

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

TEST REPORT

For

Zonar Connect

Model: 20081

Trade Name: ZONAR

Issued to

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

Issued by

**Compliance Certification Services Inc.
No.11, Wugong 6th Rd., Wugu Dist.,
New Taipei City 24891, Taiwan. (R.O.C.)
<http://www.ccsrf.com>
service@ccsrf.com
Issued Date: October 28, 2016**



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Revision History

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

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1. TEST RESULT CERTIFICATION

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

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

Equipment Under Test: Zonar Connect

Trade Name: ZONAR

Model Number: 20081

Date of Test: September 13 ~ October 27, 2016

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

We hereby certify that:

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

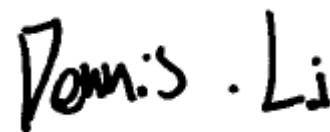
The test results of this report relate only to the tested sample identified in this report.

Approved by:



Sam Chuang
Manager
Compliance Certification Services Inc.

Tested by:



Dennis Li
Engineer
Compliance Certification Services Inc.

2. EUT DESCRIPTION

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

Remark:

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

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

3. TEST METHODOLOGY

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

3.1 EUT CONFIGURATION

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

3.2 DESCRIPTION OF TEST MODES

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

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

3.2.1 The worst mode of measurement

Radiated Emission Measurement	
Test Condition	Band edge, Emission for Unwanted and Fundamental
Voltage/Hz	120V/60Hz
Test Mode	Mode 1: Adapter Mode Mode 2: USB Charge Mode(Link NB)
Worst Mode	☒ Mode 1 ☐ Mode 2
Position	☐ Placed in fixed position. ☒ Placed in fixed position at X-Plane (E2-Plane) ☐ Placed in fixed position at Y-Plane (E1-Plane) ☐ Placed in fixed position at Z-Plane (H-Plane)

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

4. INSTRUMENT CALIBRATION

4.1 MEASURING INSTRUMENT CALIBRATION

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

4.2 MEASUREMENT EQUIPMENT USED

Equipment Used for Emissions Measurement

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

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

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

4.3 MEASUREMENT UNCERTAINTY

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

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

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

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

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

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

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

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

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

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

5.2 EQUIPMENT

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

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

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

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

5.3 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3M Semi Anechoic Chamber (FCC MRA: TW1039) to perform FCC Part 15 measurements	 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 I for the actual connections between EUT and support equipment.

6.2 SUPPORT EQUIPMENT

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

Remark:

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

7. FCC PART 22 & 24 REQUIREMENTS

7.1 AVERAGE POWER

Test Procedures

CONDUCTED POWER MEASUREMENT:

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

No non-compliance noted.

Test Data

WCDMA 12.2K RMC

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

HSDPA

Band II

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

Band V

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

HSUPA

Band II

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

Band V

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

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

7.2 ERP & EIRP MEASUREMENT

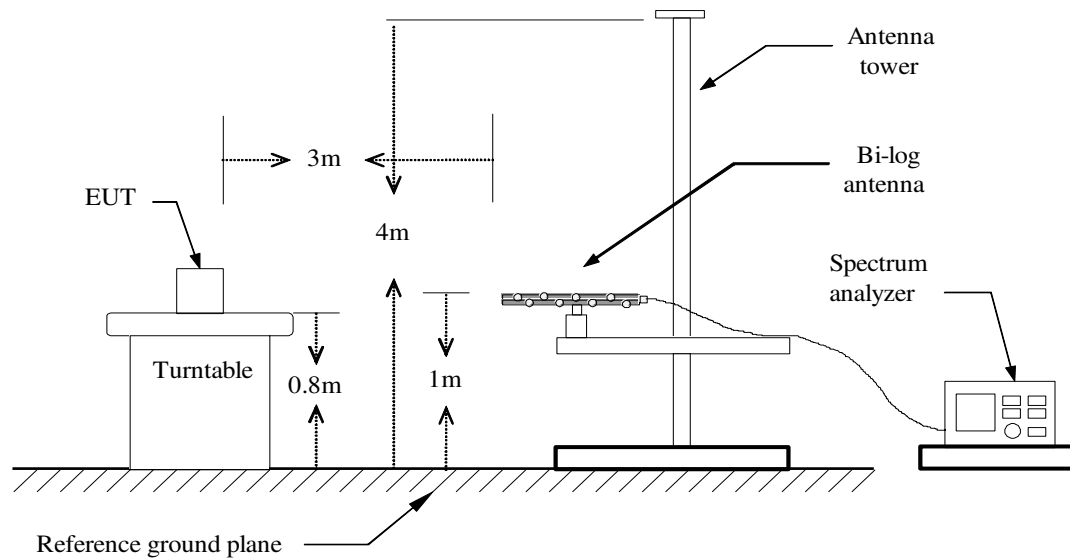
LIMIT

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

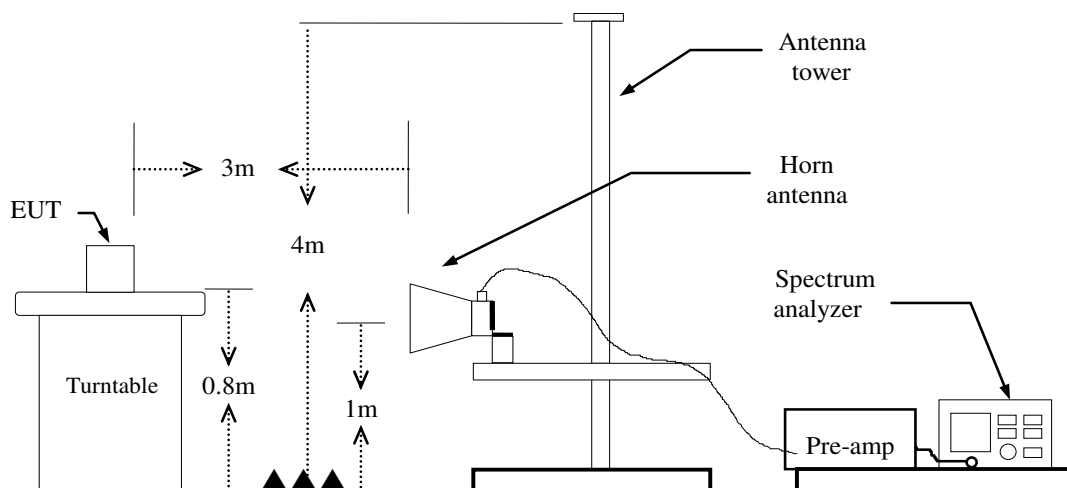
According to FCC 24.232(b): The equivalent Isotropic Radiated Power (EIRP) must not exceed 2 Watts.

Test Configuration

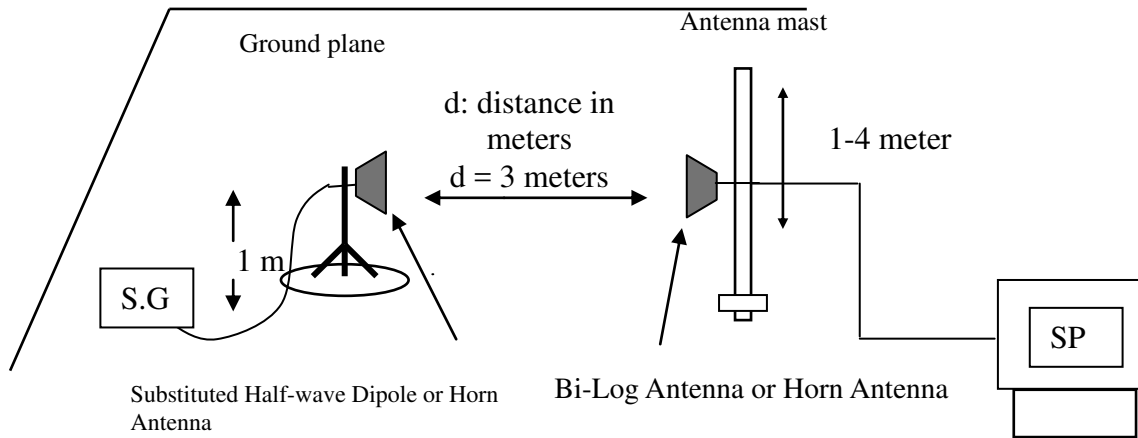
Below 1 GHz



Above 1 GHz



For Substituted Method Test Set-UP



TEST PROCEDURE

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

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

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

TEST RESULTS

No non-compliance noted.

WCDMA 12.2K RMC

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

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

7.3 OCCUPIED BANDWIDTH MEASUREMENT

Limits

For Reporting purpose only.

TEST PROCEDURES

KDB 971168 v02r02 - Section 4.2

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

TEST RESULTS

No non-compliance noted

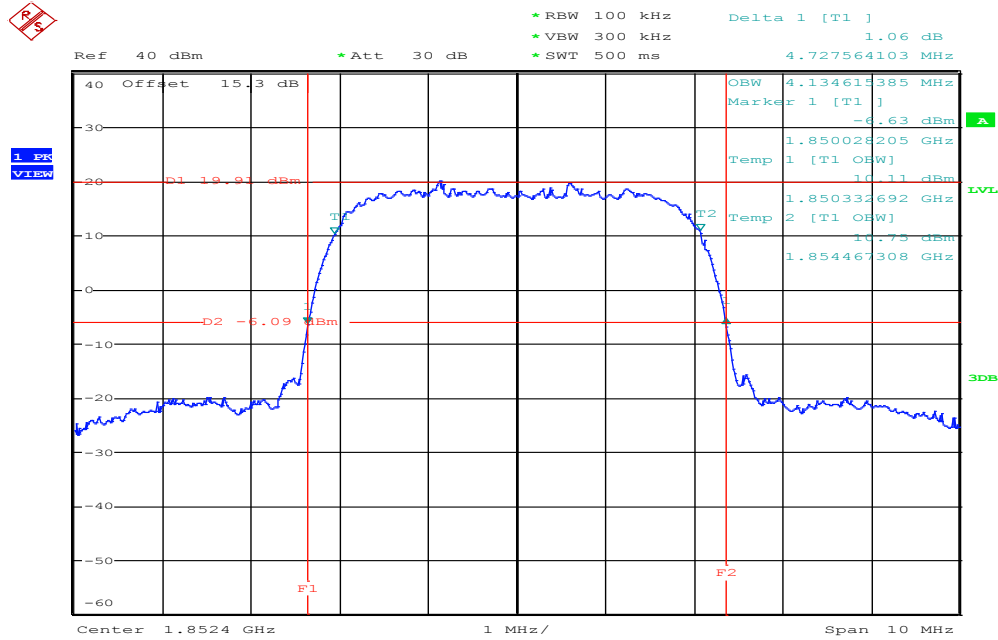
Test Data

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

Test Plot

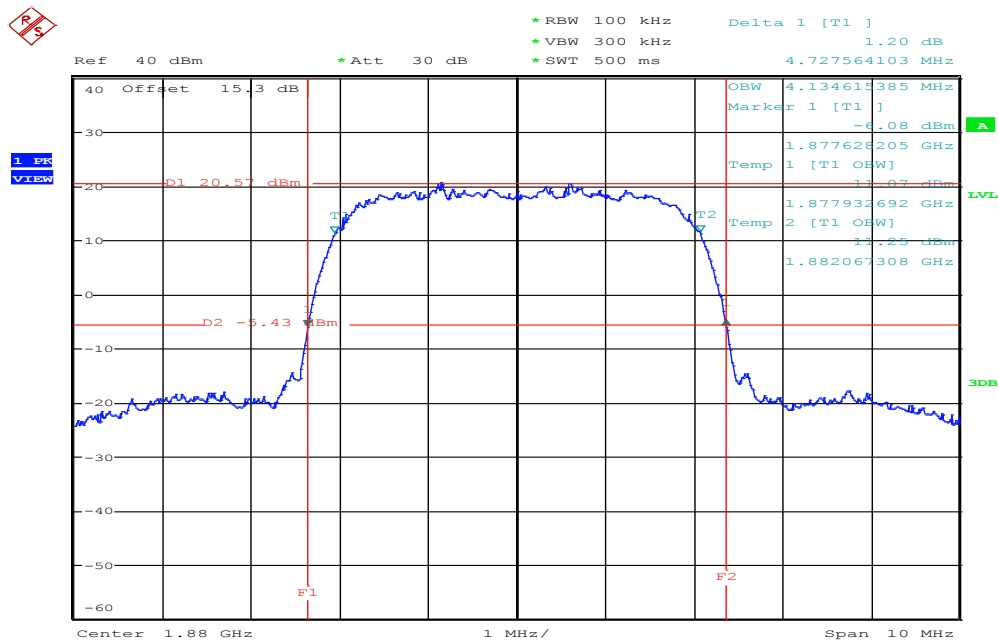
WCDMA 12.2k RMC (Band II)

Low CH



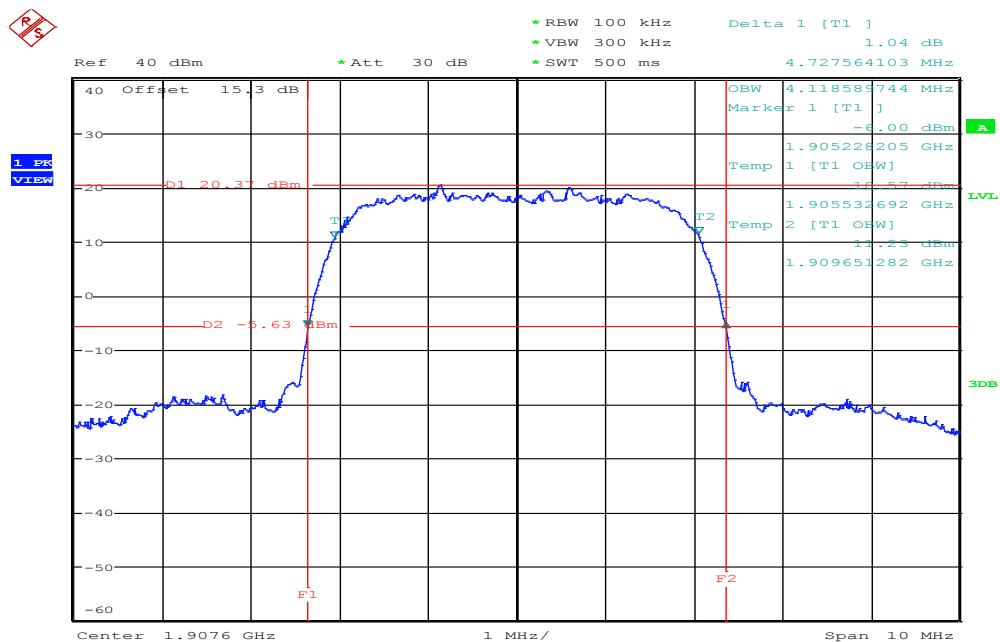
Date: 27.OCT.2016 22:03:57

Mid CH



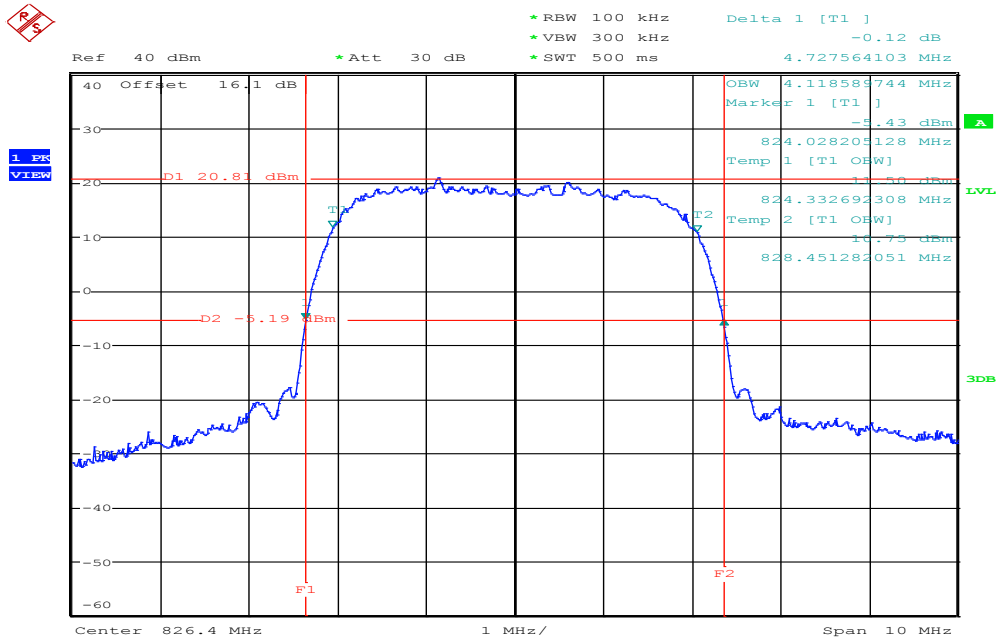
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High CH



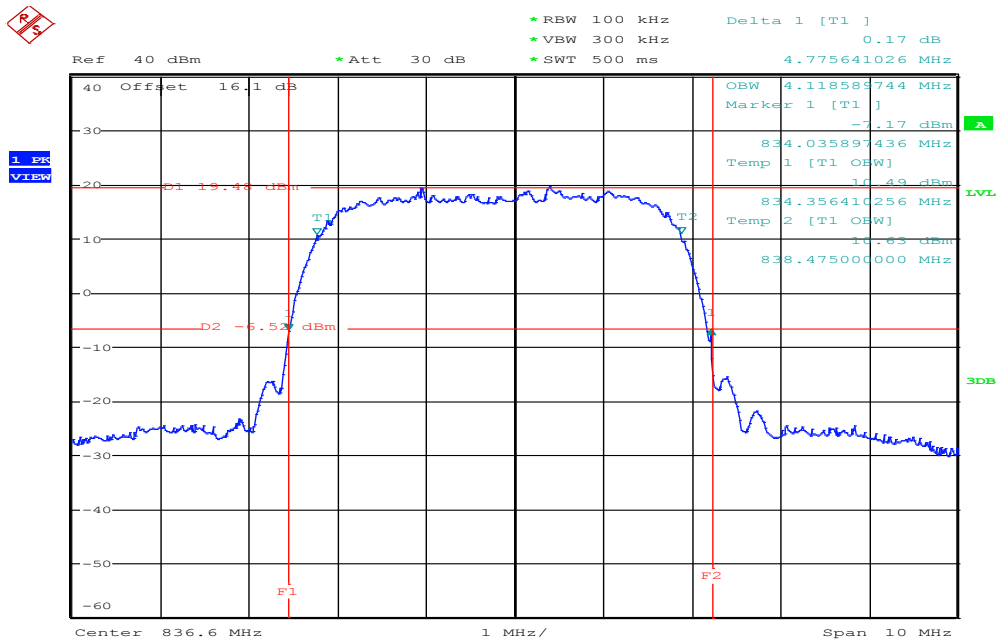
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Low CH



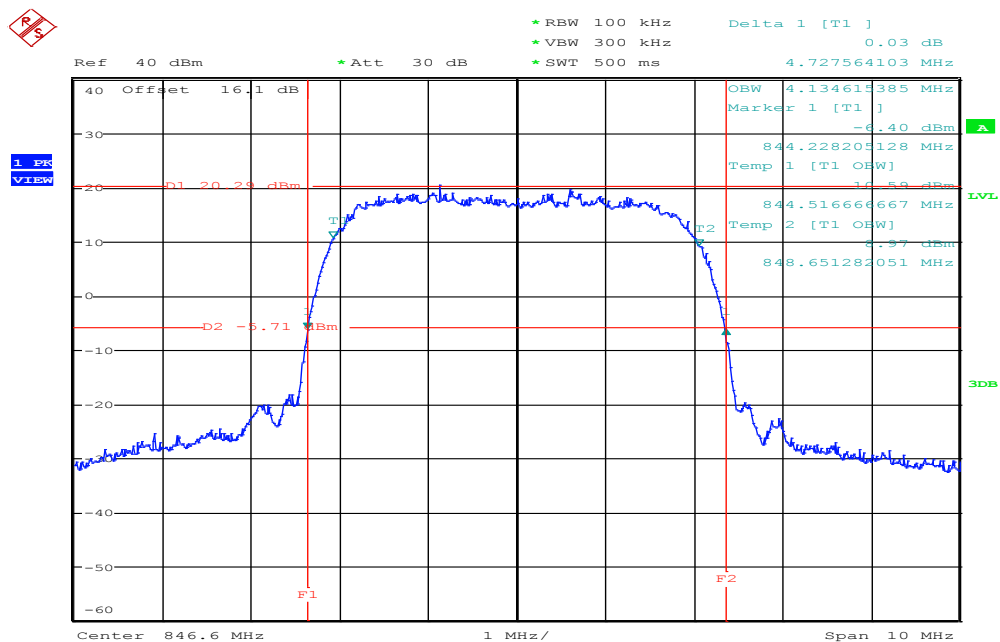
Date: 27.OCT.2016 22:35:56

Mid CH



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

High CH



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

7.4 CONDUCTED BANDEDGR MEASUREMENT

Limit

FCC §22.917(a), Band 5

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

FCC §24.238(a), Band 2

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

TEST PROCEDURE

According to KDB 971168 D01, section 6.0

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

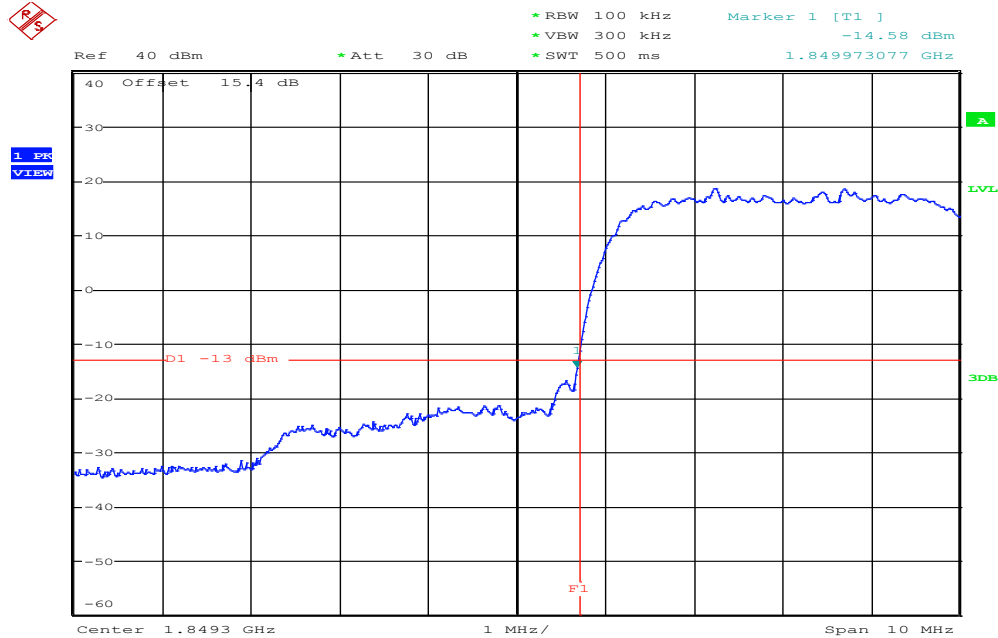
TEST RESULTS

No non-compliance noted.

Test Data

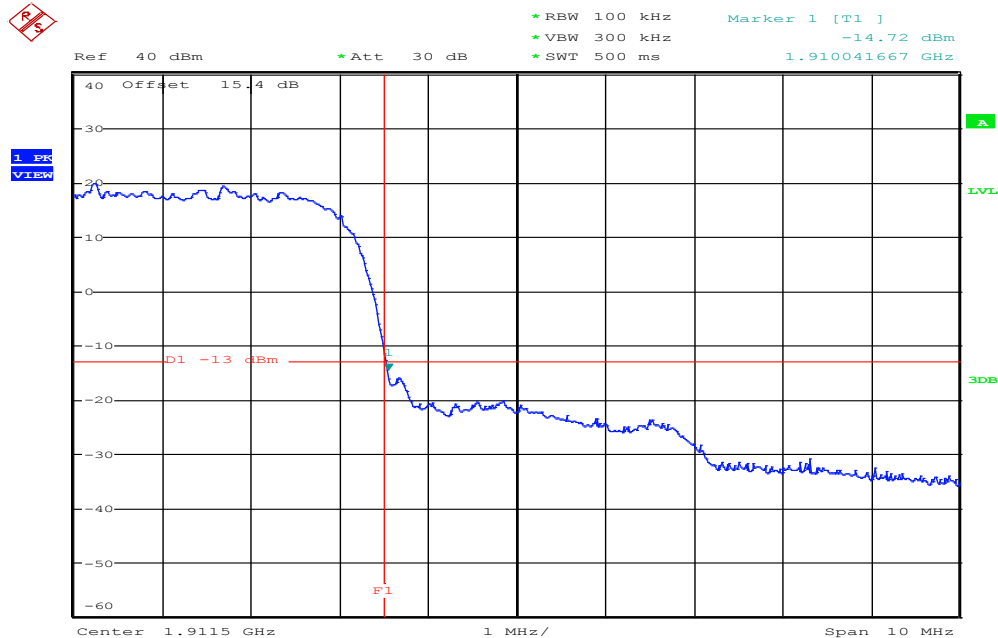
WCDMA 12.2k RMC (Band II)

Low CH



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

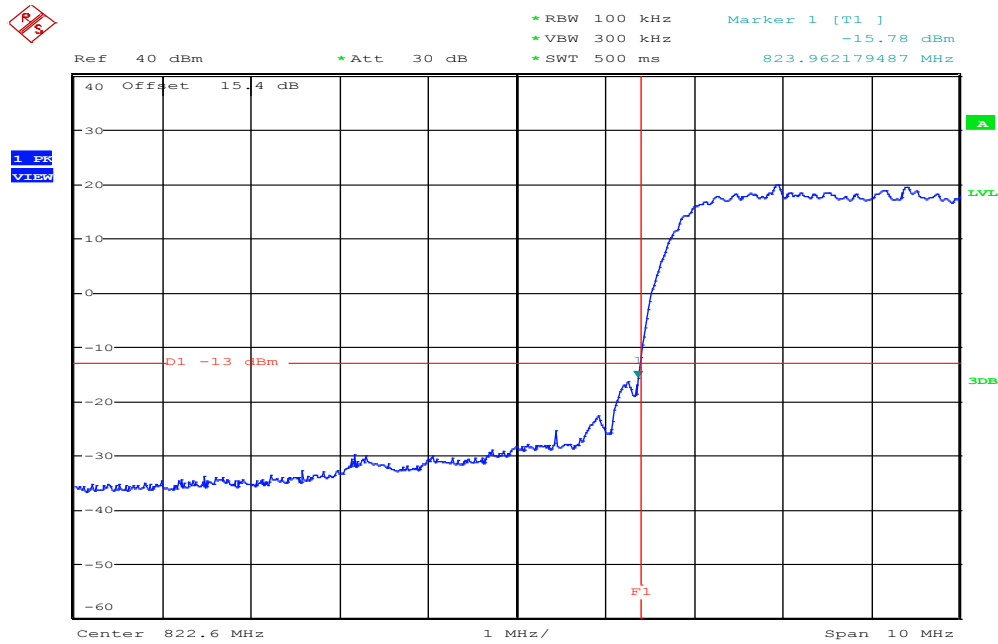
High CH



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

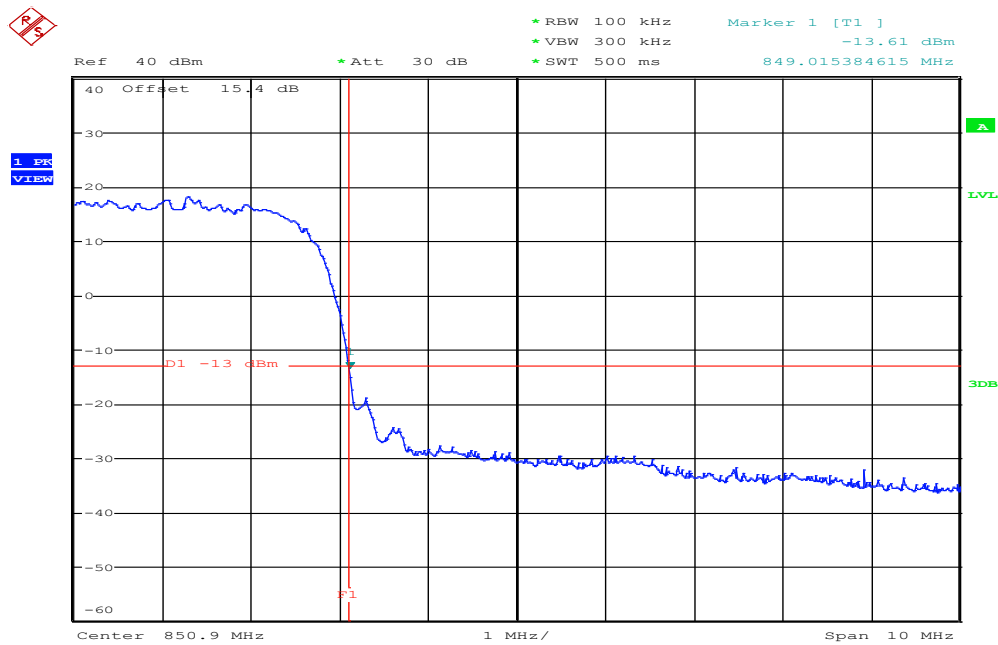
WCDMA 12.2k RMC (Band V)

Low CH



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

High CH



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

7.5 CONDUCTED SPURIOUS EMISSIONS

Limit

FCC §22.917(a), Band 5

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

FCC §24.238(a), Band 2

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

Test Procedures

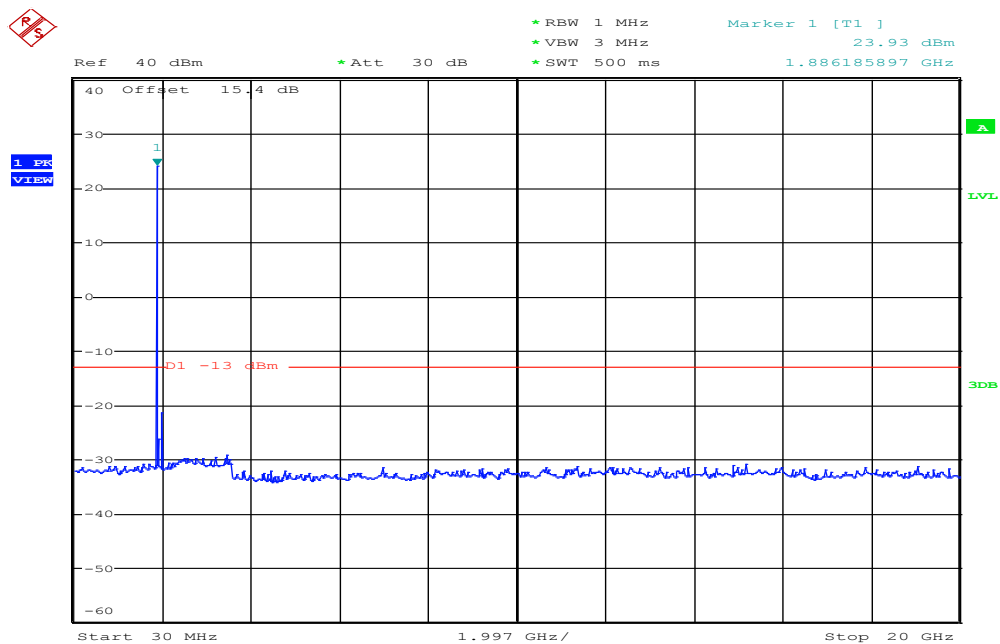
According to KDB 971168 D01, section 6.0

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

TEST RESULTS

No non-compliance noted

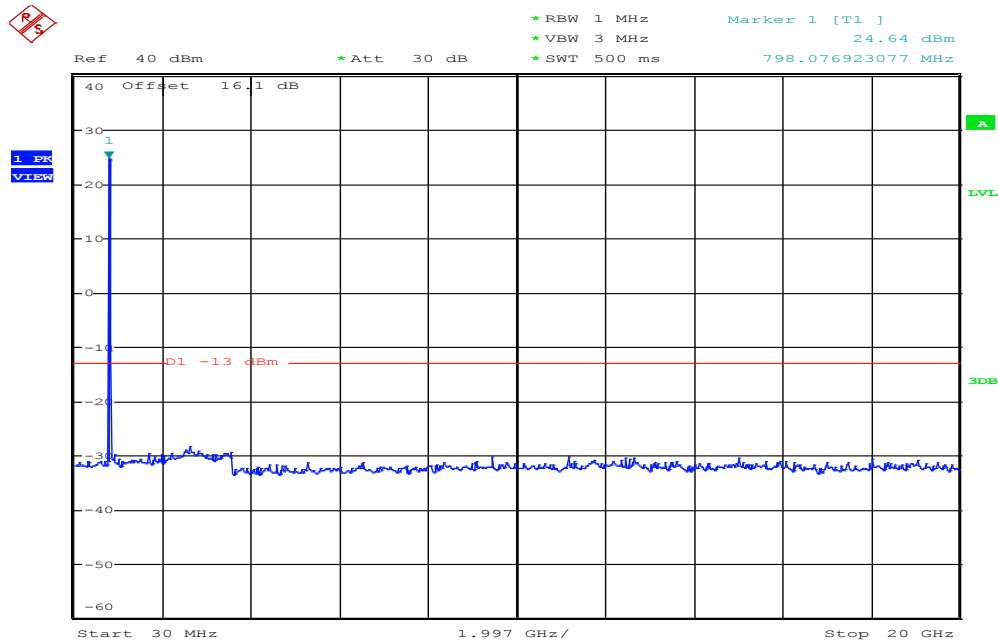
High CH



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

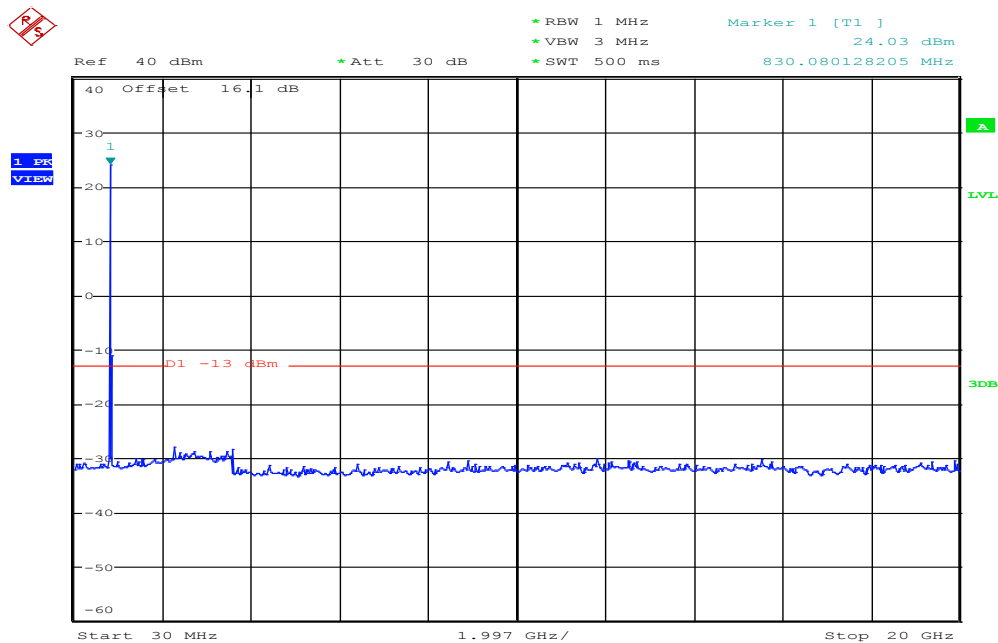
WCDMA 12.2k RMC (Band V)

Low CH



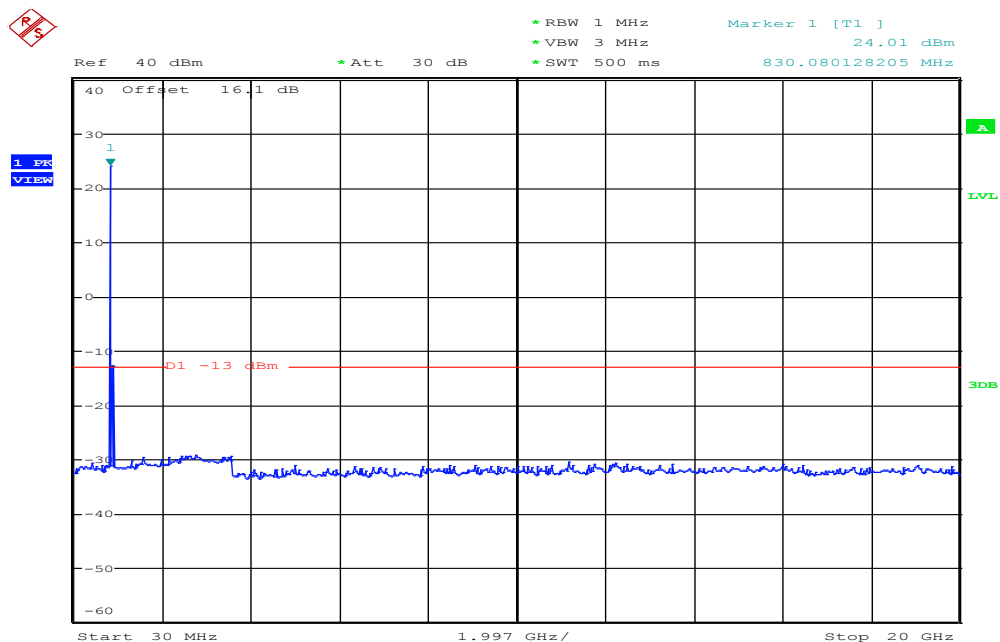
Date: 13.SEP.2016 14:32:53

Mid CH



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

High CH



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

7.6 SPURIOUS RADIATION MEASUREMENT

Limit

FCC §22.917(a), Band 5

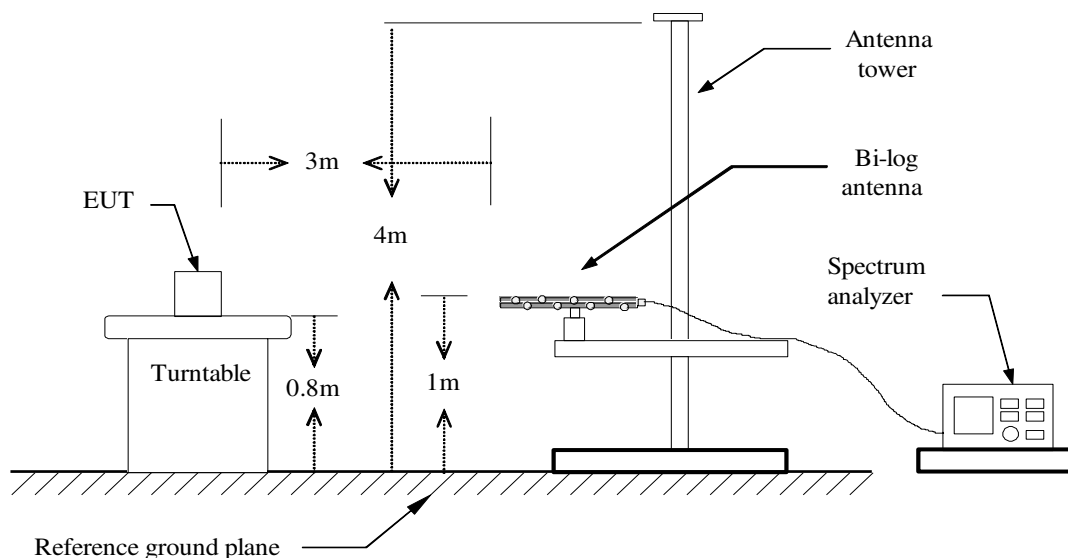
For operations in the 824-849 MHz band, out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

FCC §24.238(a), Band 2

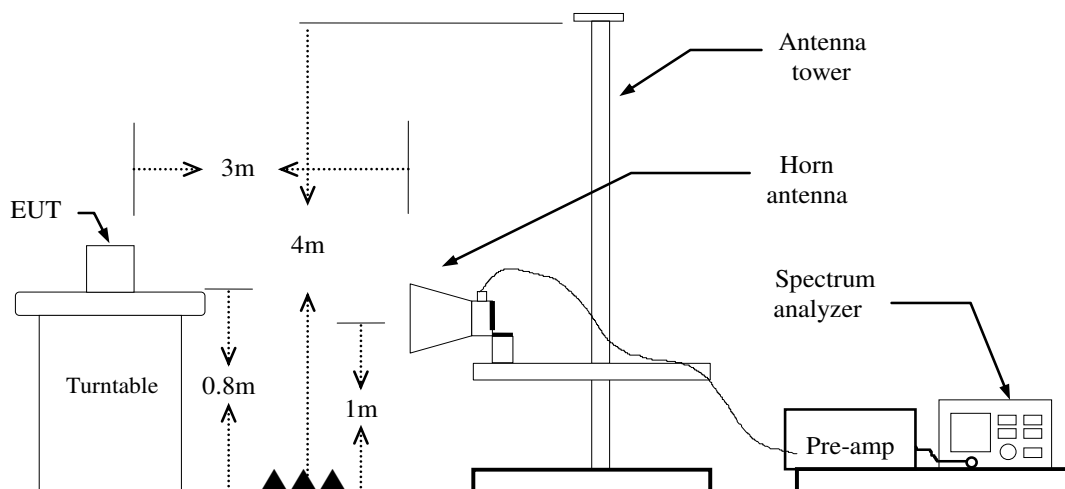
For operations in the 1850-1910 and 1930-1950 MHz band, out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

Test Configuration

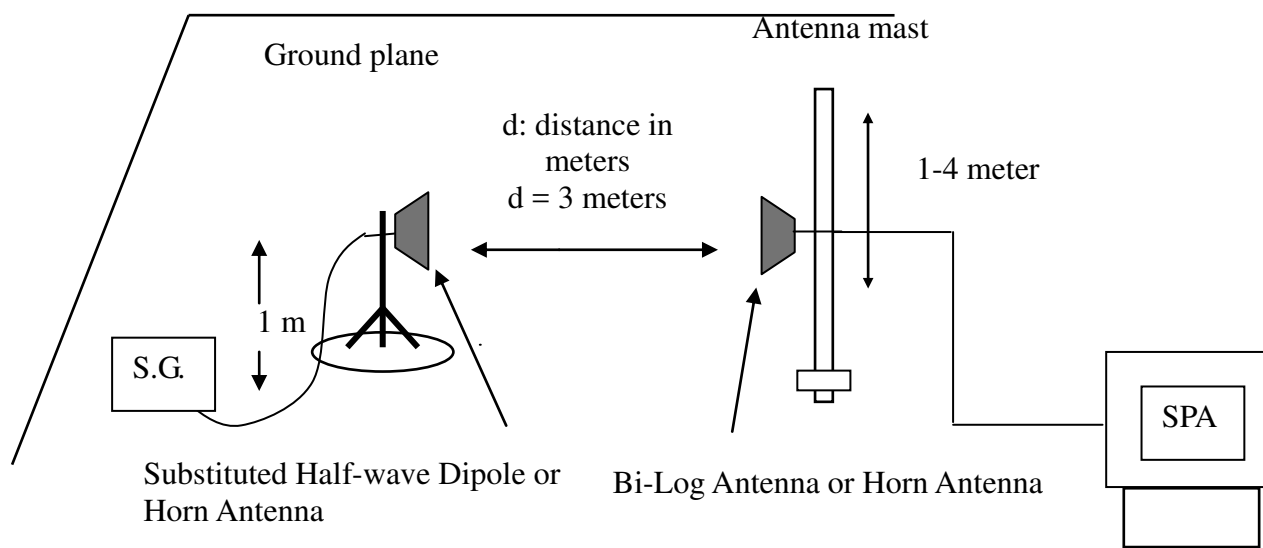
Below 1 GHz



Above 1 GHz



Substituted Method Test Set-up



TEST PROCEDURE

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

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

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

TEST RESULTS

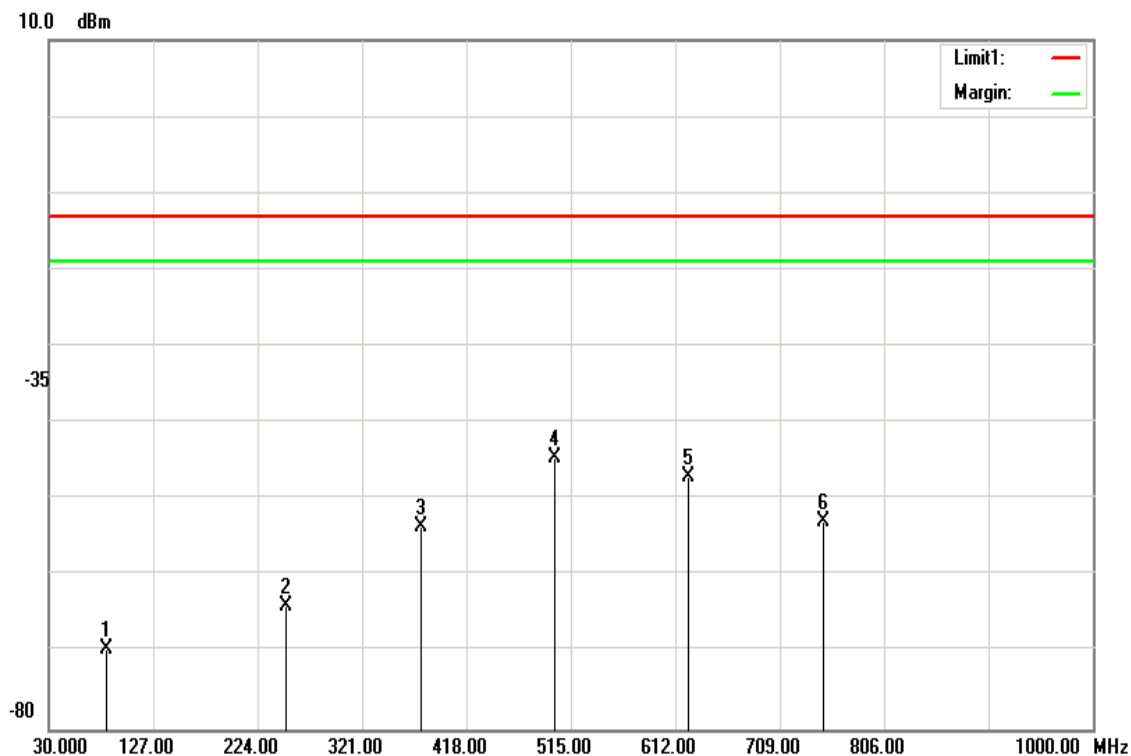
Refer to the attached tabular data sheets.

Radiated Spurious Emission Measurement Result / Below 1GHz

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

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

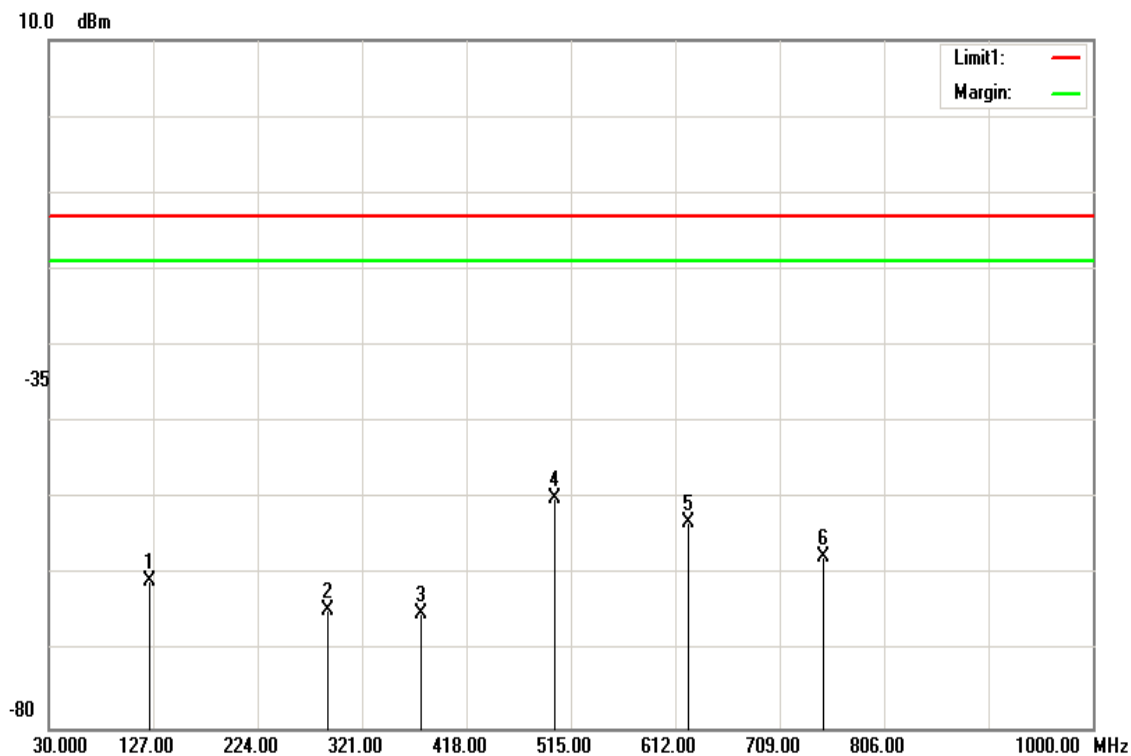
Humidity: 57.2 % RH **Polarity:** Ver.



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

Operation Mode: WCDMA 12.2k RMC
Band II / TX /Mid CH
Temperature: 22.6°C
Humidity: 57.2 % RH

Test Date: September 23, 2016
Tested by: Dennis Li
Polarity: Hor.



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

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

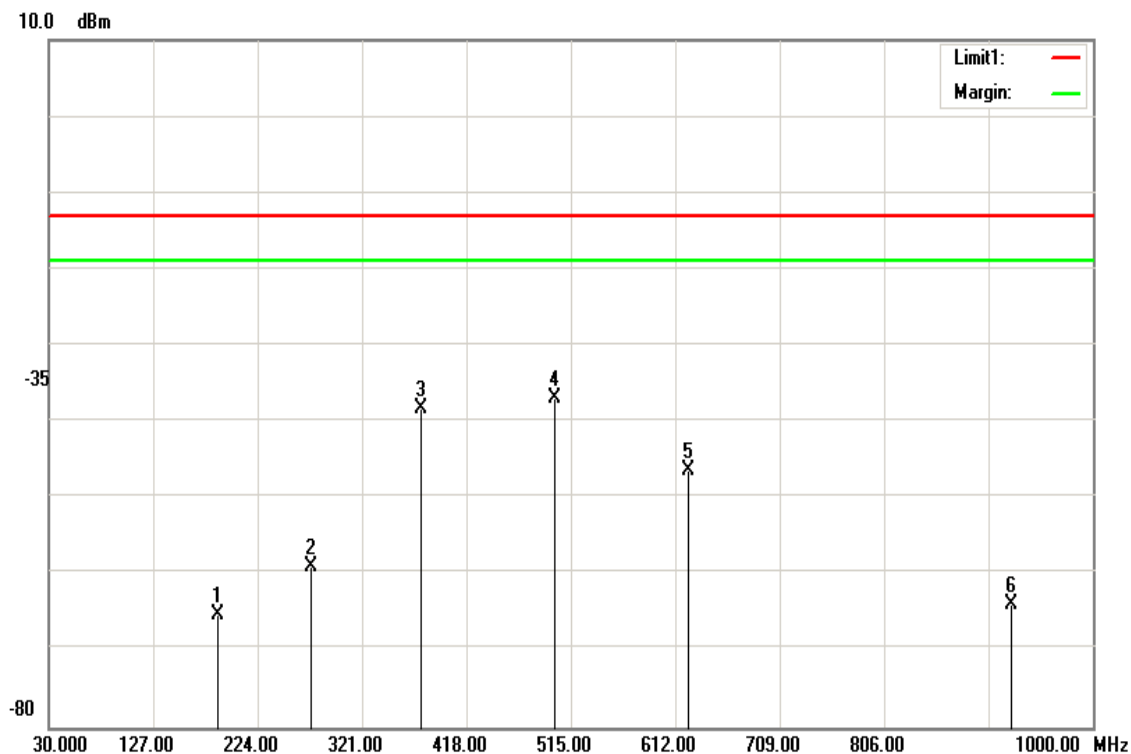
Test Date: September 23, 2016

Temperature: 22.6°C

Tested by: Dennis Li

Humidity: 57.2 % RH

Polarity: Ver.



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

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

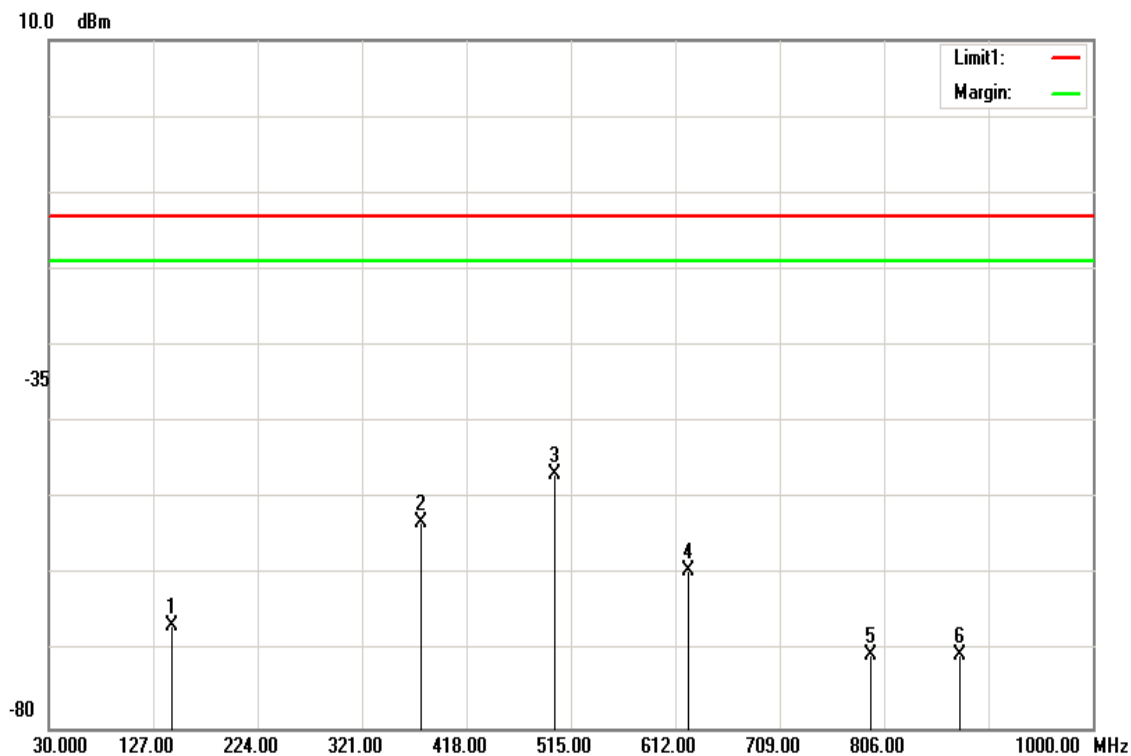
Test Date: September 23, 2016

Temperature: 22.6°C

Tested by: Dennis Li

Humidity: 57.2 % RH

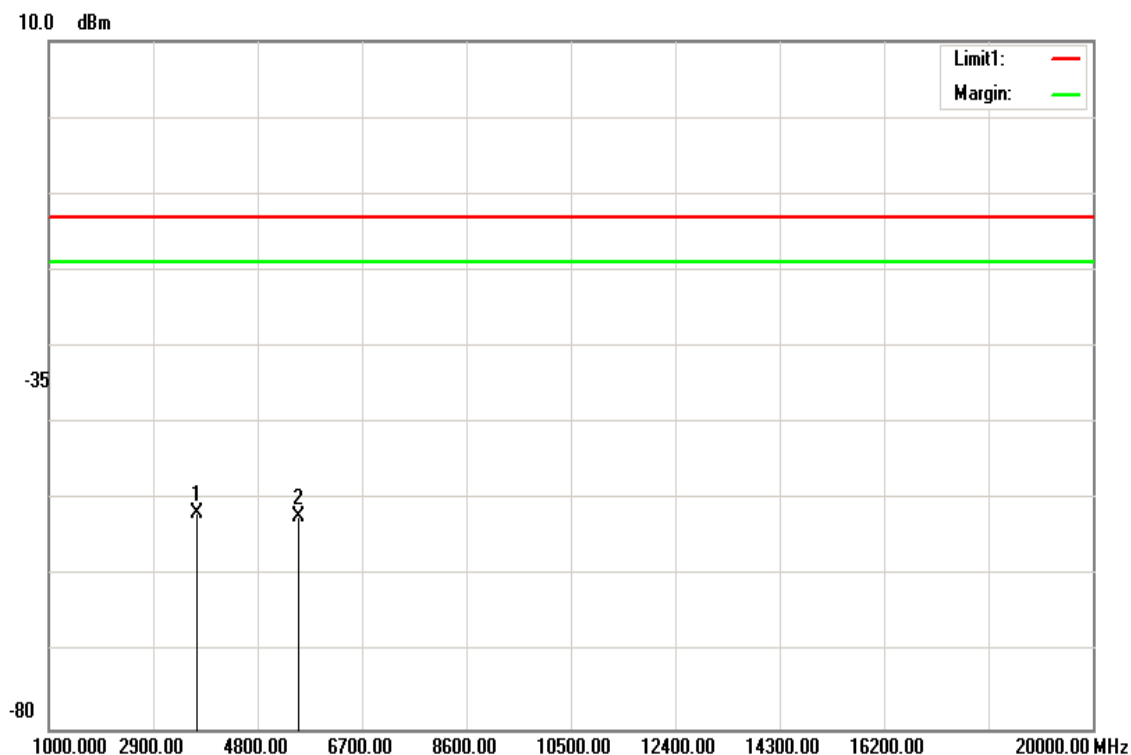
Polarity: Hor.



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

Above 1GHz

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

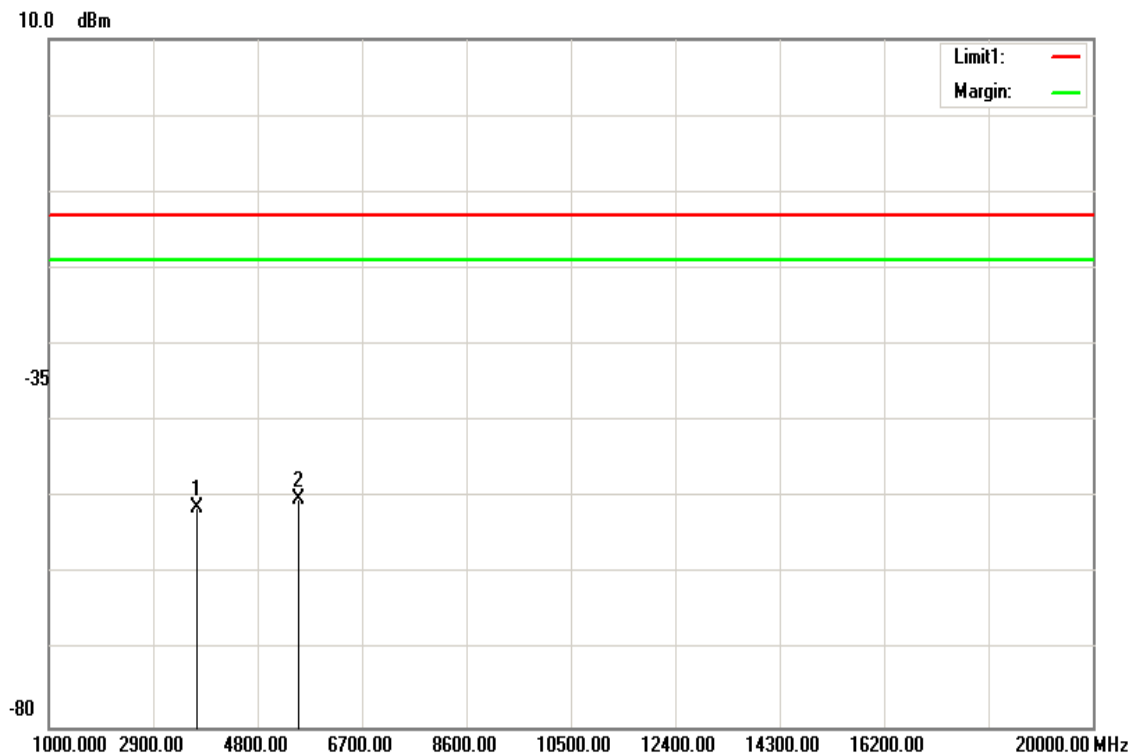


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3704.000	-57.37	6.9	12.54	-51.73	-13.00	-38.73	V
5557.000	-56.44	8.62	12.88	-52.18	-13.00	-39.18	V
N/A							

Remark:

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

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

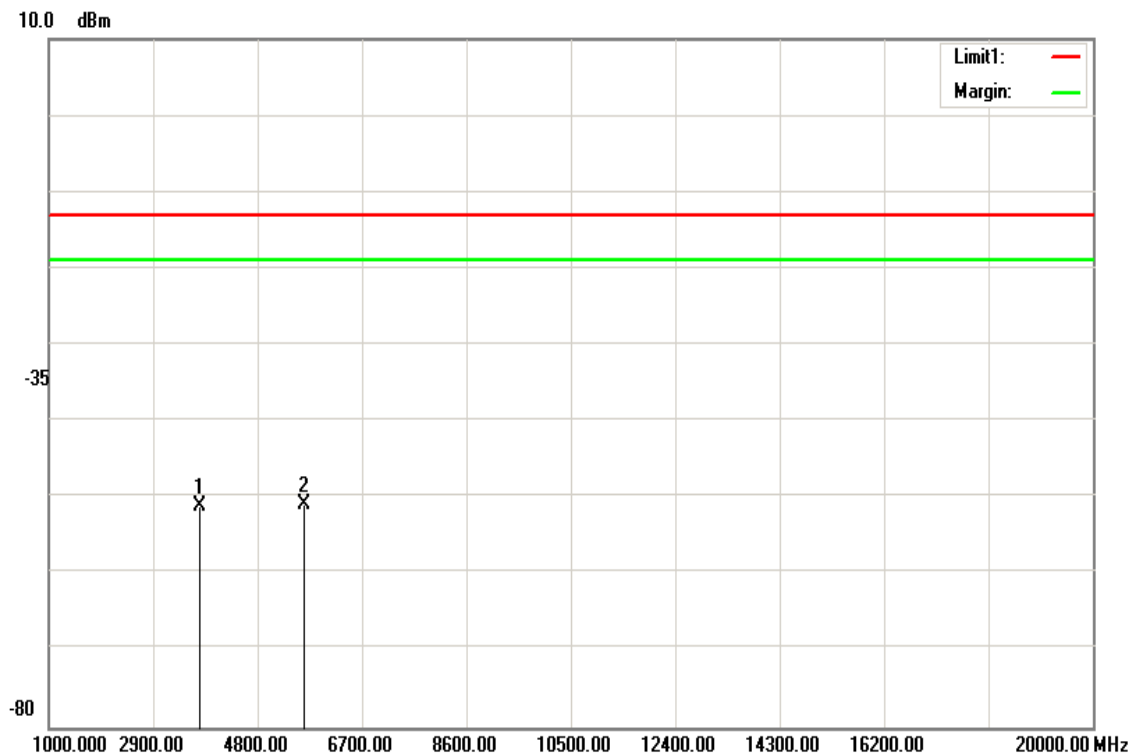


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3704.000	-56.91	6.9	12.54	-51.27	-13.00	-38.27	H
5557.000	-54.44	8.62	12.88	-50.18	-13.00	-37.18	H
N/A							

Remark:

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

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

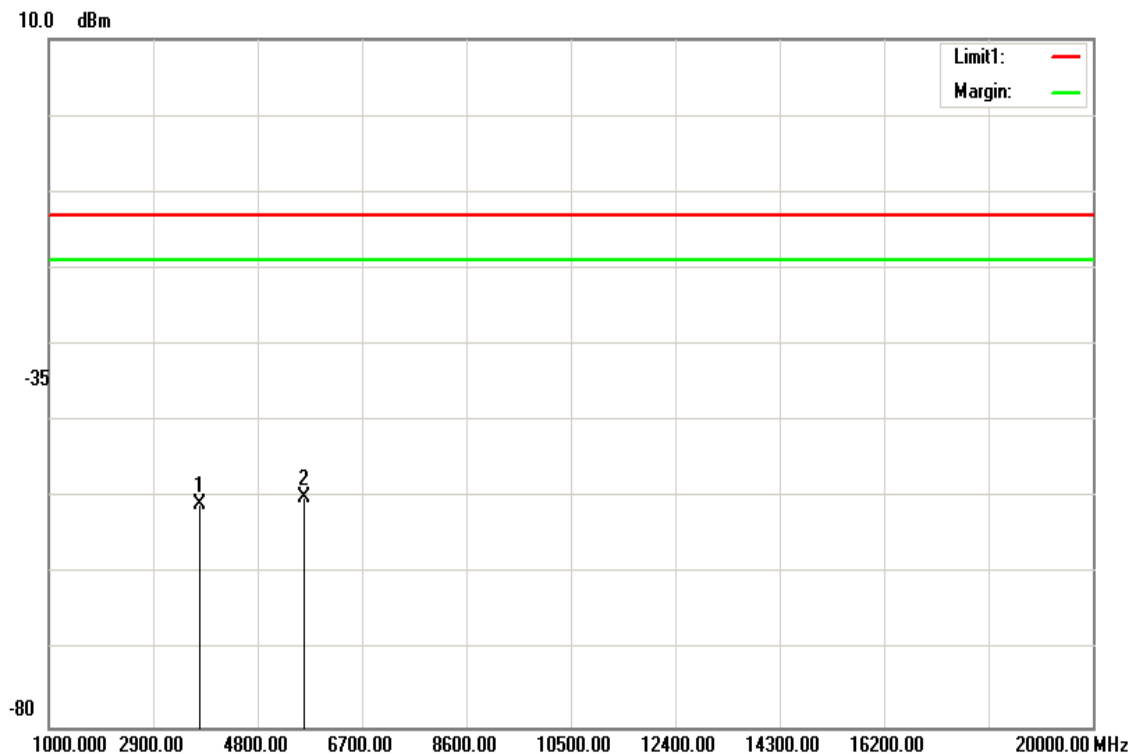


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3760.000	-56.63	6.96	12.55	-51.04	-13.00	-38.04	V
5640.000	-55.09	8.69	12.84	-50.94	-13.00	-37.94	V
N/A							

Remark:

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

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

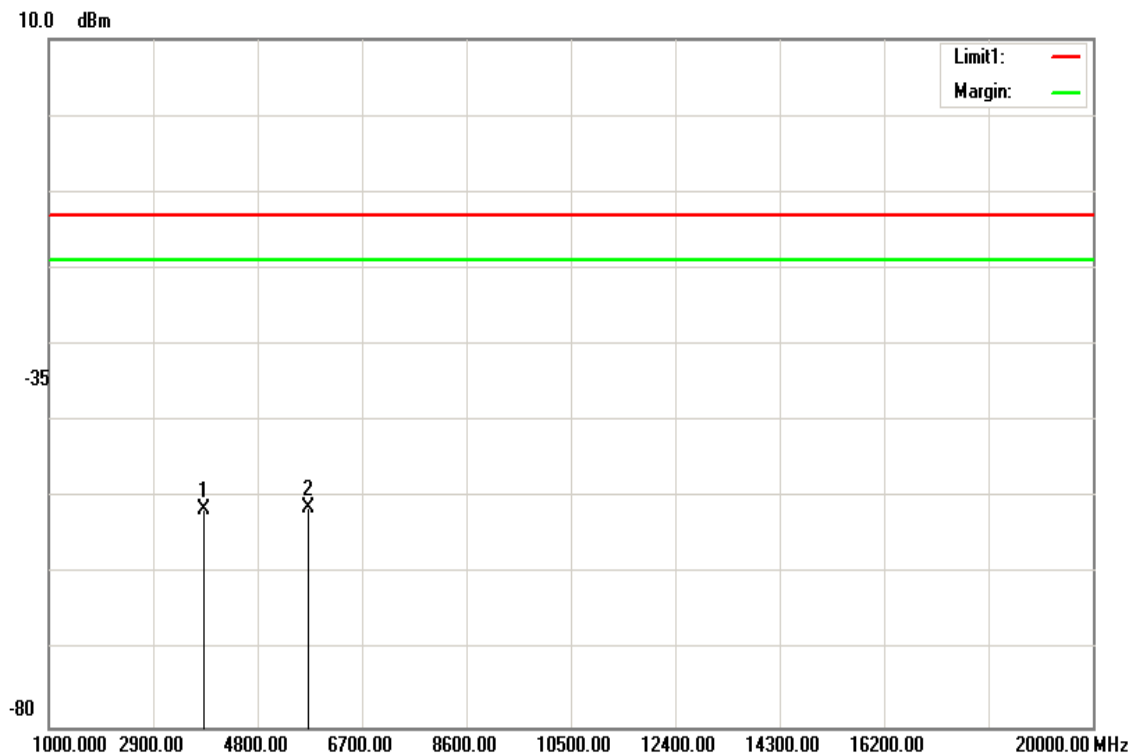


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3760.000	-56.42	6.96	12.55	-50.83	-13.00	-37.83	H
5640.000	-54.02	8.69	12.84	-49.87	-13.00	-36.87	H
N/A							

Remark:

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

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

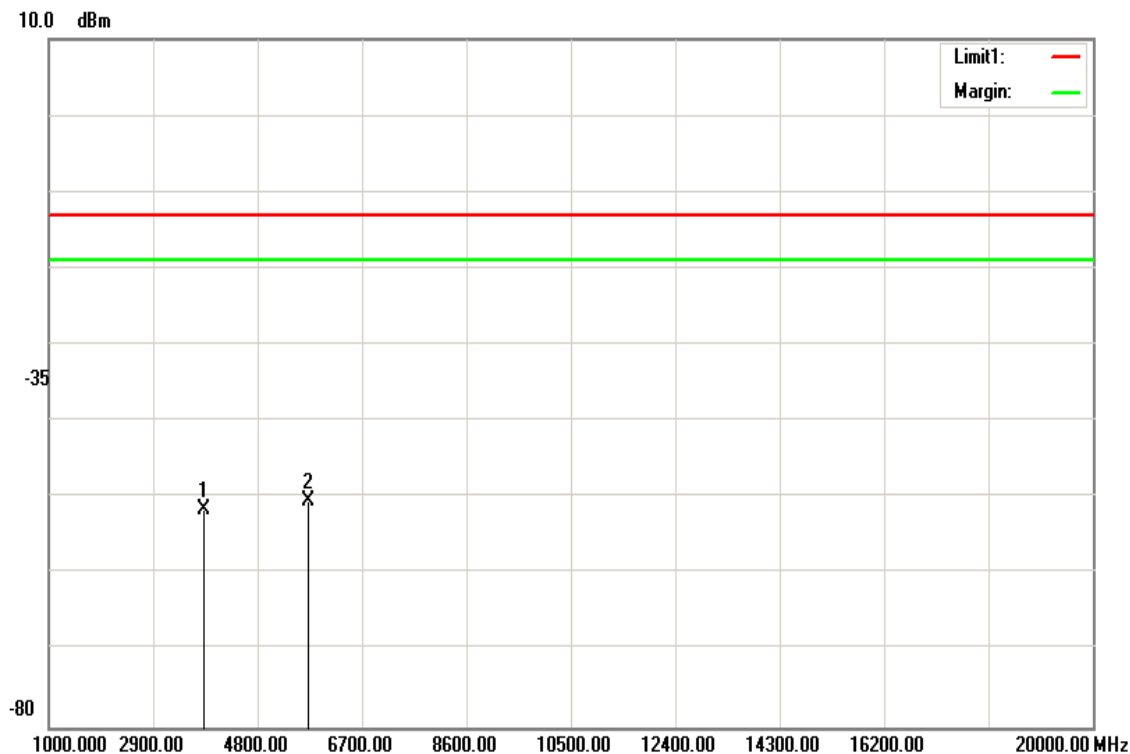


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3814.000	-57.08	7.01	12.56	-51.53	-13.00	-38.53	V
5721.000	-55.28	8.75	12.81	-51.22	-13.00	-38.22	V
N/A							

Remark:

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

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

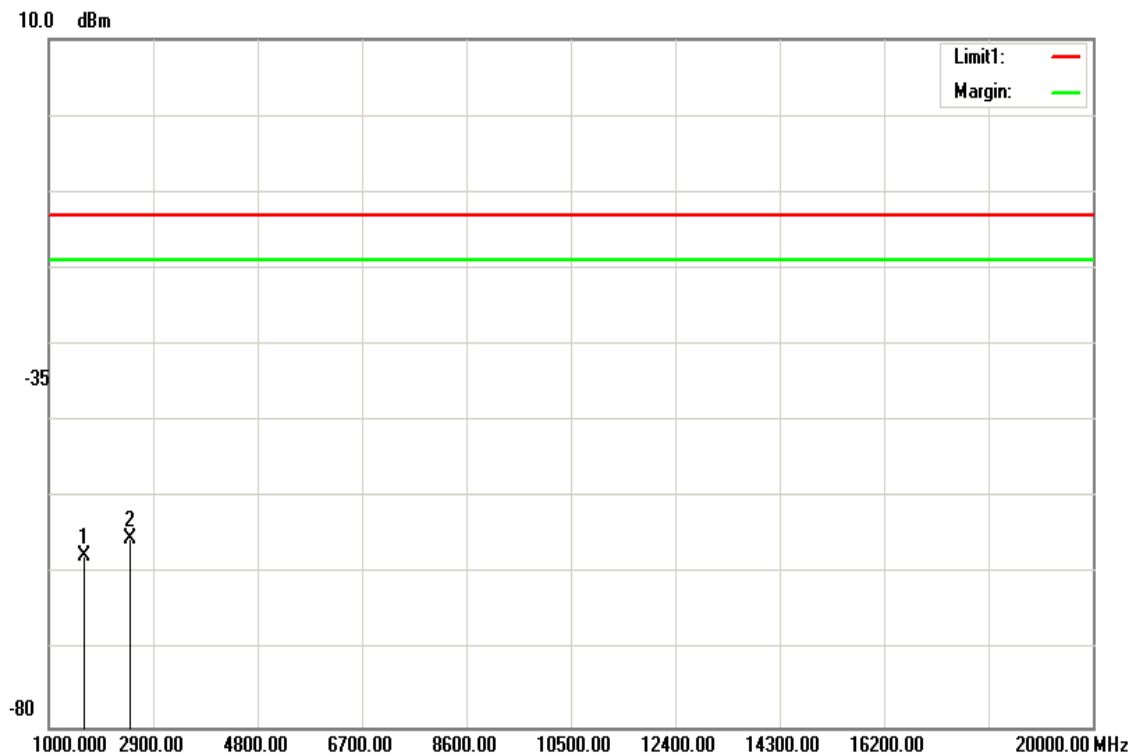


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3814.000	-57.03	7.01	12.56	-51.48	-13.00	-38.48	H
5721.000	-54.57	8.75	12.81	-50.51	-13.00	-37.51	H
N/A							

Remark:

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

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

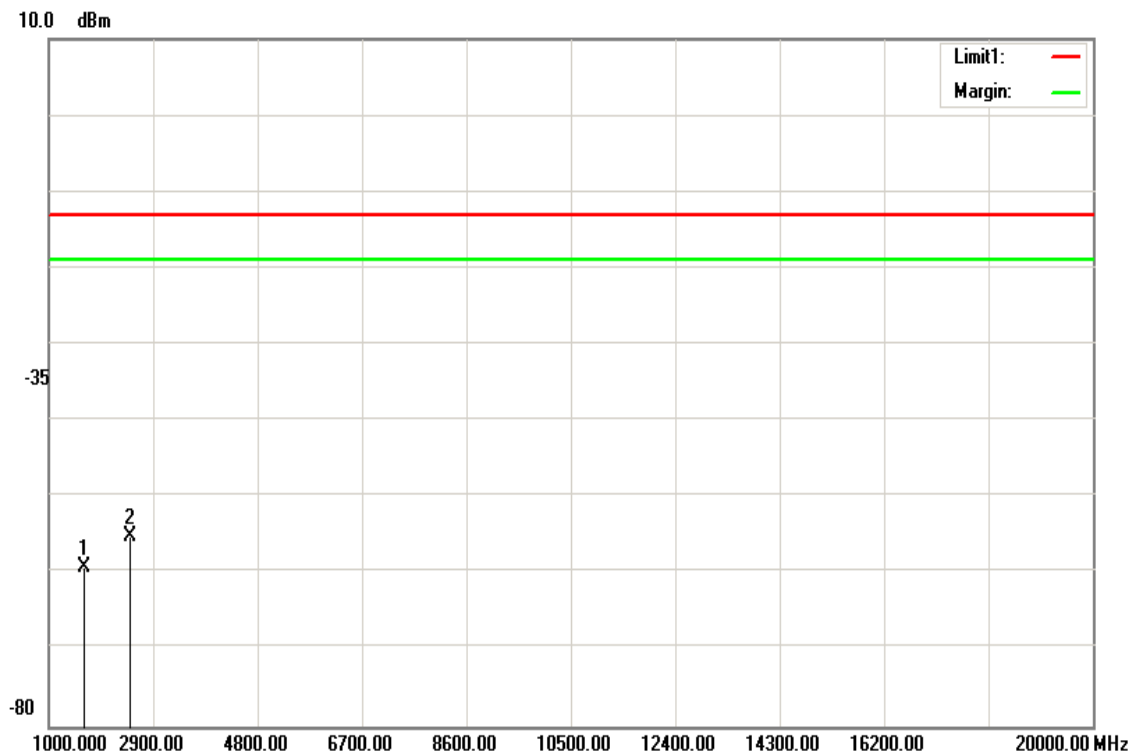


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1652.000	-62.4	4.49	9.33	-57.56	-13.00	-44.56	V
2479.000	-60.57	5.56	10.68	-55.45	-13.00	-42.45	V
N/A							

Remark:

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

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

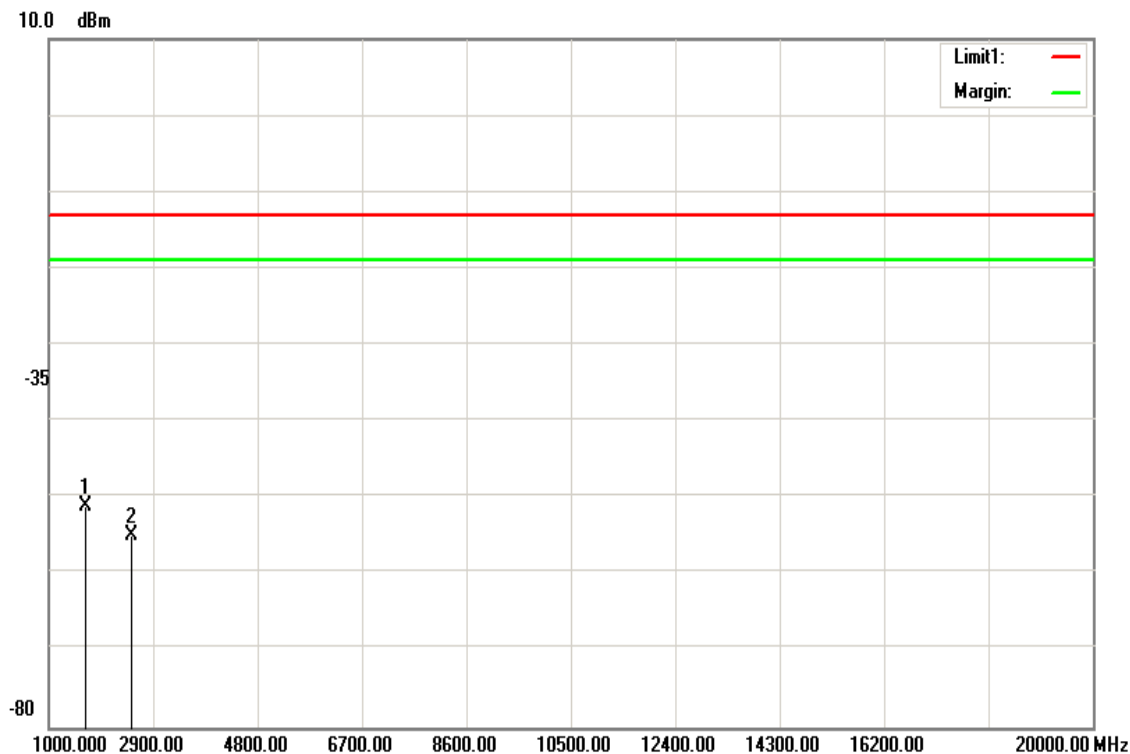


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1652.000	-64.03	4.49	9.33	-59.19	-13.00	-46.19	H
2479.000	-60.33	5.56	10.68	-55.21	-13.00	-42.21	H
N/A							

Remark:

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

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



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

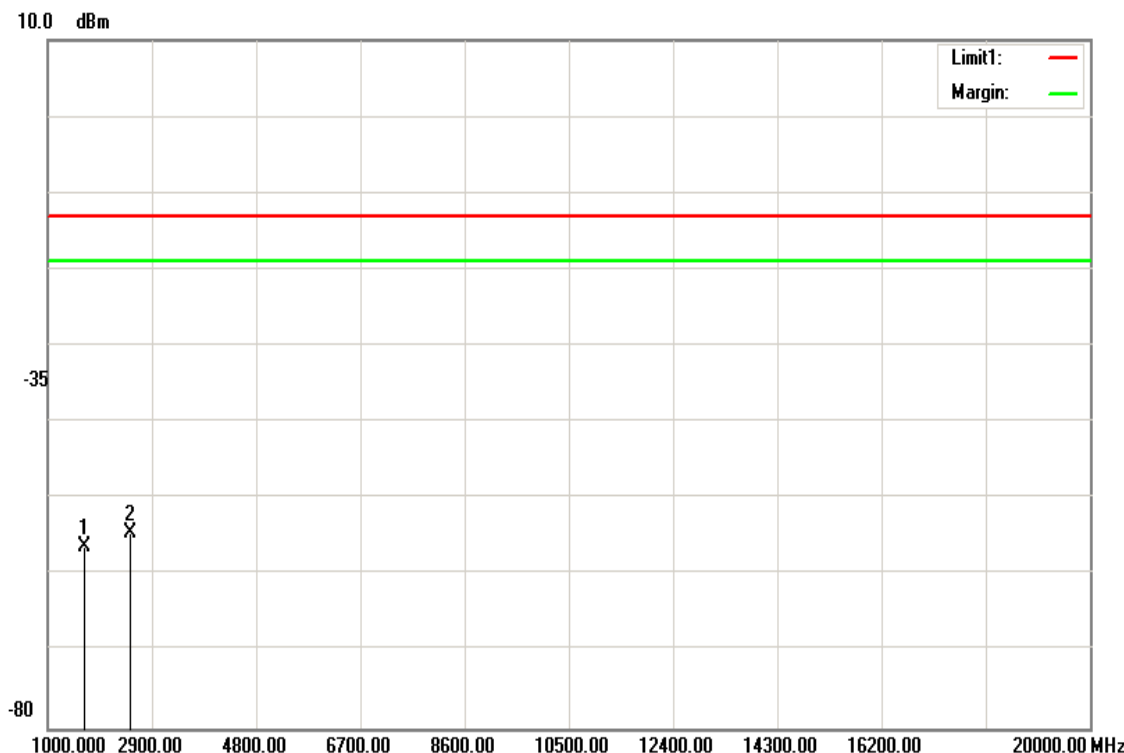
Remark:

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

Operation Mode: WCDMA 12.2k RMC
Band V / TX / Mid CH 4182
Test Date: September 23, 2016

Temperature: 22.6°C
Tested by: Dennis Li

Humidity: 57.2 % RH
Polarity: Hor.

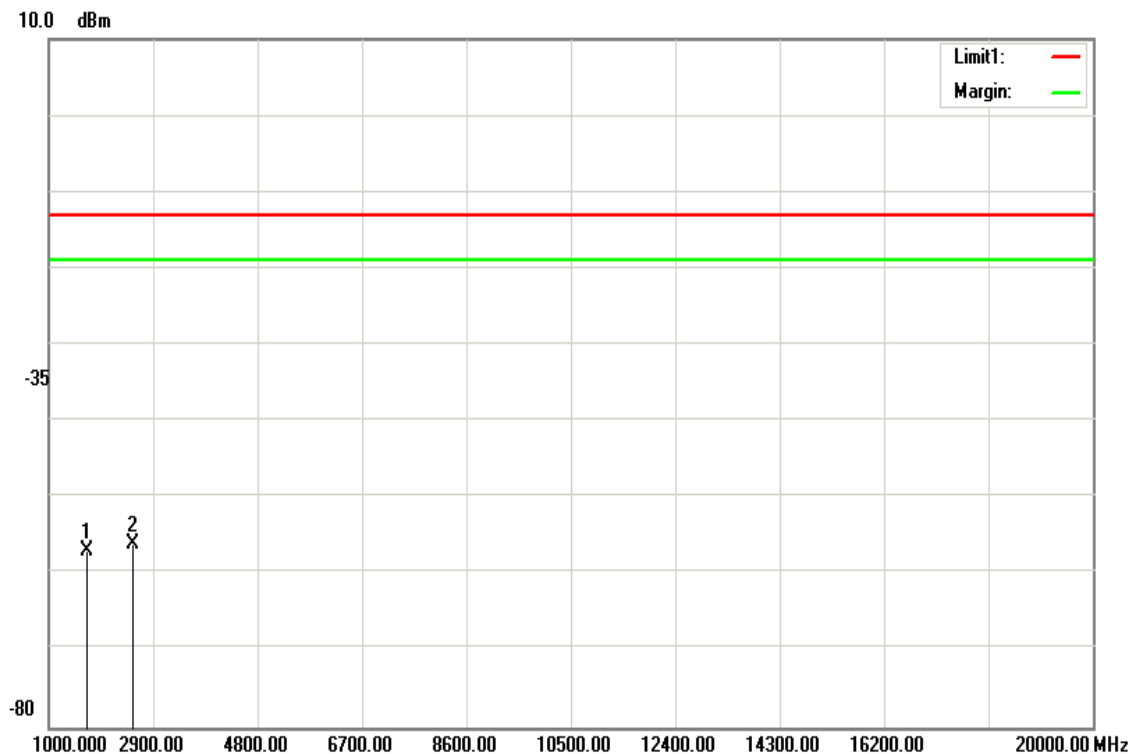


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1672.000	-61.13	4.52	9.38	-56.27	-13.00	-43.27	H
2509.000	-59.64	5.6	10.71	-54.53	-13.00	-41.53	H
N/A							

Remark:

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

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

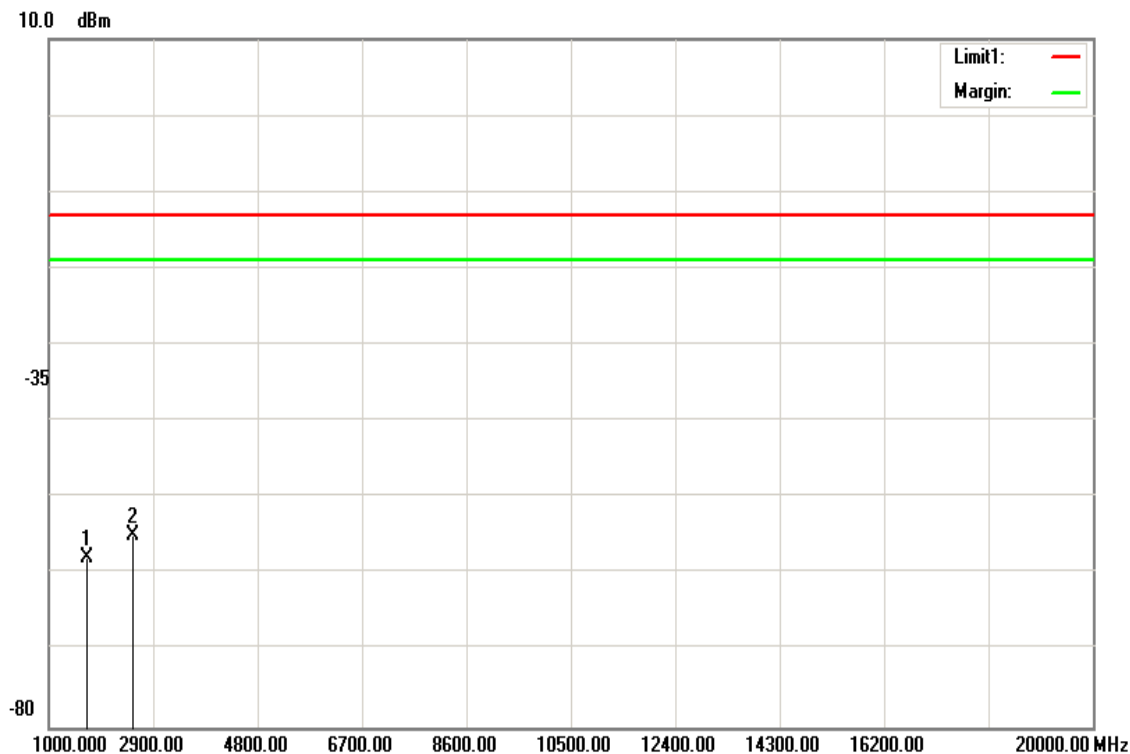


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1693.000	-61.83	4.55	9.44	-56.94	-13.00	-43.94	V
2539.000	-61.18	5.63	10.74	-56.07	-13.00	-43.07	V
N/A							

Remark:

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

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



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

Remark:

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

7.7 FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT

LIMIT

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

Test Procedure

Use Anritsu 8820 with frequency Error measurement capability.

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

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

TEST RESULTS

No non-compliance noted.

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

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

FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT:

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

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