



FCC ID: 2ARCQ-EM7565
Report No.: T180821D09-RP7

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Rev.: 00

FCC 47 CFR PART 22 SUBPART H

TEST REPORT

For

Nodegrid

Model No.: SR

Trade Name: ZPE

Issued to

ZPE Systems, Inc.
46757 Fremont Blvd., Fremont, CA 94538, USA

Issued by

Compliance Certification Services Inc.
Wugu Laboratory
No.11, Wugong 6th Rd., Wugu Dist.,
New Taipei City 24891, Taiwan. (R.O.C.)
Issued Date: December 21, 2018

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.
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Revision History

Rev.		Issue Date		Revisions	Effect Page	Revised By
00		December 21, 2018		Initial Issue	ALL	Allison Chen



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1. TEST RESULT CERTIFICATION

Applicant: ZPE Systems, Inc.
46757 Fremont Blvd., Fremont, CA 94538, USA

Manufacturer: ZPE Systems, Inc.
46757 Fremont Blvd., Fremont, CA 94538, USA

Equipment Under Test: Nodegrid

Trade Name: ZPE

Model: SR

Date of Test: December 20, 2018

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR PART 22 SUBPART H	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 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.

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

Approved by:

Tested by:

Sam Chuang
Manager
Compliance Certification Services Inc.

Jerry Chuang
Engineer
Compliance Certification Services Inc.

2. EUT DESCRIPTION

Product	Nodegrid				
Trade Name	ZPE				
Model	SR				
Model Discrepancy	N/A				
Received Date	August 21, 2018				
Power Supply	Power from AC adapter or internal Power Supply				
Frequency Range	LTE Band 26 Channel Bandwidth: 1.4MHz	824.7MHz ~ 843.3MHz			
	LTE Band 26 Channel Bandwidth: 3MHz	825.5MHz ~ 847.5MHz			
	LTE Band 26 Channel Bandwidth: 5MHz	826.5MHz ~ 846.5MHz			
	LTE Band 26 Channel Bandwidth: 10MHz	829MHz ~ 841MHz			
	LTE Band 26 Channel Bandwidth: 15MHz	831.5MHz ~ 841.5MHz			
	LTE Band 26	QPSK, 16QAM			
Antenna Specification	External Antenna LTE Band 26: 2.6 dBi				
Transmit Power (ERP Power)	LTE Band 26 Channel Bandwidth: 1.4MHz	QPSK:	27.36	dBm	
		16QAM:	27.99	dBm	
	LTE Band 26 Channel Bandwidth: 3MHz	QPSK:	27.26	dBm	
		16QAM:	28.28	dBm	
	LTE Band 26 Channel Bandwidth: 5MHz	QPSK:	27.39	dBm	
		16QAM:	28.76	dBm	
	LTE Band 26 Channel Bandwidth: 10MHz	QPSK:	27.52	dBm	
		16QAM:	27.99	dBm	
	LTE Band 26 Channel Bandwidth: 15MHz	QPSK:	27.96	dBm	
		16QAM:	28.50	dBm	

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



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3. TEST SUMMARY

FCC Standard Section	Report Section	Test Item	Result
-	2	Antenna Requirement	Pass
2.1046	-	Output Power measurement	N/A
22.913(a)	8.1	ERP Measurement	Pass
2.1055, 22.355	-	Frequency Stability v.s. temperature measurement	N/A
2.1049	-	Occupied Bandwidth Measurement	N/A
22.917(a)	-	Conducted Band Edge	N/A
22.913(d)	-	Peak to Average Ratio	N/A
22.917(a)	-	Conducted Spurious Emission	N/A
22.917(a)	8.2	Spurious Radiation Measurement	Pass

4. TEST METHODOLOGY

Both conducted and radiated testing were performed according to the procedures document on chapter 13 of TIA-603-E and FCC CFR 47, Part 2 and Part 22 Subpart H, KDB 971168 D01 Power Meas License Digital Systems.

4.1 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.

4.2 EUT EXERCISE

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

4.3 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 26: 824 MHz ~ 849 MHz

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)	26797	824.7	26805	825.5	26815	826.5
Middle channel (M)	26915	836.5	26915	836.5	26915	836.5
High channel (H)	27033	848.3	27025	847.5	27015	846.5
Channel Bandwidth	10MHz		15MHz			
	Channel	Frequency (MHz)	Channel	Frequency (MHz)		
Low channel (L)	26840	829	26865	831.5		
Middle channel (M)	26915	836.5	26915	836.5		
High channel (H)	26960	841	26965	841.5		

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
Band26	1M	1 RB ALLOCATED AT THE LOWER EDGE	1M	1 RB ALLOCATED AT THE LOWER EDGE
	3M	1 RB ALLOCATED AT THE LOWER EDGE	3M	1 RB ALLOCATED AT THE LOWER EDGE
	5M	1 RB ALLOCATED AT THE LOWER EDGE	5M	1 RB ALLOCATED AT THE LOWER EDGE
	10M	1 RB ALLOCATED AT THE LOWER EDGE	10M	1 RB ALLOCATED AT THE LOWER EDGE
	15M	1 RB ALLOCATED AT THE LOWER EDGE	15M	1 RB ALLOCATED AT THE LOWER EDGE

4.4 THE WORST MODE OF MEASUREMENT

Radiated Emission Measurement	
Test Condition	Emission for Unwanted and Fundamental
Power supply Mode	Mode 1: EUT Power by adapter.
Worst Mode	☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4
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:

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.

5. INSTRUMENT CALIBRATION

5.1 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.

5.2 MEASUREMENT EQUIPMENT USED

Equipment Used for Emissions Measurement

Wugu Fully Chamber					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Bilog Antenna	Sunol Sciences	JB1	A052609	03/14/2018	03/13/2019
Cable	HUBER SUHNER	SUCOFLEX 104PEA	23452	06/29/2018	06/28/2019
Cable	HUBER SUHNER	SUCOFLEX 104PEA	33960	06/29/2018	06/28/2019
Digital Radio Communication Tester	R&S	CMU200	116604	07/19/2018	07/18/2019
Digital Thermo-Hygro Meter	WISEWIND	1110	D06	02/08/2018	02/07/2019
Horn Antenna	SCHWARZBECK	BBHA 9120D	779	03/14/2018	03/13/2019
Pre-Amplifier	Anritsu	MH648A	M89145	06/29/2018	06/28/2019
Pre-Amplifier	EMEC	EM01G26G	060570	06/29/2018	06/28/2019
Signal Analyzer	Agilent	N9010A	MY52220817	03/22/2018	03/21/2019
Wideband Radio Communication Tester	R&S	CMW 500	116875	04/20/2018	04/19/2019
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
Software	EZ-EMC (CCS-3A1RE)				

5.3 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 $k=2$.



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6. FACILITIES AND ACCREDITATIONS

6.1 FACILITIES

- ☐ 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

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

6.2 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.

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."



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7. SETUP OF EQUIPMENT UNDER TEST

7.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix II for the actual connections between EUT and support equipment.

7.2 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.

8. FCC PART 22 REQUIREMENTS

8.1 ERP MEASUREMENT

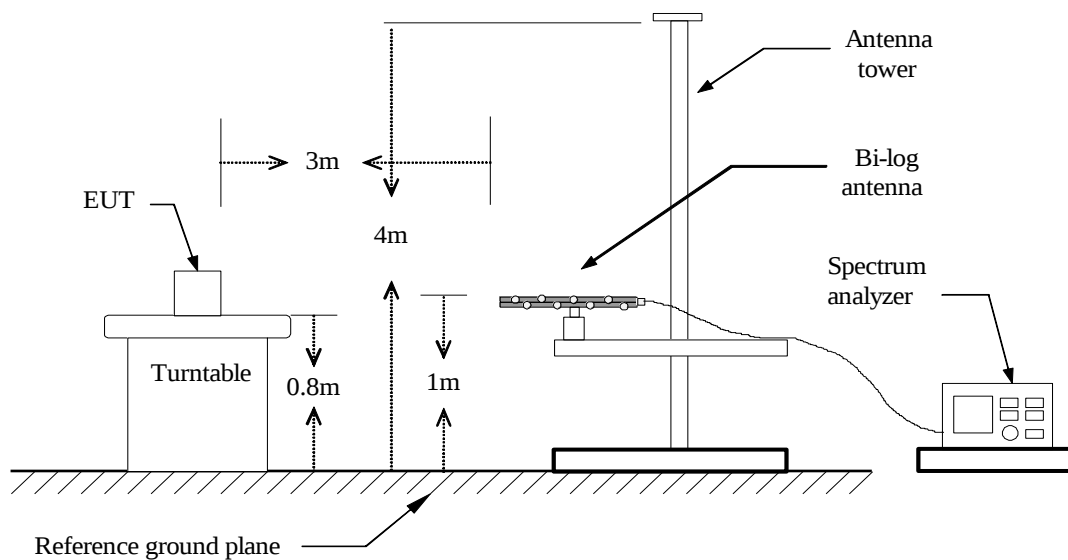
LIMIT

According to FCC §2.1046

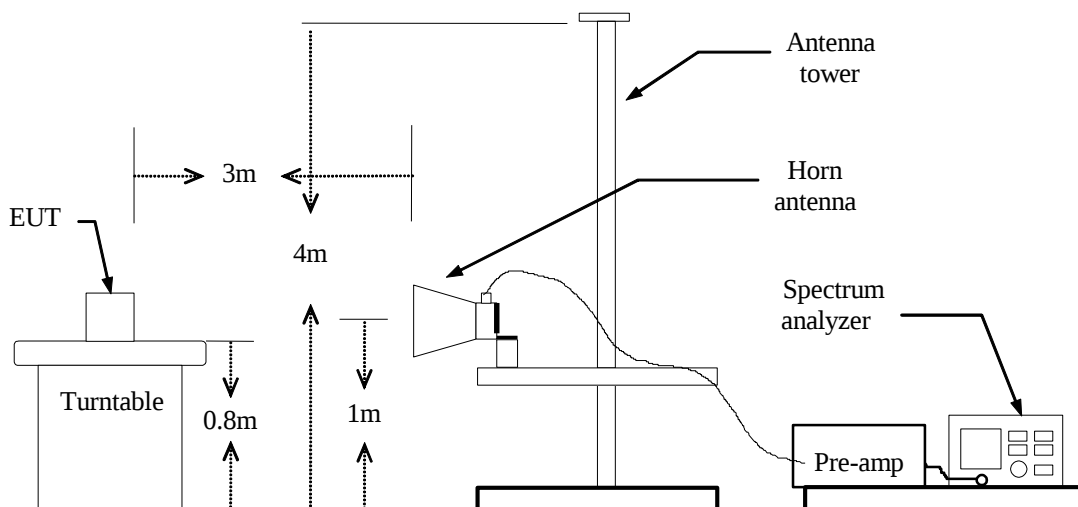
FCC 22.913(a): The Effective Radiated Power (ERP) of mobile transmitters must not exceed 7 Watts.

TEST CONFIGURATION

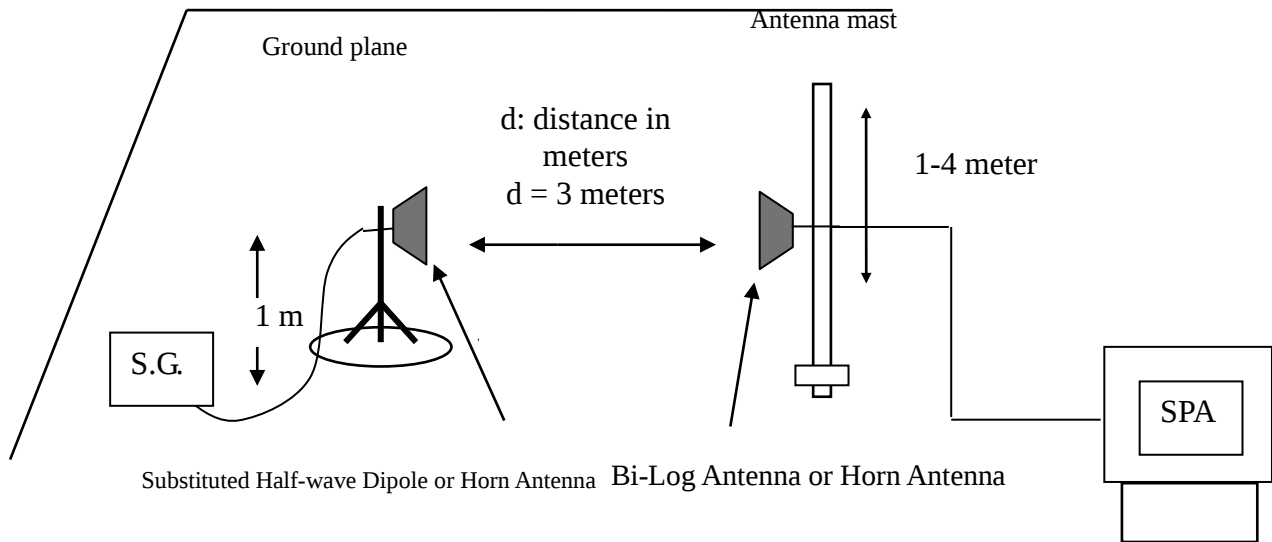
Below 1 GHz



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 Power Meas License Digital Systems.
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-E. 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.

LTE Band 26

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)
26	1.4	Lowest	QPSK	1	0	12.29	0.0169	26.94	0.4943
		Middle		1	0	12.80	0.0191	27.36	0.5445
		Highest		1	0	13.59	0.0229	26.97	0.4977
		Lowest	16 QAM	1	0	13.07	0.0203	27.30	0.5370
		Middle		1	0	13.57	0.0228	27.99	0.6295
		Highest		1	0	13.98	0.0250	26.93	0.4932

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)
26	3	Lowest	QPSK	1	0	11.29	0.0135	27.26	0.5321
		Middle		1	0	11.97	0.0157	27.12	0.5152
		Highest		1	0	11.08	0.0128	27.10	0.5129
		Lowest	16 QAM	1	0	12.68	0.0185	26.92	0.4920
		Middle		1	0	12.95	0.0197	28.28	0.6730
		Highest		1	0	14.45	0.0279	27.38	0.5470

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)
26	5	Lowest	QPSK	1	0	11.05	0.0127	27.39	0.5483
		Middle		1	0	12.09	0.0162	27.21	0.5260
		Highest		1	0	10.85	0.0122	26.98	0.4989
		Lowest	16 QAM	1	0	11.63	0.0146	27.19	0.5236
		Middle		1	0	12.31	0.0170	28.76	0.7516
		Highest		1	0	10.99	0.0126	27.06	0.5082

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)
26	10	Lowest	QPSK	1	0	10.39	0.0109	27.20	0.5248
		Middle		1	0	11.41	0.0138	27.52	0.5649
		Highest		1	0	10.85	0.0122	27.48	0.5598
		Lowest	16 QAM	1	0	11.08	0.0128	26.93	0.4932
		Middle		1	0	11.93	0.0156	27.70	0.5888
		Highest		1	0	11.57	0.0144	27.99	0.6295

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)
26	15	Lowest	QPSK	1	0	10.13	0.0103	27.10	0.5129
		Middle		1	0	10.05	0.0101	27.86	0.6109
		Highest		1	0	11.05	0.0127	27.96	0.6252
		Lowest	16 QAM	1	0	9.87	0.0097	27.44	0.5546
		Middle		1	0	10.49	0.0112	27.90	0.6166
		Highest		1	0	10.88	0.0122	28.50	0.7079

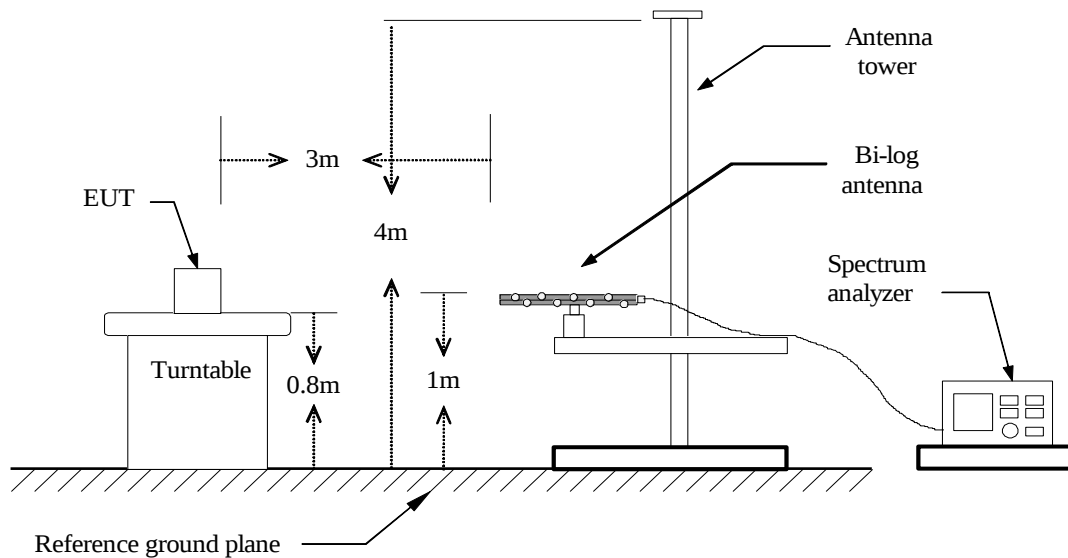
8.2 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

LIMIT

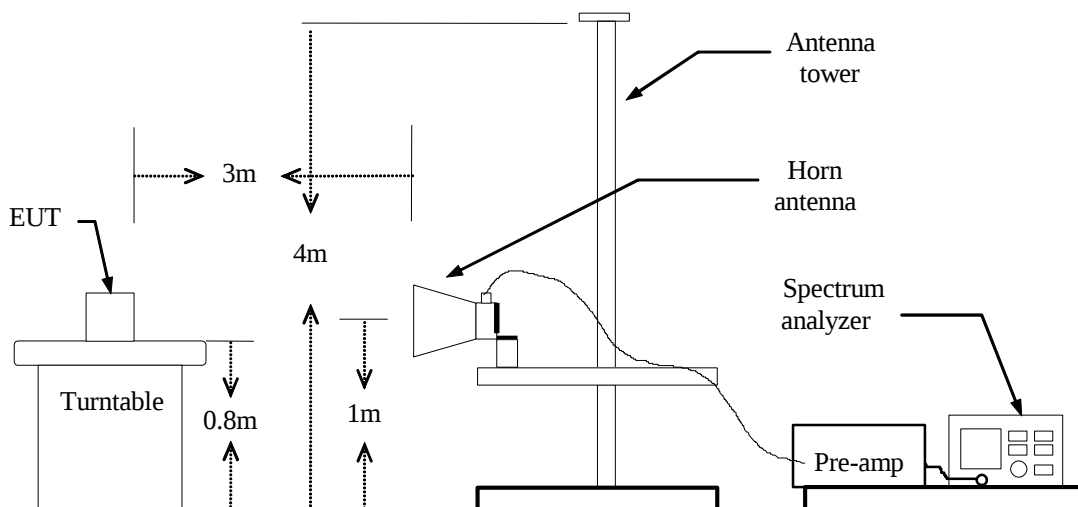
The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB. The limit of emission equal to -13dBm

Test Configuration

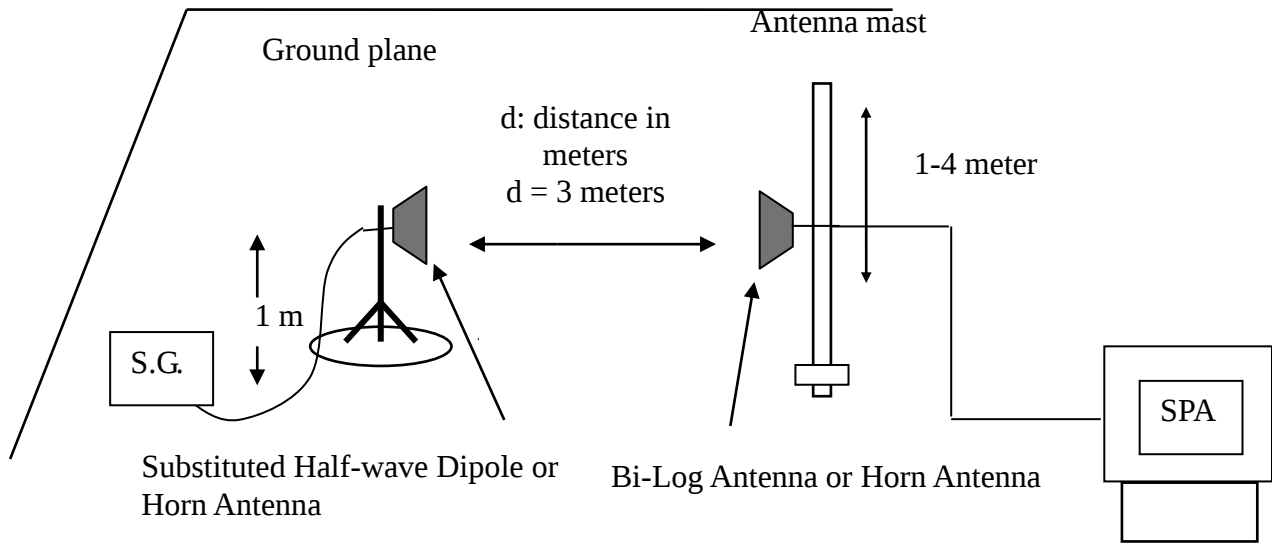
Below 1 GHz



Above 1 GHz



Substituted Method Test Set-up



TEST PROCEDURE

1. According to KDB 971168 D01 Power Meas License Digital Systems and TIA-603-E 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

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

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

TEST RESULTS

Refer to the attached tabular data sheets.

Test Results

Below 1GHz

LTE Band 26 / BW: 15MHz / QPSK / RB =1, RB Offset = 0

Operation Mode: Tx / Mid CH

Test Date:

December 20, 2018

Temperature: 23°C

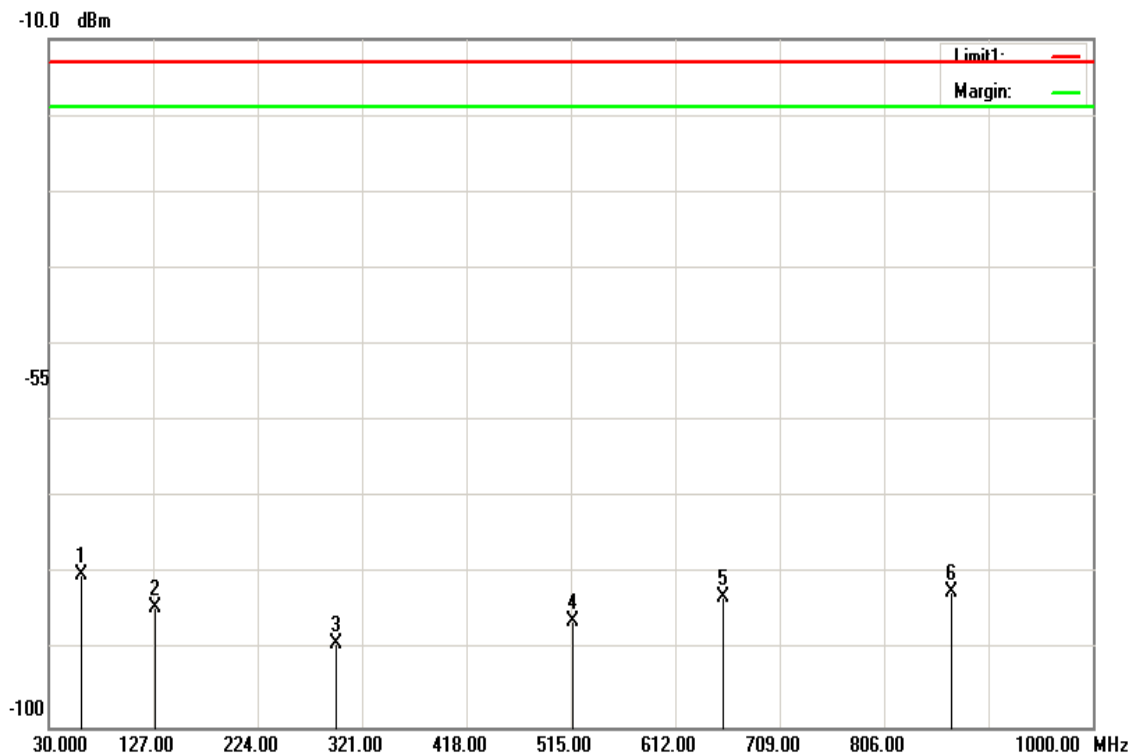
Tested by:

Jerry Chuang

Humidity: 46 %RH

Polarity:

Ver.



Frequency (MHz)	S.G. (dBm)	Cable loss(dB)	Ant.Gain (dBd)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
60.5550	-77.11	0.77	-2.15	-80.03	-13.00	-67.03	V
128.9400	-81.18	1.13	-2.15	-84.46	-13.00	-71.46	V
296.7500	-85.22	1.72	-2.15	-89.09	-13.00	-76.09	V
516.9400	-81.63	2.29	-2.15	-86.07	-13.00	-73.07	V
656.6200	-78.33	2.58	-2.15	-83.06	-13.00	-70.06	V
868.0800	-77.1	3	-2.15	-82.25	-13.00	-69.25	V

Note: We selected worst case to performed test, The results can be meet other mode.

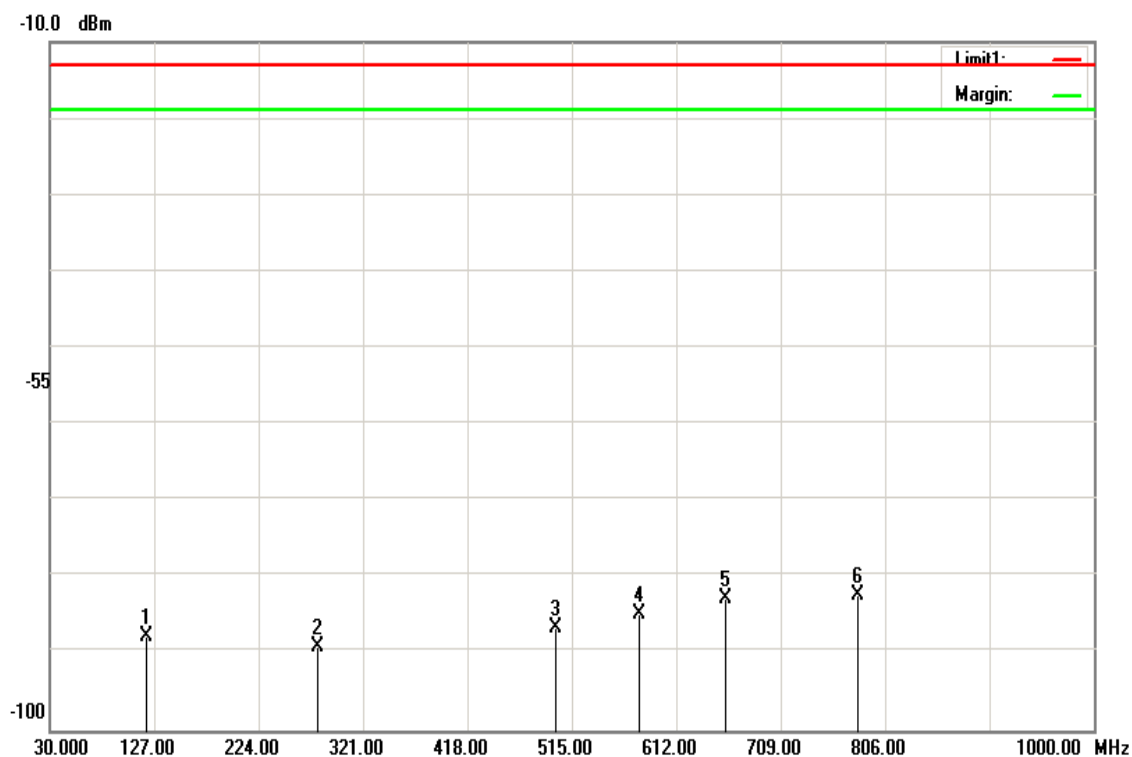
Operation Mode: Tx / Mid CH

Test Date: December 20, 2018

Temperature: 23°C

Tested by: Jerry Chuang

Humidity: 46 %RH

Polarity: Hor.


Frequency (MHz)	S.G. (dBm)	Cable loss(dB)	Ant.Gain (dBd)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
120.6950	-84.47	1.09	-2.15	-87.71	-13.00	-74.71	H
279.7750	-85.25	1.66	-2.15	-89.06	-13.00	-76.06	H
500.9350	-82.2	2.25	-2.15	-86.60	-13.00	-73.60	H
577.0800	-80.19	2.42	-2.15	-84.76	-13.00	-71.76	H
658.0750	-78.11	2.59	-2.15	-82.85	-13.00	-69.85	H
780.7800	-77.24	2.84	-2.15	-82.23	-13.00	-69.23	H

Note: We selected worst case to performed test, The results can be meet other mode.

LTE Band 26 / BW: 15MHz / 16QAM / RB =1, RB Offset = 0

Operation Mode: Tx / Mid CH

Test Date:

December 20, 2018

Temperature: 23°C

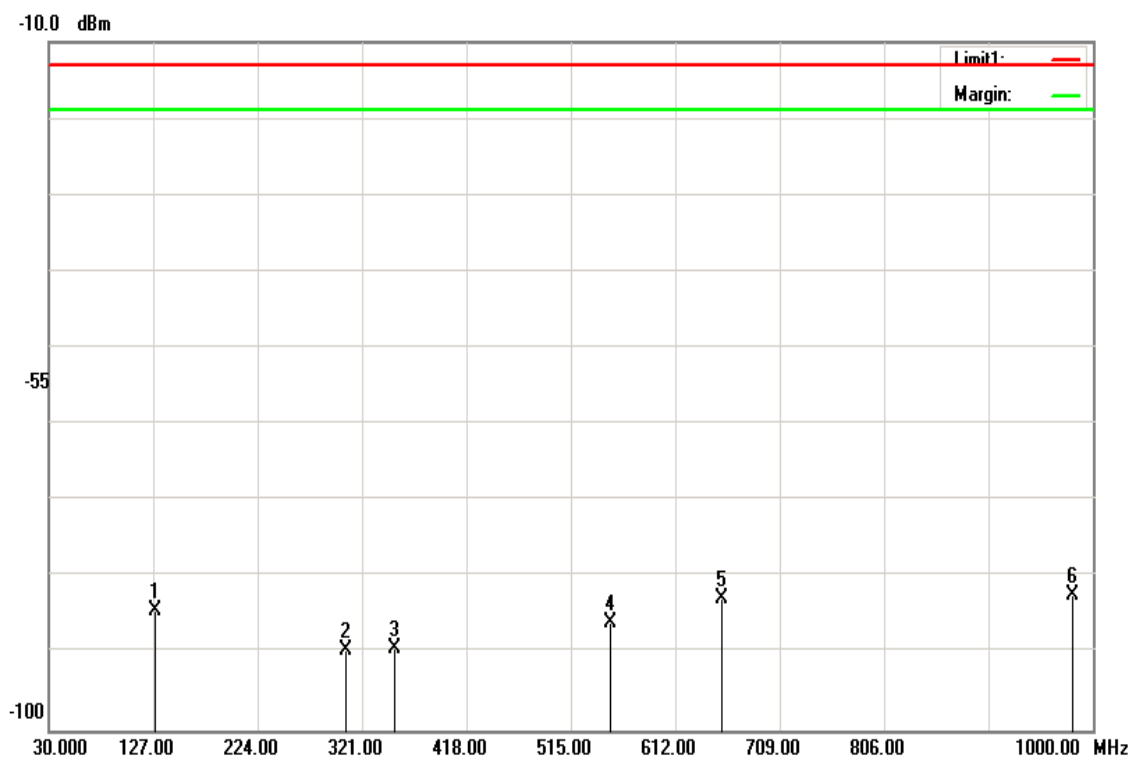
Tested by:

Jerry Chuang

Humidity: 46 %RH

Polarity:

Ver.



Frequency (MHz)	S.G. (dBm)	Cable loss(dB)	Ant.Gain (dBd)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
129.4250	-81.08	1.13	-2.15	-84.36	-13.00	-71.36	V
305.9650	-85.63	1.75	-2.15	-89.53	-13.00	-76.53	V
351.5550	-85.24	1.87	-2.15	-89.26	-13.00	-76.26	V
552.3450	-81.33	2.37	-2.15	-85.85	-13.00	-72.85	V
655.1650	-78.11	2.58	-2.15	-82.84	-13.00	-69.84	V
981.0850	-76.88	3.2	-2.15	-82.23	-13.00	-69.23	V

Note: We selected worst case to performed test, The results can be meet other mode.



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Operation Mode: Tx / Mid CH

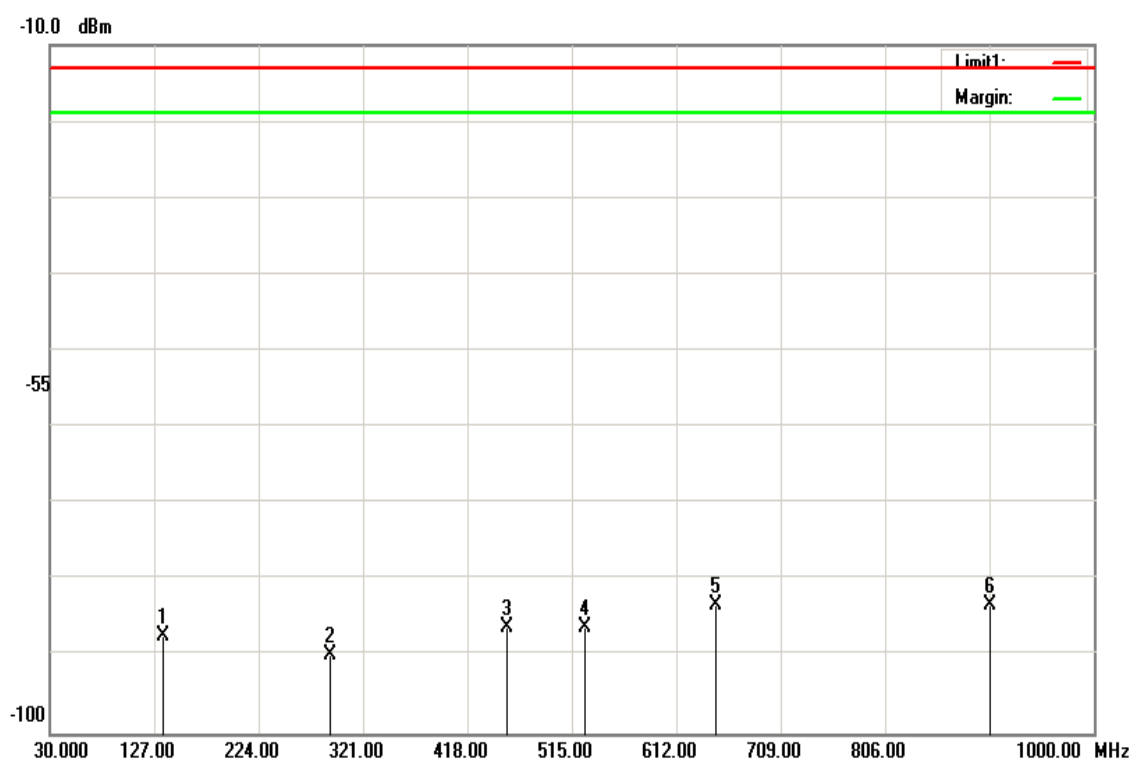
Test Date: December 20, 2018

Temperature: 23°C

Tested by: Jerry Chuang

Humidity: 46 %RH

Polarity: Hor.



Frequency (MHz)	S.G. (dBm)	Cable loss(dB)	Ant.Gain (dBd)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
136.2150	-83.95	1.15	-2.15	-87.25	-13.00	-74.25	V
289.9600	-85.87	1.69	-2.15	-89.71	-13.00	-76.71	V
455.3450	-81.88	2.14	-2.15	-86.17	-13.00	-73.17	V
527.6100	-81.68	2.31	-2.15	-86.14	-13.00	-73.14	V
649.3450	-78.47	2.57	-2.15	-83.19	-13.00	-70.19	V
903.0000	-78.09	3.06	-2.15	-83.30	-13.00	-70.30	V

Note: We selected worst case to performed test, The results can be meet other mode.



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Above 1GHz

LTE Band 26 / BW: 15MHz / QPSK RB =1, RB Offset = 0

Operation Mode: Tx / Low CH

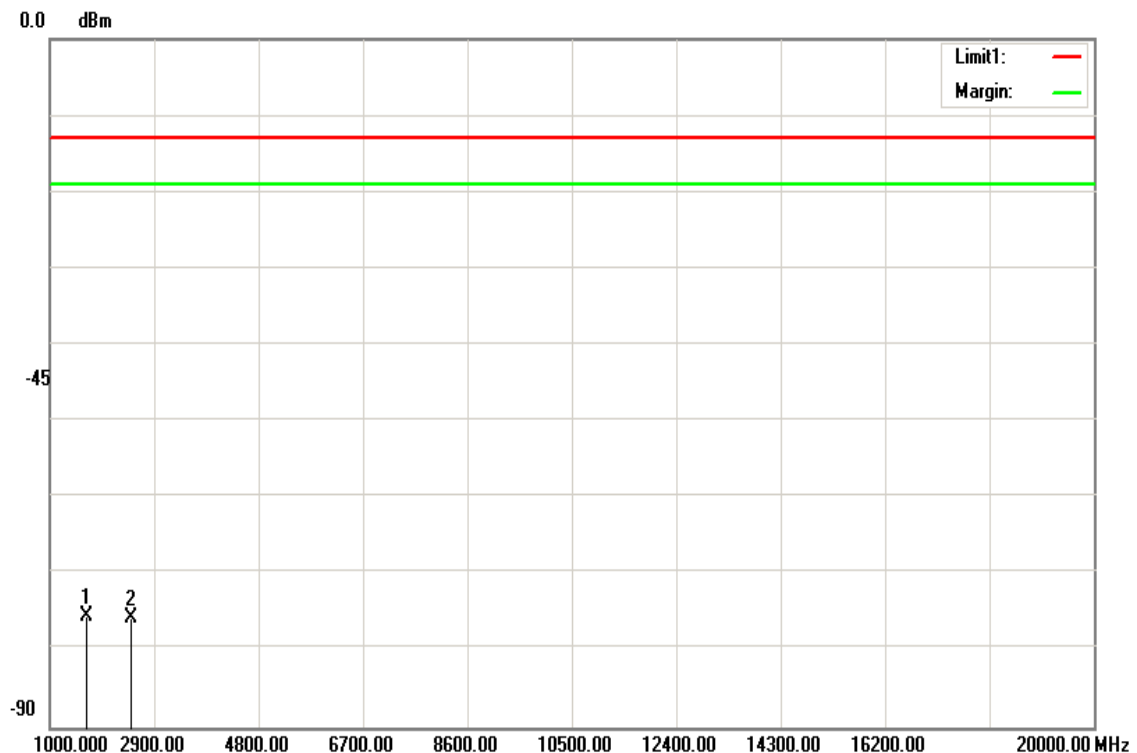
Test Date: December 20, 2018

Temperature: 23°C

Tested by: Jerry Chuang

Humidity: 46 %RH

Polarity: Ver.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1663.000	-71.32	4.22	-75.54	-13.00	-62.54	V
2494.500	-70.5	5.32	-75.82	-13.00	-62.82	V
N/A						

Remark:

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

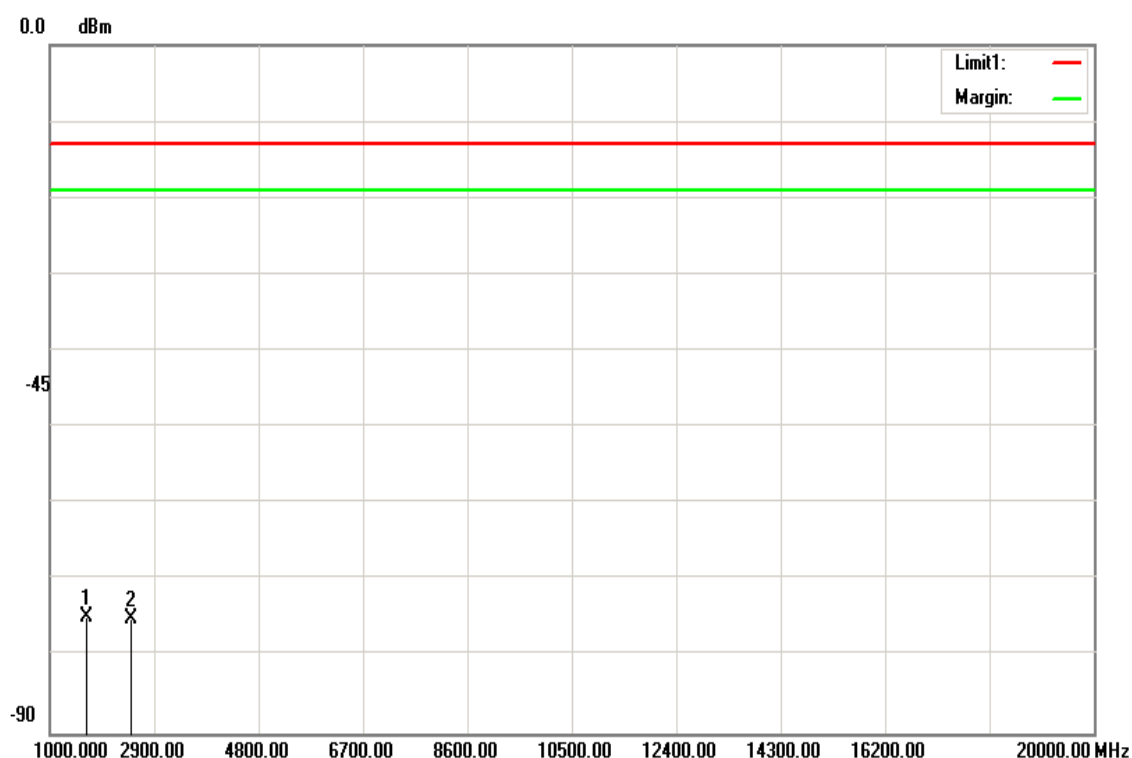


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Operation Mode: Tx / Low CH
Temperature: 23°C
Humidity: 46 %RH

Test Date: December 20, 2018
Tested by: Jerry Chuang
Polarity: Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1663.000	-70.54	4.22	-74.76	-13.00	-61.76	H
2494.500	-69.7	5.32	-75.02	-13.00	-62.02	H
N/A						

Remark:

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

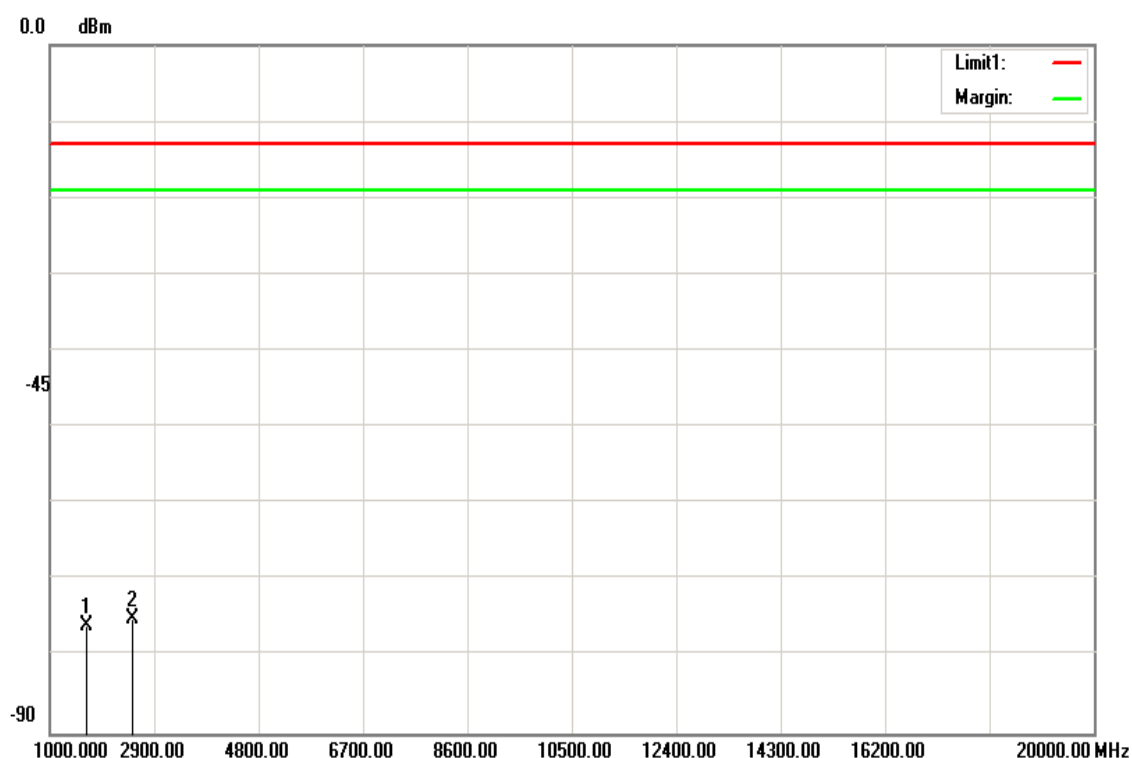


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Operation Mode: Tx / Mid CH
Temperature: 23°C
Humidity: 46 %RH

Test Date: December 20, 2018
Tested by: Jerry Chuang
Polarity: Ver.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1673.000	-71.78	4.23	-76.01	-13.00	-63.01	V
2509.500	-69.67	5.34	-75.01	-13.00	-62.01	V
N/A						

Remark:

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

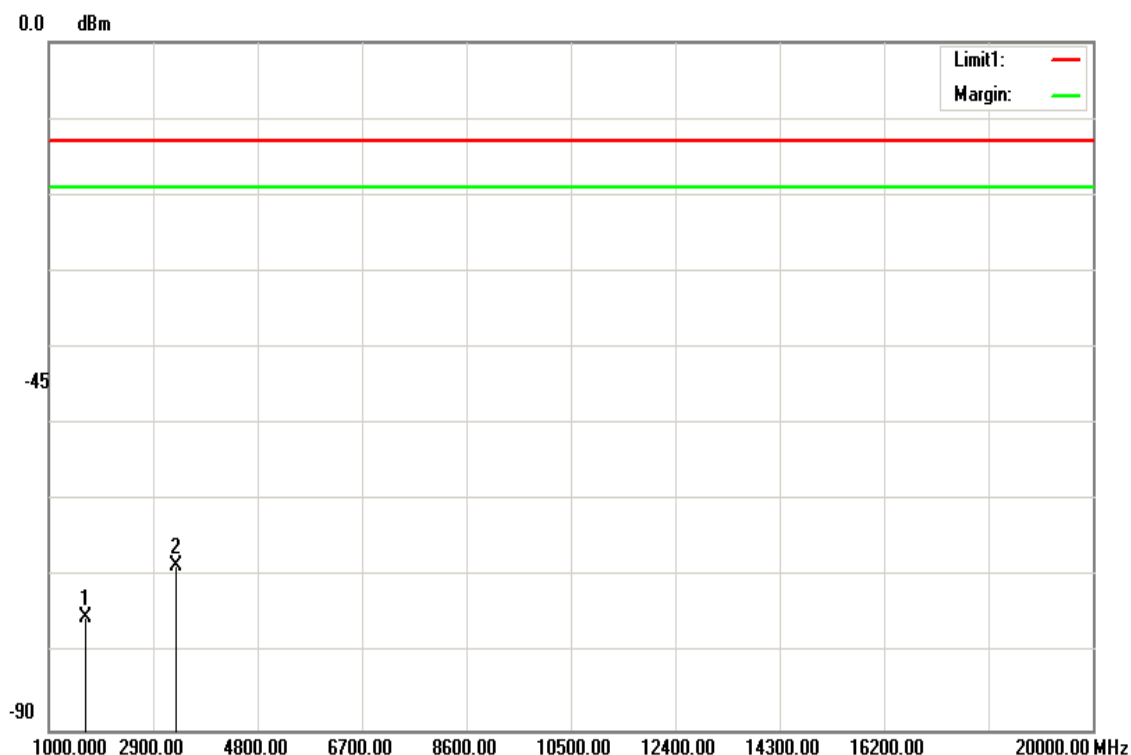


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Operation Mode: Tx / Mid CH
Temperature: 23°C
Humidity: 46 %RH

Test Date: December 20, 2018
Tested by: Jerry Chuang
Polarity: Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1673.000	-70.99	4.23	-75.22	-13.00	-62.22	H
3320.500	-62.36	6.24	-68.60	-13.00	-55.60	H
N/A						

Remark:

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

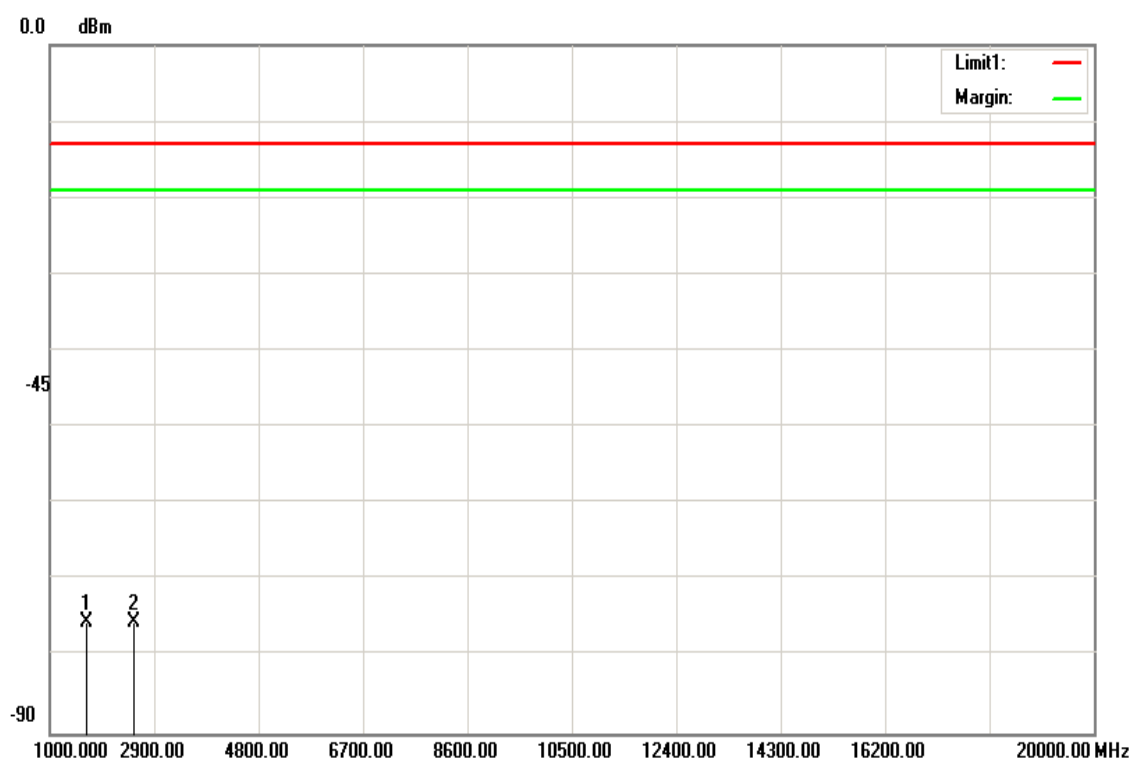


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Operation Mode: Tx / High CH
Temperature: 23°C
Humidity: 46 %RH

Test Date: December 20, 2018
Tested by: Jerry Chuang
Polarity: Ver.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1683.000	-71.23	4.25	-75.48	-13.00	-62.48	V
2524.500	-70.16	5.36	-75.52	-13.00	-62.52	V
N/A						

Remark:

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

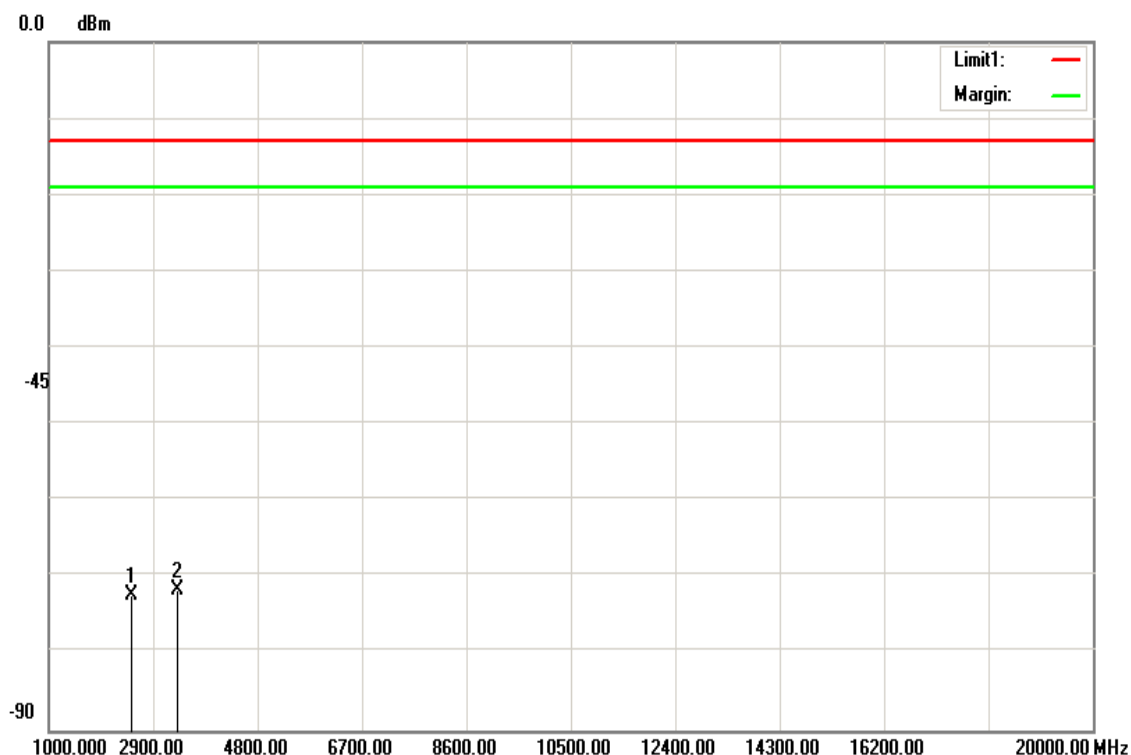


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Operation Mode: Tx / High CH
Temperature: 23°C
Humidity: 46 %RH

Test Date: December 20, 2018
Tested by: Jerry Chuang
Polarity: Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
2505.000	-67	5.34	-72.34	-13.00	-59.34	H
3338.000	-65.36	6.26	-71.62	-13.00	-58.62	H
N/A						

Remark:

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



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LTE Band 26 / BW: 15MHz / 16QAM / RB =1, RB Offset = 0

Operation Mode: Tx / Low CH

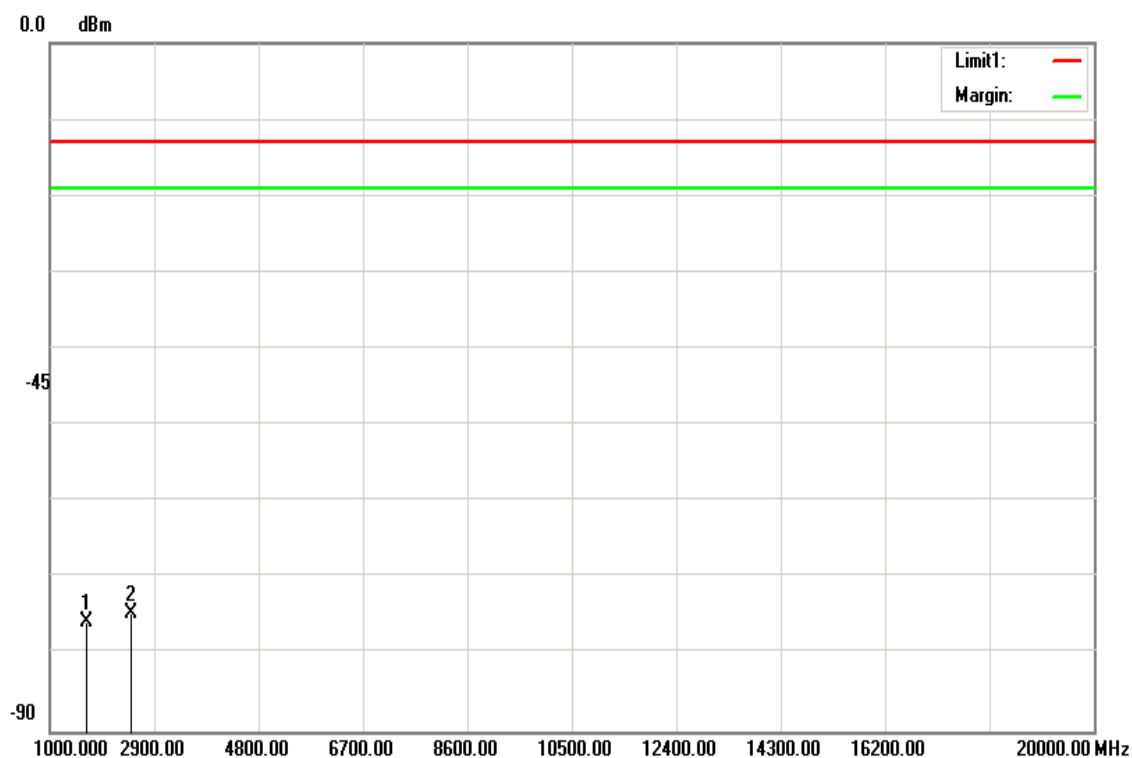
Test Date: December 20, 2018

Temperature: 23°C

Tested by: Jerry Chuang

Humidity: 46 %RH

Polarity: Ver.



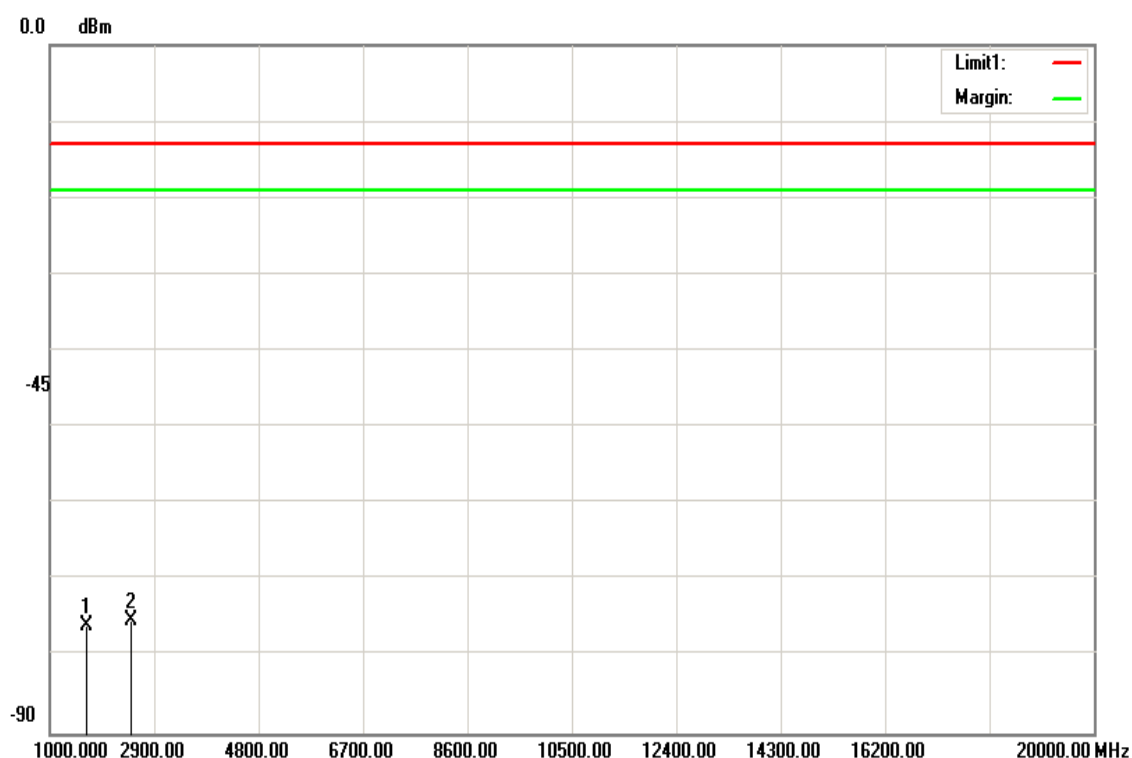
Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1663.000	-71.39	4.22	-75.61	-13.00	-62.61	V
2494.400	-69.37	5.32	-74.69	-13.00	-61.69	V
N/A						

Remark:

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

Operation Mode: Tx / Low CH
Temperature: 23°C
Humidity: 46 %RH

Test Date: December 20, 2018
Tested by: Jerry Chuang
Polarity: Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1663.000	-71.68	4.22	-75.90	-13.00	-62.90	H
2494.400	-69.89	5.32	-75.21	-13.00	-62.21	H
N/A						

Remark:

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

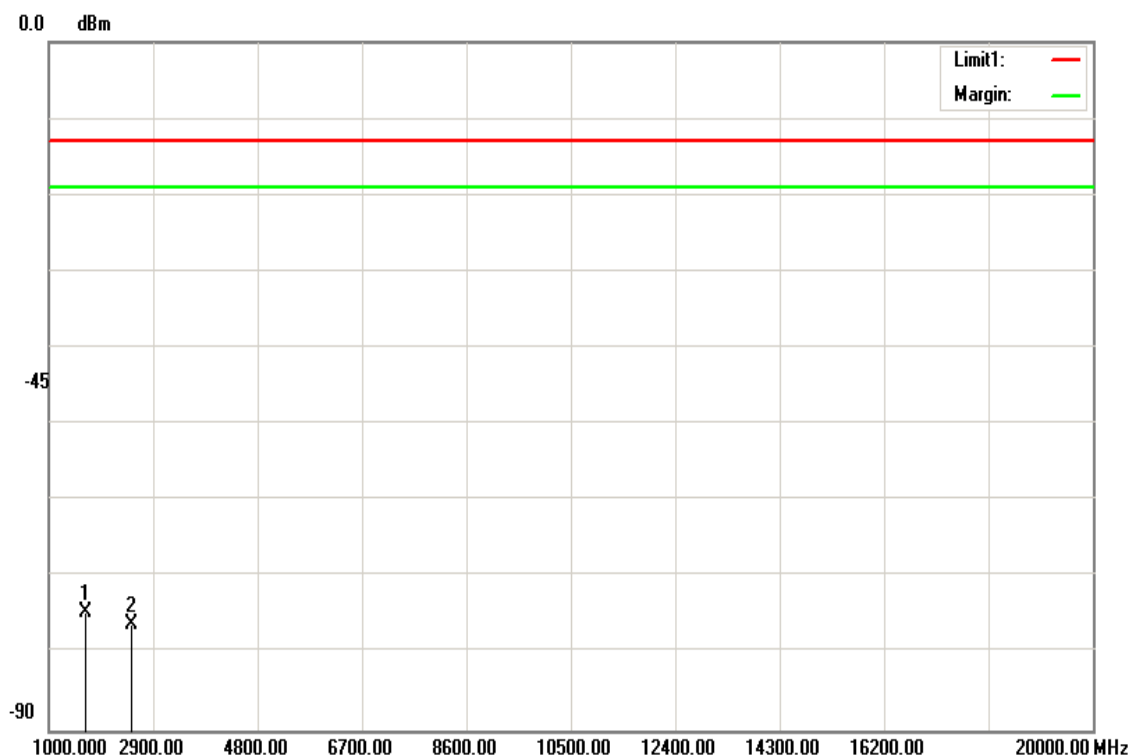


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Operation Mode: Tx / Mid CH
Temperature: 23°C
Humidity: 46 %RH

Test Date: December 20, 2018
Tested by: Jerry Chuang
Polarity: Ver.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1673.000	-70.37	4.23	-74.60	-13.00	-61.60	V
2509.500	-70.74	5.34	-76.08	-13.00	-63.08	V
N/A						

Remark:

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

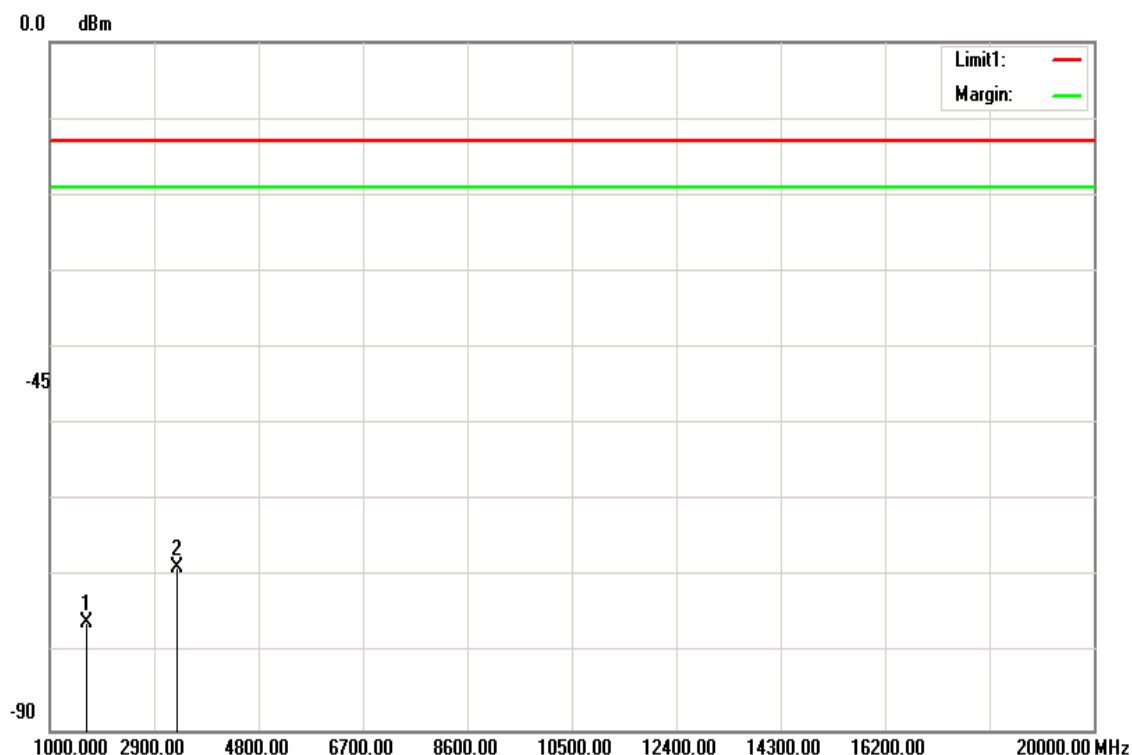


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Operation Mode: Tx / Mid CH
Temperature: 23°C
Humidity: 46 %RH

Test Date: December 20, 2018
Tested by: Jerry Chuang
Polarity: Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1673.000	-71.82	4.23	-76.05	-13.00	-63.05	H
3320.500	-62.42	6.24	-68.66	-13.00	-55.66	H
N/A						

Remark:

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

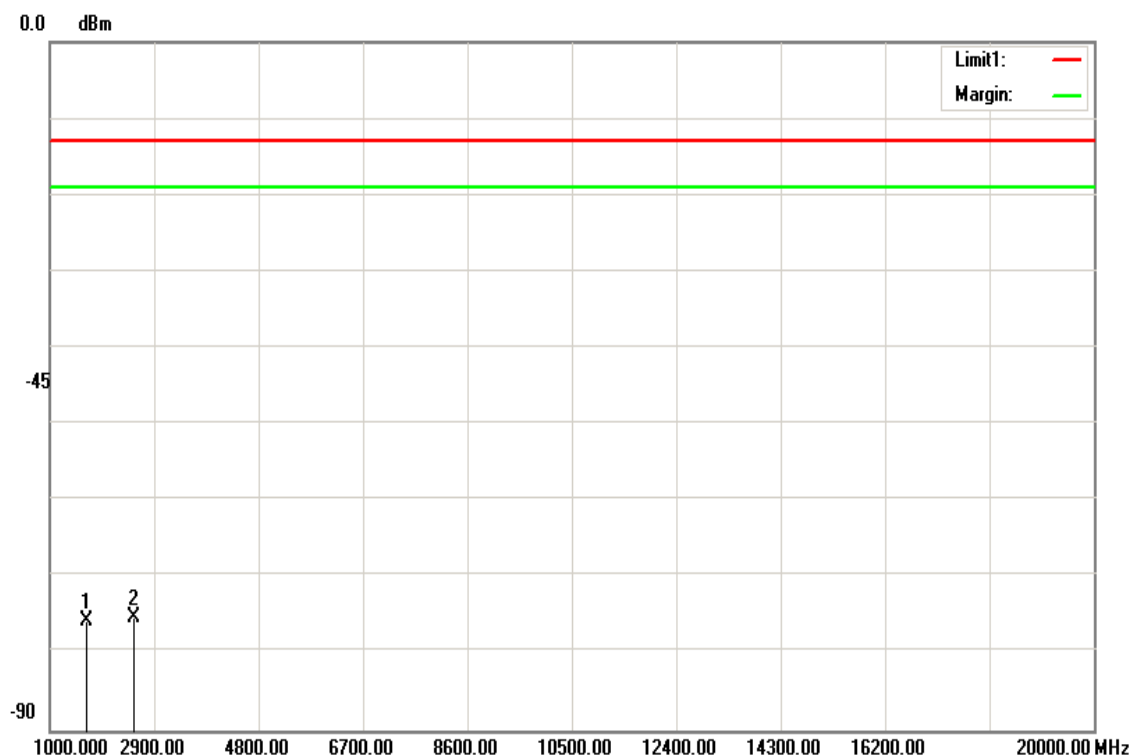


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Operation Mode: Tx / High CH
Temperature: 23°C
Humidity: 46 %RH

Test Date: December 20, 2018
Tested by: Jerry Chuang
Polarity: Ver.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1683.000	-71.41	4.25	-75.66	-13.00	-62.66	V
2524.500	-69.86	5.36	-75.22	-13.00	-62.22	V
N/A						

Remark:

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

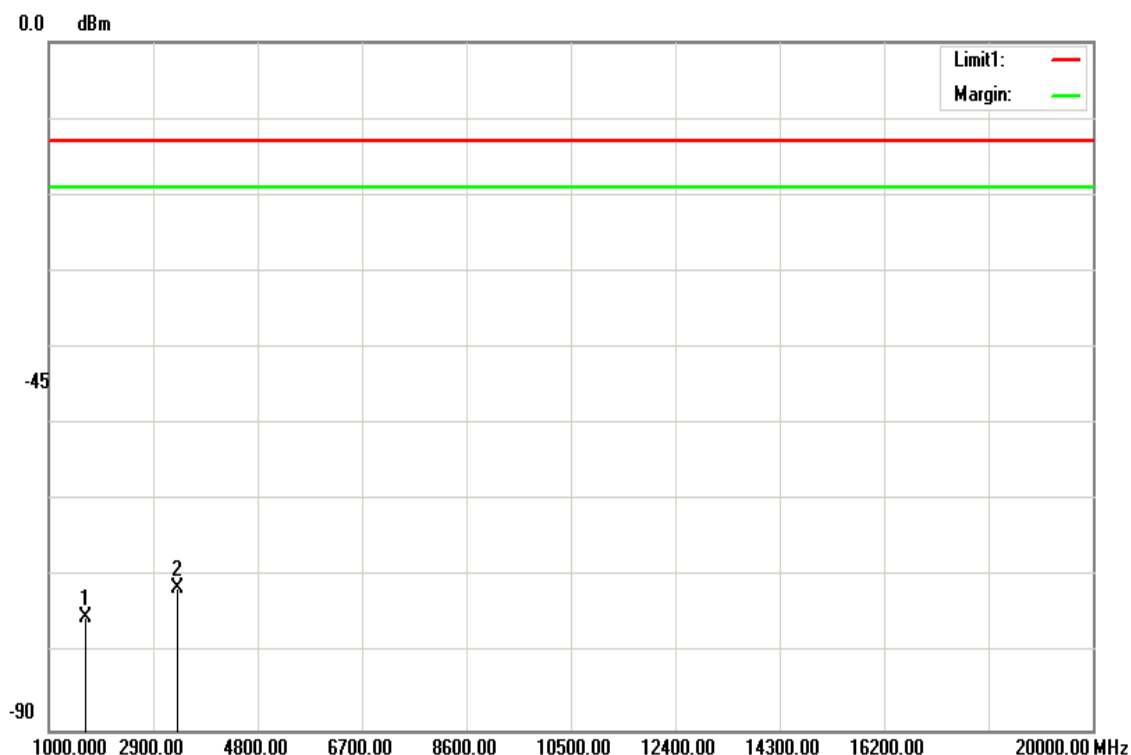


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Operation Mode: Tx / High CH
Temperature: 23°C
Humidity: 46 %RH

Test Date: December 20, 2018
Tested by: Jerry Chuang
Polarity: Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1683.000	-71.1	4.25	-75.35	-13.00	-62.35	H
3338.000	-65.11	6.26	-71.37	-13.00	-58.37	H
N/A						

Remark:

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

- End of Test Report -