FCC 47 CFR PART 22 SUBPART H AND PART 24 SUBPART E (Class II Permissive Change)

TEST REPORT

For

Radio Module

Trade Name: DURABOOK

Model: EM7565-9

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

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.7, P.25, P.31	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 14 ~ 15, 2018

APPLICABLE STANDARDS	
STANDARD	**TEST RESULT**
FCC 47 CFR PART 22 SUBPART H AND PART 24 SUBPART E	No non-compliance noted

We hereby certify that:

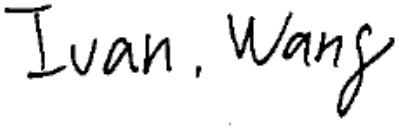
The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in TIA 603-E: 2016 and the energy emitted by the sample EUT tested as described in this report is in compliance with radiated emission limits of FCC Rule FCC PART 22 Subpart H, 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:



Ivan Wang
Assistant Engineer
Compliance Certification Services Inc.

2. EUT DESCRIPTION

Product	Radio Module	
Trade Name	DURABOOK	
Model	EM7565-9	
Model Discrepancy	All the model number was just for marketing purpose only.	
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	LTE Band 2 Channel Bandwidth: 1.4MHz	1850.7 MHz ~ 1909.2 MHz
	LTE Band 2 Channel Bandwidth: 3MHz	1851.5 MHz ~ 1908.4 MHz
	LTE Band 2 Channel Bandwidth: 5MHz	1852.5 MHz ~ 1907.5 MHz
	LTE Band 2 Channel Bandwidth: 10MHz	1855.0 MHz ~1905.0 MHz
	LTE Band 2 Channel Bandwidth: 15MHz	1857.5 MHz ~ 1902.5 MHz
	LTE Band 2 Channel Bandwidth: 20MHz	1860.0 MHz ~1900.0 MHz
	LTE Band 5 Channel Bandwidth: 1.4MHz	824.7 MHz ~ 848.2MHz
	LTE Band 5 Channel Bandwidth: 3MHz	825.5 MHz ~ 847.4 MHz
	LTE Band 5 Channel Bandwidth: 5MHz	826.5 MHz ~846.5 MHz
	LTE Band 5 Channel Bandwidth: 10MHz	829 MHz ~844 MHz
Modulation Technique	LTE Band 2	QPSK, 16QAM
	LTE Band 5	QPSK, 16QAM

Antenna Gain	Monopole Antenna Sinbon Technology Co., Ltd LTE Band II: P/N: 22+600761+00 (Main) / 2.49dBi 22+600762+00 (Aux) / 2.52dBi LTE Band V: P/N: 22+600761+00 (Main) / 0.8dBi 22+600762+00 (Aux) / 2.08dBi
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 2 and Part 22 Subpart H & 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.

3.3 DESCRIPTION OF TEST MODES

The EUT had been tested under operating condition.

Software used to control the EUT for staying in continuous transmitting mode was programmed.

LTE Band 2: 1850 MHz ~ 1915MHz

Three channels had been tested for each channel bandwidth.

Channel Bandwidth	1.4MHz		3MHz		5MHz	
	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
Low channel (L)	18607	1850.7	18615	1851.5	18625	1852.5
Middle channel (M)	18900	1880	18900	1880.0	18900	1880
High channel (H)	19192	1909.2	19184	1908.4	19175	1907.5
Channel Bandwidth	**10MHz**		**15MHz**		**20MHz**	
	Channel	**Frequency (MHz)**	**Channel**	**Frequency (MHz)**	**Channel**	**Frequency (MHz)**
Low channel (L)	18650	1855	18675	1857.5	18700	1860
Middle channel (M)	18900	1880	18900	1880.0	18900	1880
High channel (H)	19150	1905	19125	1902.5	19100	1900

LTE Band 5: 824 MHz ~ 849

Three channels had been tested for each channel bandwidth.

Channel Bandwidth	1.4MHz		3MHz	
	Channel	Frequency (MHz)	Channel	Frequency (MHz)
Low channel (L)	20407	824.7	20415	825.5
Middle channel (M)	20525	836.5	20525	836.5
High channel (H)	20642	848.2	20634	847.4
Channel Bandwidth	**5MHz**		**10MHz**	
	Channel	**Frequency (MHz)**	**Channel**	**Frequency (MHz)**
Low channel (L)	20425	826.5	20450	829
Middle channel (M)	20525	836.5	20525	836.5
High channel (H)	20625	846.5	20600	844

For test mode:

The conducted power be measured in 1, 50% and 100% RB allocation, offset to upper edge, centered and lower edge of the channel bandwidth of each required channel.

	QPSK	Worst Mode	16QAM	Worst Mode
Band2	1.4M	1 RB ALLOCATED AT THE UPPER EDGE	1.4M	1 RB ALLOCATED AT THE UPPER EDGE
	5M	1 RB ALLOCATED AT THE UPPER EDGE	5M	1 RB ALLOCATED AT THE UPPER EDGE
	10M	1 RB ALLOCATED AT THE UPPER EDGE	10M	1 RB ALLOCATED AT THE CENTERED
	20M	1 RB ALLOCATED AT THE UPPER EDGE	20M	1 RB ALLOCATED AT THE UPPER EDGE
Band5	1.4M	1 RB ALLOCATED AT THE UPPER EDGE	1.4M	1 RB ALLOCATED AT THE UPPER EDGE
	5M	1 RB ALLOCATED AT THE UPPER EDGE	5M	1 RB ALLOCATED AT THE UPPER EDGE
	10M	1 RB ALLOCATED AT THE UPPER EDGE	10M	1 RB ALLOCATED AT THE CENTERED

3.4 THE WORST MODE OF MEASUREMENT

LTE – Band 2

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 (Y-Plane) were recorded in this report.

LTE – Band 5

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
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 22 & 24 REQUIREMENTS

7.1 OUTPUT POWER MEASUREMENT

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

LTE Band 5

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power (dBm)	Average Power (W)
5	1.4	20407	824.7	QPSK	1	0	0	22.9	0.1950
					1	2	0	22.8	0.1905
					1	5	0	22.6	0.1820
					3	0	1	22.0	0.1585
					3	1	1	21.9	0.1549
					3	2	1	21.7	0.1479
					6	0	1	21.9	0.1549
				16QAM	1	0	1	22.0	0.1585
					1	2	1	21.8	0.1514
					1	5	1	21.7	0.1479
					3	0	2	20.9	0.1230
					3	1	2	20.9	0.1230
					3	2	2	20.8	0.1202
					6	0	2	21.0	0.1259
		20525	836.5	QPSK	1	0	0	23.4	0.2188
					1	2	0	23.4	0.2188
					1	5	0	23.2	0.2089
					3	0	1	22.5	0.1778
					3	1	1	22.4	0.1738
					3	2	1	22.3	0.1698
					6	0	1	22.5	0.1778
				16QAM	1	0	1	22.4	0.1738
					1	2	1	22.4	0.1738
					1	5	1	22.3	0.1698
					3	0	2	22.4	0.1738
					3	1	2	21.4	0.1380
					3	2	2	21.4	0.1380
					6	0	2	21.3	0.1349
		20642	848.2	QPSK	1	0	0	22.9	0.1950
					1	2	0	22.8	0.1905
					1	5	0	22.7	0.1862
					3	0	1	21.9	0.1549
					3	1	1	21.9	0.1549
					3	2	1	21.7	0.1479
					6	0	1	21.9	0.1549
				16QAM	1	0	1	21.9	0.1549
					1	2	1	21.8	0.1514
					1	5	1	21.8	0.1514
					3	0	2	20.9	0.1230
					3	1	2	20.9	0.1230
					3	2	2	20.8	0.1202
					6	0	2	20.8	0.1202

LTE Band 5

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power (dBm)	Average Power (W)
5	3	20415	825.5	QPSK	1	0	0	22.9	0.1950
					1	7	0	22.8	0.1905
					1	14	0	22.6	0.1820
					8	0	1	22.0	0.1585
					8	4	1	21.9	0.1549
					8	7	1	21.7	0.1479
					15	0	1	21.9	0.1549
				16QAM	1	0	1	22.0	0.1585
					1	7	1	21.8	0.1514
					1	14	1	21.7	0.1479
					8	0	2	20.9	0.1230
					8	4	2	20.9	0.1230
					8	7	2	20.8	0.1202
					15	0	2	21.0	0.1259
		20525	836.5	QPSK	1	0	0	23.4	0.2188
					1	7	0	23.4	0.2188
					1	14	0	23.2	0.2089
					8	0	1	22.5	0.1778
					8	4	1	22.4	0.1738
					8	7	1	22.3	0.1698
					15	0	1	22.5	0.1778
				16QAM	1	0	1	22.4	0.1738
					1	7	1	22.4	0.1738
					1	14	1	22.3	0.1698
					8	0	2	22.4	0.1738
					8	4	2	21.4	0.1380
					8	7	2	21.4	0.1380
					15	0	2	21.3	0.1349
		20634	847.4	QPSK	1	0	0	22.9	0.1950
					1	7	0	22.8	0.1905
					1	14	0	22.7	0.1862
					8	0	1	21.9	0.1549
					8	4	1	21.9	0.1549
					8	7	1	21.7	0.1479
					15	0	1	21.9	0.1549
				16QAM	1	0	1	21.9	0.1549
					1	7	1	21.8	0.1514
					1	14	1	21.8	0.1514
					8	0	2	20.9	0.1230
					8	4	2	20.9	0.1230
					8	7	2	20.8	0.1202
					15	0	2	20.8	0.1202

LTE Band 5

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power (dBm)	Average Power (W)
5	5	20425	826.5	QPSK	1	0	0	23.0	0.1995
					1	12	0	22.9	0.1950
					1	24	0	22.7	0.1862
					12	0	1	22.1	0.1622
					12	6	1	22.0	0.1585
					12	11	1	21.8	0.1514
					25	0	1	22.0	0.1585
				16QAM	1	0	1	22.1	0.1622
					1	12	1	21.9	0.1549
					1	24	1	21.8	0.1514
					12	0	2	21.0	0.1259
					12	6	2	21.0	0.1259
					12	11	2	20.9	0.1230
					25	0	2	21.1	0.1288
		20525	836.5	QPSK	1	0	0	23.5	0.2239
					1	12	0	23.5	0.2239
					1	24	0	23.3	0.2138
					12	0	1	22.6	0.1820
					12	6	1	22.5	0.1778
					12	11	1	22.4	0.1738
					25	0	1	22.6	0.1820
				16QAM	1	0	1	22.5	0.1778
					1	12	1	22.5	0.1778
					1	24	1	22.4	0.1738
					12	0	2	22.5	0.1778
					12	6	2	21.5	0.1413
					12	11	2	21.5	0.1413
					25	0	2	21.4	0.1380
		20625	846.5	QPSK	1	0	0	23.0	0.1995
					1	12	0	22.9	0.1950
					1	24	0	22.8	0.1905
					12	0	1	22.0	0.1585
					12	6	1	22.0	0.1585
					12	11	1	21.8	0.1514
					25	0	1	22.0	0.1585
				16QAM	1	0	1	22.0	0.1585
					1	12	1	21.9	0.1549
					1	24	1	21.9	0.1549
					12	0	2	21.0	0.1259
					12	6	2	21.0	0.1259
					12	11	2	20.9	0.1230
					25	0	2	20.9	0.1230

LTE Band 5

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power (dBm)	Average Power (W)
5	10	20450	829.0	QPSK	1	0	0	23.0	0.1995
					1	24	0	22.9	0.1950
					1	49	0	22.7	0.1862
					25	0	1	22.1	0.1622
					25	12	1	22.0	0.1585
					25	24	1	21.8	0.1514
					50	0	1	22.0	0.1585
				16QAM	1	0	1	22.1	0.1622
					1	24	1	21.9	0.1549
					1	49	1	21.8	0.1514
					25	0	2	21.0	0.1259
					25	12	2	21.0	0.1259
					25	24	2	20.9	0.1230
					50	0	2	21.1	0.1288
		20525	836.5	QPSK	1	0	0	23.5	0.2239
					1	24	0	23.5	0.2239
					1	49	0	23.3	0.2138
					25	0	1	22.6	0.1820
					25	12	1	22.5	0.1778
					25	24	1	22.4	0.1738
					50	0	1	22.6	0.1820
				16QAM	1	0	1	22.5	0.1778
					1	24	1	22.5	0.1778
					1	49	1	22.4	0.1738
					25	0	2	22.5	0.1778
					25	12	2	21.5	0.1413
					25	24	2	21.5	0.1413
					50	0	2	21.4	0.1380
		20600	844.0	QPSK	1	0	0	23.0	0.1995
					1	24	0	22.9	0.1950
					1	49	0	22.8	0.1905
					25	0	1	22.0	0.1585
					25	12	1	22.0	0.1585
					25	24	1	21.8	0.1514
					50	0	1	22.0	0.1585
				16QAM	1	0	1	22.0	0.1585
					1	24	1	21.9	0.1549
					1	49	1	21.9	0.1549
					25	0	2	21.0	0.1259
					25	12	2	21.0	0.1259
					25	24	2	20.9	0.1230
					50	0	2	20.9	0.1230

LTE Band 2

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power (dBm)	Average Power (W)
2	1.4	18607	1850.7	QPSK	1	0	0	23.3	0.2138
					1	2	0	23.1	0.2042
					1	5	0	23.1	0.2042
					3	0	1	22.3	0.1698
					3	1	1	22.1	0.1622
					3	2	1	22.2	0.1660
					6	0	1	22.3	0.1698
				16QAM	1	0	1	22.4	0.1738
					1	2	1	22.2	0.1660
					1	5	1	22.1	0.1622
					3	0	2	21.4	0.1380
					3	1	2	21.2	0.1318
					3	2	2	21.2	0.1318
					6	0	2	21.4	0.1380
		18900	1880.0	QPSK	1	0	0	23.4	0.2188
					1	2	0	23.2	0.2089
					1	5	0	23.1	0.2042
					3	0	1	22.4	0.1738
					3	1	1	22.2	0.1660
					3	2	1	22.2	0.1660
					6	0	1	22.3	0.1698
				16QAM	1	0	1	22.4	0.1738
					1	2	1	22.2	0.1660
					1	5	1	22.1	0.1622
					3	0	2	21.4	0.1380
					3	1	2	21.2	0.1318
					3	2	2	21.1	0.1288
					6	0	2	21.2	0.1318
		19192	1909.2	QPSK	1	0	0	23.4	0.2188
					1	2	0	23.3	0.2138
					1	5	0	23.2	0.2089
					3	0	1	22.4	0.1738
					3	1	1	22.3	0.1698
					3	2	1	22.2	0.1660
					6	0	1	22.4	0.1738
				16QAM	1	0	1	22.5	0.1778
					1	2	1	22.4	0.1738
					1	5	1	22.2	0.1660
					3	0	2	22.5	0.1778
					3	1	2	22.3	0.1698
					3	2	2	22.2	0.1660
					6	0	2	21.3	0.1349

LTE Band 2

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power (dBm)	Average Power (W)
2	3	18615	1851.5	QPSK	1	0	0	23.3	0.2138
					1	7	0	23.1	0.2042
					1	14	0	23.1	0.2042
					8	0	1	22.3	0.1698
					8	4	1	22.1	0.1622
					8	7	1	22.2	0.1660
					15	0	1	22.3	0.1698
				16QAM	1	0	1	22.4	0.1738
					1	7	1	22.2	0.1660
					1	14	1	22.1	0.1622
					8	0	2	21.4	0.1380
					8	4	2	21.2	0.1318
					8	7	2	21.2	0.1318
					15	0	2	21.4	0.1380
		18900	1880.0	QPSK	1	0	0	23.4	0.2188
					1	7	0	23.2	0.2089
					1	14	0	23.1	0.2042
					8	0	1	22.4	0.1738
					8	4	1	22.2	0.1660
					8	7	1	22.2	0.1660
					15	0	1	22.3	0.1698
				16QAM	1	0	1	22.4	0.1738
					1	7	1	22.2	0.1660
					1	14	1	22.1	0.1622
					8	0	2	21.4	0.1380
					8	4	2	21.2	0.1318
					8	7	2	21.1	0.1288
					15	0	2	21.3	0.1349
		19184	1908.4	QPSK	1	0	0	23.4	0.2188
					1	7	0	23.3	0.2138
					1	14	0	23.2	0.2089
					8	0	1	22.4	0.1738
					8	4	1	22.3	0.1698
					8	7	1	22.2	0.1660
					15	0	1	22.4	0.1738
				16QAM	1	0	1	22.5	0.1778
					1	7	1	22.4	0.1738
					1	14	1	22.2	0.1660
					8	0	2	22.5	0.1778
					8	4	2	22.3	0.1698
					8	7	2	22.2	0.1660
					15	0	2	21.4	0.1380

LTE Band 2

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power (dBm)	Average Power (W)
2	5	18625	1852.5	QPSK	1	0	0	23.4	0.2188
					1	12	0	23.2	0.2089
					1	24	0	23.2	0.2089
					12	0	1	22.4	0.1738
					12	6	1	22.2	0.1660
					12	11	1	22.3	0.1698
					25	0	1	22.4	0.1738
				16QAM	1	0	1	22.5	0.1778
					1	12	1	22.3	0.1698
					1	24	1	22.2	0.1660
					12	0	2	21.5	0.1413
					12	6	2	21.3	0.1349
					12	11	2	21.3	0.1349
					25	0	2	21.5	0.1413
		18900	1880.0	QPSK	1	0	0	23.5	0.2239
					1	12	0	23.3	0.2138
					1	24	0	23.2	0.2089
					12	0	1	22.5	0.1778
					12	6	1	22.3	0.1698
					12	11	1	22.3	0.1698
					25	0	1	22.4	0.1738
				16QAM	1	0	1	22.5	0.1778
					1	12	1	22.3	0.1698
					1	24	1	22.2	0.1660
					12	0	2	21.5	0.1413
					12	6	2	21.3	0.1349
					12	11	2	21.2	0.1318
					25	0	2	21.6	0.1445
		19175	1907.5	QPSK	1	0	0	23.5	0.2239
					1	12	0	23.4	0.2188
					1	24	0	23.3	0.2138
					12	0	1	22.5	0.1778
					12	6	1	22.4	0.1738
					12	11	1	22.3	0.1698
					25	0	1	22.5	0.1778
				16QAM	1	0	1	22.6	0.1820
					1	12	1	22.5	0.1778
					1	24	1	22.3	0.1698
					12	0	2	22.6	0.1820
					12	6	2	22.4	0.1738
					12	11	2	22.3	0.1698
					25	0	2	22.5	0.1778

LTE Band 2

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power (dBm)	Average Power (W)
2	10	18650	1855.0	QPSK	1	0	0	23.4	0.2188
					1	24	0	23.2	0.2089
					1	49	0	23.2	0.2089
					25	0	1	22.4	0.1738
					25	12	1	22.2	0.1660
					25	24	1	22.3	0.1698
					50	0	1	22.4	0.1738
				16QAM	1	0	1	22.5	0.1778
					1	24	1	22.3	0.1698
					1	49	1	22.2	0.1660
					25	0	2	21.5	0.1413
					25	12	2	21.3	0.1349
					25	24	2	21.3	0.1349
					50	0	2	21.5	0.1413
		18900	1880.0	QPSK	1	0	0	23.5	0.2239
					1	24	0	23.3	0.2138
					1	49	0	23.2	0.2089
					25	0	1	22.5	0.1778
					25	12	1	22.3	0.1698
					25	24	1	22.3	0.1698
					50	0	1	22.4	0.1738
				16QAM	1	0	1	22.5	0.1778
					1	24	1	22.3	0.1698
					1	49	1	22.2	0.1660
					25	0	2	21.5	0.1413
					25	12	2	21.3	0.1349
					25	24	2	21.2	0.1318
					50	0	2	21.6	0.1445
		19150	1905.0	QPSK	1	0	0	23.5	0.2239
					1	24	0	23.4	0.2188
					1	49	0	23.3	0.2138
					25	0	1	22.5	0.1778
					25	12	1	22.4	0.1738
					25	24	1	22.3	0.1698
					50	0	1	22.5	0.1778
				16QAM	1	0	1	22.6	0.1820
					1	24	1	22.5	0.1778
					1	49	1	22.3	0.1698
					25	0	2	22.6	0.1820
					25	12	2	22.4	0.1738
					25	24	2	22.3	0.1698
					50	0	2	22.5	0.1778

LTE Band 2

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power (dBm)	Average Power (W)
2	15	18675	1857.5	QPSK	1	0	0	23.5	0.2239
					1	37	0	23.3	0.2138
					1	74	0	23.3	0.2138
					36	0	1	22.5	0.1778
					36	18	1	22.3	0.1698
					36	35	1	22.4	0.1738
					75	0	1	22.5	0.1778
				16QAM	1	0	1	22.6	0.1820
					1	37	1	22.4	0.1738
					1	74	1	22.3	0.1698
					36	0	2	21.6	0.1445
					36	18	2	21.4	0.1380
					36	35	2	21.4	0.1380
					75	0	2	21.6	0.1445
		18900	1880.0	QPSK	1	0	0	23.6	0.2291
					1	37	0	23.4	0.2188
					1	74	0	23.3	0.2138
					36	0	1	22.6	0.1820
					36	18	1	22.4	0.1738
					36	35	1	22.4	0.1738
					75	0	1	22.5	0.1778
				16QAM	1	0	1	22.6	0.1820
					1	37	1	22.4	0.1738
					1	74	1	22.3	0.1698
					36	0	2	21.6	0.1445
					36	18	2	21.4	0.1380
					36	35	2	21.3	0.1349
					75	0	2	21.7	0.1479
		19125	1902.5	QPSK	1	0	0	23.6	0.2291
					1	37	0	23.5	0.2239
					1	74	0	23.4	0.2188
					36	0	1	22.6	0.1820
					36	18	1	22.5	0.1778
					36	35	1	22.4	0.1738
					75	0	1	22.6	0.1820
				16QAM	1	0	1	22.7	0.1862
					1	37	1	22.6	0.1820
					1	74	1	22.4	0.1738
					36	0	2	22.7	0.1862
					36	18	2	22.5	0.1778
					36	35	2	22.4	0.1738
					75	0	2	22.6	0.1820

LTE Band 2

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power (dBm)	Average Power (W)
2	20	18700	1860.0	QPSK	1	0	0	23.6	0.2291
					1	49	0	23.4	0.2188
					1	99	0	23.4	0.2188
					50	0	1	22.6	0.1820
					50	24	1	22.4	0.1738
					50	49	1	22.5	0.1778
					100	0	1	22.6	0.1820
				16QAM	1	0	1	22.7	0.1862
					1	49	1	22.5	0.1778
					1	99	1	22.4	0.1738
					50	0	2	21.7	0.1479
					50	24	2	21.5	0.1413
					50	49	2	21.5	0.1413
					100	0	2	21.7	0.1479
		18900	1880.0	QPSK	1	0	0	23.7	0.2344
					1	49	0	23.5	0.2239
					1	99	0	23.4	0.2188
					50	0	1	22.7	0.1862
					50	24	1	22.5	0.1778
					50	49	1	22.5	0.1778
					100	0	1	22.6	0.1820
				16QAM	1	0	1	22.7	0.1862
					1	49	1	22.5	0.1778
					1	99	1	22.4	0.1738
					50	0	2	21.7	0.1479
					50	24	2	21.5	0.1413
					50	49	2	21.4	0.1380
					100	0	2	21.8	0.1514
		19100	1900.0	QPSK	1	0	0	23.7	0.2344
					1	49	0	23.6	0.2291
					1	99	0	23.5	0.2239
					50	0	1	22.7	0.1862
					50	24	1	22.6	0.1820
					50	49	1	22.5	0.1778
					100	0	1	22.7	0.1862
				16QAM	1	0	1	22.8	0.1905
					1	49	1	22.7	0.1862
					1	99	1	22.5	0.1778
					50	0	2	22.8	0.1905
					50	24	2	22.6	0.1820
					50	49	2	22.5	0.1778
					100	0	2	22.7	0.1862

7.2 ERP & EIRP MEASUREMENT

LIMIT

According to FCC §2.1046

FCC 22.913(b):

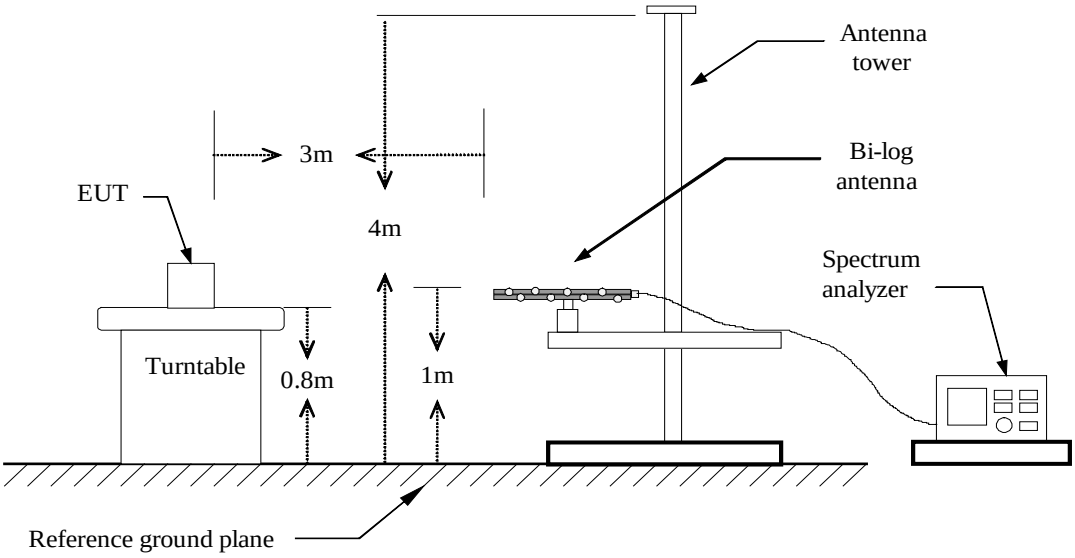
The Effective Radiated Power (ERP) of mobile transmitters must not exceed 7 Watts.

FCC 24.232(b):

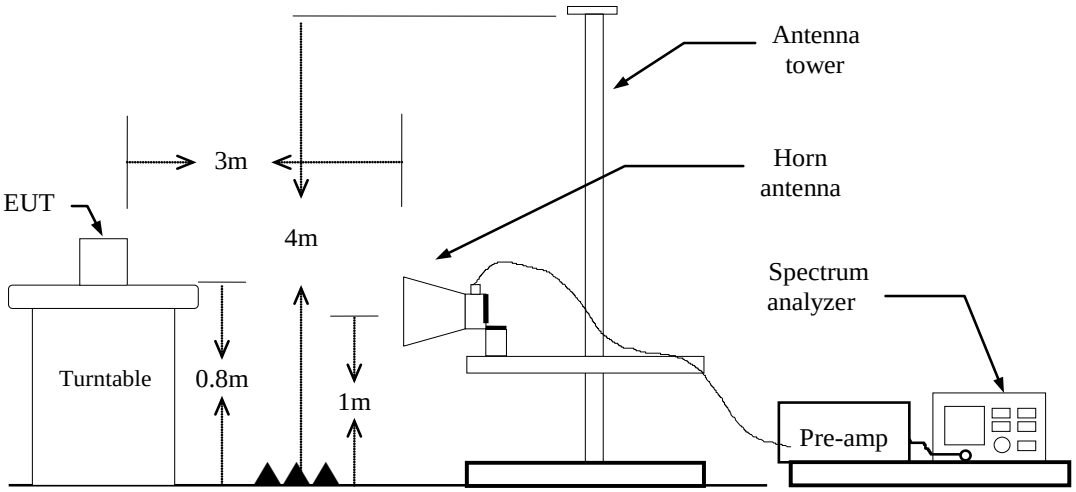
The equivalent Isotropic Radiated Power (EIRP) must not exceed 2 Watts.

Test Configuration

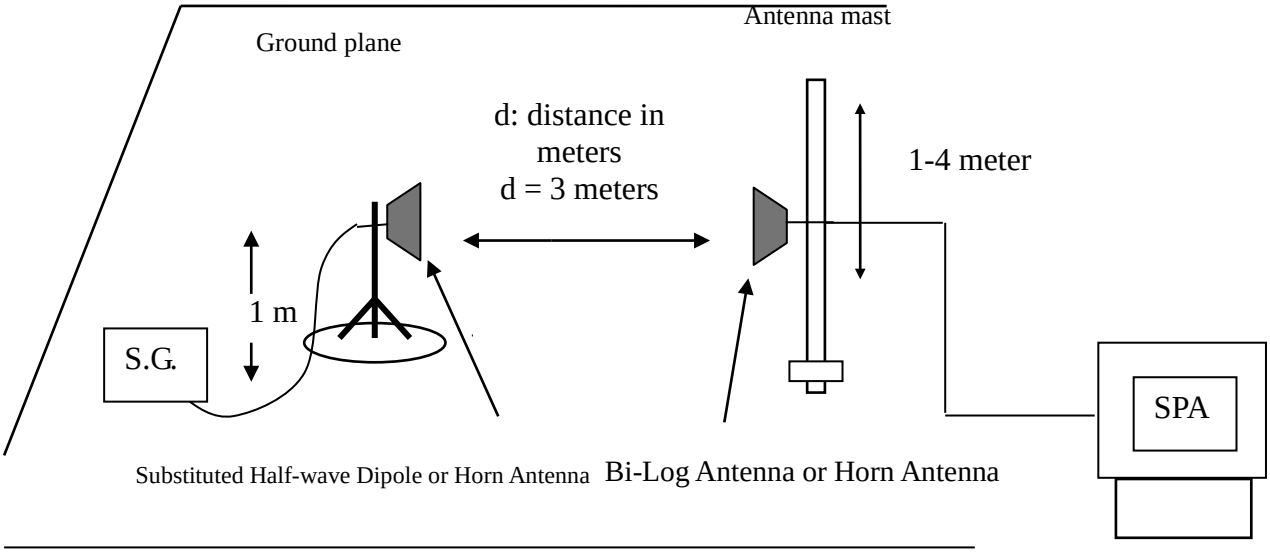
Below 1 GHz



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 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 (dBi) – Cable (dB)-2.15
EIRP = S.G. output (dBm) + Antenna Gain (dBi) – Cable (dB)

TEST RESULTS

No non-compliance noted.

LTE Band 2

BW: 1.4MHz / RB=1, RB Offset=0

Band	BW (MHz)	Channel	Mode	UL RB Allocation	UL RB offset	Vertical		Horizontal	
						EIRP (dBm)	EIRP (W)	EIRP (dBm)	EIRP (W)
2	1.4	Lowest	QPSK	1	0	20.30	0.107	21.28	0.134
		Middle		1	0	20.07	0.101	21.23	0.132
		Highest		1	0	18.26	0.067	16.30	0.042
		Lowest	16 QAM	1	0	20.05	0.101	20.95	0.124
		Middle		1	0	20.52	0.112	18.68	0.073
		Highest		1	0	17.93	0.062	17.07	0.050

BW: 3MHz / RB=1, RB Offset=0

Band	BW (MHz)	Channel	Mode	UL RB Allocation	UL RB offset	Vertical		Horizontal	
						EIRP (dBm)	EIRP (W)	EIRP (dBm)	EIRP (W)
2	3	Lowest	QPSK	1	0	19.86	0.096	21.05	0.127
		Middle		1	0	19.99	0.099	19.21	0.083
		Highest		1	0	18.78	0.075	17.59	0.057
		Lowest	16 QAM	1	0	20.00	0.100	20.99	0.125
		Middle		1	0	19.99	0.099	17.85	0.061
		Highest		1	0	18.89	0.077	18.00	0.063

BW: 5MHz / RB=1, RB Offset=0

Band	BW (MHz)	Channel	Mode	UL RB Allocation	UL RB offset	Vertical		Horizontal	
						EIRP (dBm)	EIRP (W)	EIRP (dBm)	EIRP (W)
2	5	Lowest	QPSK	1	0	19.36	0.086	20.90	0.123
		Middle		1	0	19.26	0.084	18.68	0.073
		Highest		1	0	19.46	0.088	18.44	0.069
		Lowest	16 QAM	1	0	20.10	0.102	20.98	0.125
		Middle		1	0	19.61	0.091	17.93	0.062
		Highest		1	0	19.63	0.091	18.57	0.071

BW: 10MHz / RB=1, RB Offset=0

Band	BW (MHz)	Channel	Mode	UL RB Allocation	UL RB offset	Vertical		Horizontal	
						EIRP (dBm)	EIRP (W)	EIRP (dBm)	EIRP (W)
2	10	Lowest	QPSK	1	0	19.27	0.084	20.74	0.118
		Middle		1	0	19.19	0.083	18.60	0.072
		Highest		1	0	19.86	0.096	19.04	0.080
		Lowest	16 QAM	1	0	19.85	0.096	20.91	0.123
		Middle		1	0	19.32	0.085	17.56	0.057
		Highest		1	0	20.11	0.102	19.17	0.082

BW: 15MHz / RB=1, RB Offset=0

Band	BW (MHz)	Channel	Mode	UL RB Allocation	UL RB offset	Vertical		Horizontal	
						EIRP (dBm)	EIRP (W)	EIRP (dBm)	EIRP (W)
2	15	Lowest	QPSK	1	0	19.41	0.087	20.89	0.122
		Middle		1	0	19.36	0.086	19.36	0.086
		Highest		1	0	21.70	0.147	20.61	0.115
		Lowest	16 QAM	1	0	19.65	0.092	20.38	0.109
		Middle		1	0	19.59	0.091	19.29	0.084
		Highest		1	0	21.95	0.156	20.84	0.121

BW: 20MHz / RB=1, RB Offset=0

Band	BW (MHz)	Channel	Mode	UL RB Allocation	UL RB offset	Vertical		Horizontal	
						EIRP (dBm)	EIRP (W)	EIRP (dBm)	EIRP (W)
2	20	Lowest	QPSK	1	0	19.67	0.092	19.45	0.088
		Middle		1	0	20.40	0.109	20.12	0.102
		Highest		1	0	22.09	0.161	20.97	0.125
		Lowest	16 QAM	1	0	19.86	0.096	20.93	0.123
		Middle		1	0	20.57	0.114	20.44	0.110
		Highest		1	0	22.16	0.164	20.26	0.106

LTE Band 5

BW: 1.4MHz / RB=1, RB Offset=0

Band	BW (MHz)	Channel	Mode	UL RB Allocation	UL RB offset	Vertical		Horizontal	
						ERP (dBm)	ERP (W)	ERP (dBm)	ERP (W)
5	1.4	Lowest	QPSK	1	0	18.70	0.074	26.00	0.398
		Middle		1	0	19.64	0.092	29.33	0.897
		Highest		1	0	19.55	0.090	29.38	0.867
		Lowest	16 QAM	1	0	22.42	0.174	28.53	0.712
		Middle		1	0	22.83	0.191	29.38	0.897
		Highest		1	0	22.77	0.189	29.79	0.952

BW: 3MHz / RB=1, RB Offset=0

Band	BW (MHz)	Channel	Mode	UL RB Allocation	UL RB offset	Vertical		Horizontal	
						ERP (dBm)	ERP (W)	ERP (dBm)	ERP (W)
5	3	Lowest	QPSK	1	0	19.28	0.084	28.99	0.792
		Middle		1	0	21.16	0.130	28.66	0.734
		Highest		1	0	23.56	0.227	28.67	0.736
		Lowest	16 QAM	1	0	21.17	0.130	25.41	0.347
		Middle		1	0	22.18	0.165	26.55	0.451
		Highest		1	0	22.22	0.166	27.96	0.625

BW: 5MHz / RB=1, RB Offset=0

Band	BW (MHz)	Channel	Mode	UL RB Allocation	UL RB offset	Vertical		Horizontal	
						ERP (dBm)	ERP (W)	ERP (dBm)	ERP (W)
5	5	Lowest	QPSK	1	0	22.91	0.195	28.98	0.790
		Middle		1	0	24.93	0.311	27.46	0.557
		Highest		1	0	23.72	0.235	27.54	0.567
		Lowest	16 QAM	1	0	21.47	0.140	25.50	0.562
		Middle		1	0	22.06	0.160	26.76	0.597
		Highest		1	0	22.57	0.180	25.98	0.396

BW: 10MHz / RB=1, RB Offset=0

Band	BW (MHz)	Channel	Mode	UL RB Allocation	UL RB offset	Vertical		Horizontal	
						ERP (dBm)	ERP (W)	ERP (dBm)	ERP (W)
5	10	Lowest	QPSK	1	0	21.37	0.137	28.52	0.711
		Middle		1	0	20.15	0.103	29.22	0.835
		Highest		1	0	21.19	0.131	29.47	0.885
		Lowest	16 QAM	1	0	20.49	0.111	25.70	0.371
		Middle		1	0	21.18	0.131	26.20	0.416
		Highest		1	0	20.80	0.120	26.92	0.492

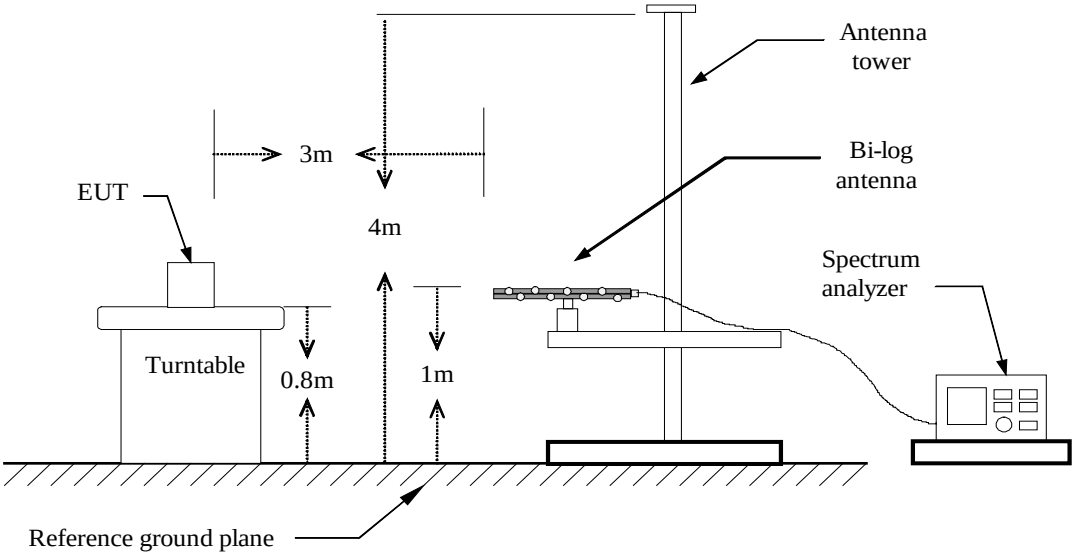
7.3 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

LIMIT

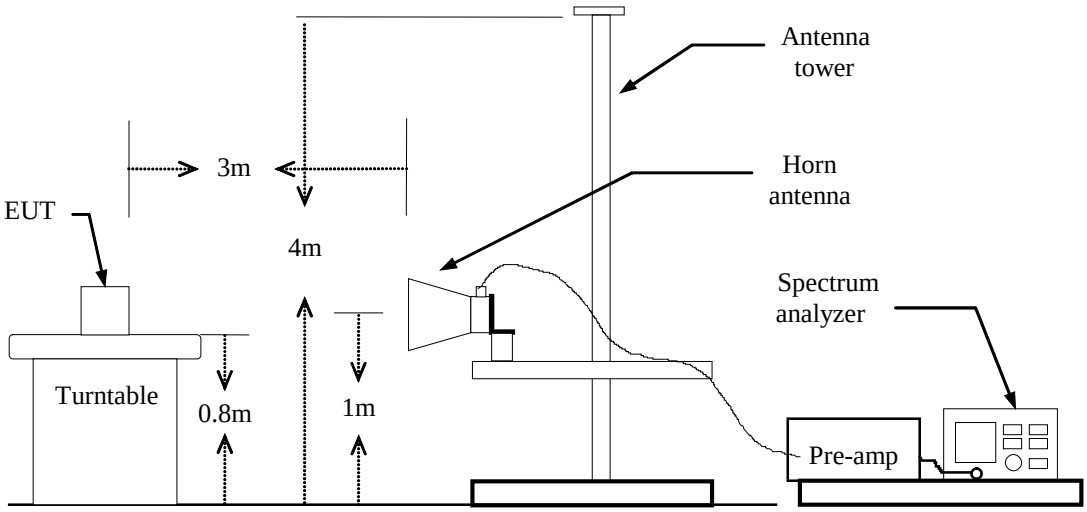
The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 +10 log10(P) dB. The limit of emission equal to –13dBm

Test Configuration

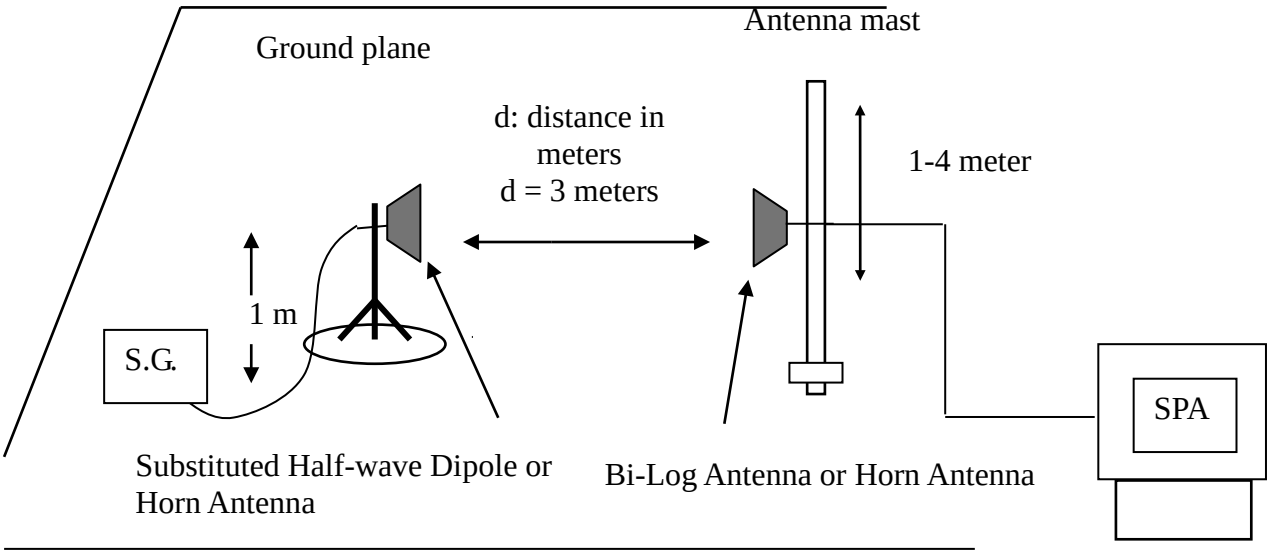
Below 1 GHz



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 : 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

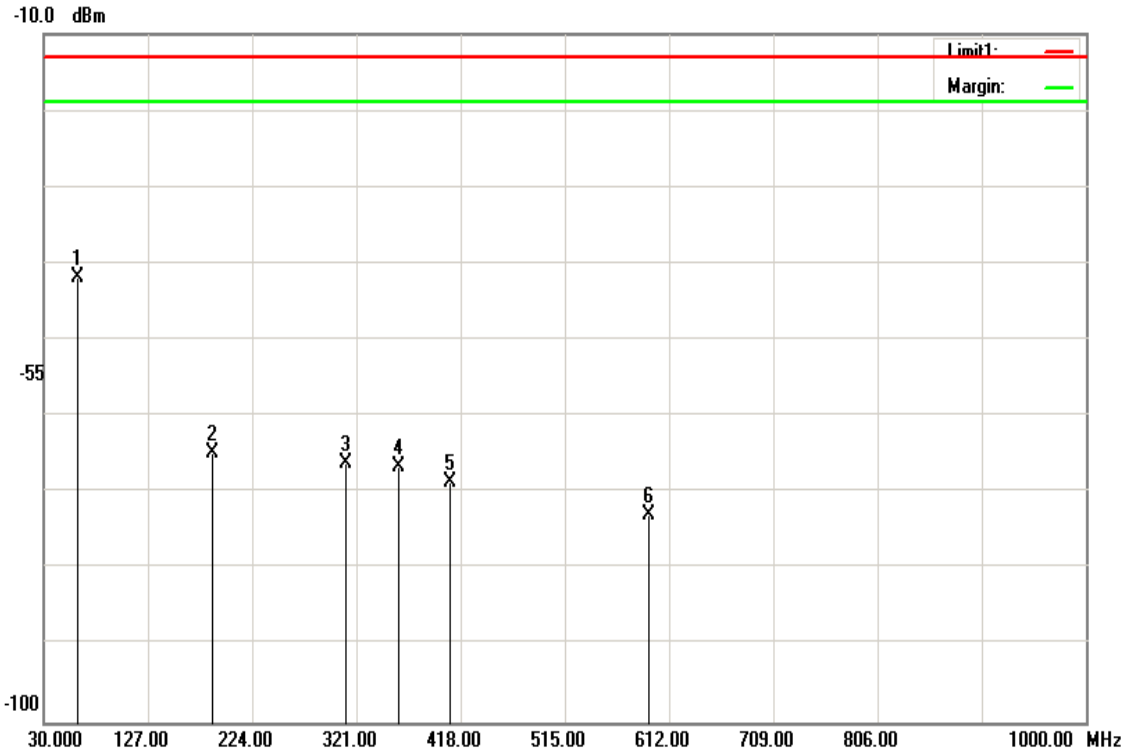
Refer to the attached tabular data sheets.

Test Results

Below 1GHz

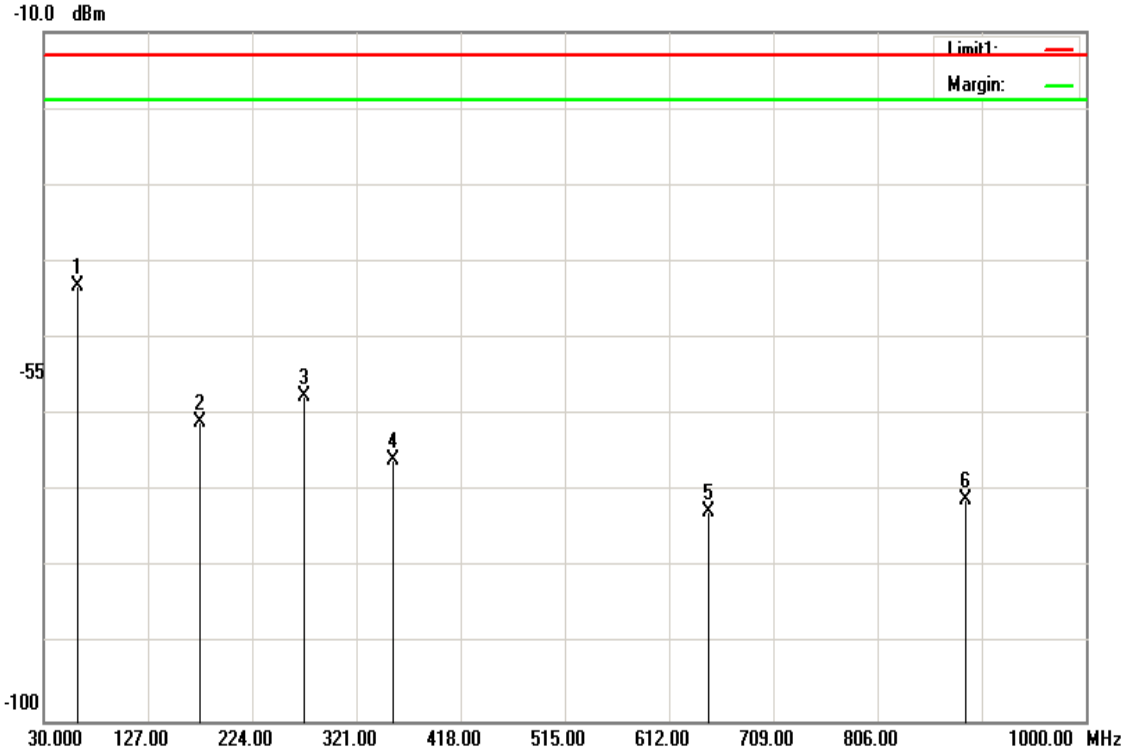
LTE Band 2 / BW: 20MHz / QPSK / RB =1, RB Offset = 0

Operation Mode:	Tx / Mid CH	**Test Date:**	March 14, 2018
Temperature:	22°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)
61.5250	-40.82	-1	-41.82	-13.00	-28.82	V
187.6250	-68.83	4.1	-64.73	-13.00	-51.73	V
311.3000	-73.17	6.95	-66.22	-13.00	-53.22	V
359.8000	-73.81	7.14	-66.67	-13.00	-53.67	V
408.3000	-75.93	7.26	-68.67	-13.00	-55.67	V
592.6000	-72.58	-0.33	-72.91	-13.00	-59.91	V

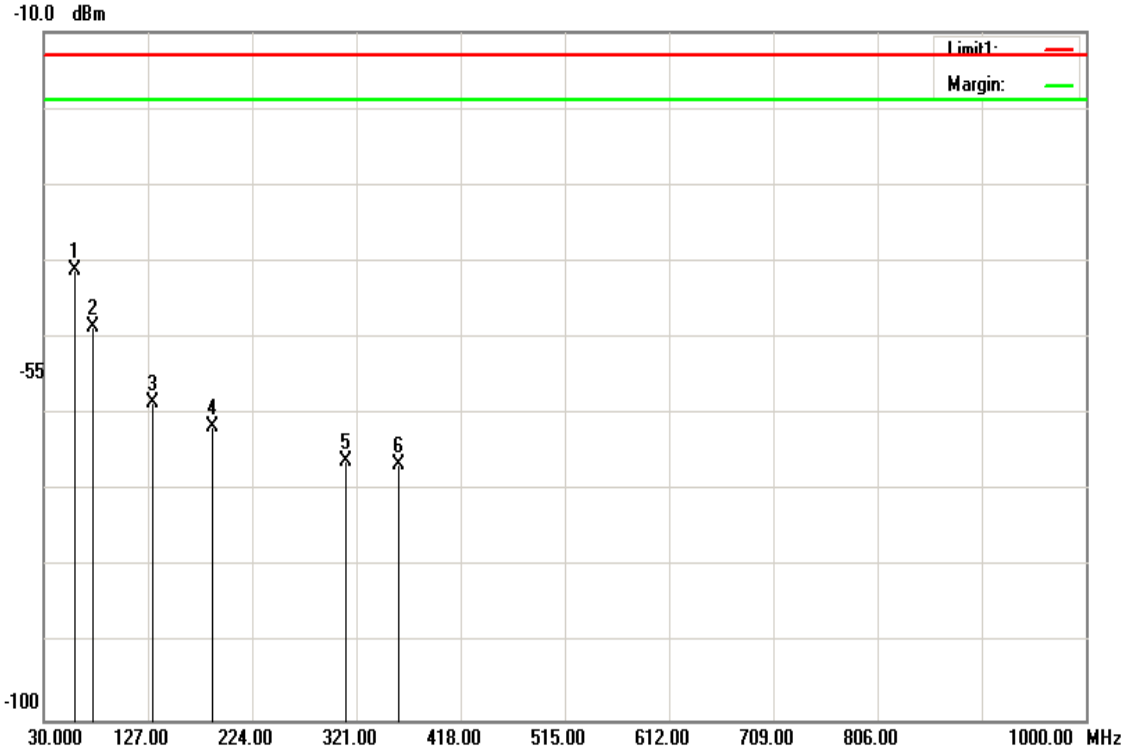
Operation Mode:	Tx / Mid CH	**Test Date:**	March 14, 2018
Temperature:	22°C	**Tested by:**	Ivan Wang
Humidity:	54% RH	**Polarity:**	Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
61.5250	-42.14	-1	-43.14	-13.00	-30.14	H
175.5000	-63.91	3.04	-60.87	-13.00	-47.87	H
272.5000	-64.74	7.17	-57.57	-13.00	-44.57	H
354.9500	-73.14	7.12	-66.02	-13.00	-53.02	H
648.3750	-73.86	1.2	-72.66	-13.00	-59.66	H
888.4500	-72.37	1.39	-70.98	-13.00	-57.98	H

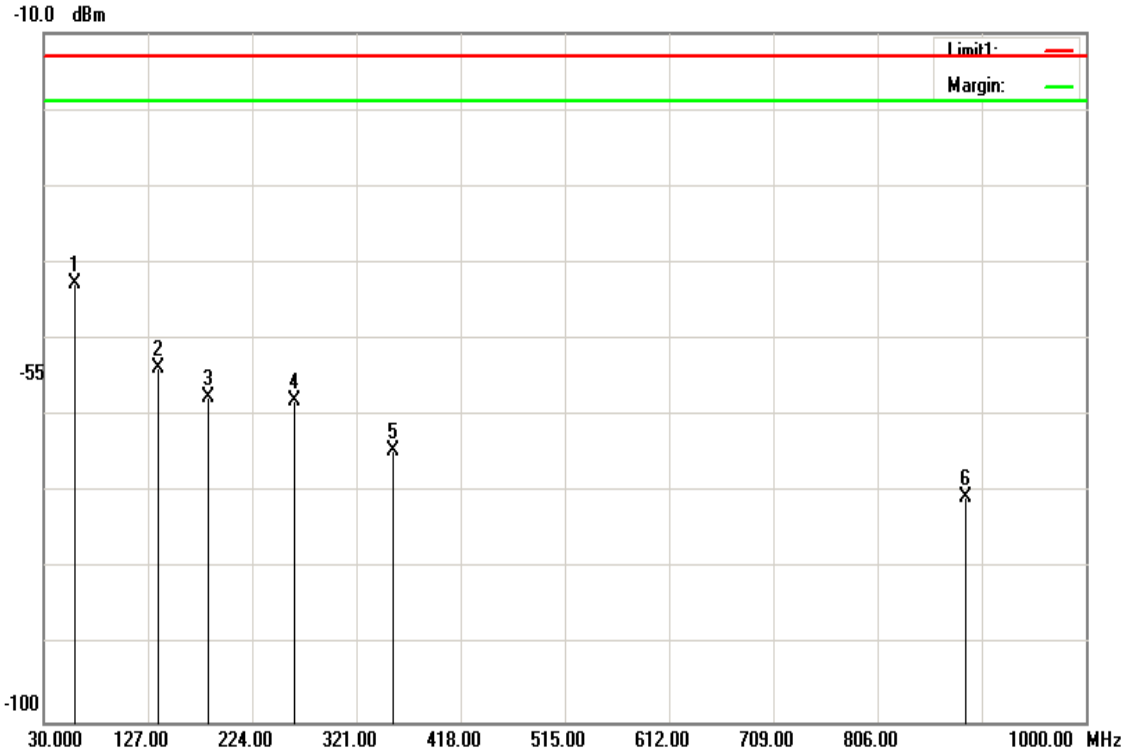
LTE Band 2 / BW: 20MHz / 16QAM / RB =1, RB Offset = 0

Operation Mode:	Tx / Mid CH	**Test Date:**	March 14, 2018
Temperature:	22°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)
59.1000	-39.83	-1.39	-41.22	-13.00	-28.22	V
76.0750	-49.11	0.58	-48.53	-13.00	-35.53	V
131.8500	-59.65	1.08	-58.57	-13.00	-45.57	V
187.6250	-65.73	4.1	-61.63	-13.00	-48.63	V
311.3000	-73.06	6.95	-66.11	-13.00	-53.11	V
359.8000	-73.78	7.14	-66.64	-13.00	-53.64	V

Operation Mode:	Tx / Mid CH	**Test Date:**	March 14, 2018
Temperature:	22°C	**Tested by:**	Ivan Wang
Humidity:	54% RH	**Polarity:**	Hor.

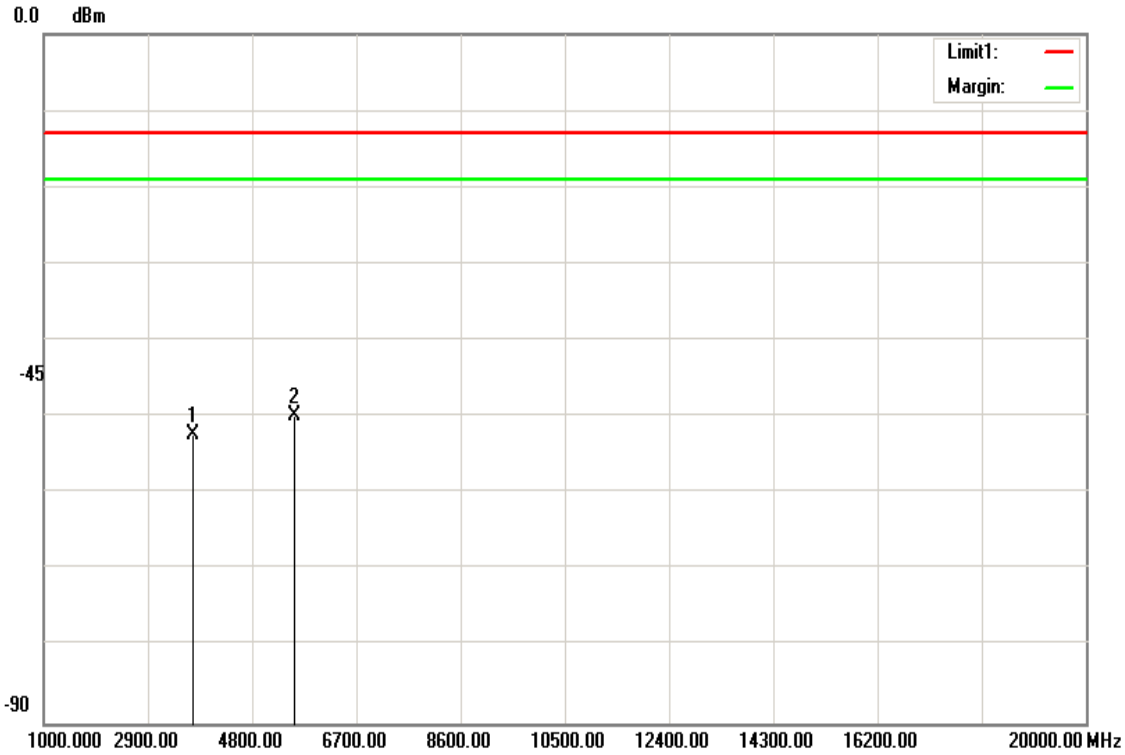


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
59.1000	-41.44	-1.39	-42.83	-13.00	-29.83	H
136.7000	-54.93	1.15	-53.78	-13.00	-40.78	H
182.7750	-61.58	4.1	-57.48	-13.00	-44.48	H
262.8000	-65.28	7.27	-58.01	-13.00	-45.01	H
354.9500	-71.74	7.12	-64.62	-13.00	-51.62	H
888.4500	-72.12	1.39	-70.73	-13.00	-57.73	H

Above 1GHz

LTE Band 2 / BW: 20MHz / QPSK RB =1, RB Offset = 0

Operation Mode:	Tx / Low CH	**Test Date:**	March 14, 2018
Temperature:	22°C	**Tested by:**	Ivan Wang
Humidity:	54% RH	**Polarity:**	Ver.

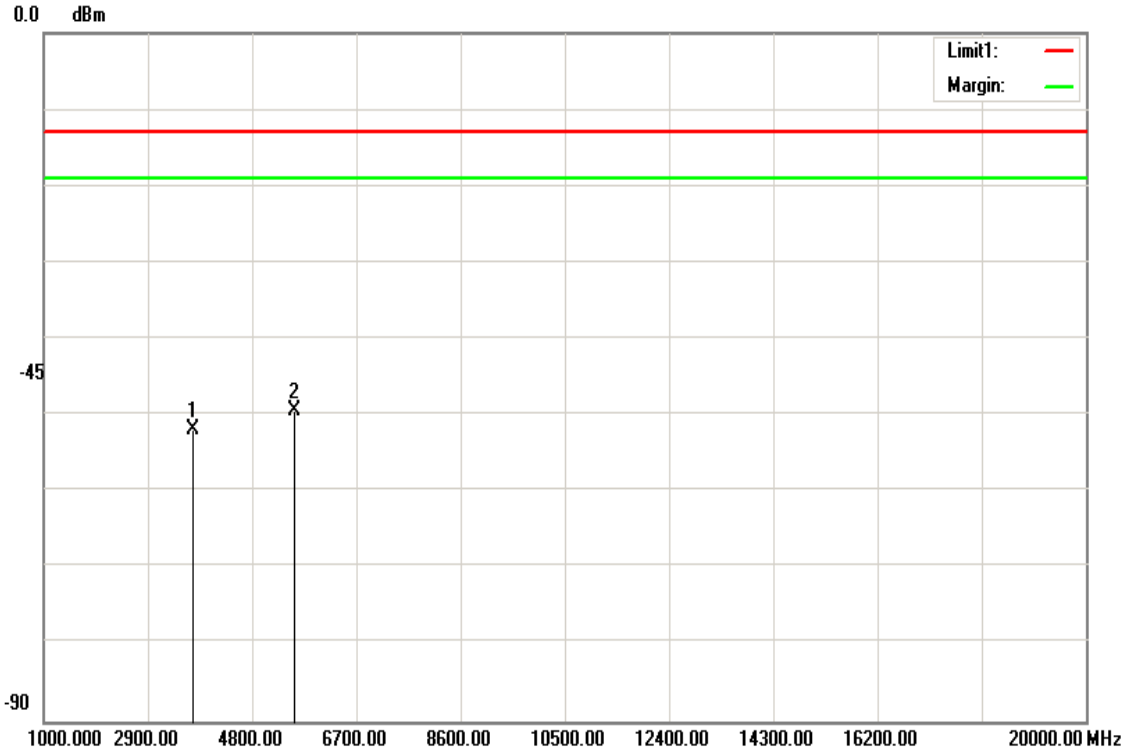


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3720.000	-64.94	12.54	-52.40	-13.00	-39.40	V
5580.000	-62.73	12.87	-49.86	-13.00	-36.86	V
N/A						

Remark:

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

Operation Mode:	Tx / Low CH	**Test Date:**	March 14, 2018
Temperature:	22°C	**Tested by:**	Ivan Wang
Humidity:	54% RH	**Polarity:**	Hor.

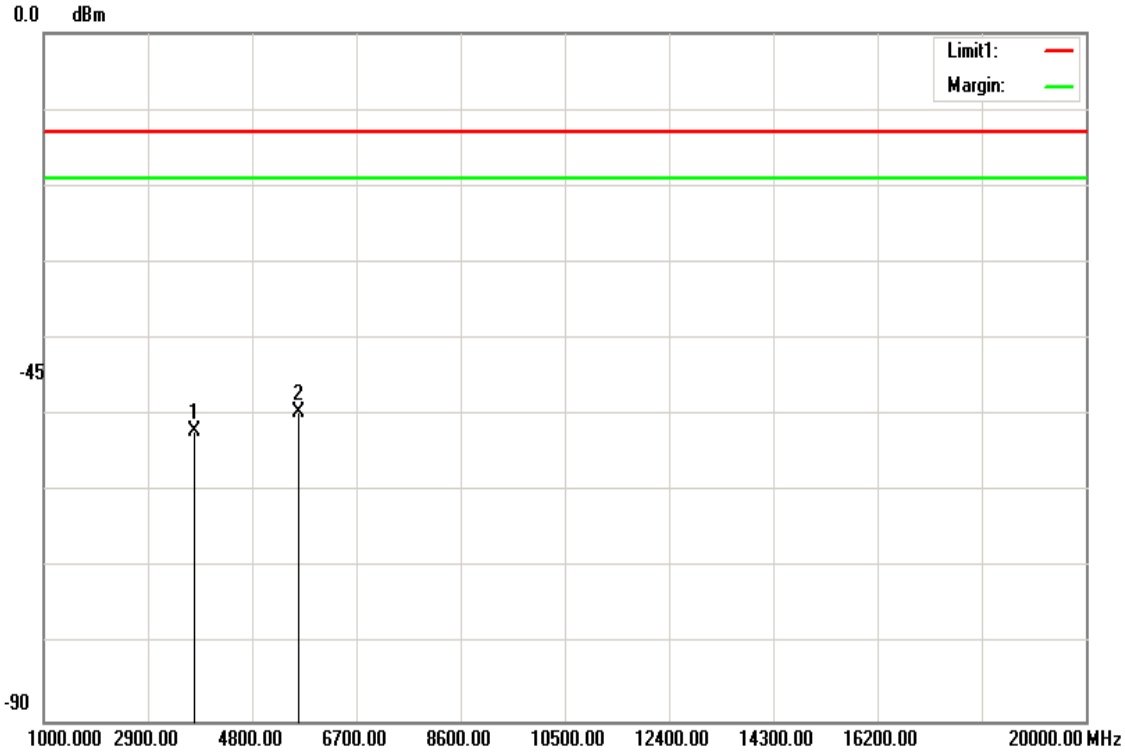


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3720.000	-64.35	12.54	-51.81	-13.00	-38.81	H
5580.000	-62.35	12.87	-49.48	-13.00	-36.48	H
N/A						

Remark:

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

Operation Mode:	Tx / Mid CH	**Test Date:**	March 14, 2018
Temperature:	22°C	**Tested by:**	Ivan Wang
Humidity:	54% RH	**Polarity:**	Ver.

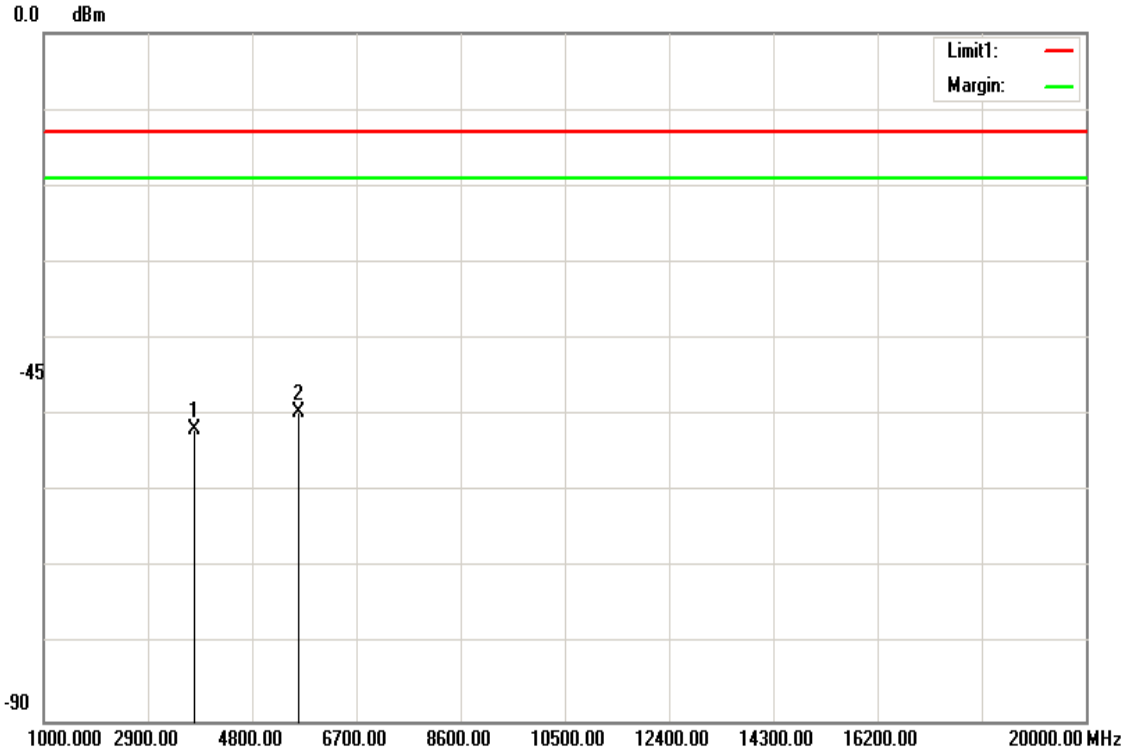


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3760.000	-64.73	12.55	-52.18	-13.00	-39.18	V
5640.000	-62.54	12.84	-49.70	-13.00	-36.70	V
N/A						

Remark:

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

Operation Mode:	Tx / Mid CH	**Test Date:**	March 14, 2018
Temperature:	22°C	**Tested by:**	Ivan Wang
Humidity:	54% RH	**Polarity:**	Hor.

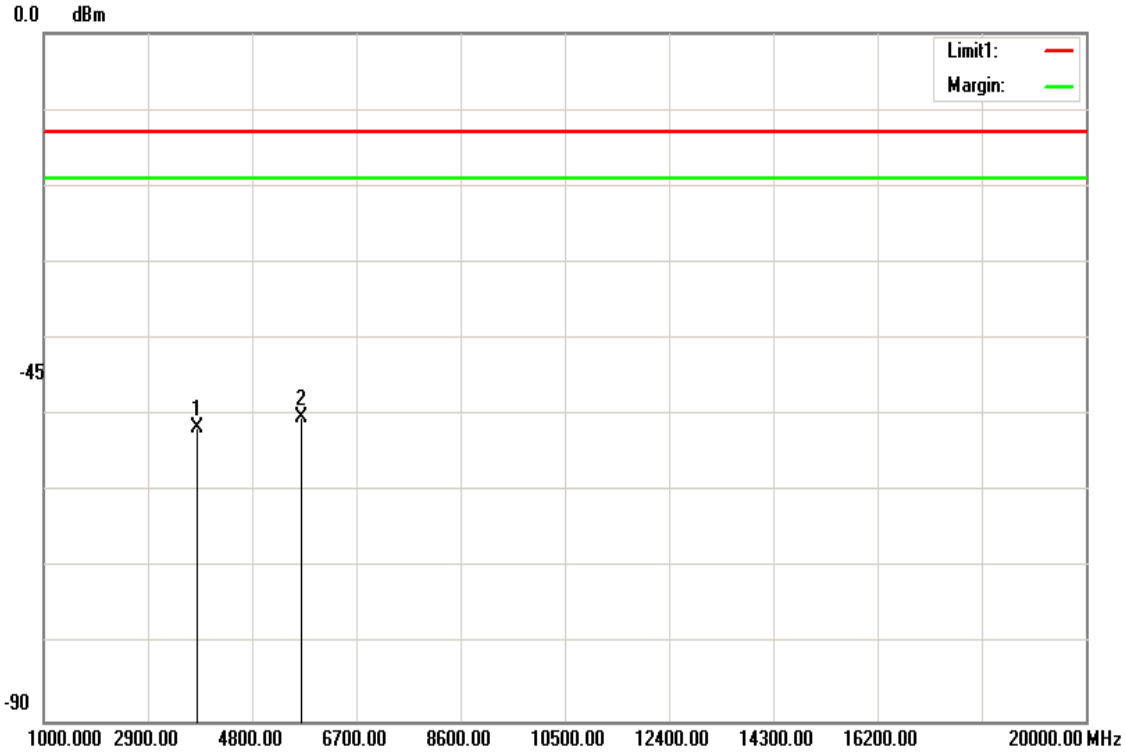


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3760.000	-64.38	12.55	-51.83	-13.00	-38.83	H
5640.000	-62.55	12.84	-49.71	-13.00	-36.71	H
N/A						

Remark:

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

Operation Mode:	Tx / High CH	**Test Date:**	March 14, 2018
Temperature:	22°C	**Tested by:**	Ivan Wang
Humidity:	54% RH	**Polarity:**	Ver.

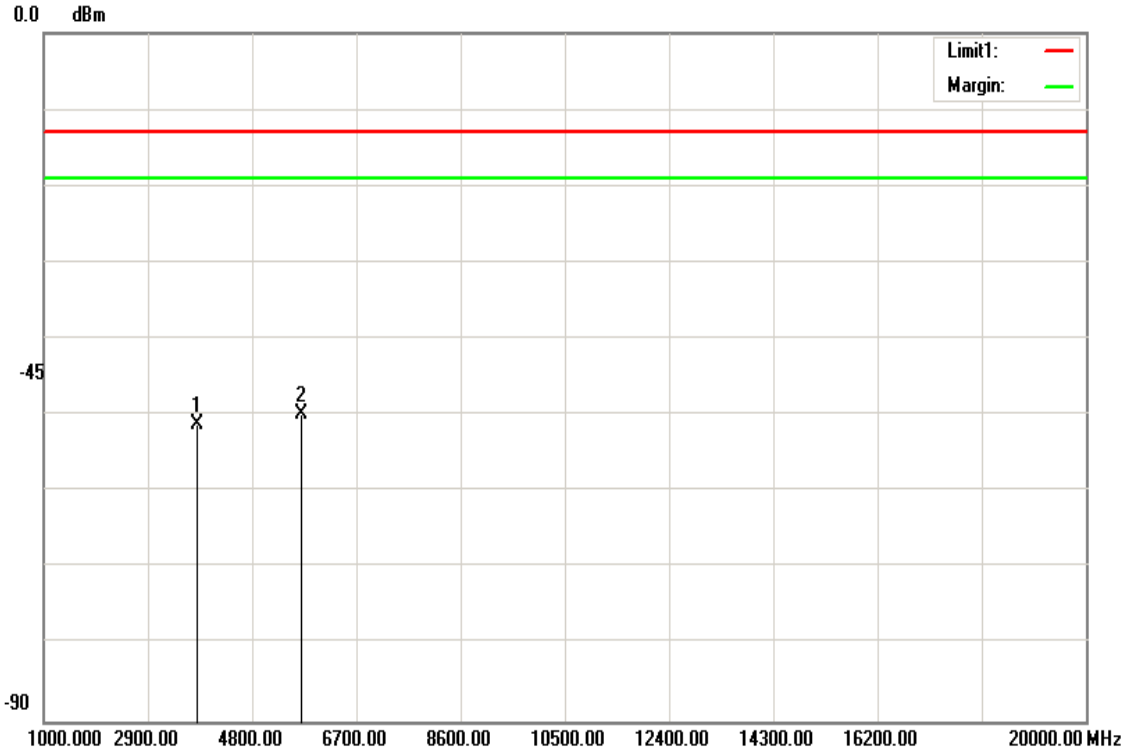


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3800.000	-64.12	12.56	-51.56	-13.00	-38.56	V
5700.000	-63.19	12.82	-50.37	-13.00	-37.37	V
N/A						

Remark:

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

Operation Mode:	Tx / High CH	**Test Date:**	March 14, 2018
Temperature:	22°C	**Tested by:**	Ivan Wang
Humidity:	54% RH	**Polarity:**	Hor.



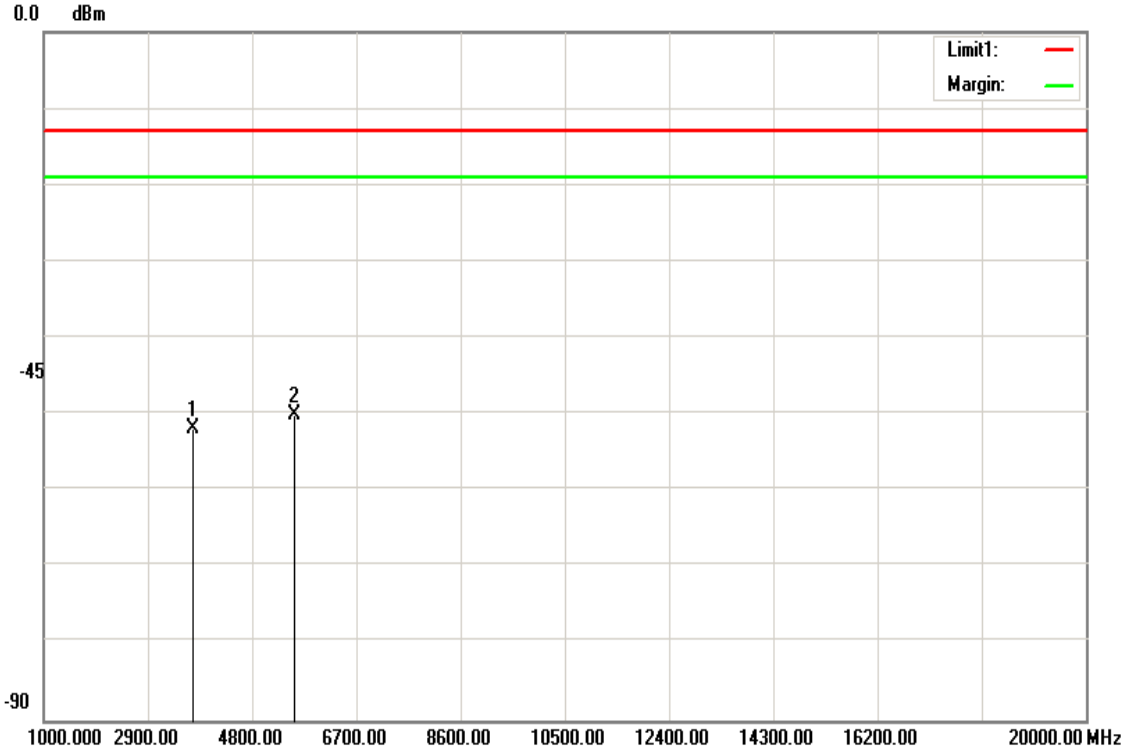
Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3800.000	-63.84	12.56	-51.28	-13.00	-38.28	H
5700.000	-62.72	12.82	-49.90	-13.00	-36.90	H
N/A						

Remark:

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

LTE Band 2 / BW: 20MHz / 16QAM / RB =1, RB Offset = 0

Operation Mode:	Tx / Low CH	**Test Date:**	March 14, 2018
Temperature:	22°C	**Tested by:**	Ivan Wang
Humidity:	54% RH	**Polarity:**	Ver.

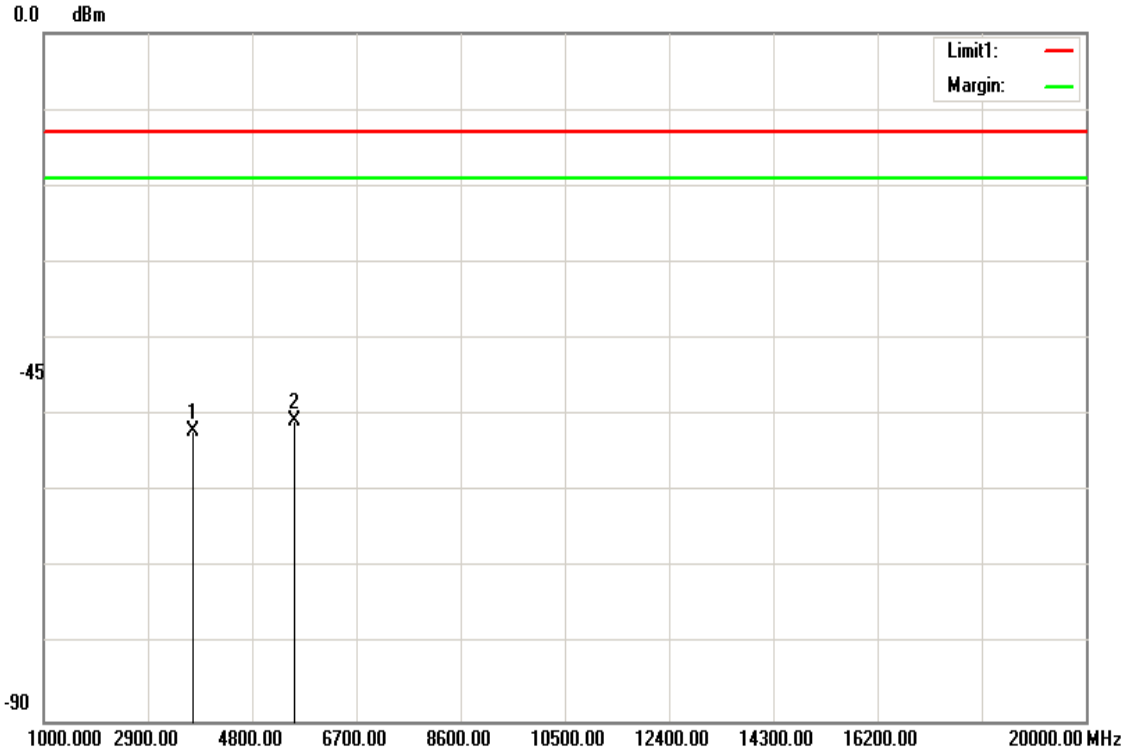


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3720.000	-64.42	12.54	-51.88	-13.00	-38.88	V
5580.000	-63.01	12.87	-50.14	-13.00	-37.14	V
N/A						

Remark:

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

Operation Mode:	Tx / Low CH	**Test Date:**	March 14, 2018
Temperature:	22°C	**Tested by:**	Ivan Wang
Humidity:	54% RH	**Polarity:**	Hor.

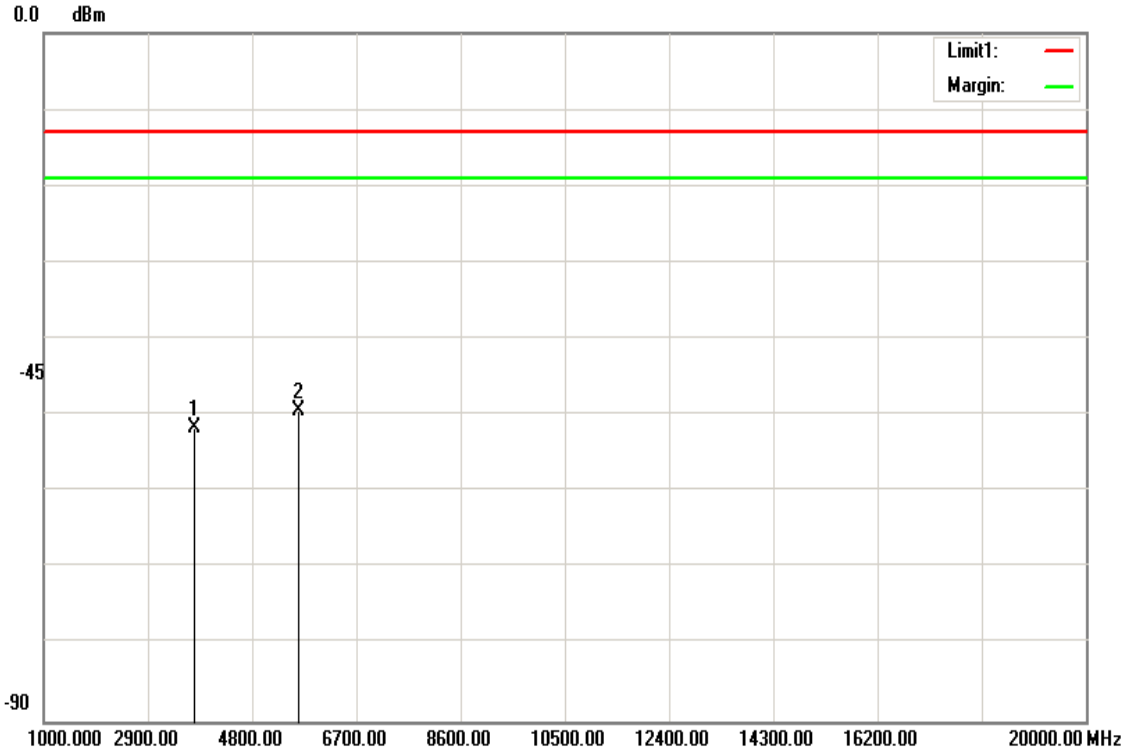


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3720.000	-64.56	12.54	-52.02	-13.00	-39.02	H
5580.000	-63.57	12.87	-50.70	-13.00	-37.70	H
N/A						

Remark:

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

Operation Mode:	Tx / Mid CH	**Test Date:**	March 14, 2018
Temperature:	22°C	**Tested by:**	Ivan Wang
Humidity:	54% RH	**Polarity:**	Ver.

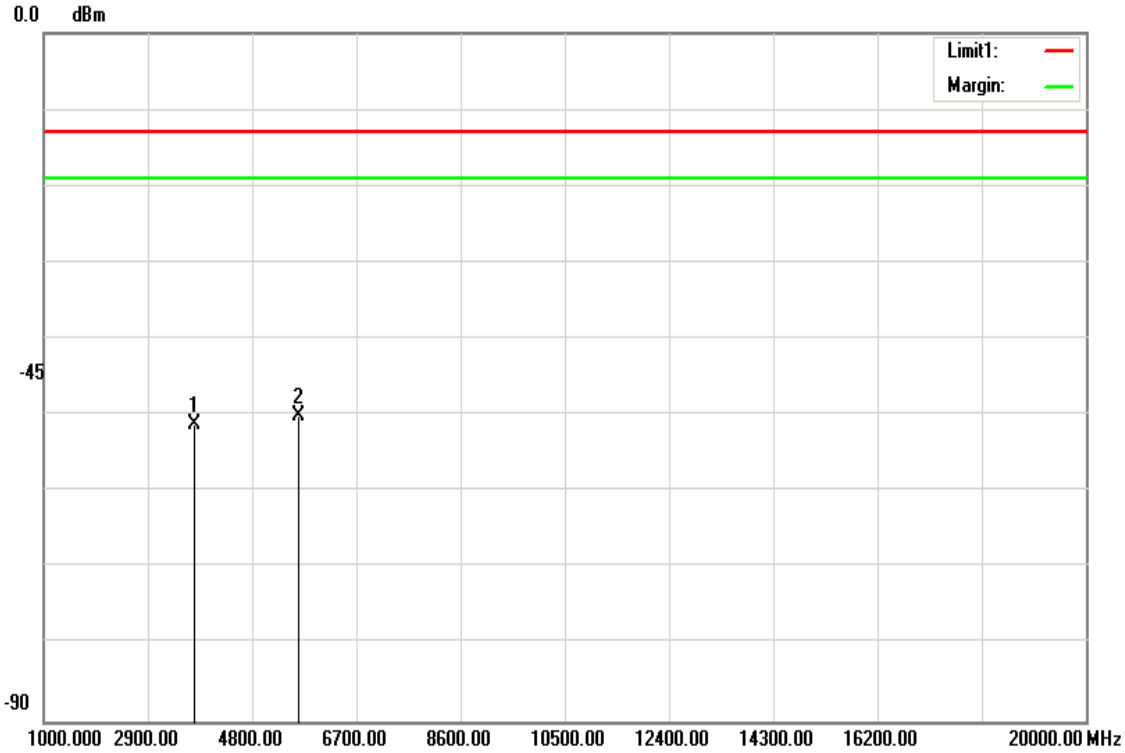


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3760.000	-64.26	12.55	-51.71	-13.00	-38.71	V
5640.000	-62.31	12.84	-49.47	-13.00	-36.47	V
N/A						

Remark:

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

Operation Mode:	Tx / Mid CH	**Test Date:**	March 14, 2018
Temperature:	22°C	**Tested by:**	Ivan Wang
Humidity:	54% RH	**Polarity:**	Hor.

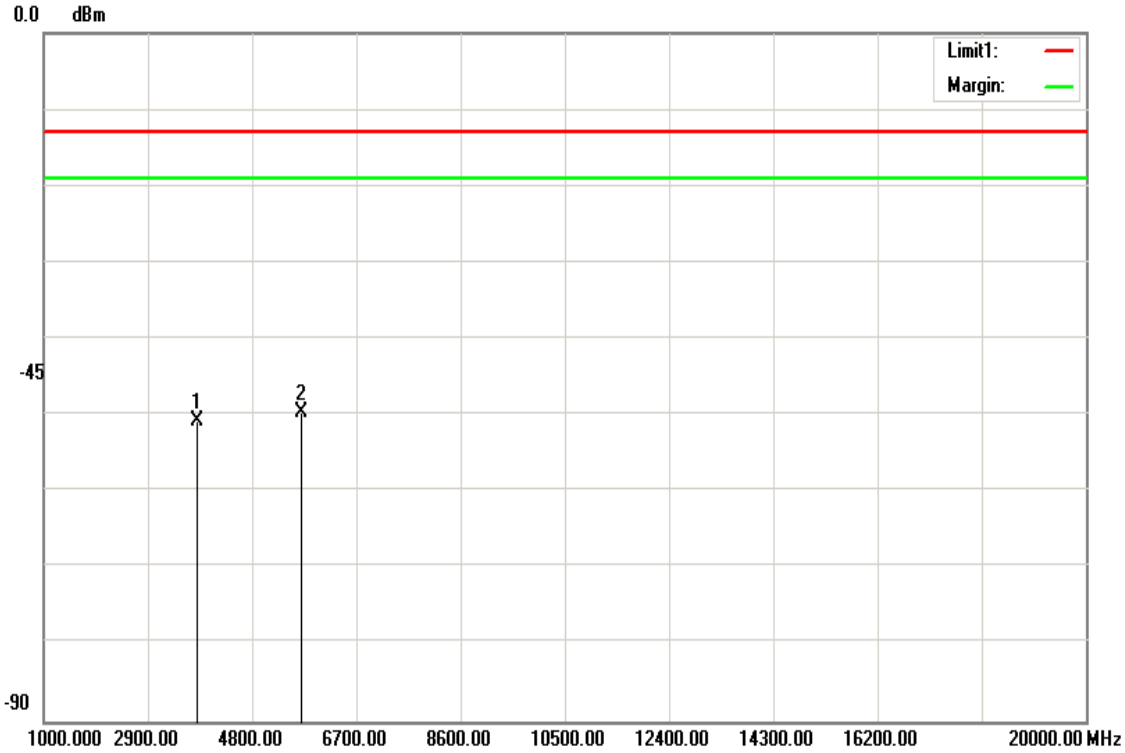


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3760.000	-63.8	12.55	-51.25	-13.00	-38.25	H
5640.000	-62.94	12.84	-50.10	-13.00	-37.10	H
N/A						

Remark:

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

Operation Mode:	Tx / High CH	**Test Date:**	March 14, 2018
Temperature:	22°C	**Tested by:**	Ivan Wang
Humidity:	54% RH	**Polarity:**	Ver.

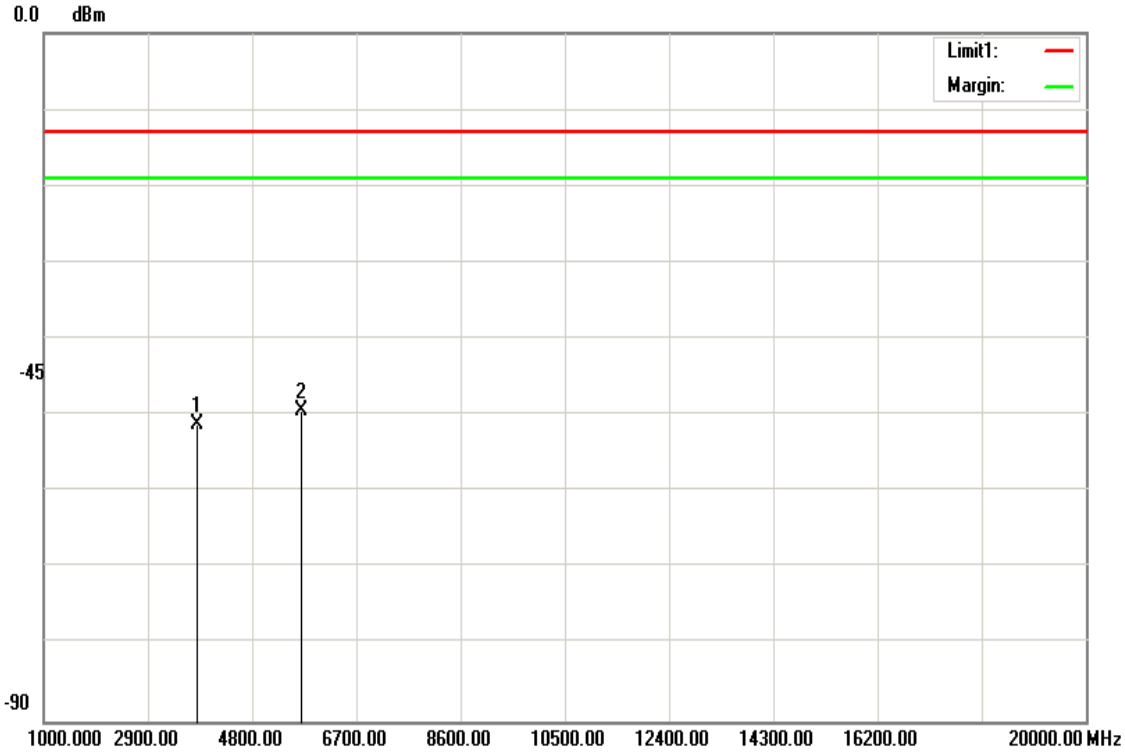


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3800.000	-63.39	12.56	-50.83	-13.00	-37.83	V
5700.000	-62.33	12.82	-49.51	-13.00	-36.51	V
N/A						

Remark:

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

Operation Mode:	Tx / High CH	**Test Date:**	March 14, 2018
Temperature:	22°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)
3800.000	-63.81	12.56	-51.25	-13.00	-38.25	H
5700.000	-62.15	12.82	-49.33	-13.00	-36.33	H
N/A						

Remark:

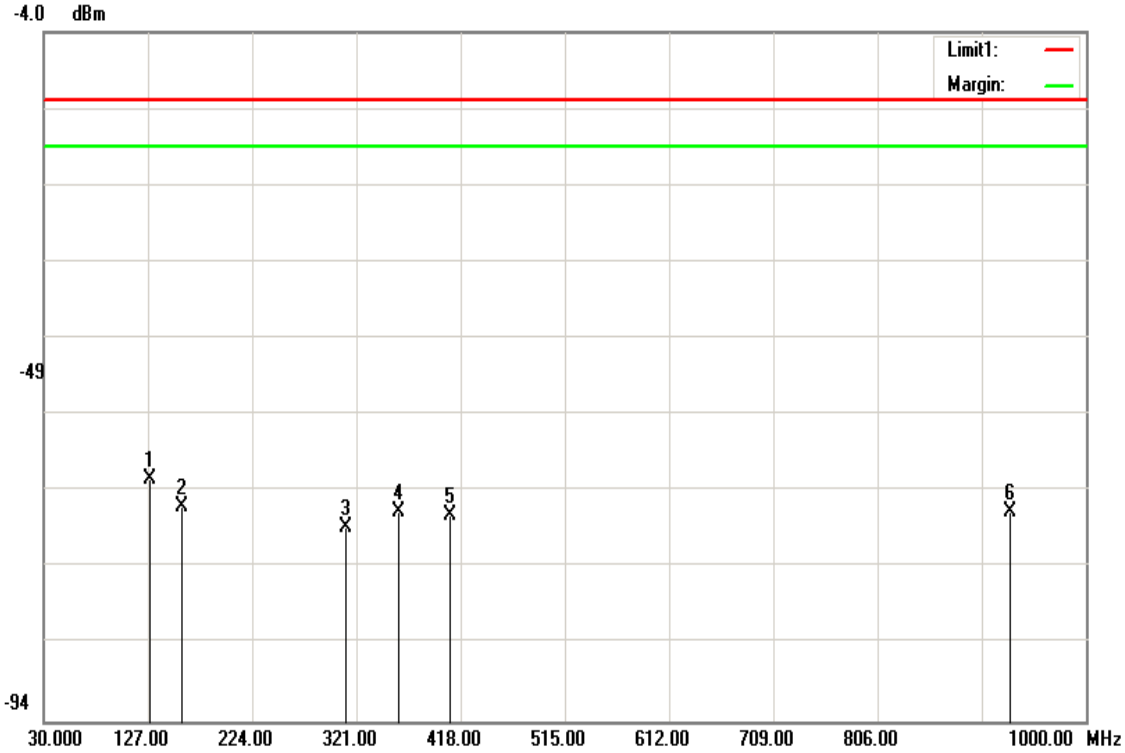
1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*

Test Results

Below 1GHz

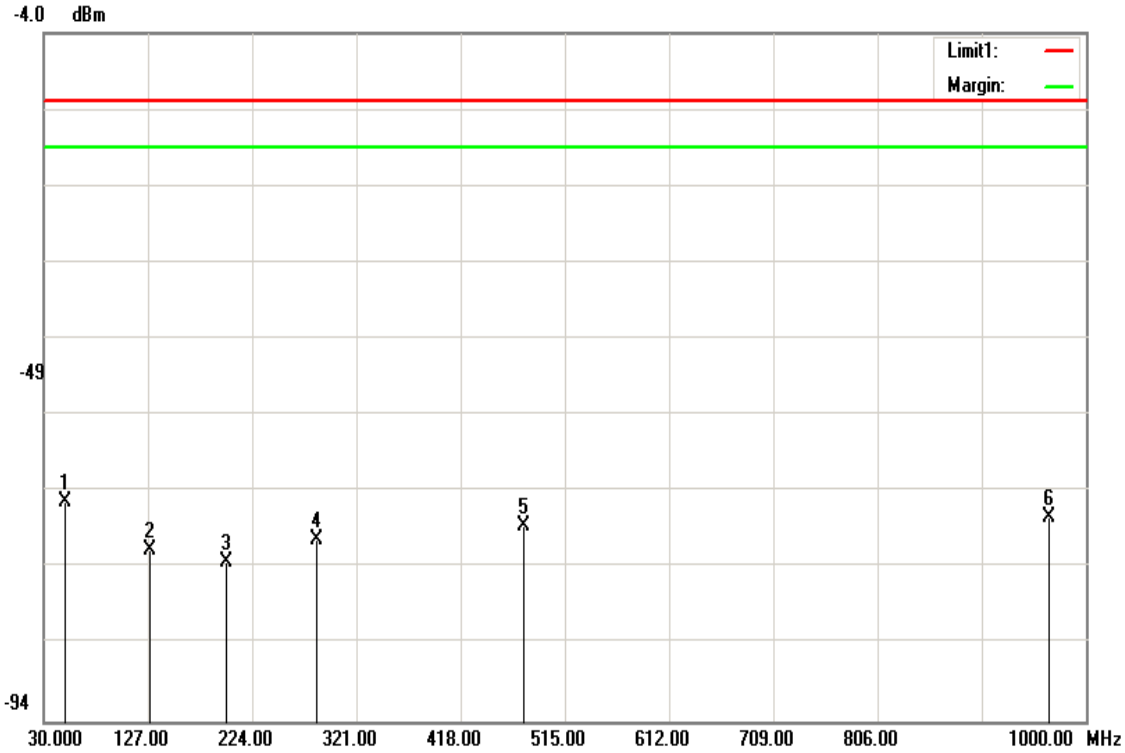
LTE Band 5 / BW: 10MHz / QPSK / RB =1, RB Offset = 0

Operation Mode:	Tx / Mid CH	**Test Date:**	March 15, 2018
Temperature:	21°C	**Tested by:**	Ivan Wang
Humidity:	52% RH	**Polarity:**	Ver.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
129.4250	-63.39	1.04	-62.35	-13.00	-49.35	V
158.5250	-65.62	-0.47	-66.09	-13.00	-53.09	V
311.3000	-75.61	6.95	-68.66	-13.00	-55.66	V
359.8000	-73.85	7.14	-66.71	-13.00	-53.71	V
408.3000	-74.34	7.26	-67.08	-13.00	-54.08	V
929.6750	-68.02	1.37	-66.65	-13.00	-53.65	V

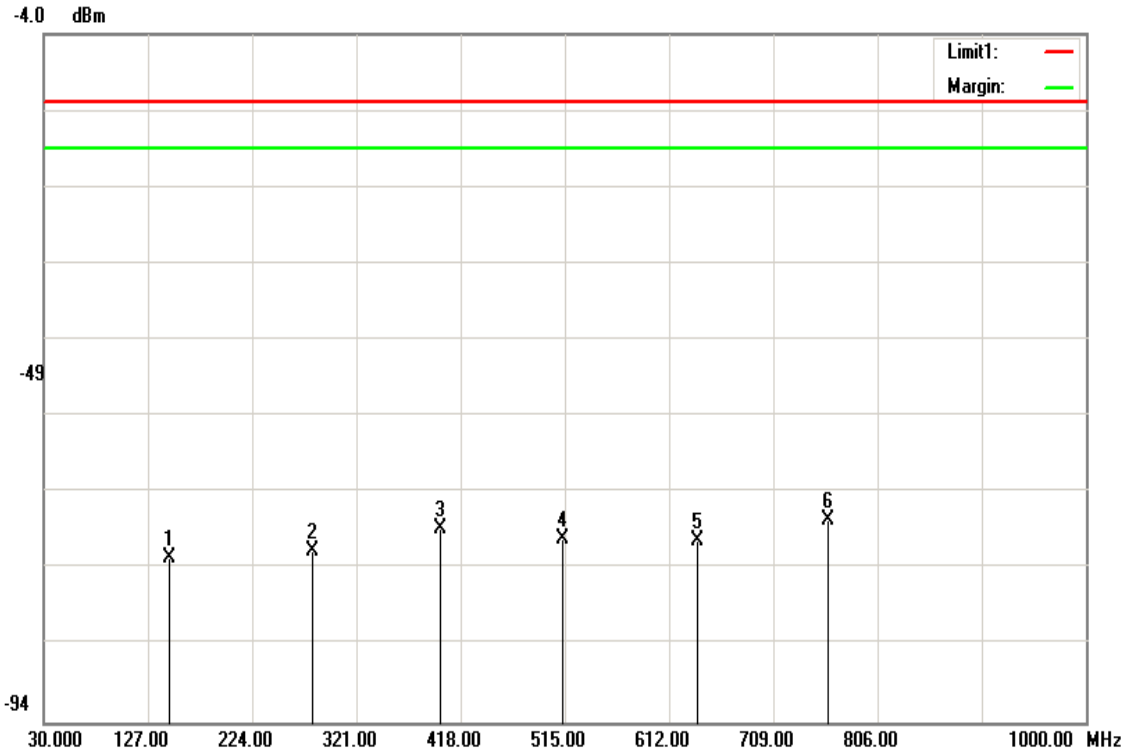
Operation Mode:	Tx / Mid CH	**Test Date:**	March 15, 2018
Temperature:	21°C	**Tested by:**	Ivan Wang
Humidity:	52% RH	**Polarity:**	Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
49.4000	-62.76	-2.56	-65.32	-13.00	-52.32	H
129.4250	-72.7	1.04	-71.66	-13.00	-58.66	H
199.7500	-77.32	4.1	-73.22	-13.00	-60.22	H
284.6250	-77.36	7.05	-70.31	-13.00	-57.31	H
476.2000	-75.31	6.92	-68.39	-13.00	-55.39	H
966.0500	-70.32	3.01	-67.31	-13.00	-54.31	H

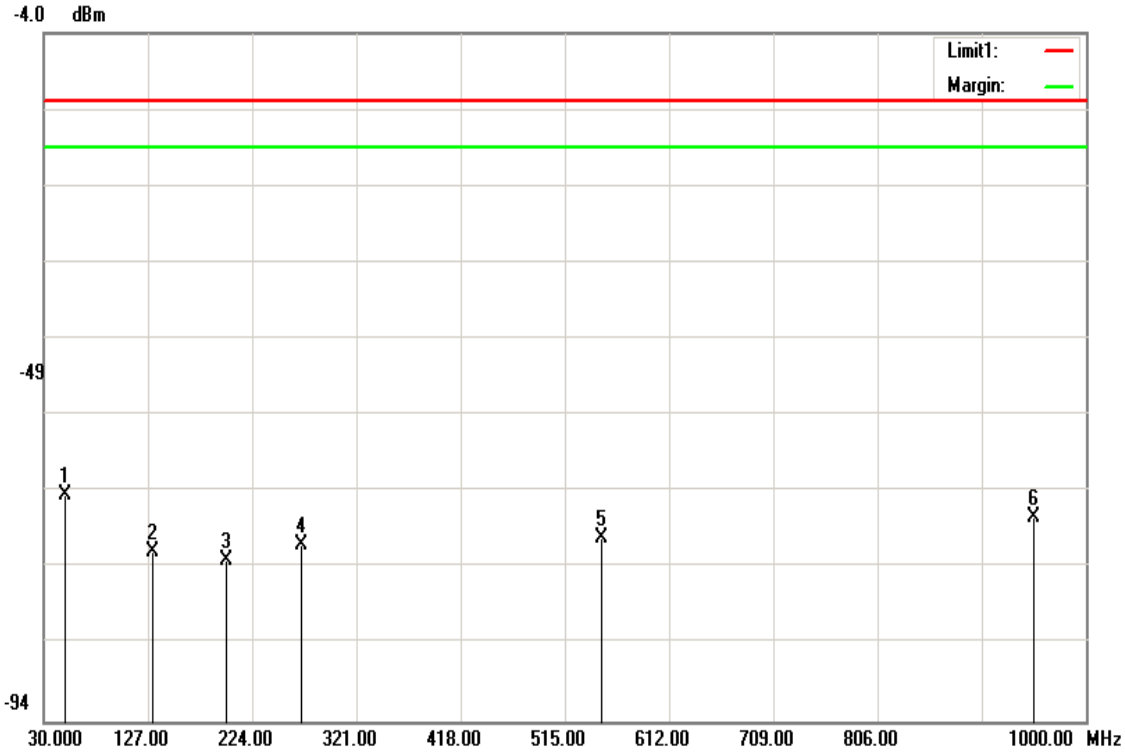
LTE Band 5 / BW: 10MHz / 16QAM / RB =1, RB Offset = 0

Operation Mode:	Tx / Mid CH	**Test Date:**	March 15, 2018
Temperature:	21°C	**Tested by:**	Ivan Wang
Humidity:	52% RH	**Polarity:**	Ver.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
146.4000	-73.13	0.62	-72.51	-13.00	-59.51	V
279.7750	-78.8	7.1	-71.70	-13.00	-58.70	V
398.6000	-75.96	7.29	-68.67	-13.00	-55.67	V
512.5750	-76.84	6.81	-70.03	-13.00	-57.03	V
638.6750	-70.82	0.64	-70.18	-13.00	-57.18	V
759.9250	-69.04	1.59	-67.45	-13.00	-54.45	V

Operation Mode:	Tx / Mid CH l	**Test Date:**	March 15, 2018
Temperature:	21°C	**Tested by:**	Ivan Wang
Humidity:	52% RH	**Polarity:**	Hor.

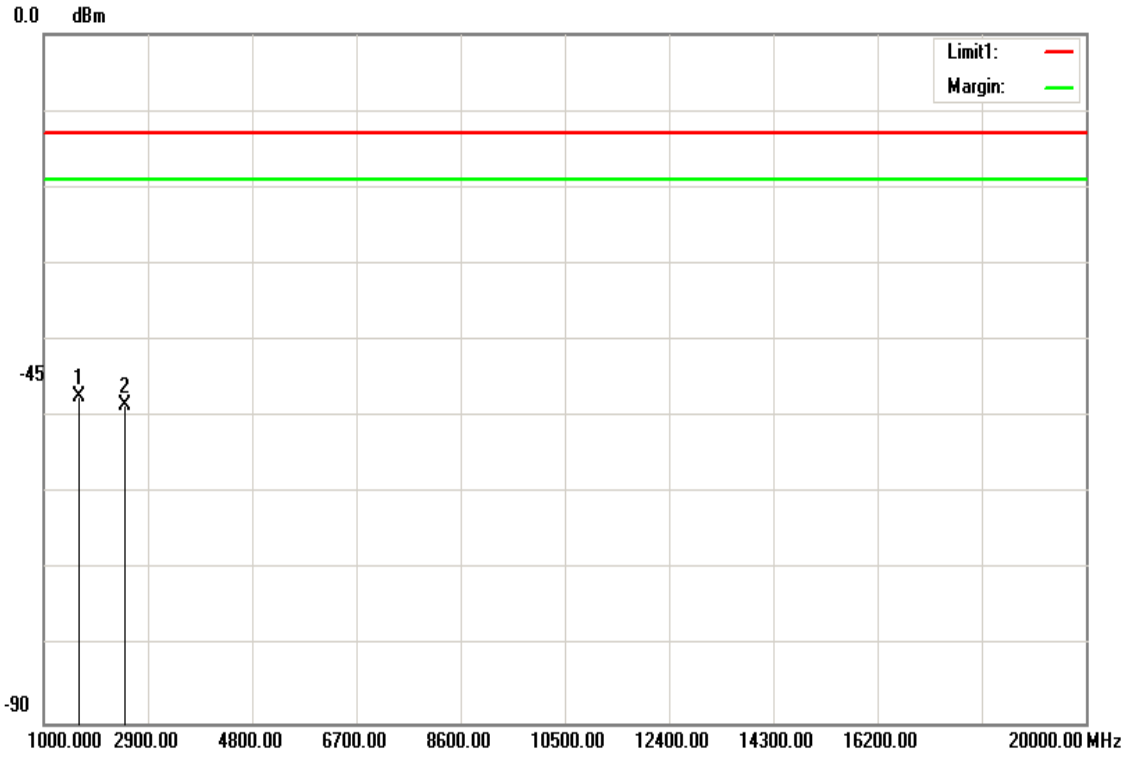


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
49.4000	-61.93	-2.56	-64.49	-13.00	-51.49	H
131.8500	-72.81	1.08	-71.73	-13.00	-58.73	H
199.7500	-77.15	4.1	-73.05	-13.00	-60.05	H
270.0750	-78.06	7.2	-70.86	-13.00	-57.86	H
548.9500	-76.91	6.85	-70.06	-13.00	-57.06	H
951.5000	-68.91	1.47	-67.44	-13.00	-54.44	H

Above 1GHz

LTE Band 5 / BW: 10 MHz / QPSK / RB =1, RB Offset = 0

Operation Mode:	Tx / Low CH	**Test Date:**	March 15, 2018
Temperature:	21°C	**Tested by:**	Ivan Wang
Humidity:	52% RH	**Polarity:**	Ver.

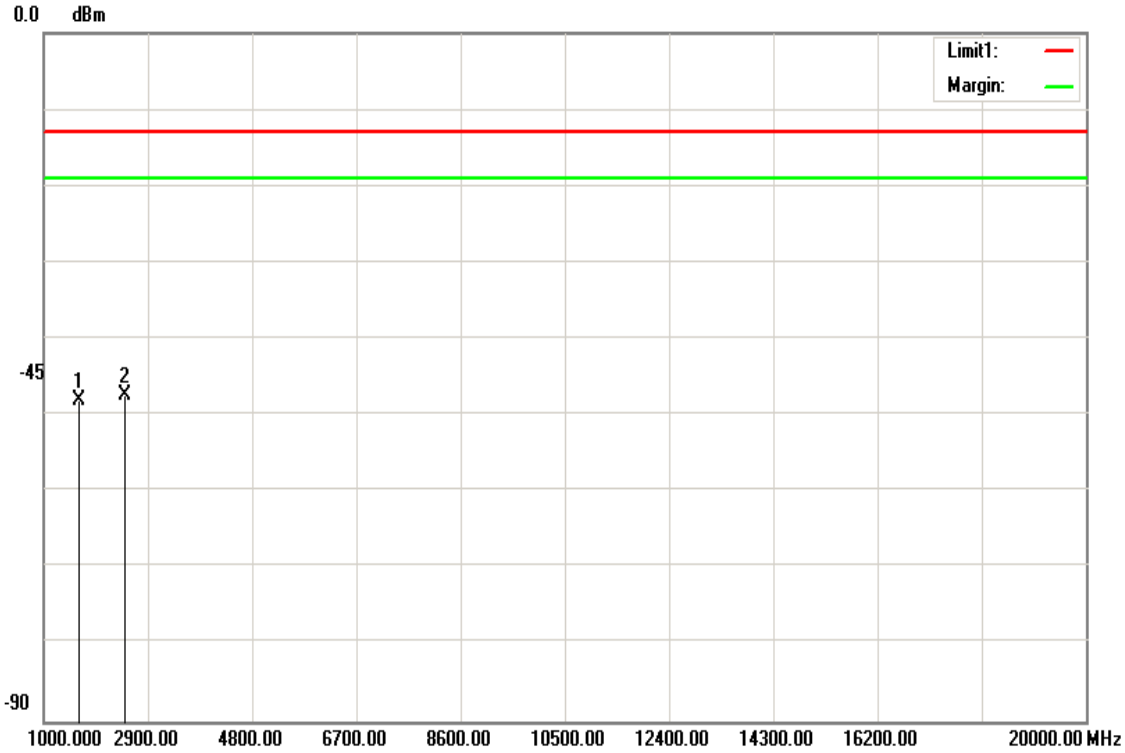


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1658.000	-48.87	1.52	-47.35	-13.00	-34.35	V
2487.000	-50.38	1.84	-48.54	-13.00	-35.54	V
N/A						

Remark:

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

Operation Mode:	Tx / Low CH	**Test Date:**	March 15, 2018
Temperature:	21°C	**Tested by:**	Ivan Wang
Humidity:	52% RH	**Polarity:**	Hor.

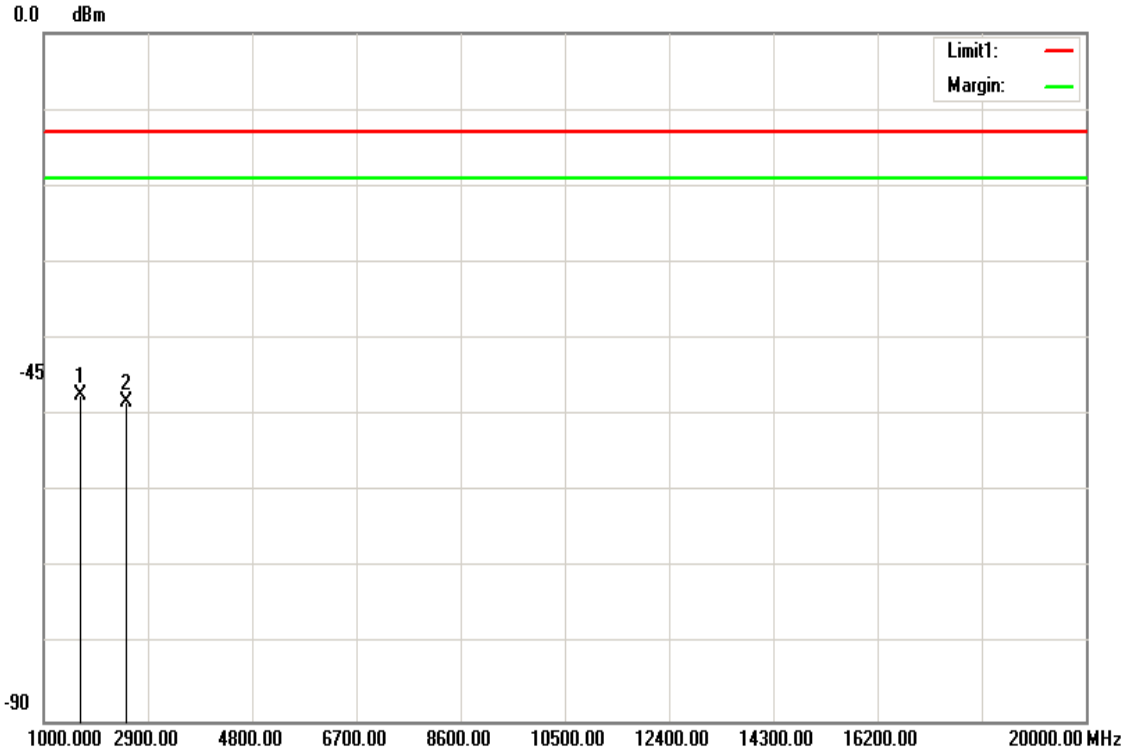


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1658.000	-49.52	1.52	-48.00	-13.00	-35.00	H
2487.000	-49.16	1.84	-47.32	-13.00	-34.32	H
N/A						

Remark:

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

Operation Mode:	Tx / Mid CH	**Test Date:**	March 15, 2018
Temperature:	21°C	**Tested by:**	Ivan Wang
Humidity:	52% RH	**Polarity:**	Ver.

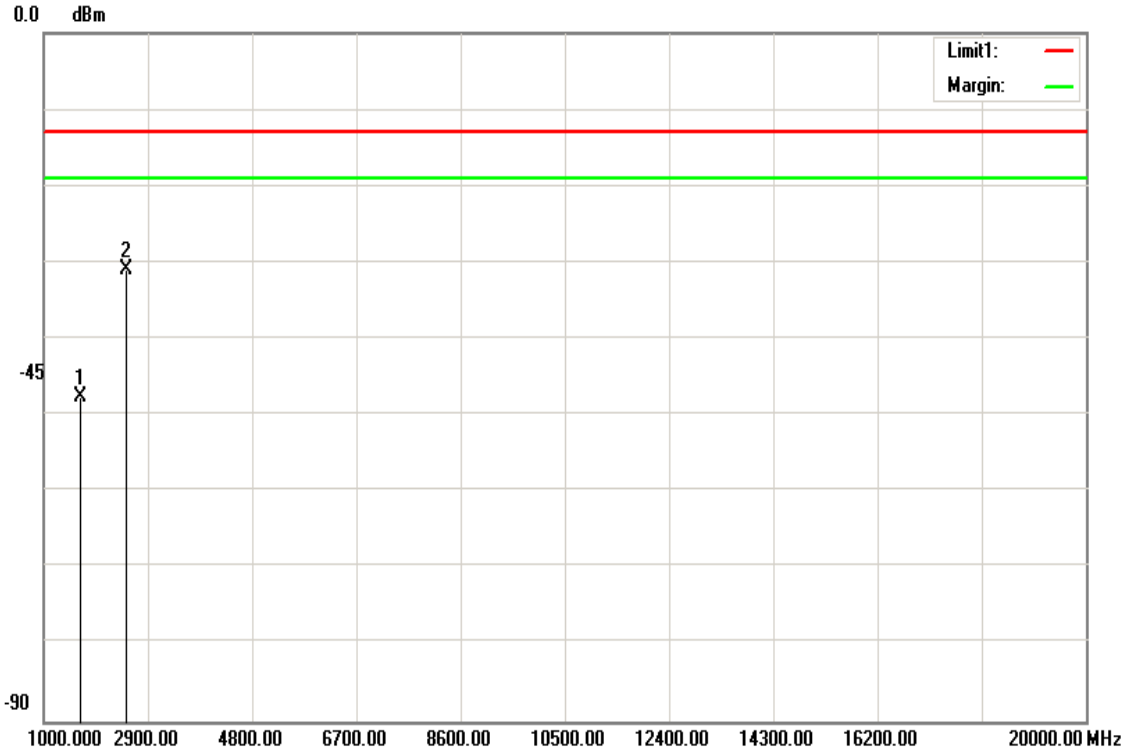


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1672.000	-48.97	1.52	-47.45	-13.00	-34.45	V
2508.000	-50.29	2	-48.29	-13.00	-35.29	V
N/A						

Remark:

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

Operation Mode:	Tx / Mid CH	**Test Date:**	March 15, 2018
Temperature:	21°C	**Tested by:**	Ivan Wang
Humidity:	52% RH	**Polarity:**	Hor.

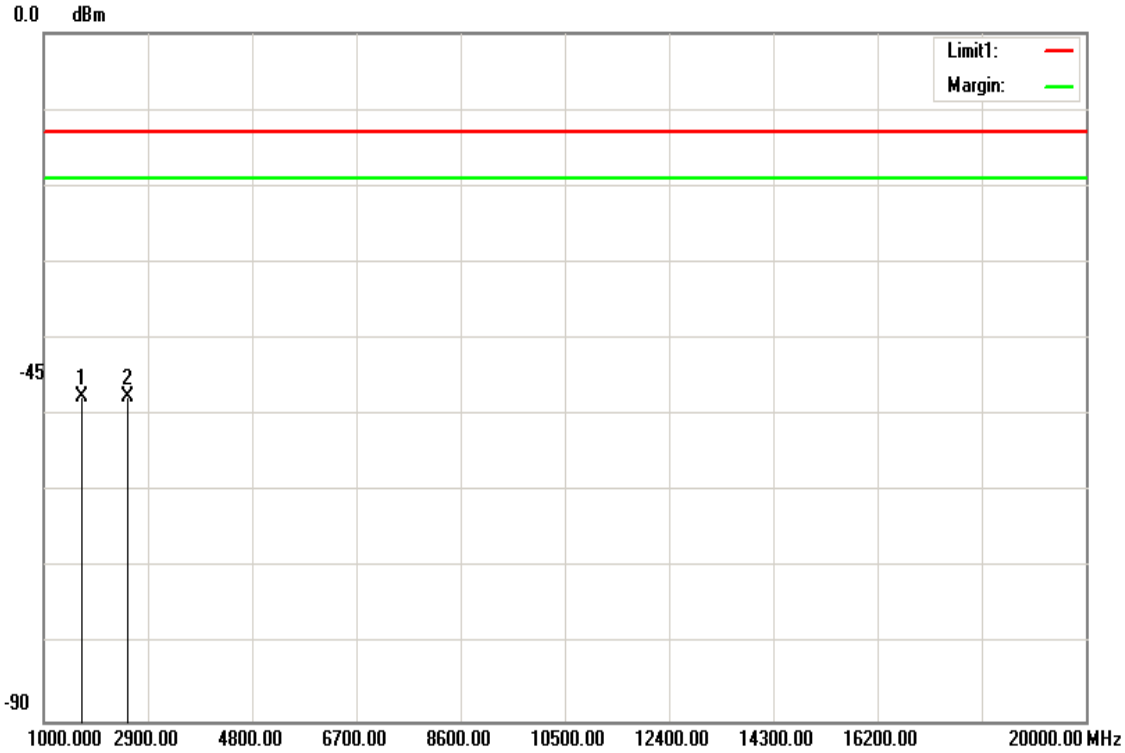


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1672.000	-49.06	1.52	-47.54	-13.00	-34.54	H
2508.000	-32.98	2	-30.98	-13.00	-17.98	H
N/A						

Remark:

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

Operation Mode:	Tx / High CH	**Test Date:**	March 15, 2018
Temperature:	21°C	**Tested by:**	Ivan Wang
Humidity:	52% RH	**Polarity:**	Ver.

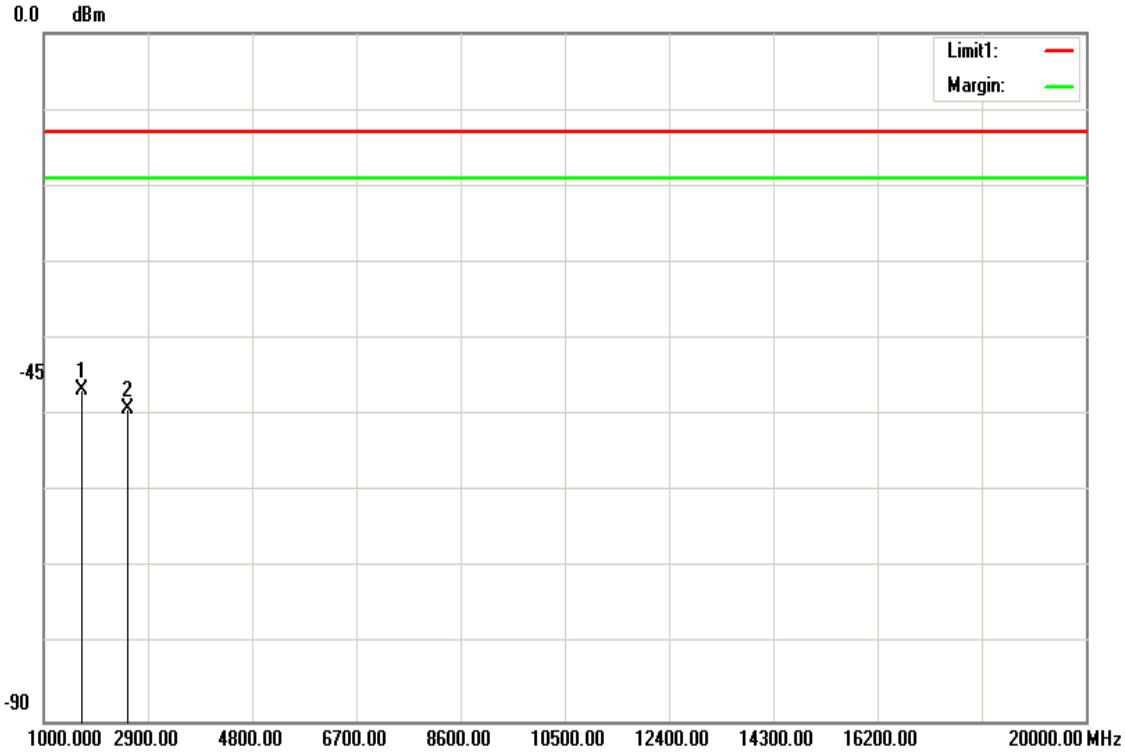


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1688.000	-49.08	1.51	-47.57	-13.00	-34.57	V
2532.000	-50.06	2.45	-47.61	-13.00	-34.61	V
N/A						

Remark:

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

Operation Mode:	Tx / High CH	**Test Date:**	March 15, 2018
Temperature:	21°C	**Tested by:**	Ivan Wang
Humidity:	52% RH	**Polarity:**	Hor.



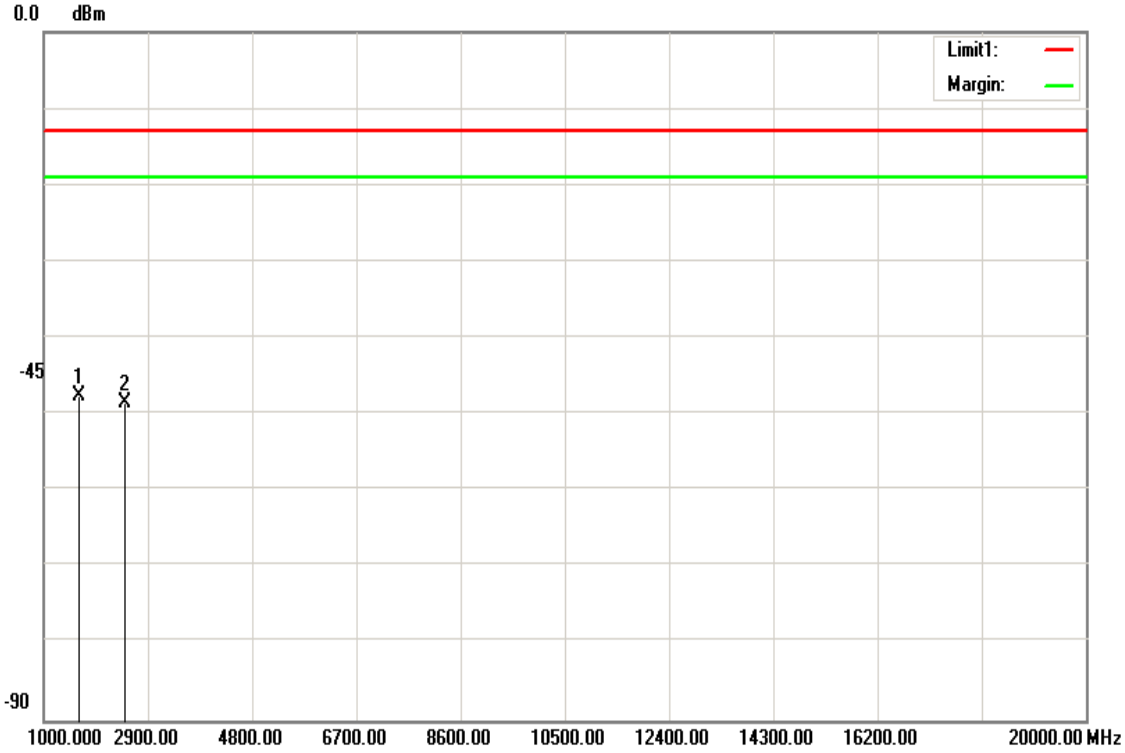
Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1688.000	-48.31	1.51	-46.80	-13.00	-33.80	H
2532.000	-51.51	2.45	-49.06	-13.00	-36.06	H
N/A						

Remark:

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

LTE Band 5 / BW: 10MHz / 16QAM / RB =1, RB Offset = 0

Operation Mode:	Tx / Low CH	**Test Date:**	March 15, 2018
Temperature:	21°C	**Tested by:**	Ivan Wang
Humidity:	52% RH	**Polarity:**	Ver.

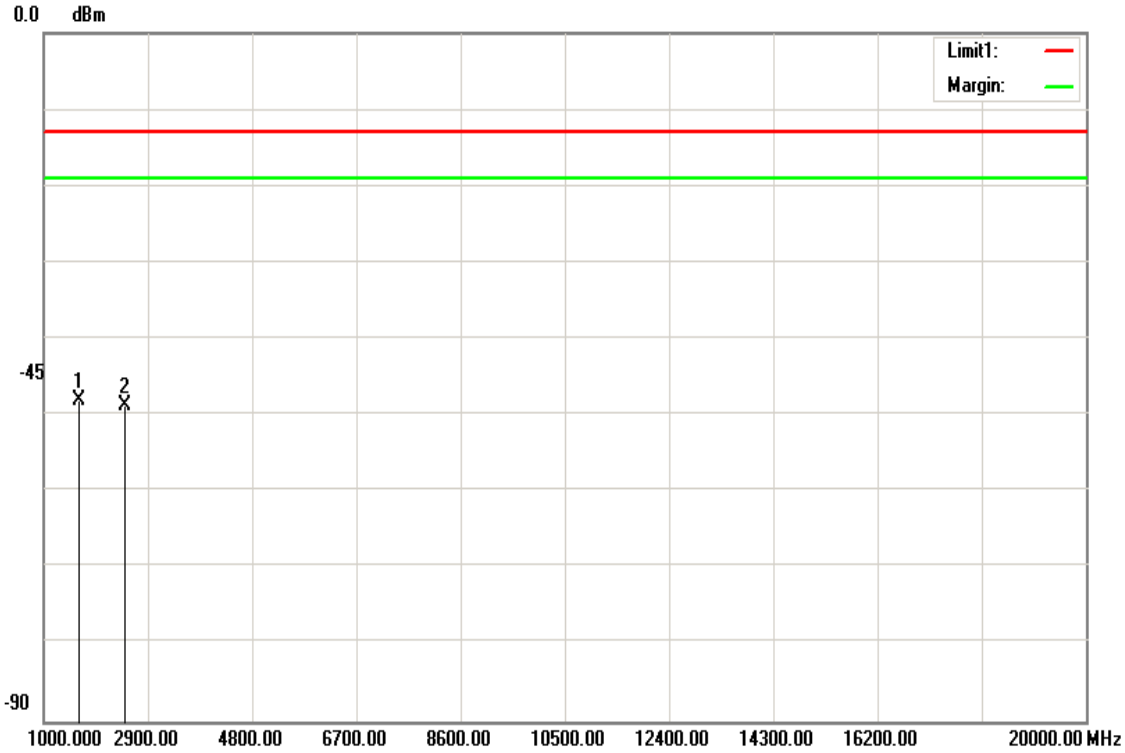


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1658.000	-49.02	1.52	-47.50	-13.00	-34.50	V
2487.000	-50.33	1.84	-48.49	-13.00	-35.49	V
N/A						

Remark:

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

Operation Mode:	Tx / Low CH	**Test Date:**	March 15, 2018
Temperature:	21°C	**Tested by:**	Ivan Wang
Humidity:	52% RH	**Polarity:**	Hor.

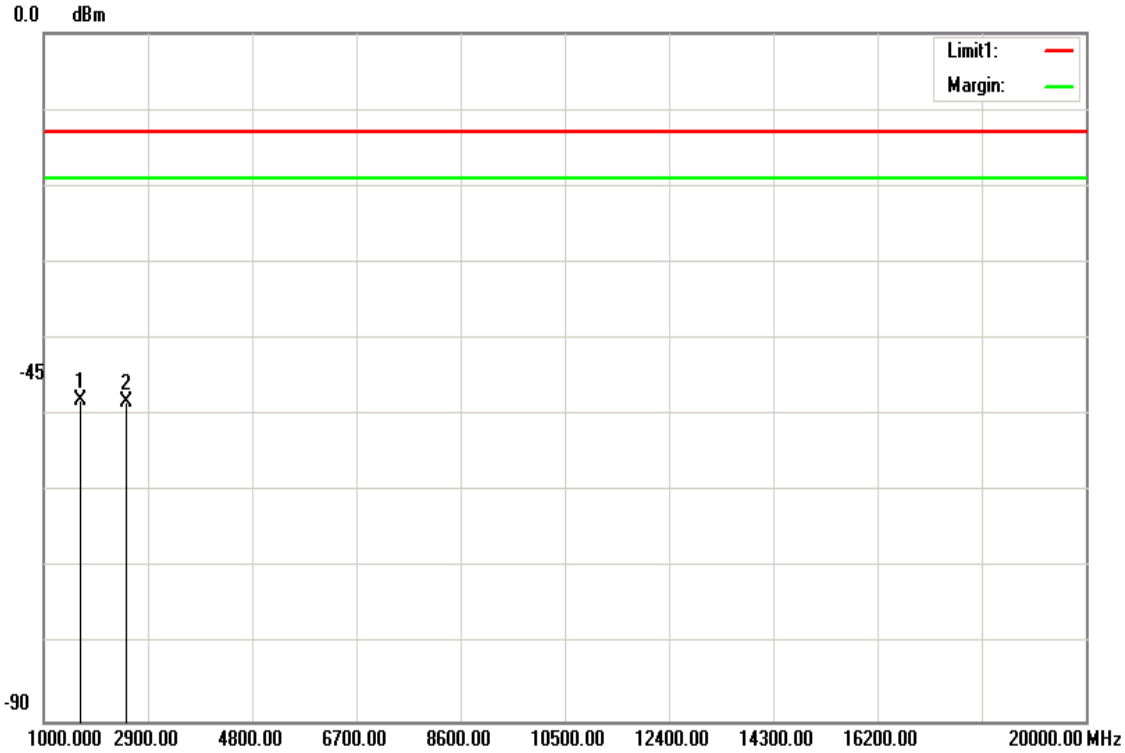


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1658.000	-49.64	1.52	-48.12	-13.00	-35.12	H
2487.000	-50.48	1.84	-48.64	-13.00	-35.64	H
N/A						

Remark:

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

Operation Mode:	Tx / Mid CH	**Test Date:**	March 15, 2018
Temperature:	21°C	**Tested by:**	Ivan Wang
Humidity:	52% RH	**Polarity:**	Ver.

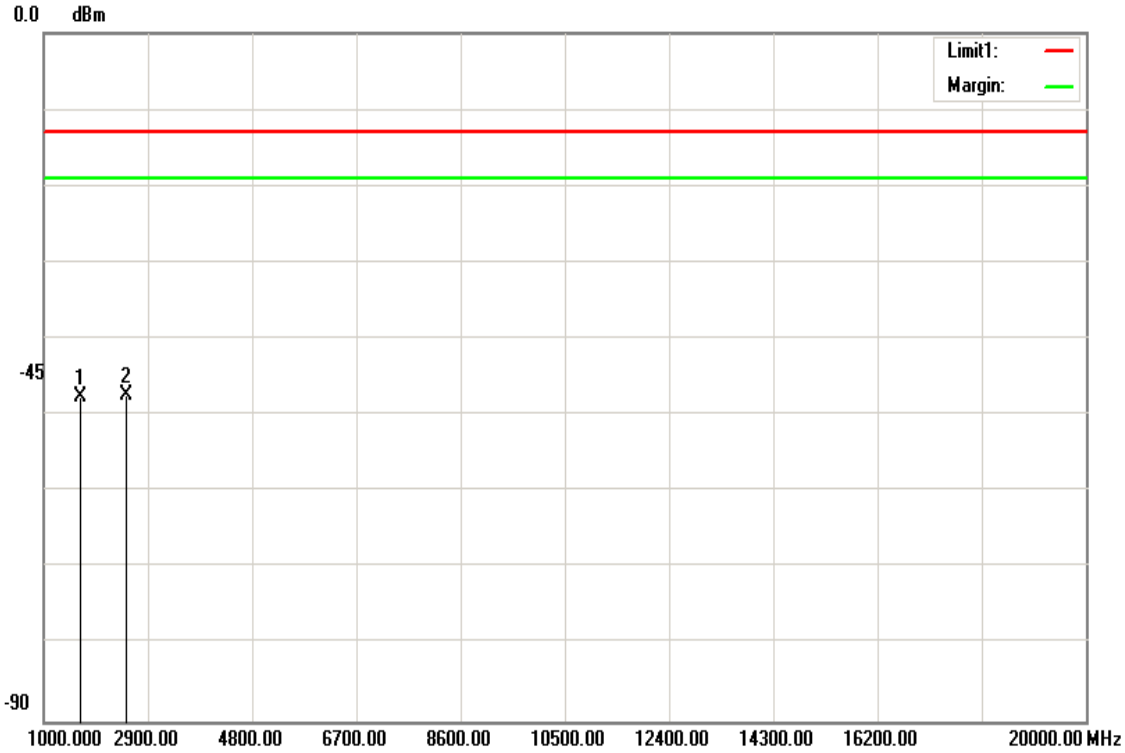


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1672.000	-49.63	1.52	-48.11	-13.00	-35.11	V
2508.000	-50.33	2	-48.33	-13.00	-35.33	V
N/A						

Remark:

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

Operation Mode:	Tx / Mid CH	**Test Date:**	March 15, 2018
Temperature:	21°C	**Tested by:**	Ivan Wang
Humidity:	52% RH	**Polarity:**	Hor.

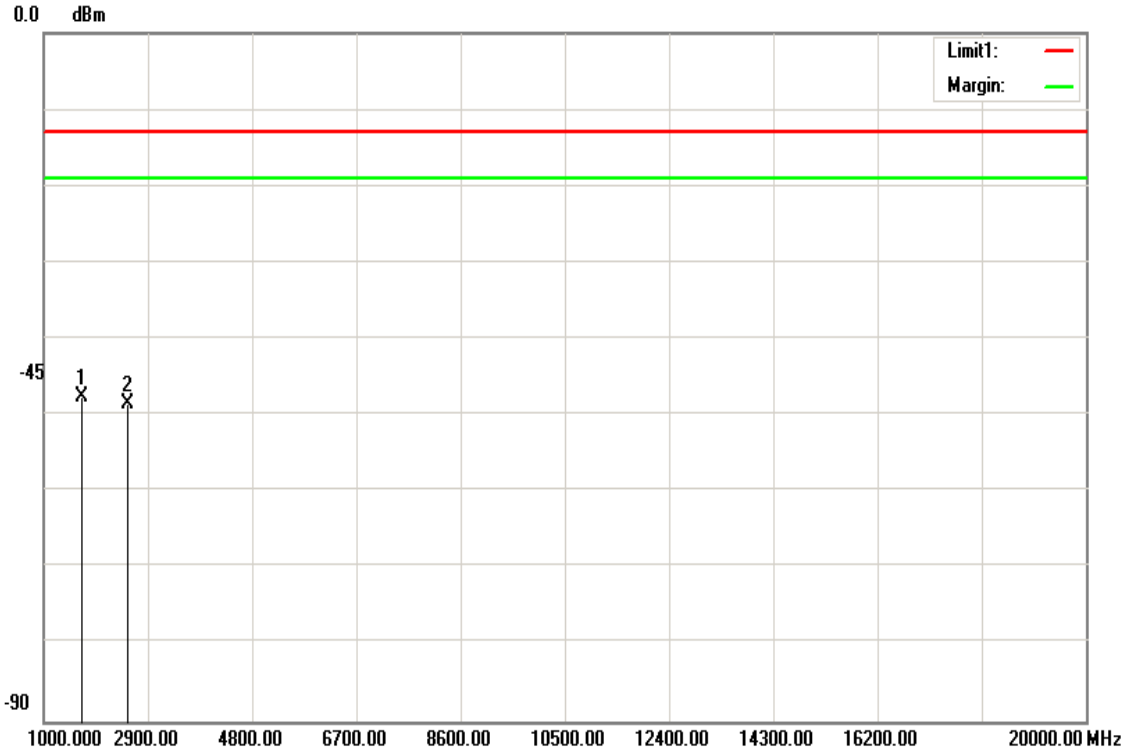


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1672.000	-49.11	1.52	-47.59	-13.00	-34.59	H
2508.000	-49.29	2	-47.29	-13.00	-34.29	H
N/A						

Remark:

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

Operation Mode:	Tx / High CH	**Test Date:**	March 15, 2018
Temperature:	21°C	**Tested by:**	Ivan Wang
Humidity:	52% RH	**Polarity:**	Ver.

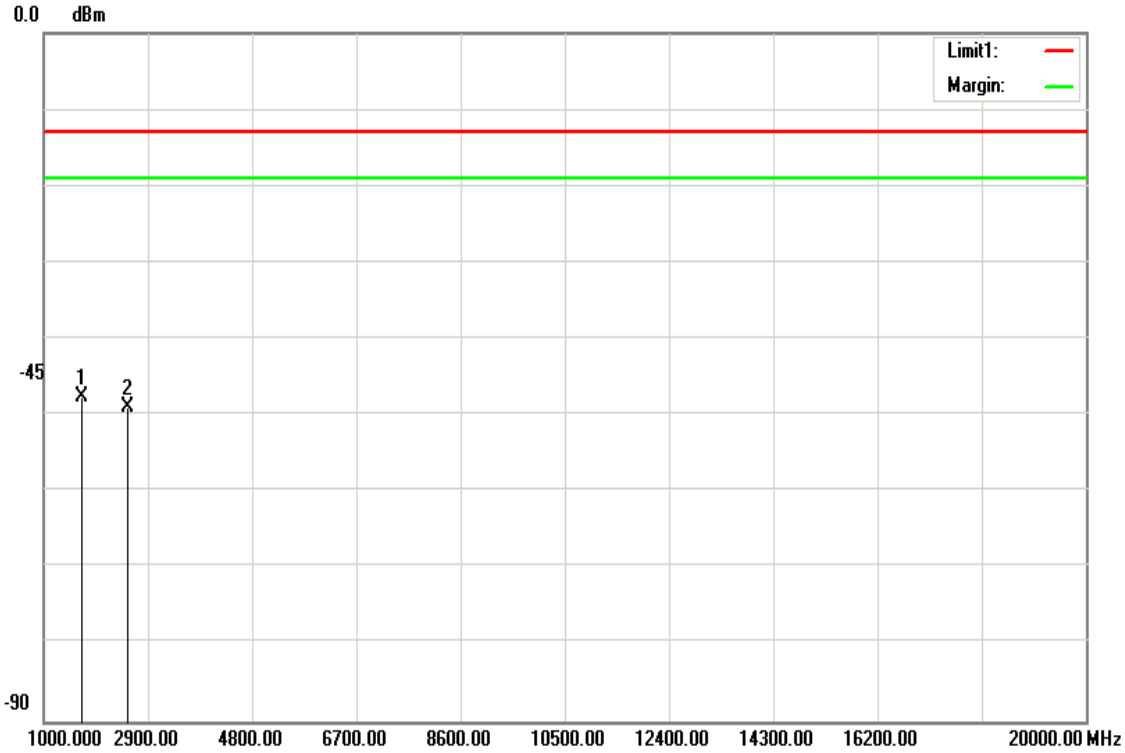


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1688.000	-49.11	1.51	-47.60	-13.00	-34.60	V
2532.000	-50.91	2.45	-48.46	-13.00	-35.46	V
N/A						

Remark:

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

Operation Mode:	Tx / High CH	**Test Date:**	March 15, 2018
Temperature:	21°C	**Tested by:**	Ivan Wang
Humidity:	52% RH	**Polarity:**	Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1688.000	-49.16	1.51	-47.65	-13.00	-34.65	H
2532.000	-51.35	2.45	-48.90	-13.00	-35.90	H
N/A						

Remark:

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