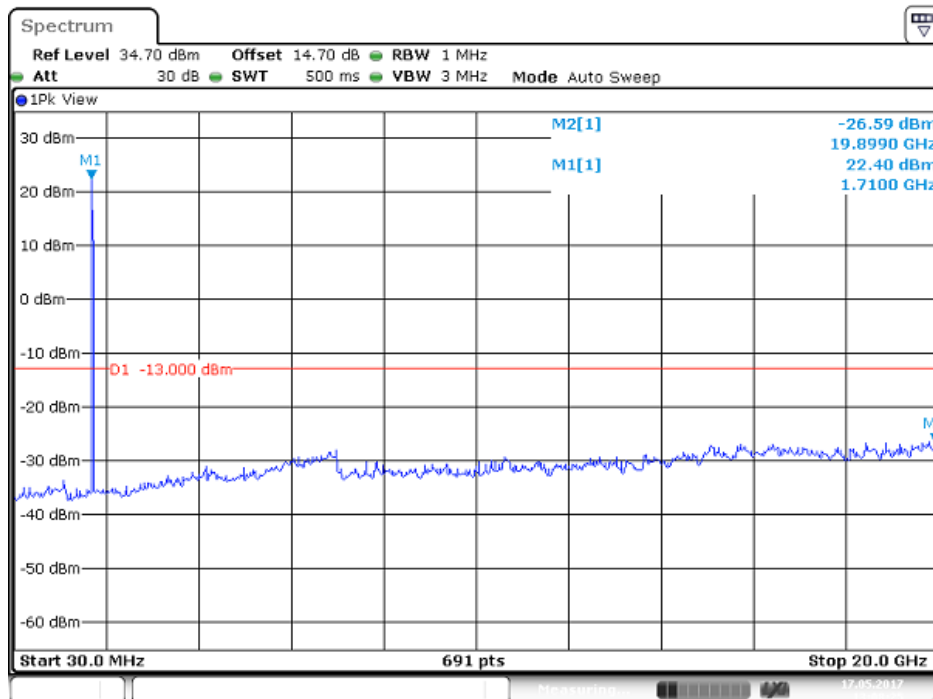
Test Data

WCDMA 12.2K RMC (BAND IV)

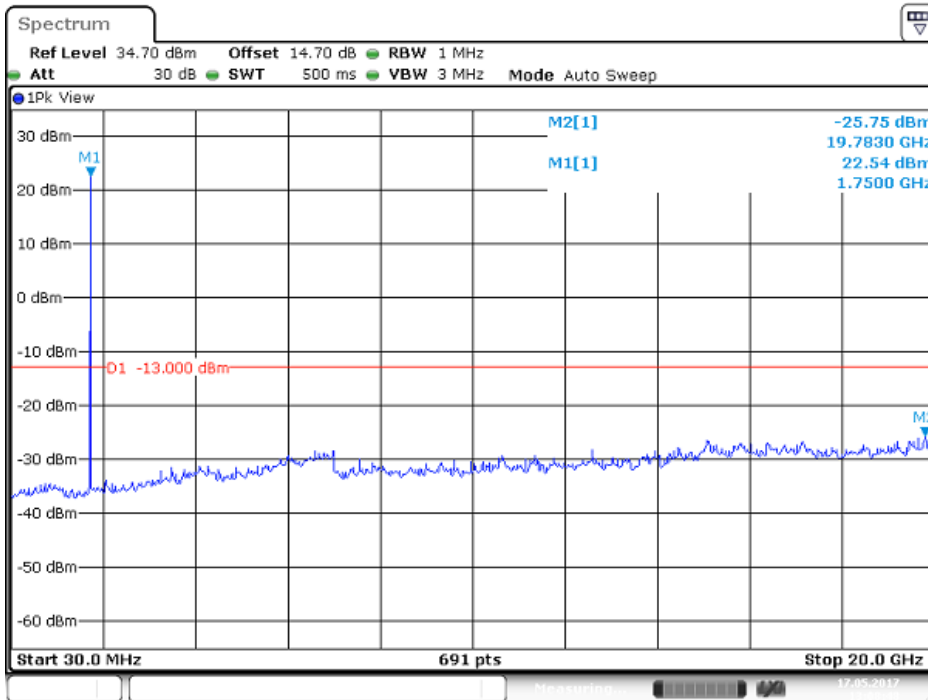
CH Low



CH Mid



CH High



Date: 17 MAY 2017 13:08:48

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.

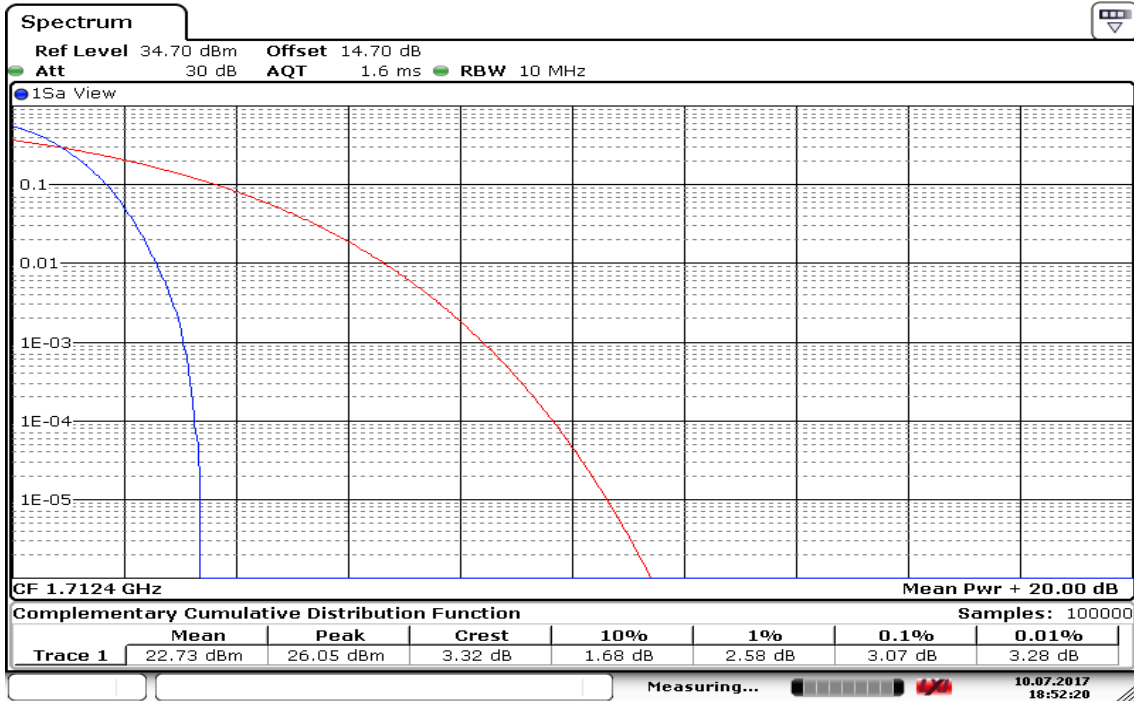
Test Procedures

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

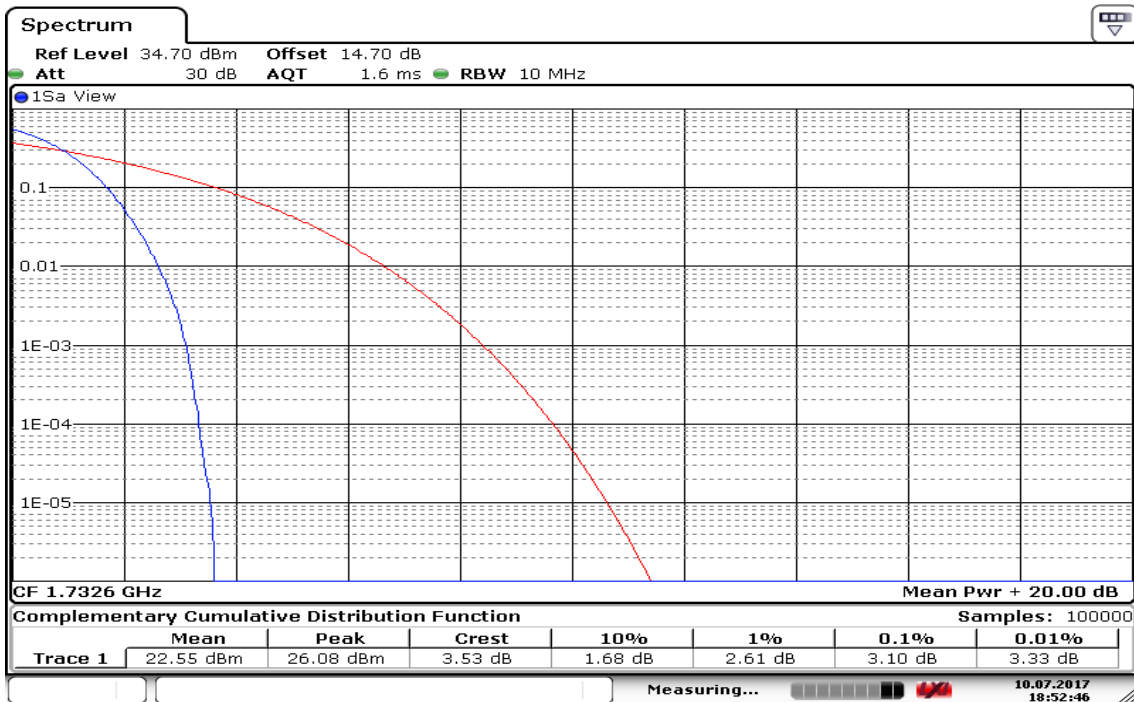
WCDMA 12.2K RMC (BAND IV)

CH Low



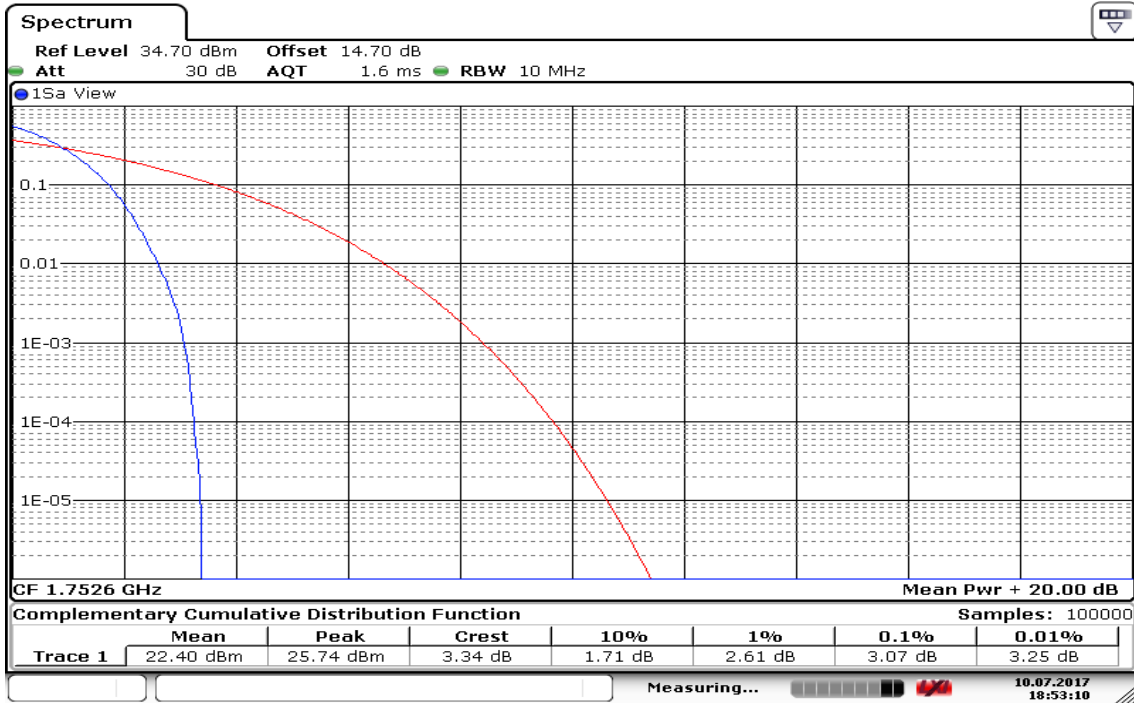
Date: 10.JUL.2017 18:52:20

CH Mid



Date: 10.JUL.2017 18:52:46

CH High



Date: 10.JUL.2017 18:53:10

7.7 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

LIMIT

FCC §27.53 (h)

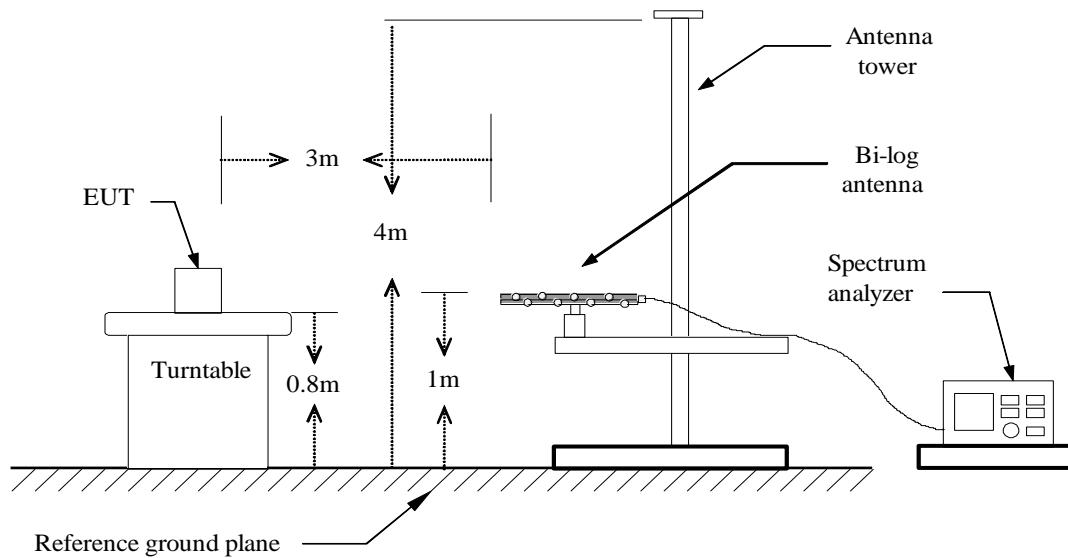
The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10} (P)$ dB.

RSS-139 section 6.6

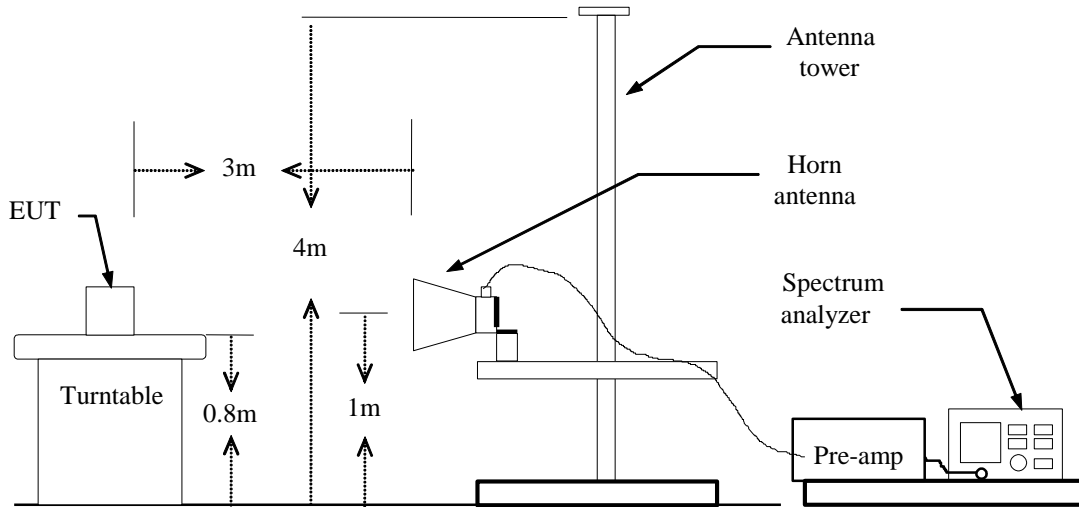
The mean power of emission must be attenuated below the mean power of the non-modulated carrier (P) on any frequency twice or more than twice the fundamental frequency by at least $43 + 10 \log P$ dB.

Test Configuration

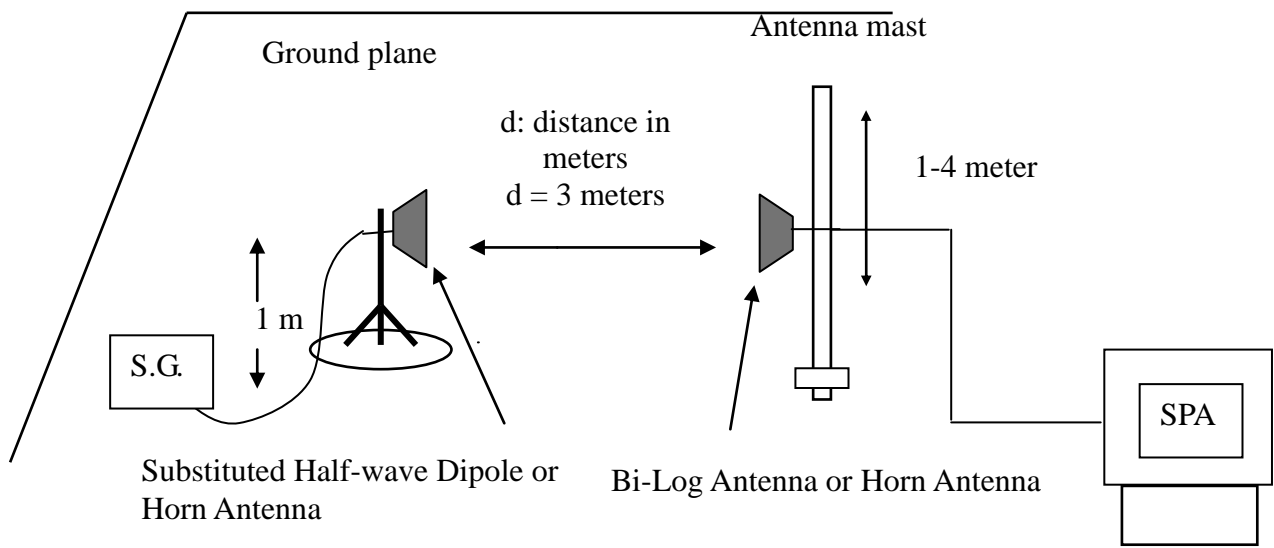
Below 1 GHz



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.

Below 1GHz

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

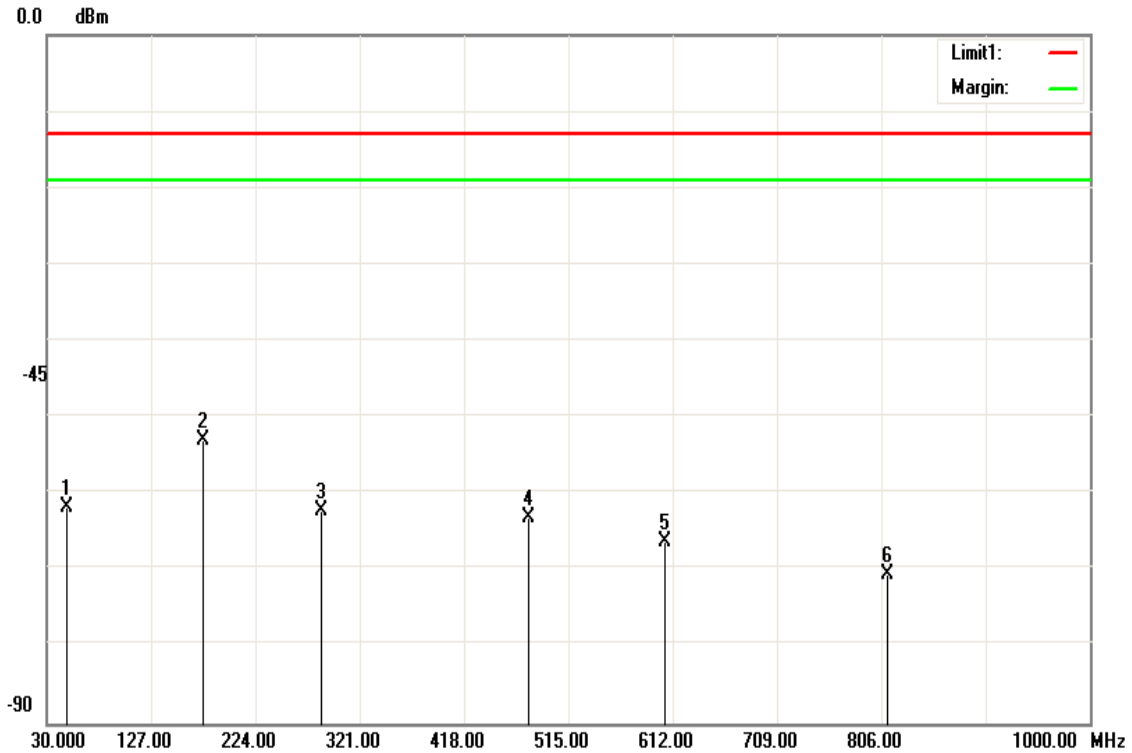
Test Date: May 19, 2017

Temperature: 22 °C

Tested by: Timmy Wang

Humidity: 45 % RH

Polarity: Ver.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
48.4300	-58.7	-2.98	-61.68	-13.00	-48.68	V
175.5000	-56.05	3.04	-53.01	-13.00	-40.01	V
285.1100	-69.34	7.05	-62.29	-13.00	-49.29	V
478.1400	-70.13	6.91	-63.22	-13.00	-50.22	V
605.2100	-64.88	-1.28	-66.16	-13.00	-53.16	V
811.8200	-71.72	1.26	-70.46	-13.00	-57.46	V

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

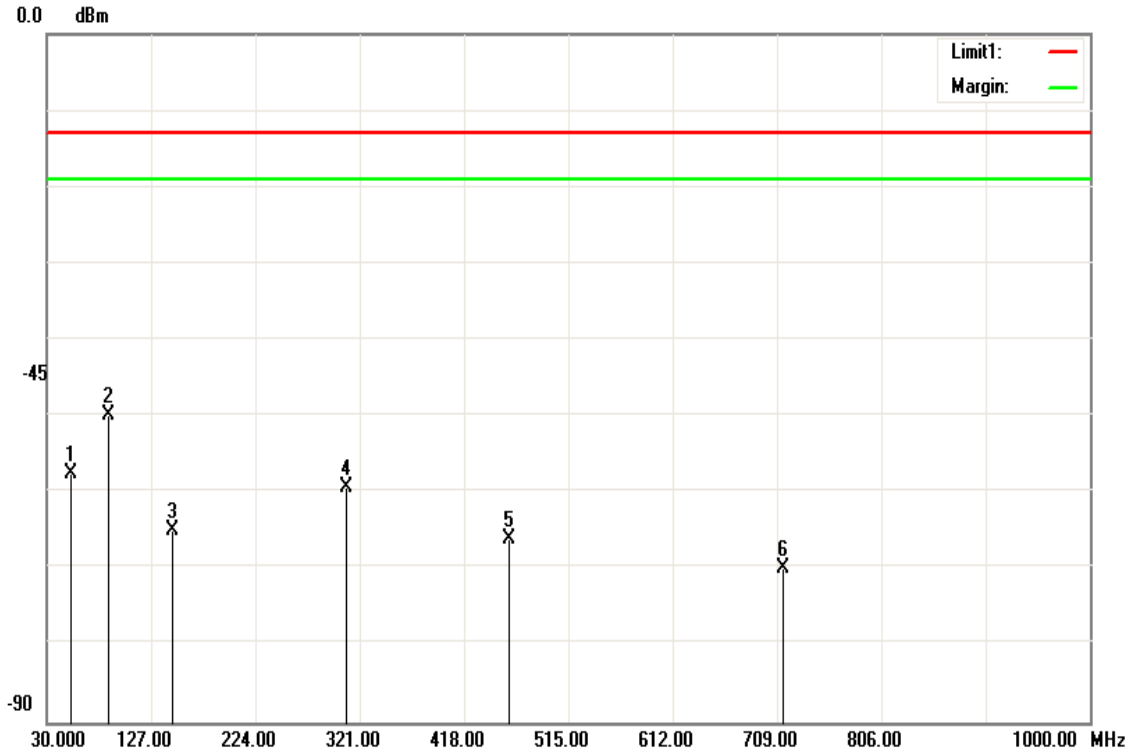
Test Date: May 19, 2017

Temperature: 22 °C

Tested by: Timmy Wang

Humidity: 45 % RH

Polarity: Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
52.3100	-55.44	-2.07	-57.51	-13.00	-44.51	H
87.2300	-50.21	0.36	-49.85	-13.00	-36.85	H
146.4000	-65.5	0.62	-64.88	-13.00	-51.88	H
308.3900	-66.28	6.93	-59.35	-13.00	-46.35	H
459.7100	-73.06	7	-66.06	-13.00	-53.06	H
714.8200	-71.83	1.94	-69.89	-13.00	-56.89	H

Above 1GHz

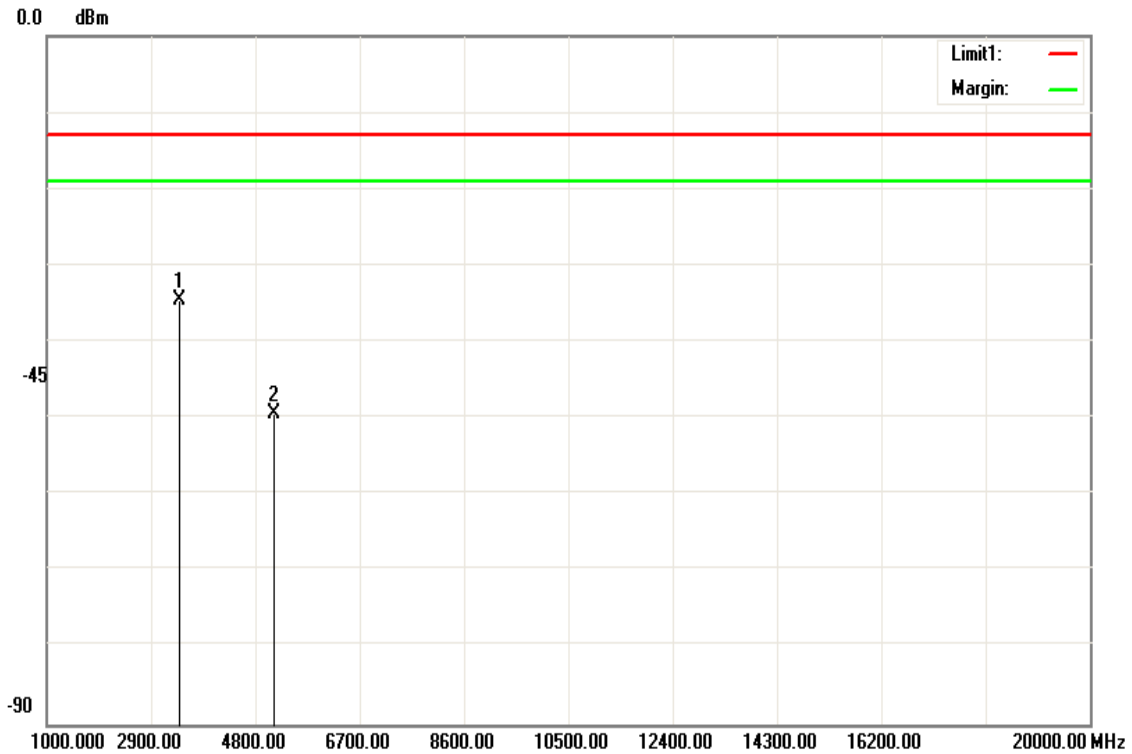
Operation Mode: WCDMA 12.2k RMC Band IV / TX /Low CH **Test Date:** May 22, 2017

Temperature: 23°C

Tested by: Timmy Wang

Humidity: 51 % RH

Polarity: Ver.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3422.000	-46.94	12.3	-34.64	-13.00	-21.64	V
5137.000	-61.89	12.61	-49.28	-13.00	-36.28	V
N/A						

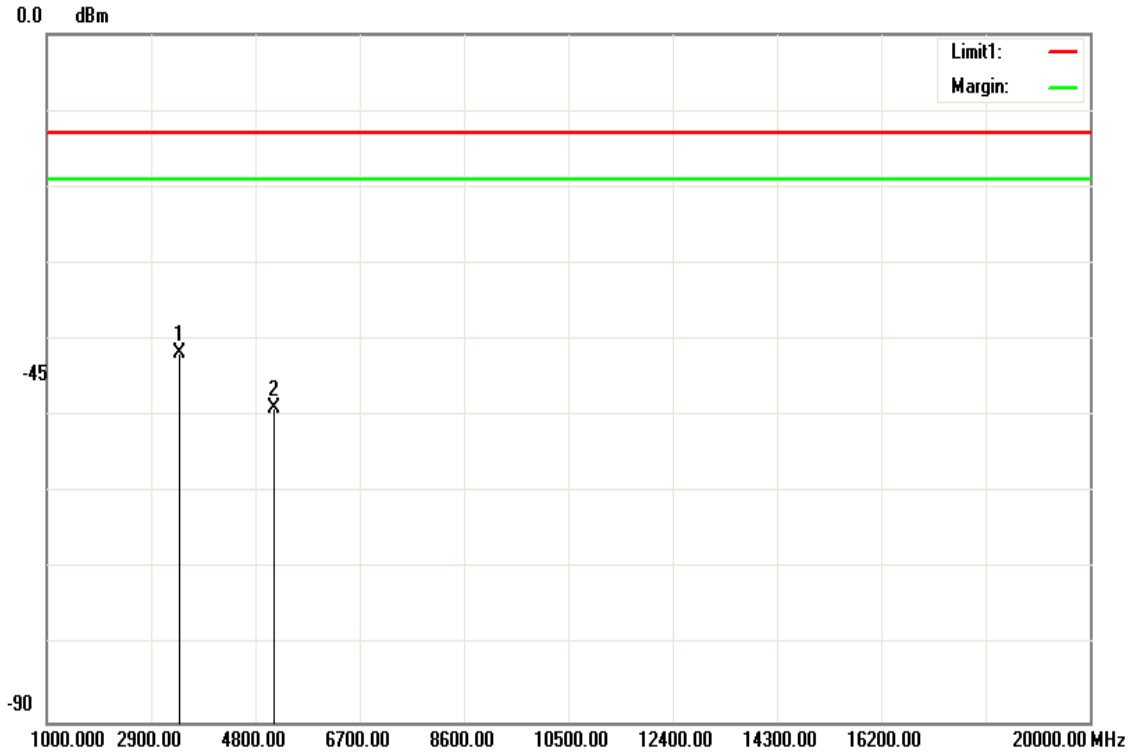
Remark:

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:** May 22, 2017

Temperature: 23°C **Tested by:** Timmy Wang

Humidity: 51 % RH **Polarity:** Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3429.000	-54.08	12.32	-41.76	-13.00	-28.76	H
5137.000	-61.52	12.61	-48.91	-13.00	-35.91	H
N/A						

Remark:

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

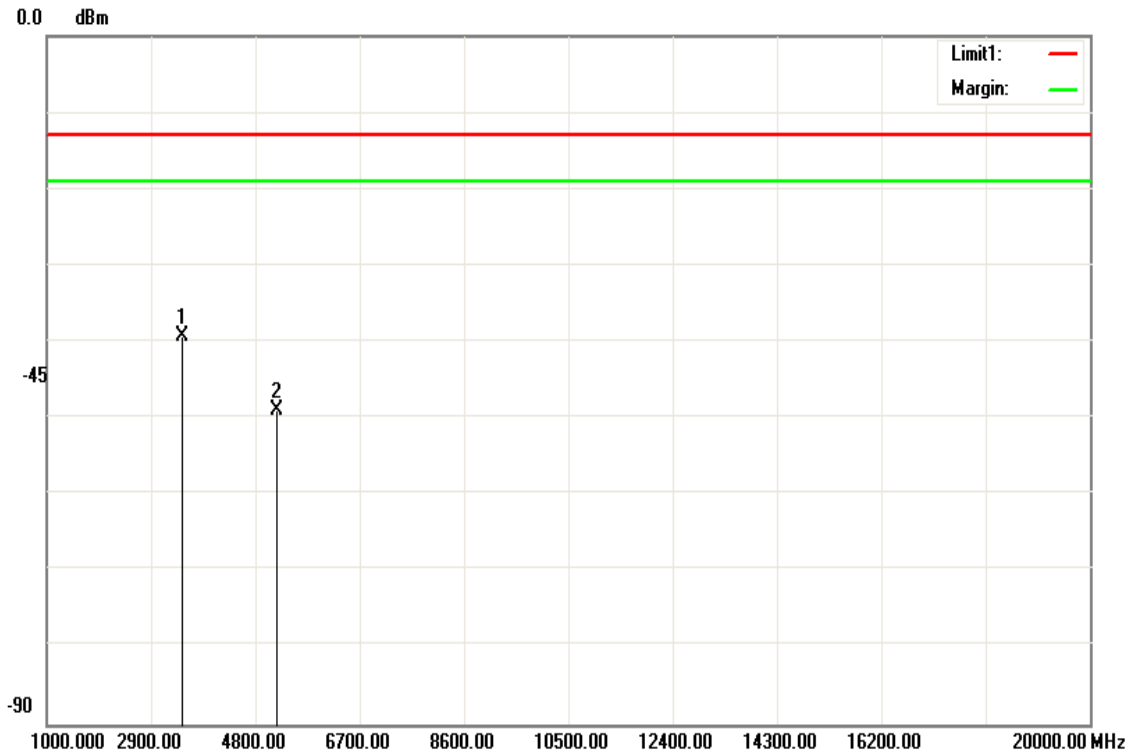
Operation Mode: WCDMA 12.2k RMC Band IV / TX/Mid CH **Test Date:** May 22, 2017

Temperature: 23°C

Tested by: Timmy Wang

Humidity: 51 % RH

Polarity: Ver.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3464.000	-51.72	12.41	-39.31	-13.00	-26.31	V
5197.000	-61.67	12.66	-49.01	-13.00	-36.01	V
N/A						

Remark:

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

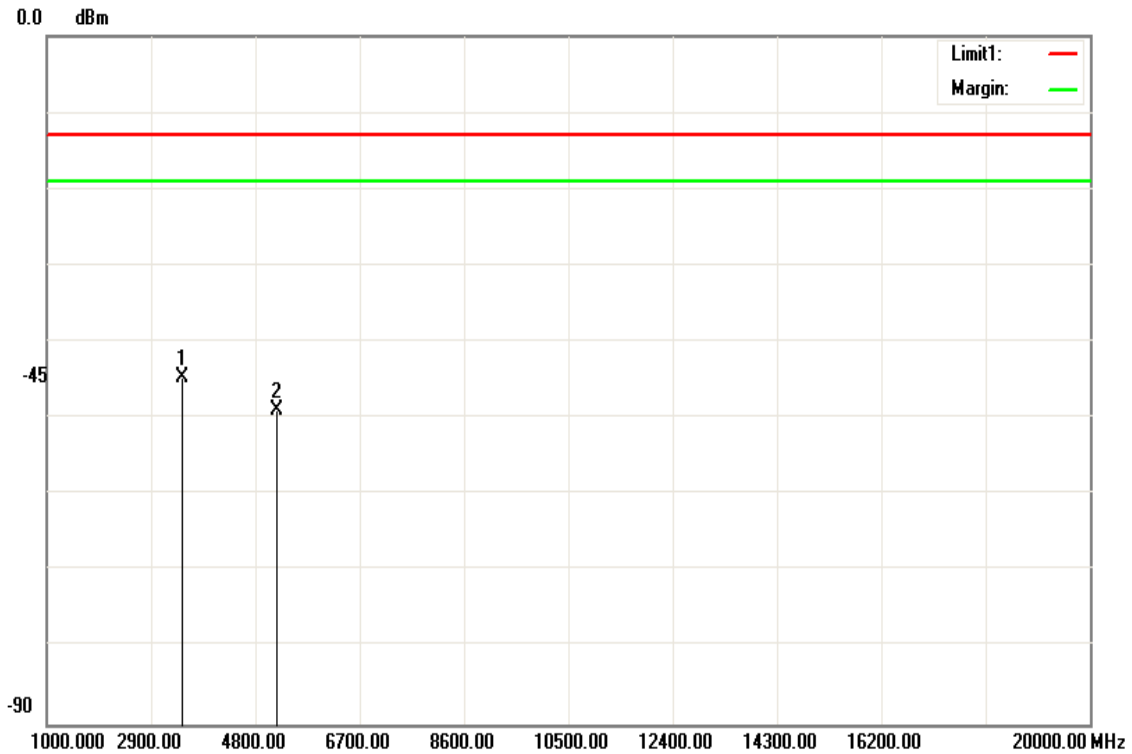
Operation Mode: WCDMA 12.2k RMC Band IV / TX/Mid CH **Test Date:** May 22, 2017

Temperature: 23°C

Tested by: Timmy Wang

Humidity: 51 % RH

Polarity: Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3464.000	-56.97	12.41	-44.56	-13.00	-31.56	H
5197.000	-61.66	12.66	-49.00	-13.00	-36.00	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

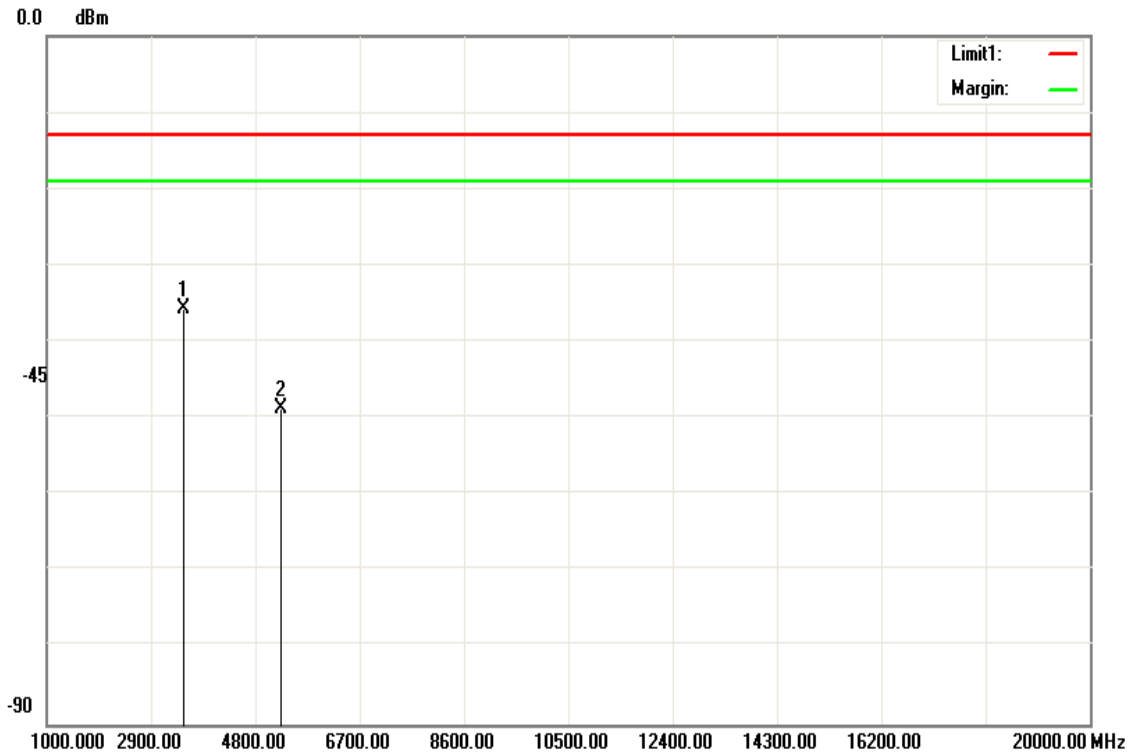
Test Date: May 22, 2017

Temperature: 23°C

Tested by: Timmy Wang

Humidity: 51 % RH

Polarity: Ver.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3506.000	-48.06	12.5	-35.56	-13.00	-22.56	V
5256.000	-61.46	12.7	-48.76	-13.00	-35.76	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

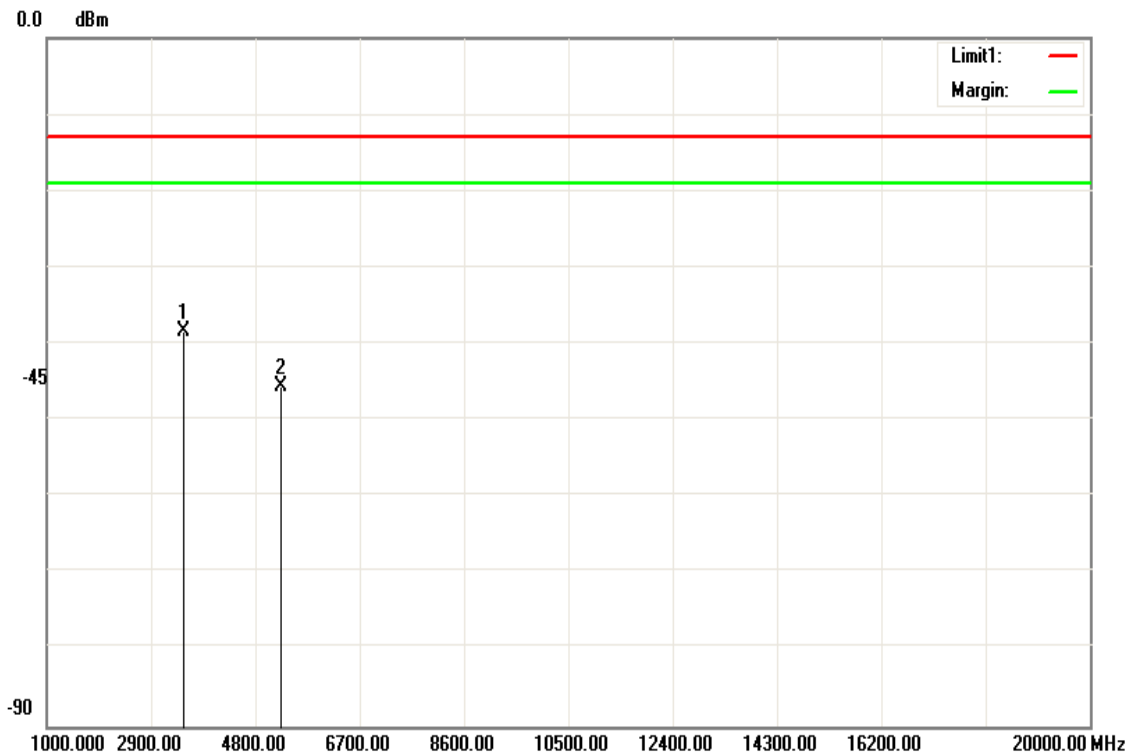
Test Date: May 22, 2017

Temperature: 23°C

Tested by: Timmy Wang

Humidity: 51 % RH

Polarity: Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3506.000	-50.78	12.5	-38.28	-13.00	-25.28	H
5263.000	-58.16	12.71	-45.45	-13.00	-32.45	H
N/A						

Remark:

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

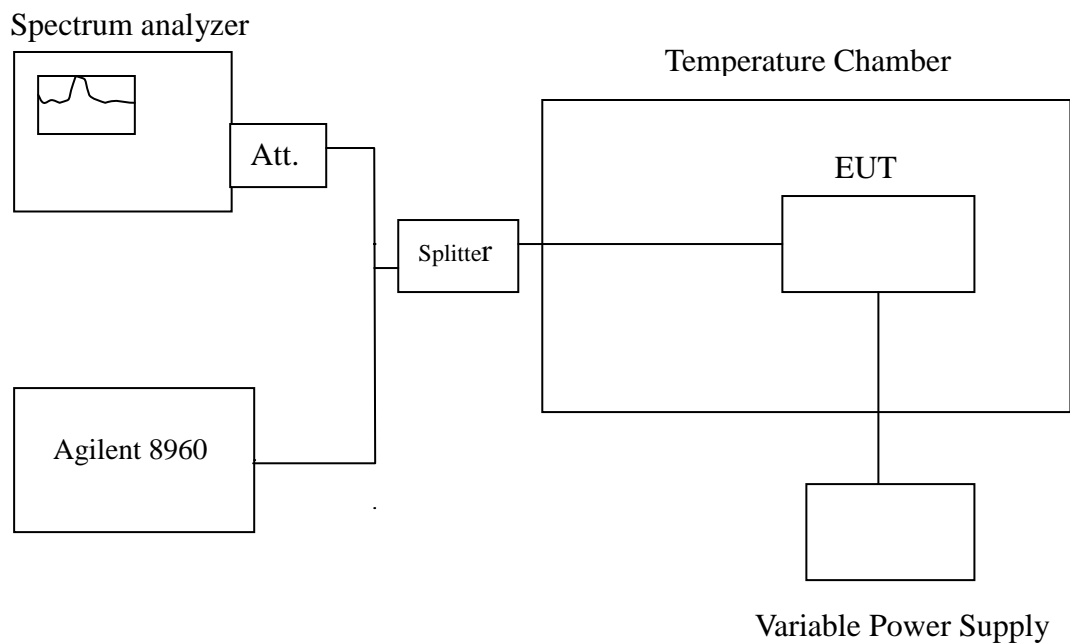
7.8 FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT

LIMIT

According to FCC §2.1055, FCC§27.54 and RSS-139 (6.4).

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 (Vac)	Environment Temperature (°C)	BW: 20M Frequency Error(Hz)	Frequency Error (ppm)	Limit (ppm)
120	50	3.00	0.001752	+/- 2.5
120	40	2.00	0.001168	
120	30	4.00	0.002336	
120	20	6.00	0.003504	
120	10	2.00	0.001168	
120	0	8.00	0.004672	
120	-10	6.00	0.003504	
120	-20	5.00	0.002920	

Reference Frequency: WCDMA 12.2k RMC Band IV Mid Channel 1732.6 MHz				
Limit: ± 2.5 ppm = 4331.5 Hz				
Power Supply (Vac)	Environment Temperature (°C)	BW: 20M Frequency Error(Hz)	Frequency Error (ppm)	Limit (ppm)
120	50	4.00	0.002309	+/- 2.5
120	40	4.00	0.002309	
120	30	5.00	0.002886	
120	20	5.00	0.002886	
120	10	4.00	0.002309	
120	0	2.00	0.001154	
120	-10	1.00	0.000577	
120	-20	5.00	0.002886	

Reference Frequency: WCDMA 12.2k RMC Band IV High Channel 1752.6 MHz				
Limit: ± 2.5 ppm = 4381.5 Hz				
Power Supply (Vac)	Environment Temperature (°C)	BW: 20M Frequency Error(Hz)	Frequency Error (ppm)	Limit (ppm)
120	50	-16.00	-0.009129	+/- 2.5
120	40	-10.00	-0.005706	
120	30	-12.00	-0.006847	
120	20	-13.00	-0.007418	
120	10	-12.00	-0.006847	
120	0	-10.00	-0.005706	
120	-10	-14.00	-0.007988	
120	-20	-12.00	-0.006847	

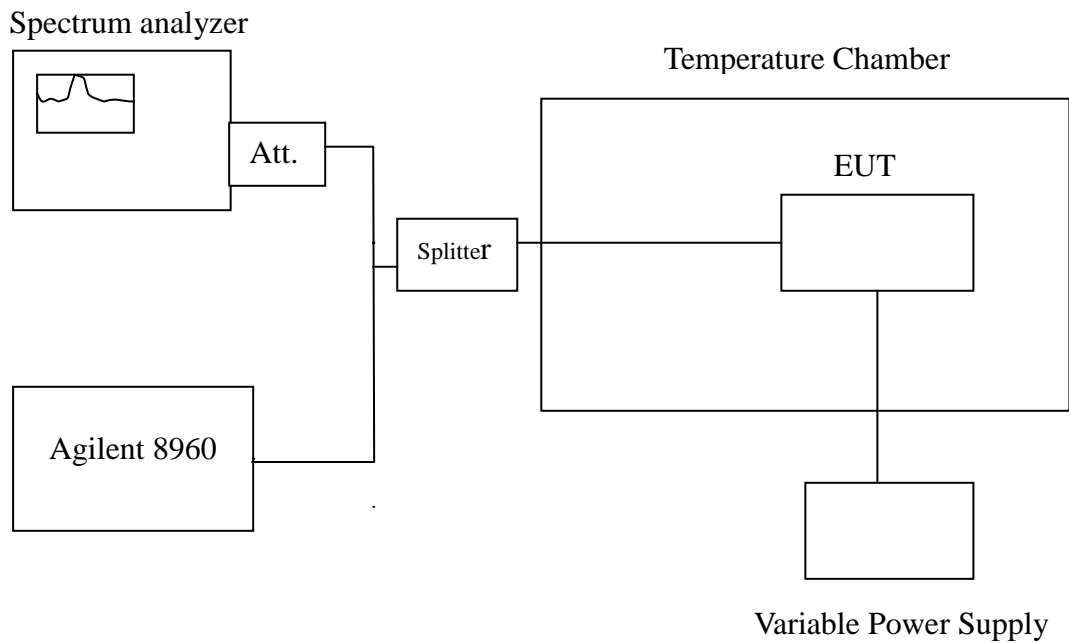
7.9 FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT

LIMIT

According to FCC §2.1055, FCC§27.54 and RSS-139 (6.4).

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

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 (Vac)	Environment Temperature (°C)	BW: 20M Frequency Error(Hz)	Frequency Error (ppm)	Limit (ppm)
102	20	6.00	0.003504	+/- 2.5
120		6.00	0.003504	
138		5.00	0.002920	

Reference Frequency: WCDMA 12.2k RMC Band IV Mid Channel 1732.6 MHz				
Limit: ± 2.5 ppm = 4331.5Hz				
Power Supply (Vac)	Environment Temperature (°C)	BW: 20M Frequency Error(Hz)	Frequency Error (ppm)	Limit (ppm)
102	20	4.00	0.002309	+/- 2.5
120		5.00	0.002886	
138		4.00	0.002309	

Reference Frequency: WCDMA 12.2k RMC Band IV High Channel 1752.6 MHz				
Limit: ± 2.5 ppm = 4381.5Hz				
Power Supply (Vac)	Environment Temperature (°C)	BW: 20M Frequency Error(Hz)	Frequency Error (ppm)	Limit (ppm)
102	20	-12.00	-0.006847	+/- 2.5
120		-13.00	-0.007418	
138		-13.00	-0.007418	