FCC 47 CFR PART 27 SUBPART L
(Class II Permissive Change)

TEST REPORT

For

Radio Module

Model: EM7565-9

Trade Name: DURABOOK

Issued to

TWINHEAD INTERNATIONAL CORP.
11F, No. 550, Rueiguang Rd., Neihu, Taipei, Taiwan 114, R.O.C.

Issued by

Compliance Certification Services Inc.
Wugu Laboratory
No.11, Wugong 6th Rd., Wugu Dist.,
New Taipei City 24891, Taiwan. (R.O.C.)
http://www.ccsrf.com
Issued Date: March 26, 2018

Testing Laboratory
1309

Revision History

Rev.		Issue Date		Revisions	Effect Page	Revised By
00		March 26, 2018		Initial Issue	ALL	Doris Chu
01		April 27, 2018		1.Revise TIA 603-D: 2010 and TIA-603-C: 2004 to TIA 603-E: 2016.	P.4, P.6, P.13, P.16	Doris Chu

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1 TEST RESULT CERTIFICATION

Applicant: TWINHEAD INTERNATIONAL CORP.
11F, No. 550, Rueiguang Rd., Neihu, Taipei, Taiwan 114, R.O.C.

Manufacturer: TWINHEAD INTERNATIONAL CORP.
11F, No. 550, Rueiguang Rd., Neihu, Taipei, Taiwan 114, R.O.C.

Equipment Under Test: Radio Module

Trade Name: DURABOOK

Model: EM7565-9

Date of Test: March 9, 2018

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

We hereby certify that:

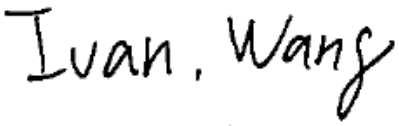
The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in TIA 603-E: 2016 and the energy emitted by the sample EUT tested as described in this report is in compliance with radiated emission limits of FCC Rule 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:



Ivan Wang
Engineer
Compliance Certification Services Inc.

2 EUT DESCRIPTION

Product	Radio Module
Model No.	EM7565-9
Model Discrepancy	N/A
Trade Name	DURABOOK
Received Date	December 21, 2017
Power Supply	Power form Adapter FSP / FSP065-REBN2 I/P: 100-240VAC, 50-60Hz, 1.5A O/P: 19VDC, 3.42A
Frequency Range	WCDMA Band IV: 1712.4-1752.6 MHz
Antenna Gain	Monopole Antenna Sinbon Technology Co., Ltd WCDMA band IV: P/N: 22+600761+00 (Main) / 0.71dBi 22+600762+00 (Aux) / 2.15dBi
Class II Permissive Change	1. The subject approved module is being used in a specific host. [Product: Fully-Rugged Tablet PC, brand name/model: DURABOOK / X11XXXXXX(X=0~9,A~Z,a~z,Blank), U11XXXXXX(X=0~9,A~Z,a~z,Blank), R11(R5)]. 2. Power reduction per tune-up procedure is applied in order to comply with exposure requirements. 3. The product only installs a WLAN module [X11XXXXXX(X=0~9,A~Z,a~z,Blank), U11XXXXXX(X=0~9,A~Z,a~z,Blank), R11(R5)]

Remark:

1. Client consigns only one sample to test (model number: X11BK). Therefore, the testing Lab. just guarantees the unit, which has been tested.

3 TEST METHODOLOGY

Both conducted and radiated testing were performed according to the procedures document on TIA 603-E: 2016 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: X11BK) 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

WCDMA Band IV

Radiated Emission Measurement	
Test Condition	**Band edge, Emission for Unwanted and Fundamental**
Voltage/Hz	**230V /50Hz**
Test Mode	**Mode 1: EUT Power by Adapter**
Worst Mode	☒ **Mode 1** ☐ **Mode 2** ☐ **Mode 3** ☐ **Mode 4**
Position	☐ **P**laced in fixed position. ☒ **P**laced in fixed position at X-Plane (E2-Plane) ☐ **P**laced in fixed position at Y-Plane (E1-Plane) ☐ **P**laced 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 (X-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.*

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	EMEC	EM01M62G	60570	08/01/2017	07/31/2018
Bilog Antenna	Sunol Sciences	JB3	A030105	06/20/2017	06/19/2018
Horn Antenna	EMCO	3115	9602-4659	06/22/2017	06/21/2018
Pre-Amplifier	Anritsu	MH648A	M89145	06/27/2017	06/26/2018
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
WIFI signal cable	HUBER SUHNER	SUCOFLEX 104PEA	23452	07/31/2017	07/30/2018
Filter	N/A	800-1G	N/A	N/A	N/A
Filter	N/A	1800-2000	N/A	N/A	N/A
Radio Communication Analyzer	Anritsu	MT-8820C	6201240043	07/11/2017	07/10/2018
Wireless Communication Test Set	Anritsu	8960	MY48363204	07/26/2017	07/25/2018

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, Chunghsen 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

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
	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.

WCDMA 12.2K RMC

Band	Mode	Frequency (MHz)	CH	AVG Power (dBm)	Output Power (W)
IV	WCDMA 12.2K RMC	1712.4	1312	23.10	0.2042
		1732.6	1413	23.20	0.2089
		1752.6	1513	23.00	0.1995

HSDPA

Band	Mode	Frequency (MHz)	CH	AVG Power (dBm)	Output Power (W)
IV	Subtest 1	1712.4	1312	23.00	0.1995
		1732.6	1413	22.90	0.1950
		1752.6	1513	22.80	0.1905
	Subtest 2	1712.4	1312	22.50	0.1778
		1732.6	1413	22.40	0.1738
		1752.6	1513	22.30	0.1698
	Subtest 3	1712.4	1312	22.00	0.1585
		1732.6	1413	21.90	0.1549
		1752.6	1513	21.80	0.1514
	Subtest 4	1712.4	1312	22.00	0.1585
		1732.6	1413	21.90	0.1549
		1752.6	1513	21.80	0.1514

HSUPA

Band	Mode	Frequency (MHz)	CH	AVG Power (dBm)	Output Power (W)
IV	Subtest 1	1712.4	1312	23.00	0.1995
		1732.6	1413	22.90	0.1950
		1752.6	1513	22.80	0.1905
	Subtest 2	1712.4	1312	21.00	0.1259
		1732.6	1413	20.90	0.1230
		1752.6	1513	20.80	0.1202
	Subtest 3	1712.4	1312	22.00	0.1585
		1732.6	1413	21.90	0.1549
		1752.6	1513	21.80	0.1514
	Subtest 4	1712.4	1312	21.00	0.1259
		1732.6	1413	20.90	0.1230
		1752.6	1513	20.80	0.1202
	Subtest 5	1712.4	1312	23.00	0.1995
		1732.6	1413	22.90	0.1950
		1752.6	1513	22.80	0.1905

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

7.2 ERP & EIRP MEASUREMENT

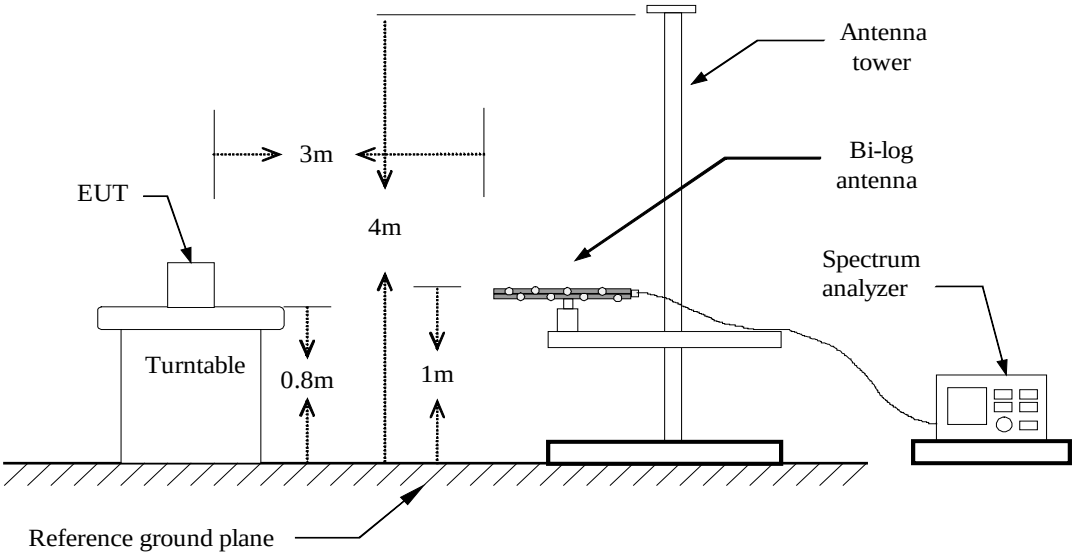
LIMIT

FCC Part 27.50(d)(4)

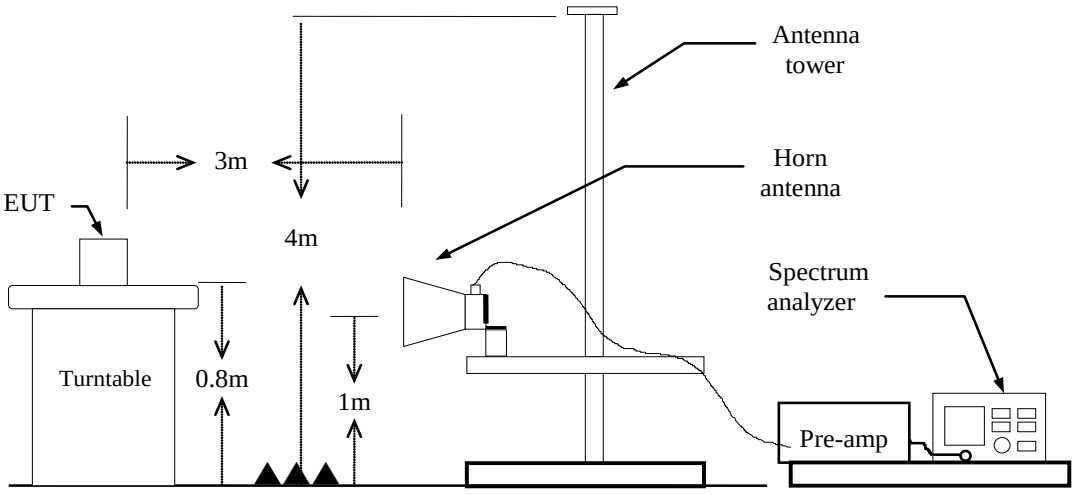
Fixed, mobile, and portable (handheld) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

Test Configuration

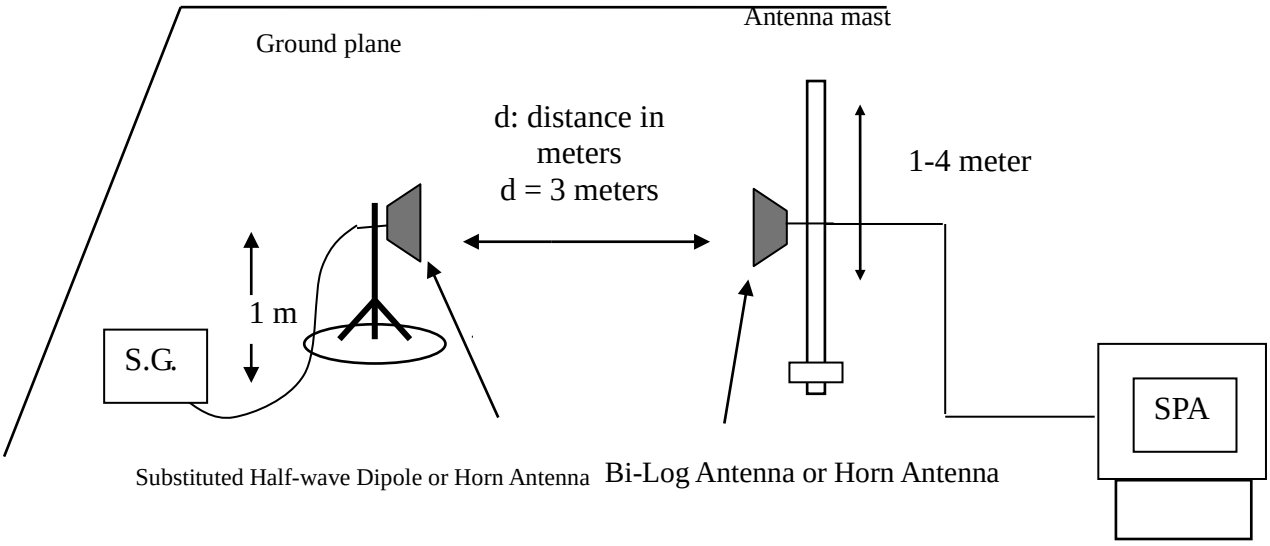
Below 1 GHz



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 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 603-E: 2016. 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.

ERP = S.G. output (dBm) + Antenna Gain (dBd) – Cable (dB)
EIRP = S.G. output (dBm) + Antenna Gain (dBi) – 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 IV)	Lowest	12.91	0.019	22.79	0.190
	Middle	10.91	0.012	21.37	0.137
	Highest	12.13	0.016	22.97	0.198

7.3 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

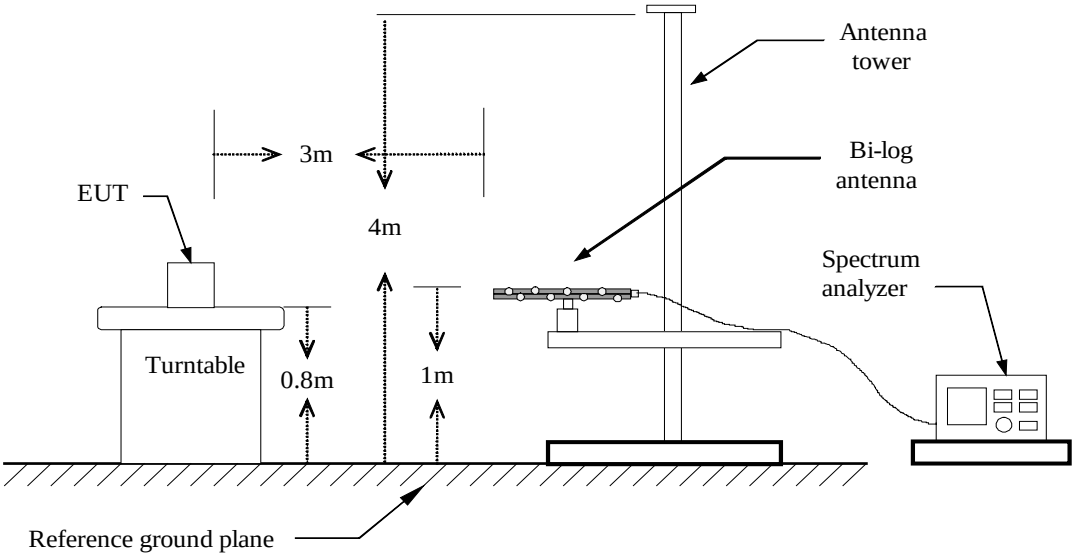
LIMIT

FCC §27.53 (h)

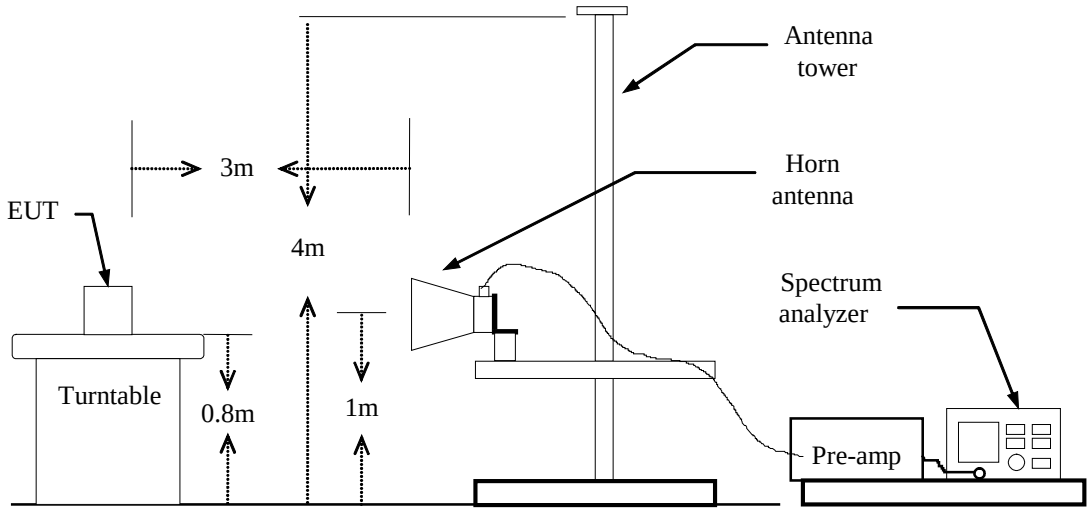
The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log10 (P) dB.

Test Configuration

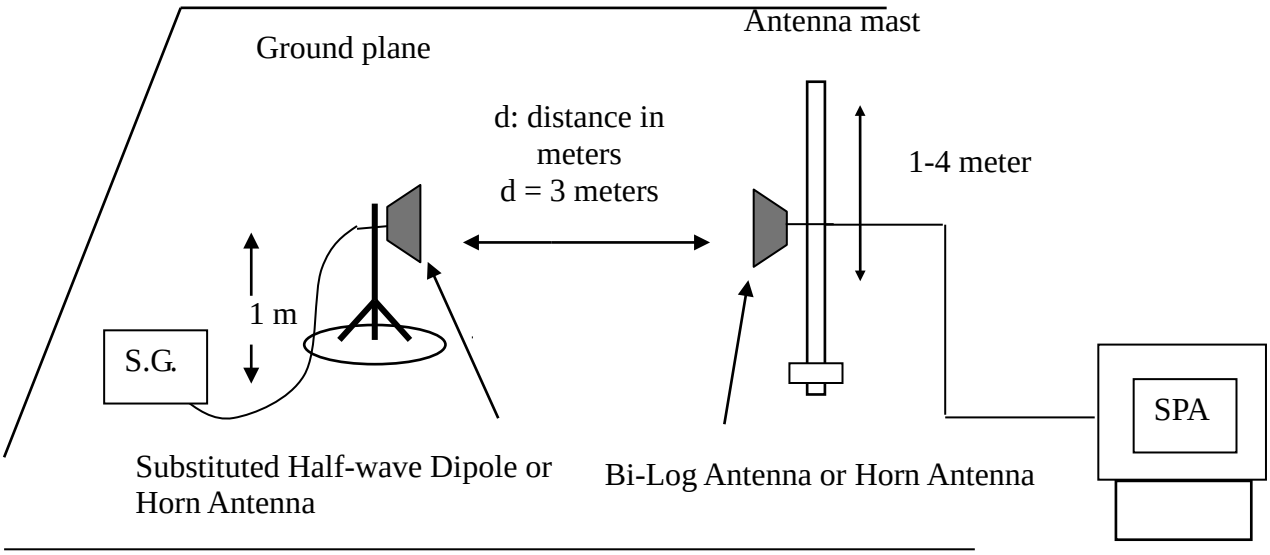
Below 1 GHz



Above 1 GHz



Substituted Method Test Set-up



TEST PROCEDURE

1. According to KDB 971168 D01. section 5.8 and TIA 603-E: 2016 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

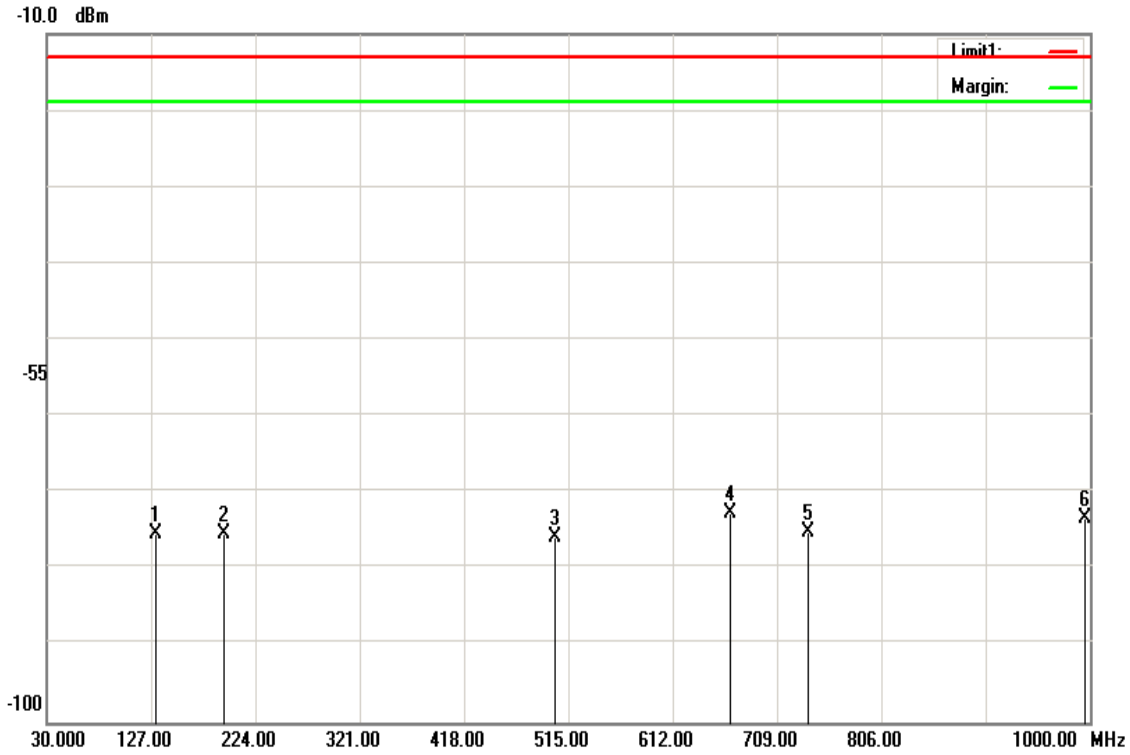
Refer to the attached tabular data sheets.

Below 1GHz

Operation Mode: WCDMA 12.2k RMC Band IV / TX /Mid CH **Test Date:** March 9, 2018

Temperature: 21 °C **Tested by:** Ivan Wang

Humidity: 54 % RH **Polarity:** Ver.

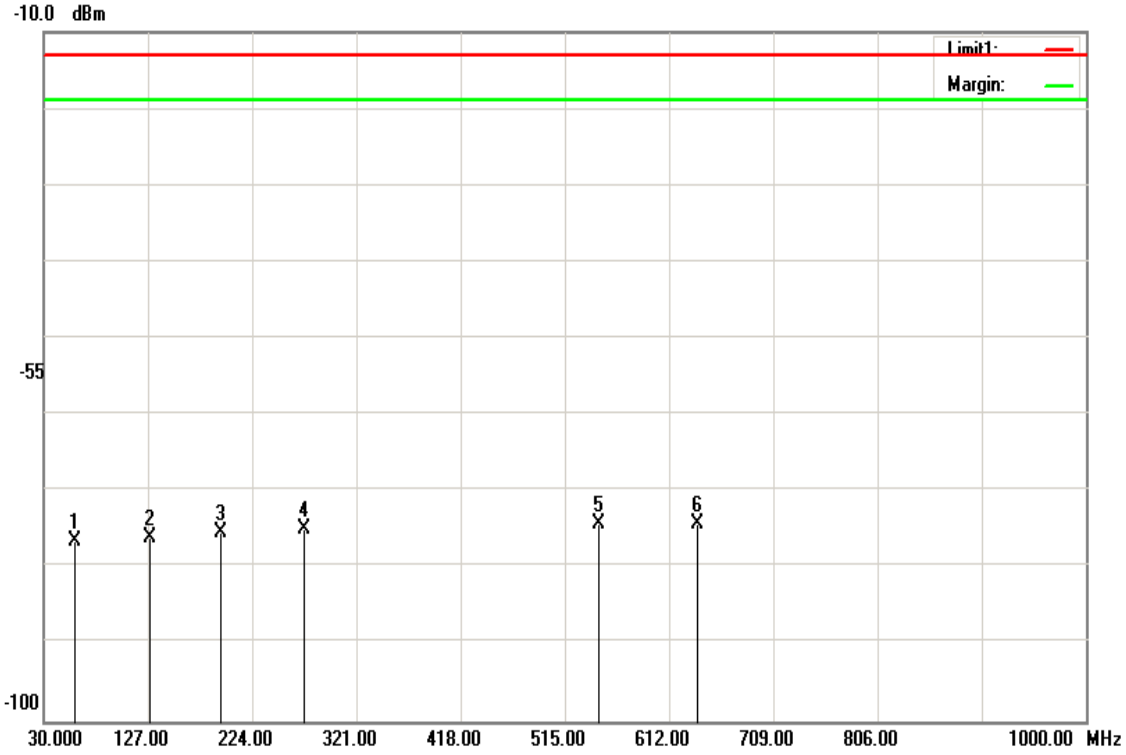


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
131.8500	-76.51	1.08	-75.43	-13.00	-62.43	V
194.9000	-79.49	4.1	-75.39	-13.00	-62.39	V
502.8750	-82.5	6.8	-75.70	-13.00	-62.70	V
665.3500	-74.29	1.52	-72.77	-13.00	-59.77	V
738.1000	-76.89	1.76	-75.13	-13.00	-62.13	V
995.1500	-79.45	6.09	-73.36	-13.00	-60.36	V

Operation Mode: WCDMA 12.2k RMC Band IV / TX /Mid CH **Test Date:** March 9, 2018

Temperature: 21 °C **Tested by:** Ivan Wang

Humidity: 54 % RH **Polarity:** Hor.



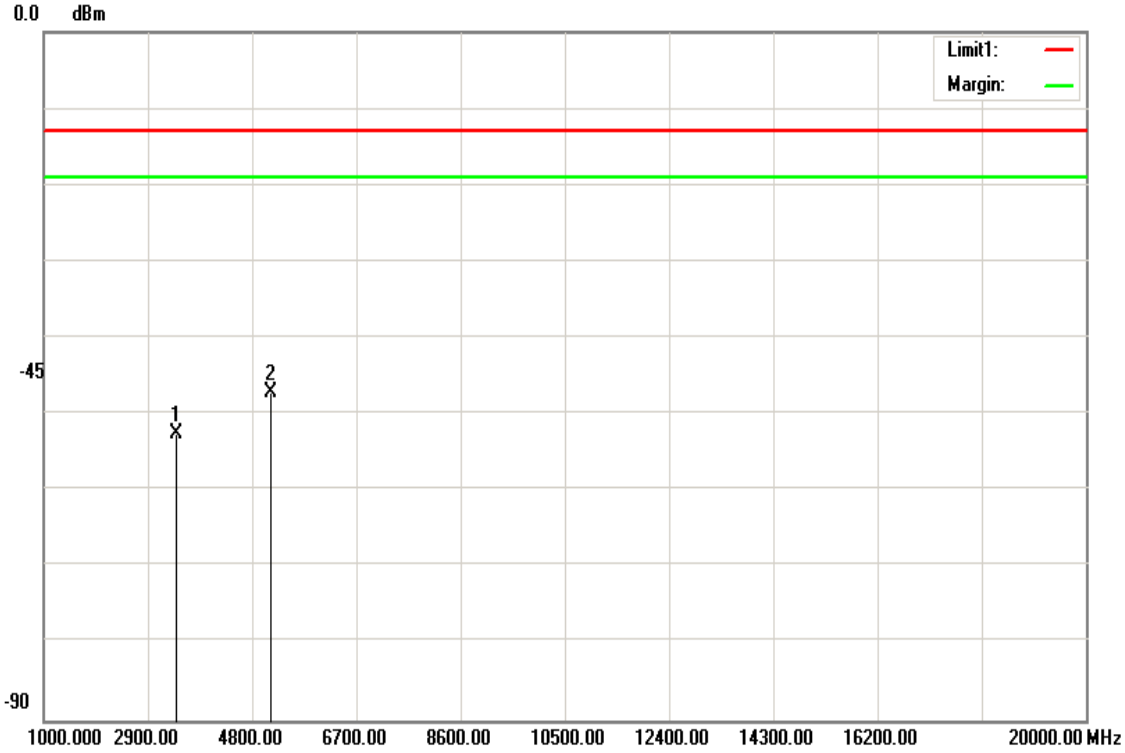
Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
59.1000	-75.11	-1.39	-76.50	-13.00	-63.50	H
129.4250	-77.16	1.04	-76.12	-13.00	-63.12	H
194.9000	-79.41	4.1	-75.31	-13.00	-62.31	H
272.5000	-82	7.17	-74.83	-13.00	-61.83	H
546.5250	-81.16	6.85	-74.31	-13.00	-61.31	H
638.6750	-74.95	0.64	-74.31	-13.00	-61.31	H

Above 1GHz

Operation Mode: WCDMA 12.2k RMC Band IV / TX /Low CH **Test Date:** March 9, 2018

Temperature: 21°C **Tested by:** Ivan Wang

Humidity: 54 % RH **Polarity:** Ver.

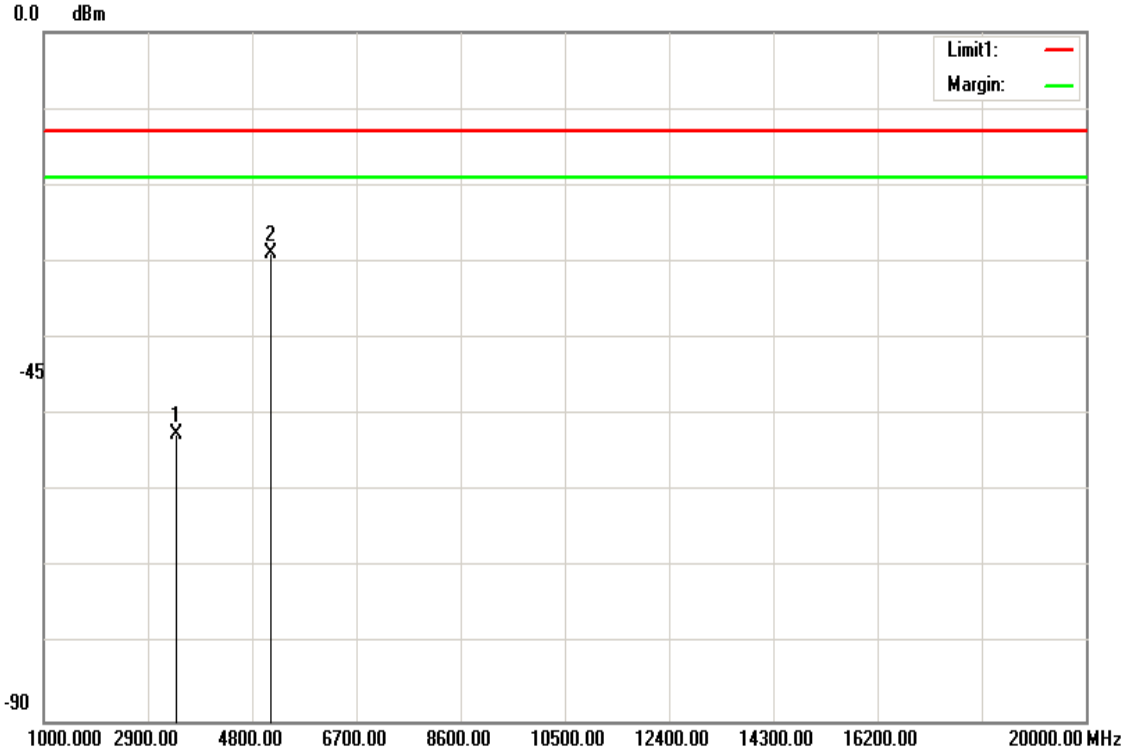


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3424.000	-64.74	12.3	-52.44	-13.00	-39.44	V
5137.000	-59.72	12.61	-47.11	-13.00	-34.11	V
N/A						

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:**	March 9, 2018
Temperature:	21°C	**Tested by:**	Ivan Wang
Humidity:	54 % RH	**Polarity:**	Hor.

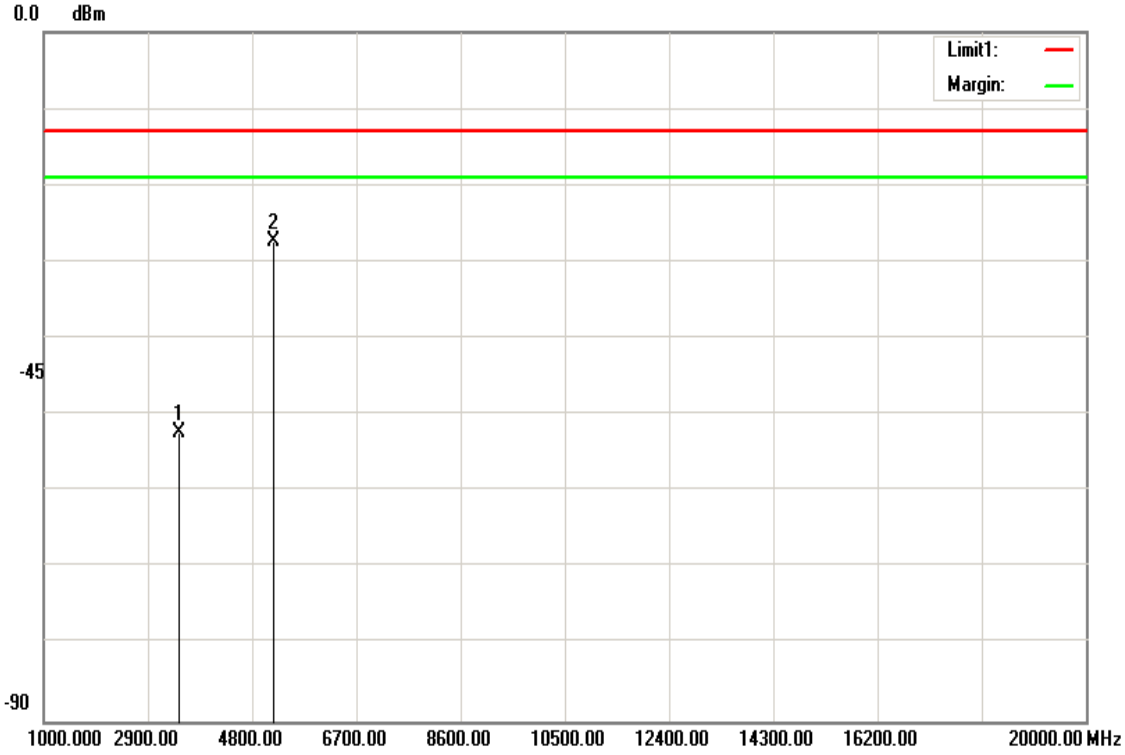


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3424.000	-64.92	12.3	-52.62	-13.00	-39.62	H
5137.000	-41.49	12.61	-28.88	-13.00	-15.88	H
N/A						

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:**	March 9, 2018
Temperature:	21°C	**Tested by:**	Ivan Wang
Humidity:	54 % RH	**Polarity:**	Ver.

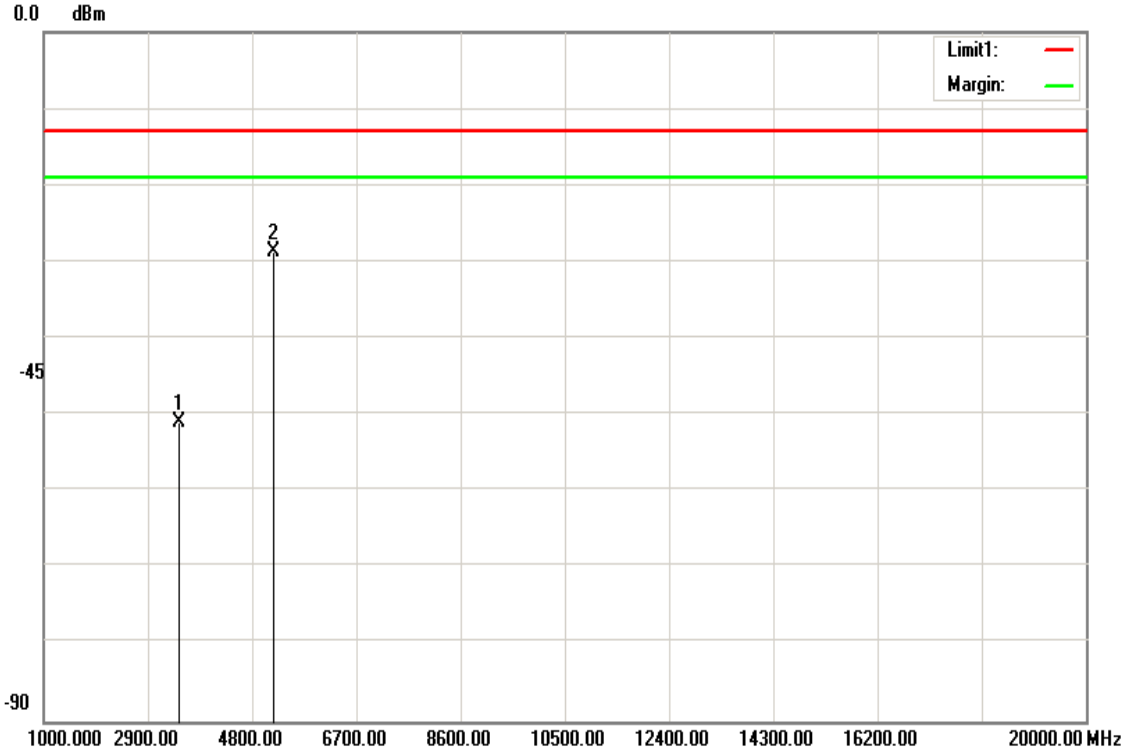


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3465.000	-64.65	12.41	-52.24	-13.00	-39.24	V
5197.000	-39.98	12.66	-27.32	-13.00	-14.32	V
N/A						

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:**	March 9, 2018
Temperature:	21°C	**Tested by:**	Ivan Wang
Humidity:	54 % RH	**Polarity:**	Hor.

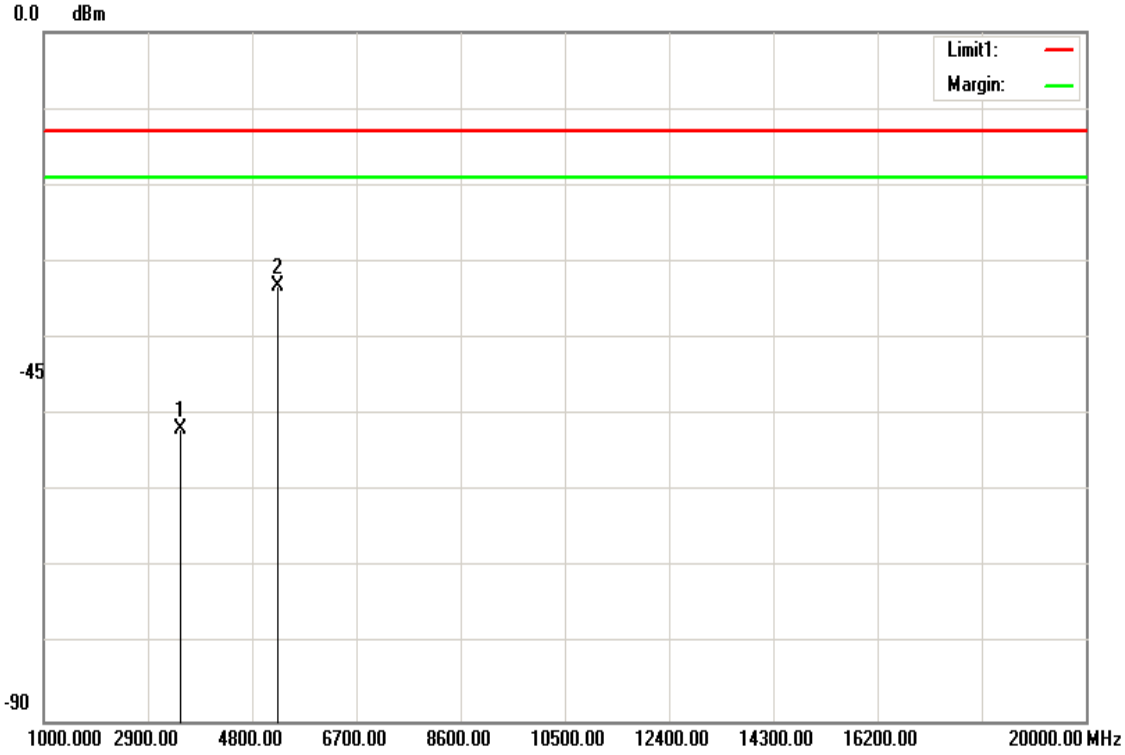


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3465.000	-63.43	12.41	-51.02	-13.00	-38.02	H
5197.000	-41.25	12.66	-28.59	-13.00	-15.59	H
N/A						

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:**	March 9, 2018
Temperature:	21°C	**Tested by:**	Ivan Wang
Humidity:	54 % RH	**Polarity:**	Ver.

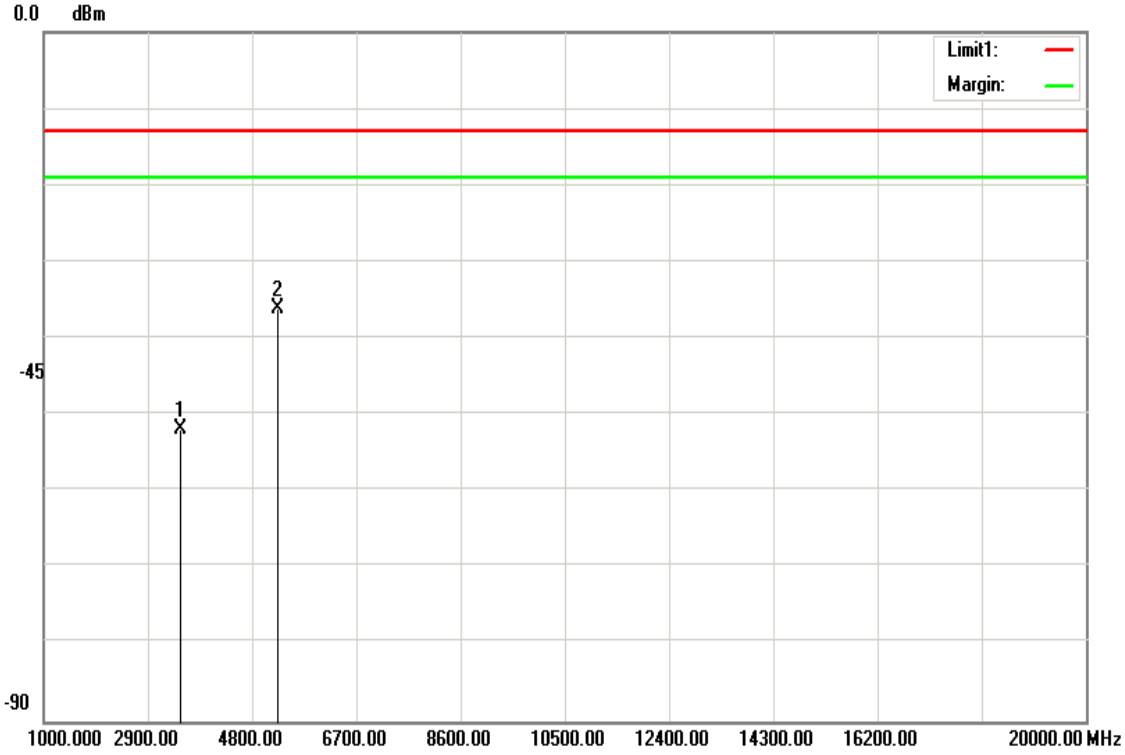


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3505.000	-64.41	12.5	-51.91	-13.00	-38.91	V
5257.000	-45.83	12.71	-33.12	-13.00	-20.12	V
N/A						

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:**	March 9, 2018
Temperature:	21°C	**Tested by:**	Ivan Wang
Humidity:	54 % RH	**Polarity:**	Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3505.000	-64.32	12.5	-51.82	-13.00	-38.82	H
5257.000	-48.87	12.71	-36.16	-13.00	-23.16	H
N/A						

Remark:

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