

FCC RADIO TEST REPORT

FCC 47 CFR PART 15 SUBPART C

Test Standard	FCC Part 15.249
FCC ID	X8DLEADR
Brand name	ROCCAT
Product name	ROCCAT® Leadr – Wireless Multi-Button RGB Gaming Mouse
Model No.	Leadr
Test Result	Pass

The test Result was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were given in ANSI C63.10: 2013 and compliance standards.

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

The test Report of full or partial shall not copy. Without written approval of CCS. Inc.

The sample selected for test was production product and was provided by manufacturer.



Approved by:

A handwritten signature in black ink, appearing to read "Sam Chuang", written over a horizontal line.

Sam Chuang
Manager

Reviewed by:

A handwritten signature in black ink, appearing to read "Zeus Chen", written over a horizontal line.

Zeus Chen
Supervisor

Revision History

Rev.	Issue Date	Revisions	Revised By
00	December 7, 2016	Initial Issue	Doris Chu
01	March 4, 2017	1. Fieldstrength values as Output Power 2. Delete Sec. 4.3.2	Angel Cheng
02	March 21, 2017	1. Add NO.4 in section 4.3.2 in page 19. 2. Add The Lowest Frequency in section 1.1 in page 4. 3. Revise Modulation Type in section 1.2 in page 5.	Doris Chu
03	March 27, 2017	1. add notes in section 4.3.2 (5.	Doris Chu

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1. GENERAL INFORMATION

1.1 EUT INFORMATION

Applicant	ROCCAT GmbH Otto von Bahrenpark Paul-Dessau-Str. 3G 22761 Hamburg Germany
Equipment	ROCCAT® Leadr – Wireless Multi-Button RGB Gaming Mouse
Model Name	Leadr
Model Discrepancy	N/A
EUT Functions	2.4G SRD
The Lowest Frequency	16MHz
Received Date	Oct 28, 2016
Date of Test	Nov 11, 2016 ~ Dec 6, 2016
Field strength	Peak : 83.28 dBuV/m at 3m Average : 78.29 dBuV/m at 3m
Power Operation	☐ AC 120V/60Hz ☐ Adapter(Not for sale) ☐ PoE(Not for sale) ☒ DC Type : ☒ Battery 3.7V ☐ DC Power Supply ☐ External DC adapter ☒ From host system

1.2 EUT CHANNEL INFORMATION

Frequency Range	2403MHz-2480MHz
Modulation Type	FSK & Frequency hopping for SRD
Number of channel	78 Channels

Remark:

Refer as ANSI 63.10:2013 clause 5.6.1 Table 4 for test channels

Number of frequencies to be tested		
Frequency range in which device operates	Number of frequencies	Location in frequency range of operation
☐ 1 MHz or less	1	Middle
☐ 1 MHz to 10 MHz	2	1 near top and 1 near bottom
☒ More than 10 MHz	3	1 near top, 1 near middle, and 1 near bottom

1.3 ANTENNA INFORMATION

Antenna Category	☒ Integral: antenna permanently attached ☐ External dedicated antennas ☐ External Unique antenna connector
Antenna Type	☐ PIFA ☒ PCB ☐ Dipole ☐ Printed ☐ Coils
Antenna Gain	3.27 dBi

1.4 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
AC Powerline Conducted Emission	+/- 1.2575
Emission bandwidth, 20dB bandwidth	+/- 1.4003
RF output power, conducted	+/- 1.1372
Power density, conducted	+/- 1.4003
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
3M Semi Anechoic Chamber / 40G~60G	+/- 1.8509
3M Semi Anechoic Chamber / 60G~75G	+/- 1.9869
3M Semi Anechoic Chamber / 75G~110G	+/- 2.9651
3M Semi Anechoic Chamber / 110G~170G	+/- 2.7807
3M Semi Anechoic Chamber / 170G~220G	+/- 3.6437
3M Semi Anechoic Chamber / 220G~325G	+/- 4.2982

Remark:

1. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$
2. ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report.

1.5 FACILITIES AND TEST LOCATION

All measurement facilities used to collect the measurement data are located at No.11, Wugong 6th Rd., Wugu Dist., New Taipei City 24891, Taiwan. (R.O.C.)

Test site	Test Engineer	Remark
AC Conduction Room	Anderson Kuo	
Radiation	Dennis Li	
RF Conducted	ED Chiang	

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

1.6 INSTRUMENT CALIBRATION

RF Conducted Test Site				
Equipment	Manufacturer	Model	S/N	Cal Due
Spectrum Analyzer	R&S	FSV 40	101073	07/31/2017

3M 966 Chamber Test Site				
Equipment	Manufacturer	Model	S/N	Cal Due
Spectrum Analyzer	Agilent	E4446A	US42510252	12/07/2016
Loop Ant	COM-POWER	AL-130	121051	02/24/2017
Bilog Antenna	Sunol Sciences	JB3	A030105	07/02/2017
Pre-Amplifier	EMEC	EM330	60609	06/07/2017
Horn Antenna	ETC	MCTD 1209	DRH13M02003	09/01/2017
Pre-Amplifier	MITEQ	AMF-6F-260400-40-8P	985646	01/13/2017
Horn Antenna	EMCO	3116	26370	01/14/2017
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R
Turn Table	CCS	CC-T-1F	N/A	N.C.R

AC Conducted Emissions Test Site				
Equipment	Manufacturer	Model	S/N	Cal Due
LISN	R&S	ENV216	101054	05/10/2017
Receiver	R&S	ESCI	101073	08/19/2017

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

1.7 SUPPORT AND EUT ACCESSORIES EQUIPMENT

EUT Accessories Equipment					
No.	Equipment	Brand	Model	Series No.	FCC ID
	N/A				

Support Equipment					
No.	Equipment	Brand	Model	Series No.	FCC ID
1	Notebook	ASUS	A&J	N/A	PD9WM3945ABG

1.8 Test methodology and applied standards

The test methodology, setups and results comply with all requirements in accordance with ANSI C63.10:2013, FCC Part 2, FCC Part 15.249,

1.9 Table of accreditations and listings

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3M Semi Anechoic Chamber (FCC MRA: TW1039) to perform FCC Part 15 measurements	 FCC MRA: TW1039
Canada	Industry Canada	3M Semi Anechoic Chamber (IC 2324G-1 / IC 2324G-2) to perform	 IC 2324G-1 IC 2324G-2

2. TEST SUMMERY

FCC Standard Sec.	Chapter	Test Item	Result
15.203	1.2	Antenna Requirement	Pass
15.207(a)	4.1	AC Conducted Emission	Pass
15.215	4.2	20 dB Bandwidth	Pass
-	4.2	Occupied Bandwidth (99%)	-
15.249(a)	4.3	Radiation Band Edge	Pass
15.249(a), 15.209(a)	4.3	Radiation Spurious Emission	Pass

3. DESCRIPTION OF TEST MODES

3.1 THE WORST MODE OF OPERATING CONDITION

Operation mode	SRD
Test Channel Frequencies	1.Lowest Channel : 2403MHz 2.Middle Channel : 2441MHz 3.Highest Channel : 2480MHz

Remark:

1. EUT pre-scanned data rate of output power for each mode, the worst data rate were recorded in this report.

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3.2 THE WORST MODE OF MEASUREMENT

AC Power Line Conducted Emission	
Test Condition	AC Power line conducted emission for line and neutral
Voltage/Hz	120V/60Hz
Test Mode	Mode 1: EUT power by host system via USB cable EUT
Worst Mode	☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4

Radiated Emission Measurement Above 1G	
Test Condition	Band edge, Emission for Unwanted and Fundamental
Voltage/Hz	120V/60Hz
Test Mode	Mode 1: EUT power by host system via USB cable EUT Mode 2: EUT power by battery
Worst Mode	☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4
Worst 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)
Worst Polarity	☒ Horizontal ☐ Vertical

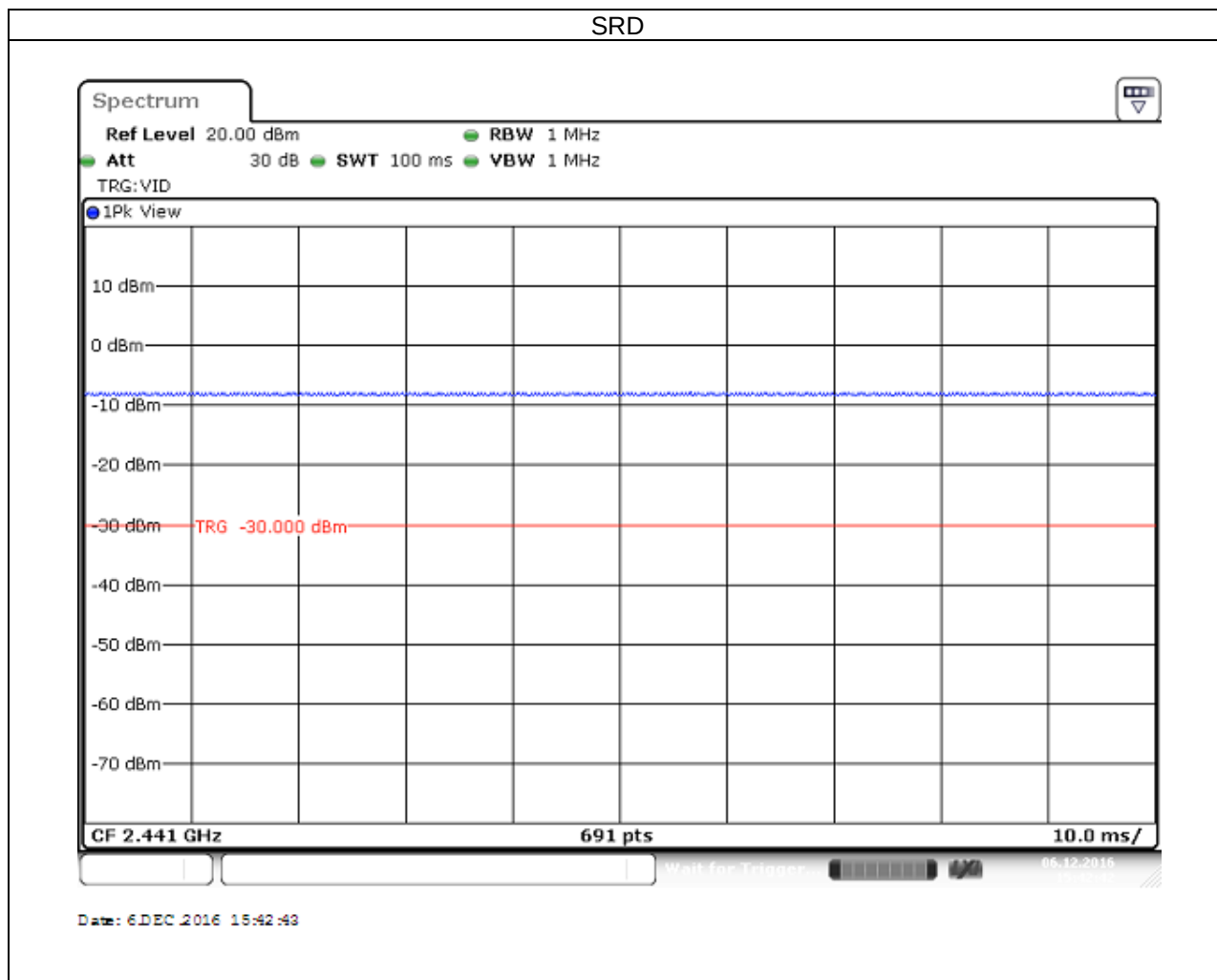
Radiated Emission Measurement Below 1G	
Test Condition	Radiated Emission Below 1G
Voltage/Hz	120V/60Hz
Test Mode	Mode 1: EUT power by host system via USB cable EUT Mode 2: EUT power by battery
Worst Mode	☒ Mode 1 ☒ Mode 2 ☐ Mode 3 ☐ Mode 4

Remark:

1. The worst mode was record in this test report.
2. EUT pre-scanned in three axis ,X,Y, Z and two polarity, Horizontal and Vertical for radiated measurement. The worst case(X-Plane and Horizontal) were recorded in this report.
3. For below 1G AC power line conducted emission and radiation emission were performed the EUT transmit at the highest output power channel as worse case.
4. EUT power supply had two ways (host system and battery),that EUT pre-scanned two power supply at Radiated below 1G, and the worst case was host system mode. Therefore EUT used adapter mode for Radiated measurement above 1G and Conduction below 1G in test report.

3.3 EUT DUTY CYCLE

Duty Cycle				
Configuration	TX ON (ms)	TX ALL (ms)	Duty Cycle (%)	Duty Factor(dB)
SRD	100	100	100 %	0.00 dB



4. TEST RESULT

4.1 AC POWER LINE CONDUCTED EMISSION

4.1.1 Test Limit

According to §15.207(a)

Frequency Range (MHz)	Limits(dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50

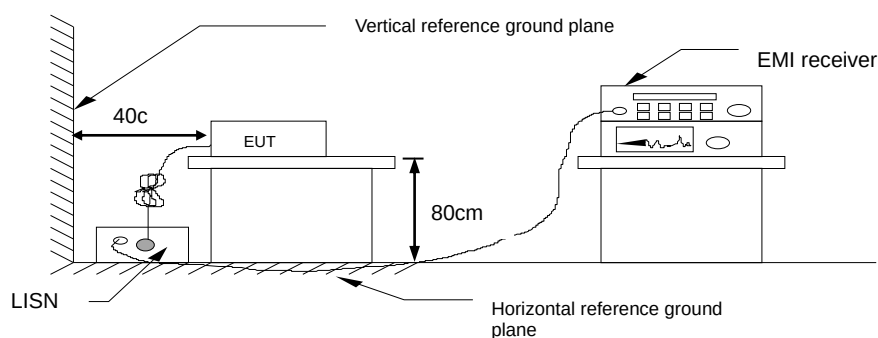
* Decreases with the logarithm of the frequency.

4.1.2 Test Procedure

Test method Refer as ANSI 63.10:2013 clause 6.2,

1. The EUT was placed on a non-conducted table, which is 0.8m above horizontal ground plane and 0.4m above vertical ground plane.
2. EUT connected to the line impedance stabilization network (LISN)
3. Receiver set RBW of 9kHz and Detector Peak, and note as quasi-peak and average.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. Recorded Line for Neutral and Line.

4.1.3 Test Setup

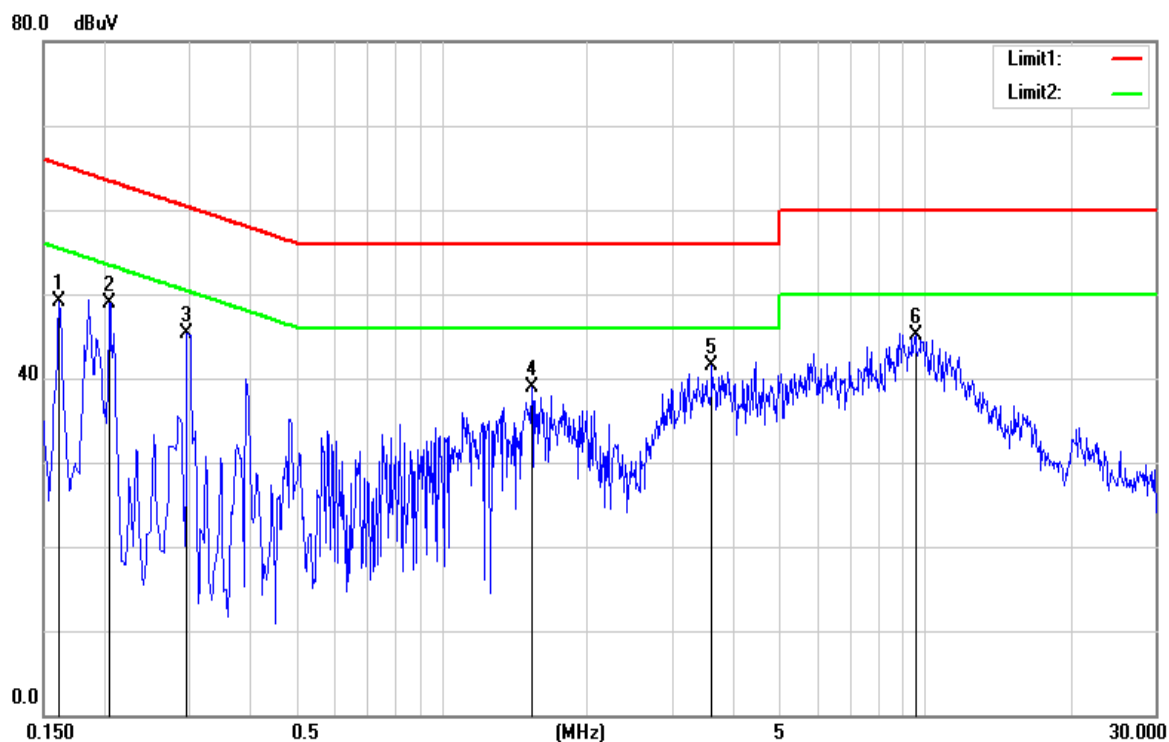


4.1.4 Test Result

Pass

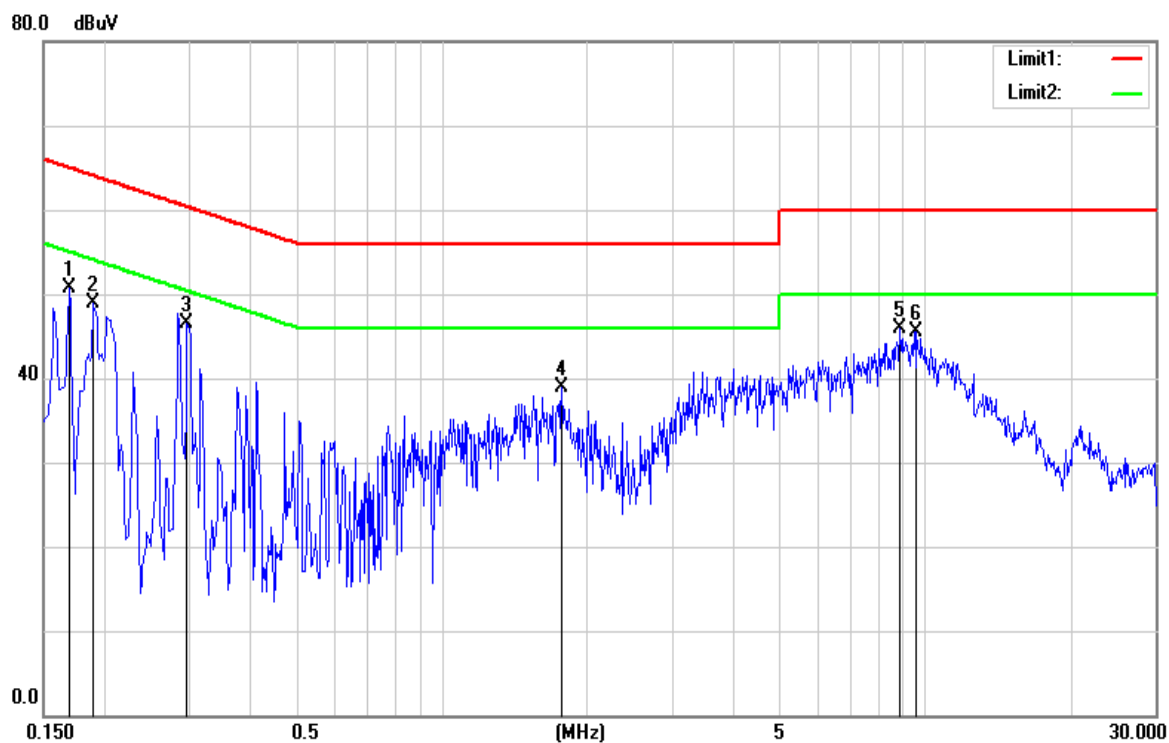
Test Data

Test Mode:	Mode 1	Temp/Hum	24(°C)/ 56%RH
Test Voltage:	120Vac / 60Hz	Test Date	Nov 11, 2016
Phase:	Line	Test Engineer	Anderson Kuo



Frequency (MHz)	Quasi Peak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	Quasi Peak result (dBuV)	Average result (dBuV)	Quasi Peak limit (dBuV)	Average limit (dBuV)	Quasi Peak margin (dB)	Average margin (dB)	Remark
0.1620	39.39	35.18	9.69	49.08	44.87	65.36	55.36	-16.28	-10.49	Pass
0.2060	39.29	37.75	9.68	48.97	47.43	63.36	53.37	-14.39	-5.94	Pass
0.2980	35.60	33.28	9.68	45.28	42.96	60.30	50.30	-15.02	-7.34	Pass
1.5420	28.77	24.85	10.11	38.88	34.96	56.00	46.00	-17.12	-11.04	Pass
3.6340	31.67	29.87	9.81	41.48	39.68	56.00	46.00	-14.52	-6.32	Pass
9.6020	35.08	32.74	9.94	45.02	42.68	60.00	50.00	-14.98	-7.32	Pass

Test Mode:	Mode 1	Temp/Hum	27(°C)/ 53%RH
Test Voltage:	120Vac / 60Hz	Test Date	Nov 11, 2016
Phase:	Neutral	Test Engineer	Anderson Kuo



Frequency (MHz)	Quasi Peak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	Quasi Peak result (dBuV)	Average result (dBuV)	Quasi Peak limit (dBuV)	Average limit (dBuV)	Quasi Peak margin (dB)	Average margin (dB)	Remark
0.1700	40.98	38.48	9.64	50.62	48.12	64.96	54.96	-14.34	-6.84	Pass
0.1900	39.24	37.88	9.64	48.88	47.52	64.03	54.04	-15.15	-6.48	Pass
0.2980	36.91	34.87	9.64	46.55	44.51	60.30	50.30	-13.75	-5.79	Pass
1.7780	29.02	27.44	9.89	38.91	37.33	56.00	46.00	-17.09	-8.67	Pass
8.9020	35.95	33.74	9.89	45.84	43.63	60.00	50.00	-14.16	-6.37	Pass
9.6500	35.69	33.94	9.91	45.60	43.85	60.00	50.00	-14.40	-6.15	Pass

4.2 20DB BANDWIDTH AND OCCUPIED BANDWIDTH(99%)

4.2.1 Test Limit

20 dB Bandwidth : For reporting purposes only.

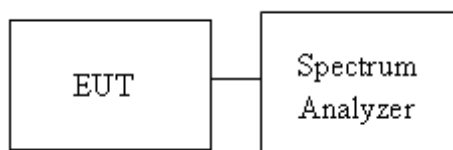
Occupied Bandwidth(99%) : For reporting purposes only.

4.2.2 Test Procedure

Test method Refer as ANSI 63.10:2013 clause 6.9.2,

1. The EUT RF output connected to the spectrum analyzer by RF cable.
2. Setting maximum power transmit of EUT
3. SA set RBW = 100kHz, VBW = 300kHz and Detector = Peak, to measurement 6 dB Bandwidth and 99% Bandwidth.
4. Measure and record the result of 6 dB Bandwidth and 99% Bandwidth. in the test report.

4.2.3 Test Setup



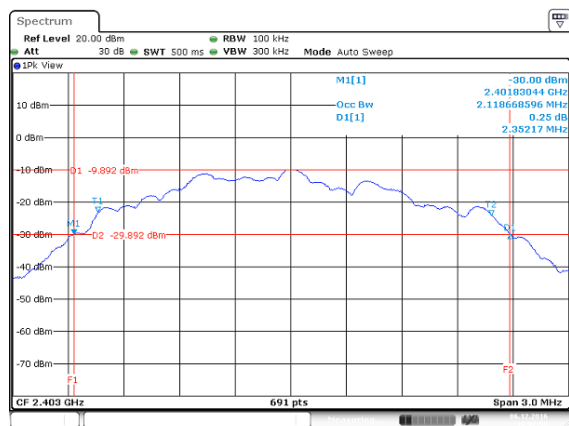
4.2.4 Test Result

Test mode: SRD mode / 2403-2480 MHz			
Channel	Frequency (MHz)	OBW(99%) (MHz)	20dB BW (MHz)
Low	2403	2.1186	2.3521
Mid	2442	2.1230	2.3826
High	2480	2.1273	2.3782

Test Data

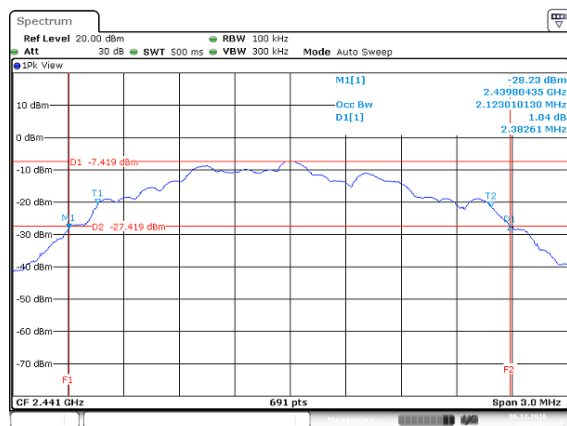
SRD mode

Low CH



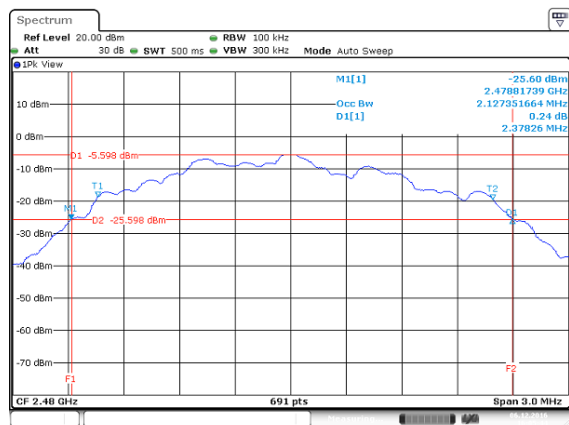
Date: 6 DEC 2016 16:02:59

Mid CH



Date: 6 DEC 2016 16:04:21

High CH



Date: 6 DEC 2016 16:05:46

4.3 RADIATION BANDEDGE AND SPURIOUS EMISSION

4.3.1 Test Limit

According to §15.249(a)

(1) The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency (MHz)	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
2400-2483.5	50	500
5725-5875	50	500
24000-24250	250	2500

* Field strength limits are specified at a distance of 3 meters

Fundamental Limit Conversion		
Average (mV/m) at 3M	Average (dBuV/m) at 3M	Peak (dBuV/m) at 3M
50	93.97	113.97

Harmonic Limit Conversion		
Average (uV/m) at 3M	Average (dBuV/m) at 3M	Peak (dBuV/m) at 1M
500	53.97	73.97

*(Limit=20LOG(500)=53.79 dBuV/m)

(2) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209(follow the table), whichever is the lesser attenuation

Below 30 MHz

Frequency	Field Strength (microvolts/m)	Measurement Distance (metres)
9-490 kHz	2,400/F (F in kHz)	300
490-1,705 kHz	24,000/F (F in kHz)	30
1.705-30 MHz	30	30

Above 30 MHz

Frequency	Field Strength (microvolts/m)	Measurement Distance (metres)
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

4.3.2 Test Procedure

1. The EUT is placed on a turntable, Above 1 GHz is 1.5m and below 1 GHz is 0.8m above ground plane. The EUT Configured un accordance with ANSI C63.10, and the EUT set in a continuous mode.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level. And EUT is set 3m away from the receiving antenna, which is scanned from 1m to 4m above the ground plane to find out the highest emissions. Measurement are made polarized in both the vertical and the horizontal positions with antenna.
3. Span shall wide enough to full capture the emission measured. The SA from 30MHz to 26.5GHz set to the low, Mid and High channels with the EUT transmit.
4. Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open are test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 937606.
5. Below 30MHz radiated emission was investigated starting from 9KHz and no emissions were found within 20dB from the limit.

6. The SA setting following :

(1) Below 1G : RBW = 100kHz, VBW $\geq$ 3 RBW, Sweep = Auto, Detector = Peak, Trace = Max hold.

(2) Above 1G :

(2.1) For Peak measurement : RBW = 1MHz, VBW $\geq$ 3 RBW, Sweep = Auto, Detector = Peak, Trace = Max hold.

(2.2) For Average measurement : RBW = 1MHz, VBW

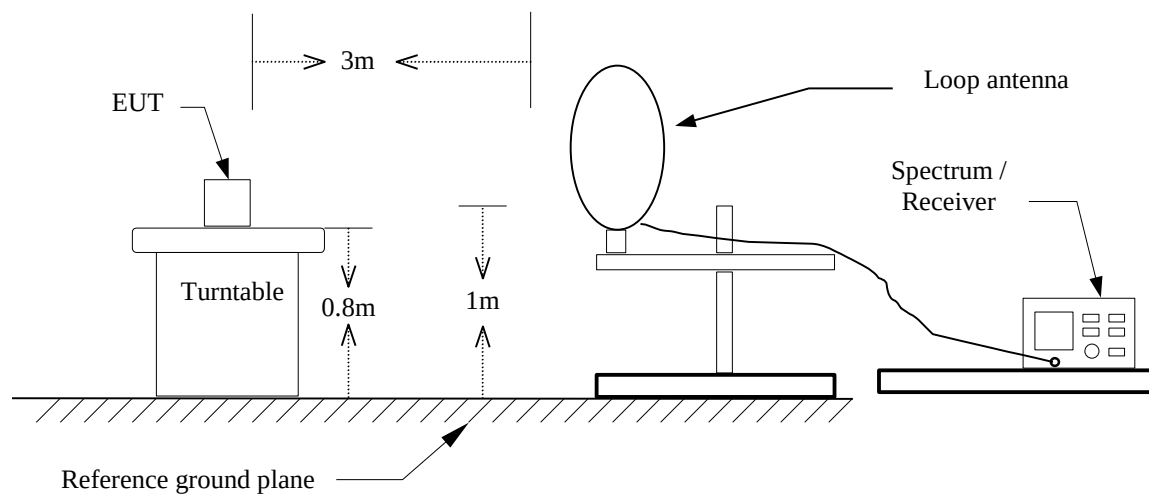
·If Duty Cycle $\geq$ 98%, VBW=10Hz.

·If Duty Cycle < 98%, VBW=1/T.

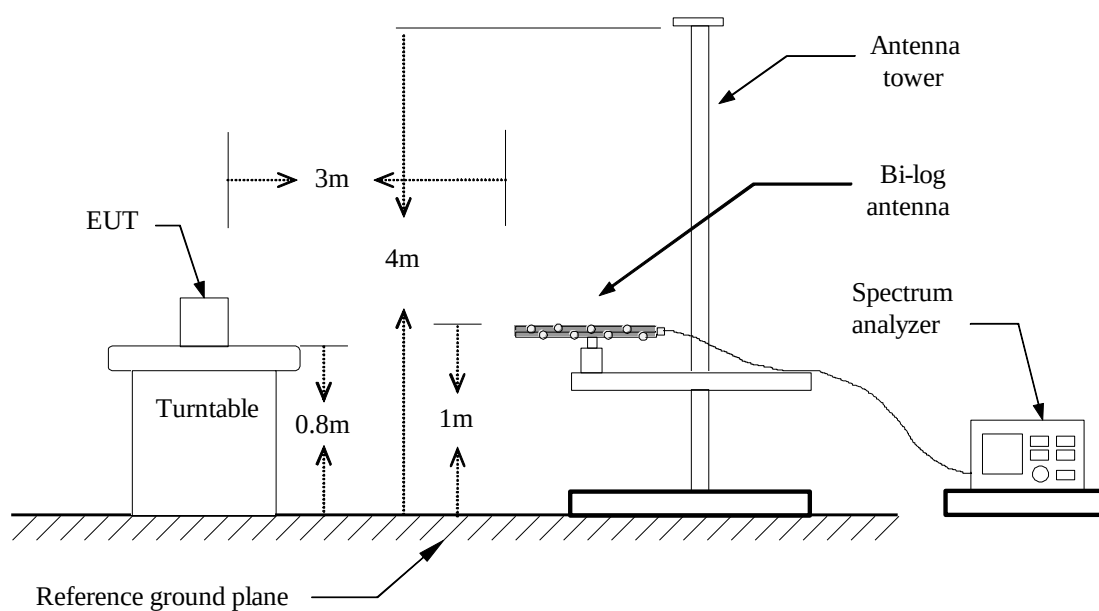
Configuration	Duty Cycle (%)	VBW
SRD	100%	10Hz

4.3.3 Test Setup

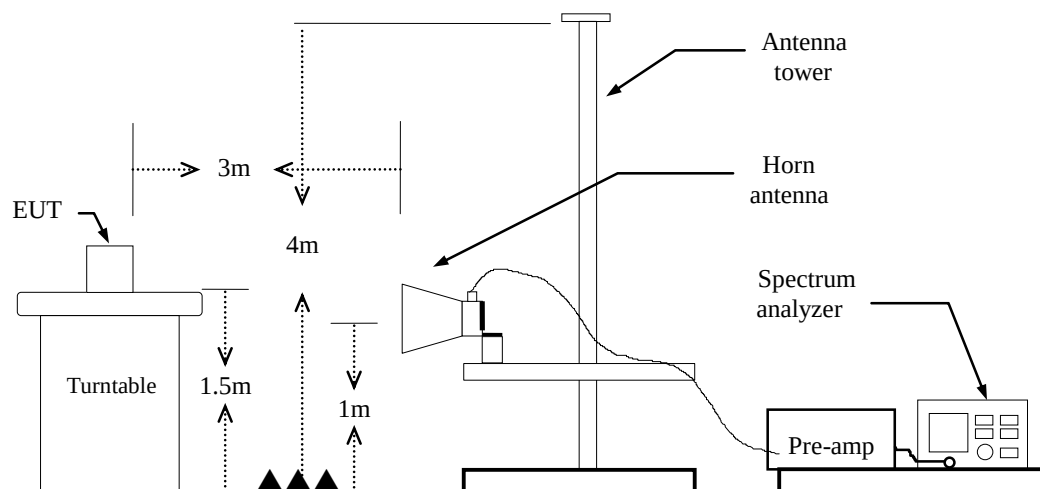
9kHz ~ 30MHz



30MHz ~ 1GHz



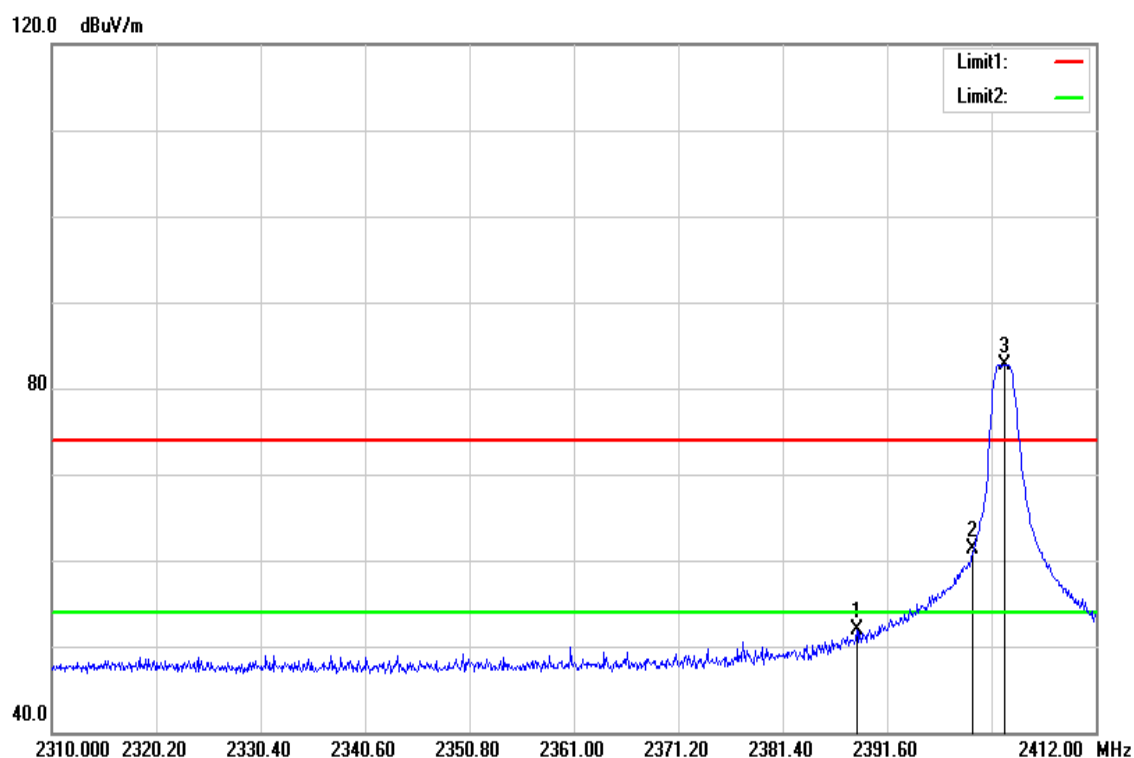
Above 1 GHz



4.3.4 Test Result

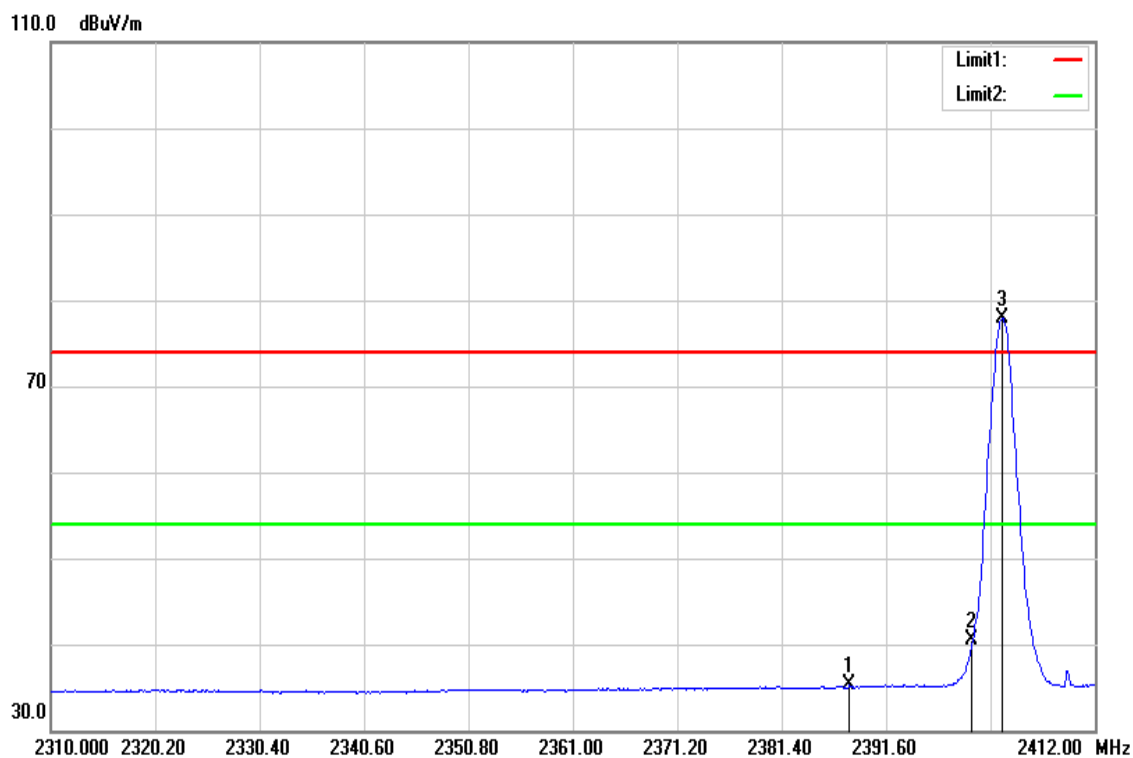
Band Edge Test Data

Test Mode:	SRD Low CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 05, 2016
Polarize	Horizontal	Test Engineer	Dennis Li
Detector	Peak	Test Voltage:	120Vac / 60Hz



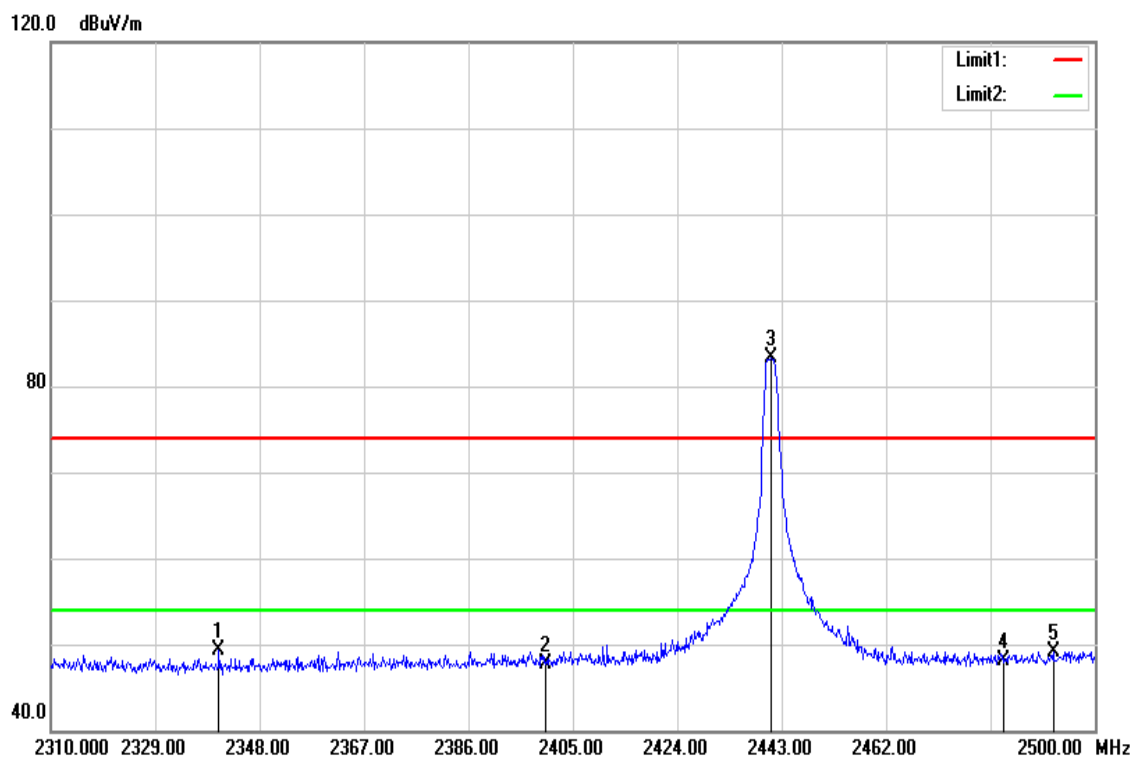
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2388.642	54.47	-2.50	51.97	74.00	-22.03	peak
2400.000	63.68	-2.41	61.27	74.00	-12.73	peak
2403.126	85.17	-2.42	82.75	-	-	peak

Test Mode:	SRD Low CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 05, 2016
Polarize	Horizontal	Test Engineer	Dennis Li
Detector	Average	Test Voltage:	120Vac / 60Hz



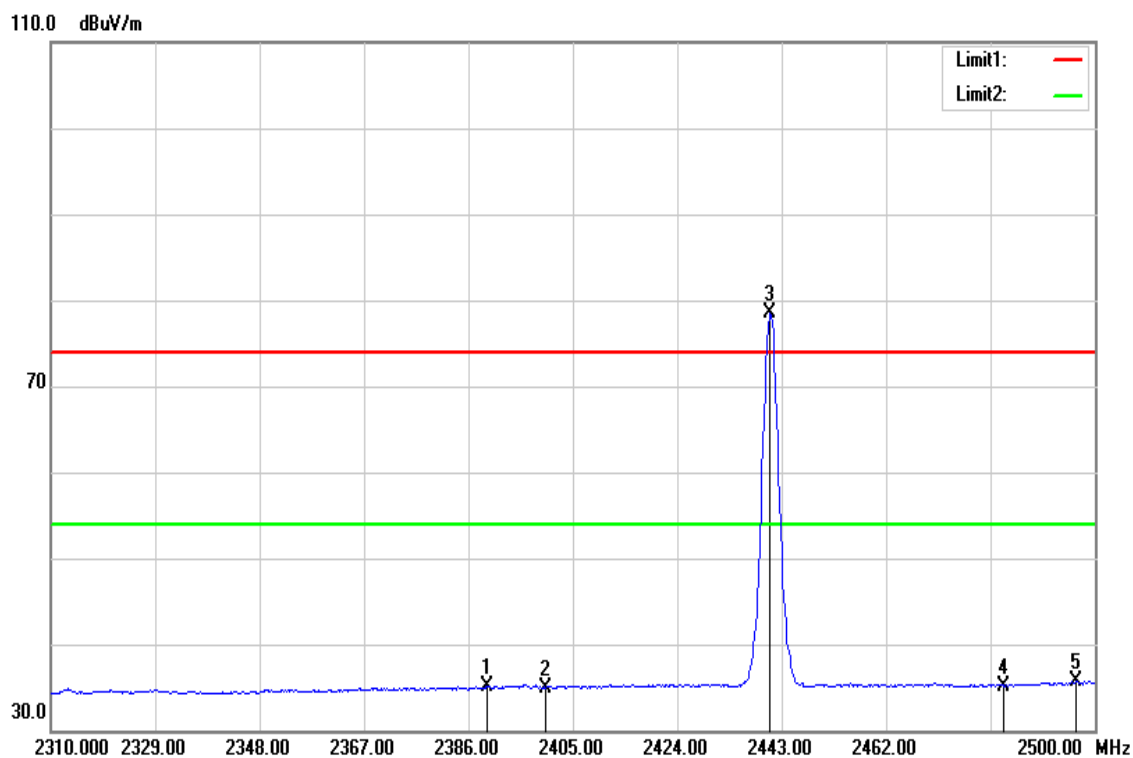
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2388.030	37.72	-2.51	35.21	54.00	-18.79	AVG
2400.000	42.82	-2.41	40.41	54.00	-13.59	AVG
2402.922	80.37	-2.42	77.95	-	-	AVG

Test Mode:	SRD Mid CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 05, 2016
Polarize	Horizontal	Test Engineer	Dennis Li
Detector	Peak	Test Voltage:	120Vac / 60Hz



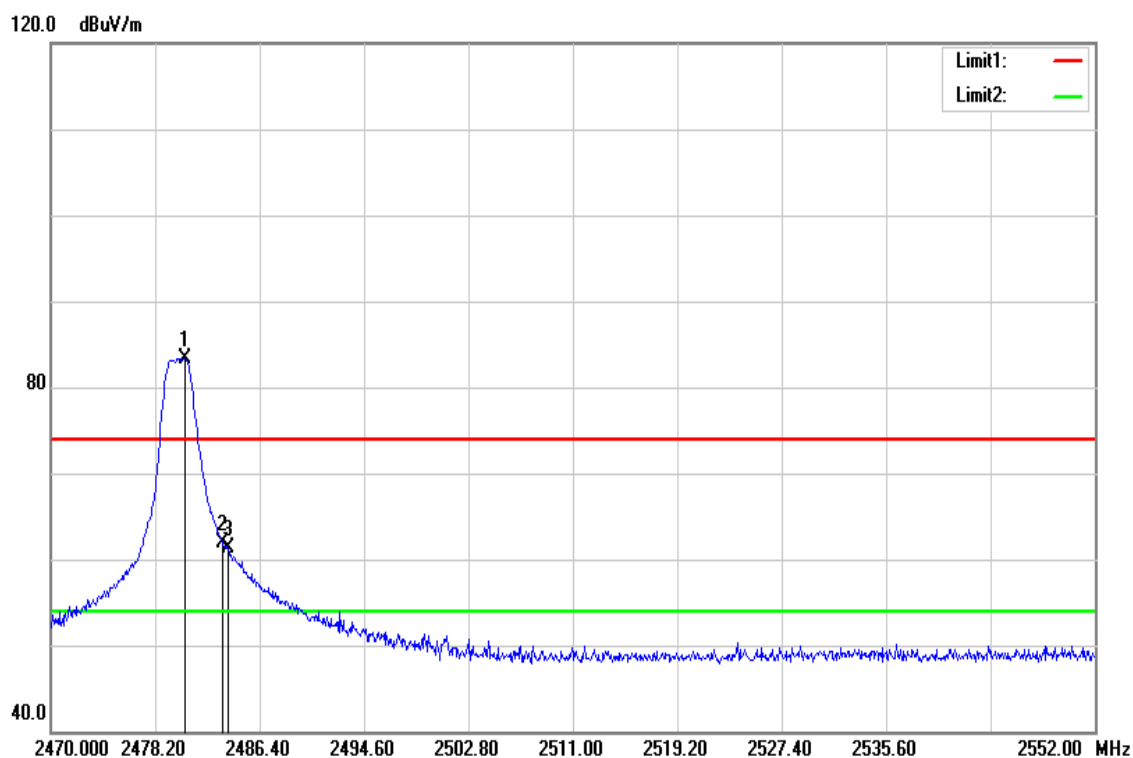
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2340.590	52.20	-2.95	49.25	74.00	-24.75	peak
2400.000	50.13	-2.41	47.72	74.00	-26.28	peak
2441.100	85.43	-2.20	83.23	-	-	peak
2483.500	50.04	-1.99	48.05	74.00	-25.95	peak
2492.400	51.03	-1.91	49.12	74.00	-24.88	peak

Test Mode:	SRD Mid CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 05, 2016
Polarize	Horizontal	Test Engineer	Dennis Li
Detector	Average	Test Voltage:	120Vac / 60Hz



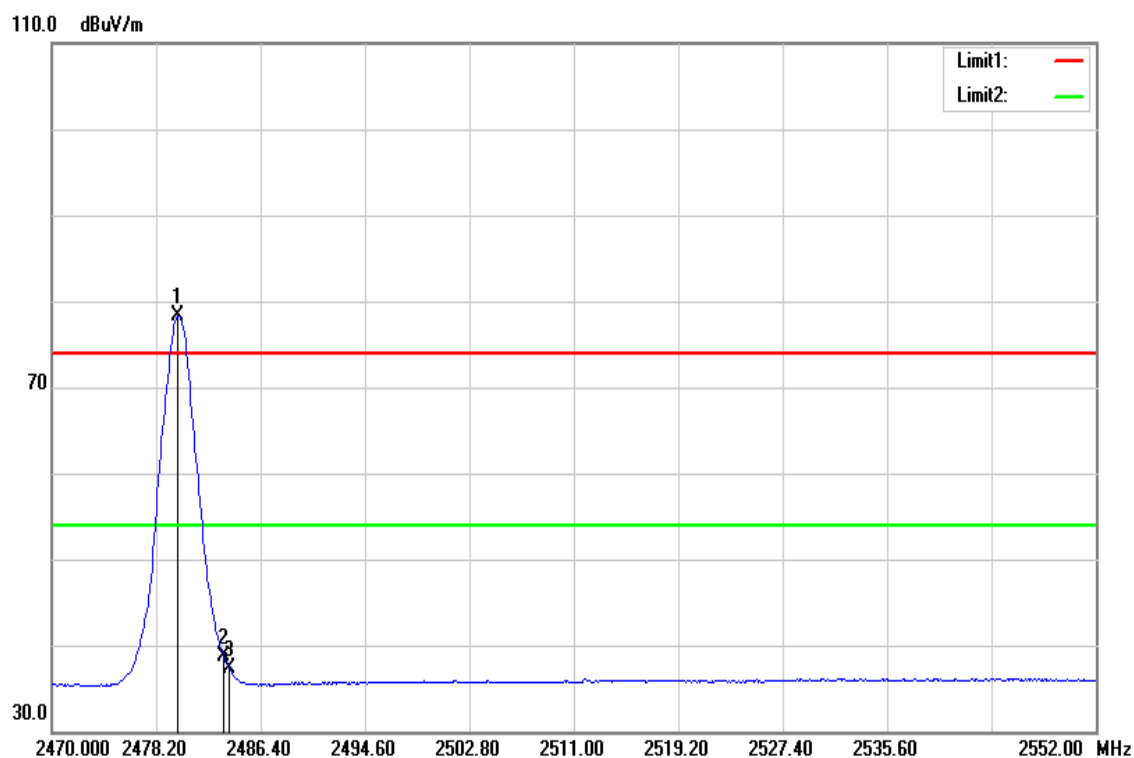
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2389.420	37.59	-2.50	35.09	54.00	-18.91	AVG
2400.000	37.36	-2.41	34.95	54.00	-19.05	AVG
2440.910	80.64	-2.21	78.43	-	-	AVG
2483.500	37.16	-1.99	35.17	54.00	-18.83	AVG
2496.580	37.60	-1.88	35.72	54.00	-18.28	AVG

Test Mode:	SRD High CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 05, 2016
Polarize	Horizontal	Test Engineer	Dennis Li
Detector	Peak	Test Voltage:	120Vac / 60Hz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2480.496	85.31	-2.03	83.28	-	-	peak
2483.500	63.86	-1.99	61.87	74.00	-12.13	peak
2483.900	63.39	-1.99	61.40	74.00	-12.60	peak

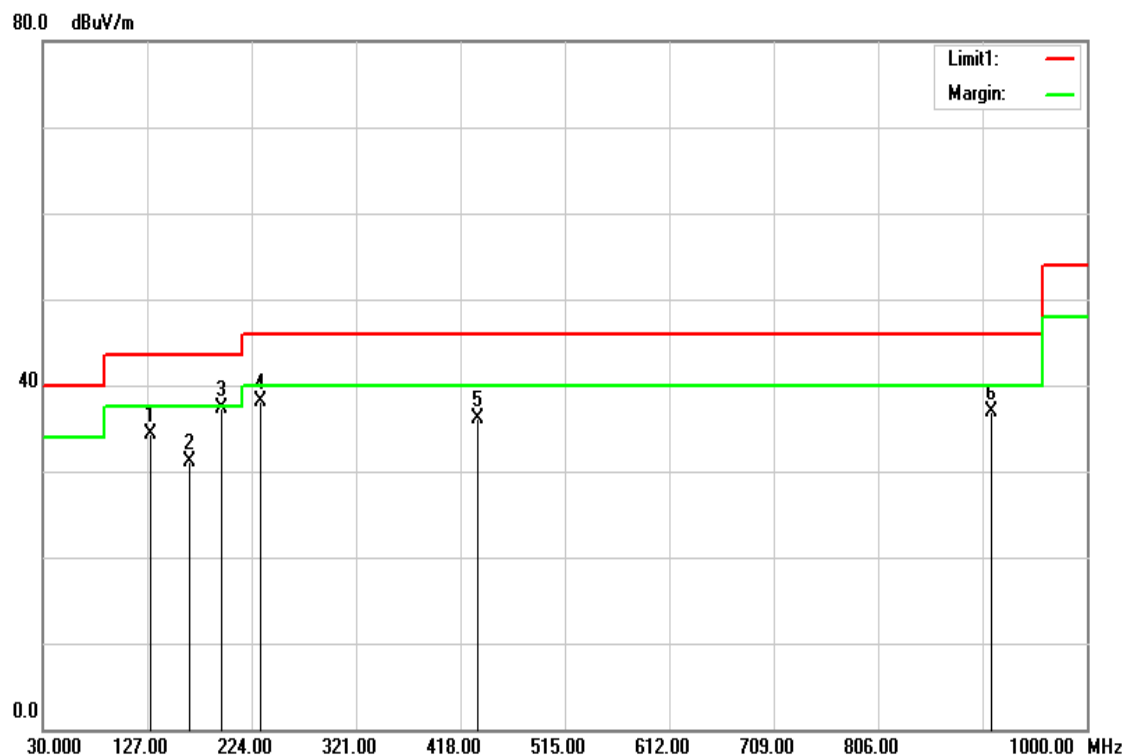
Test Mode:	SRD High CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 05, 2016
Polarize	Horizontal	Test Engineer	Dennis Li
Detector	Average	Test Voltage:	120Vac / 60Hz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2479.922	80.32	-2.03	78.29	-	-	AVG
2483.500	40.72	-1.99	38.73	54.00	-15.27	AVG
2483.900	39.30	-1.99	37.31	54.00	-16.69	AVG

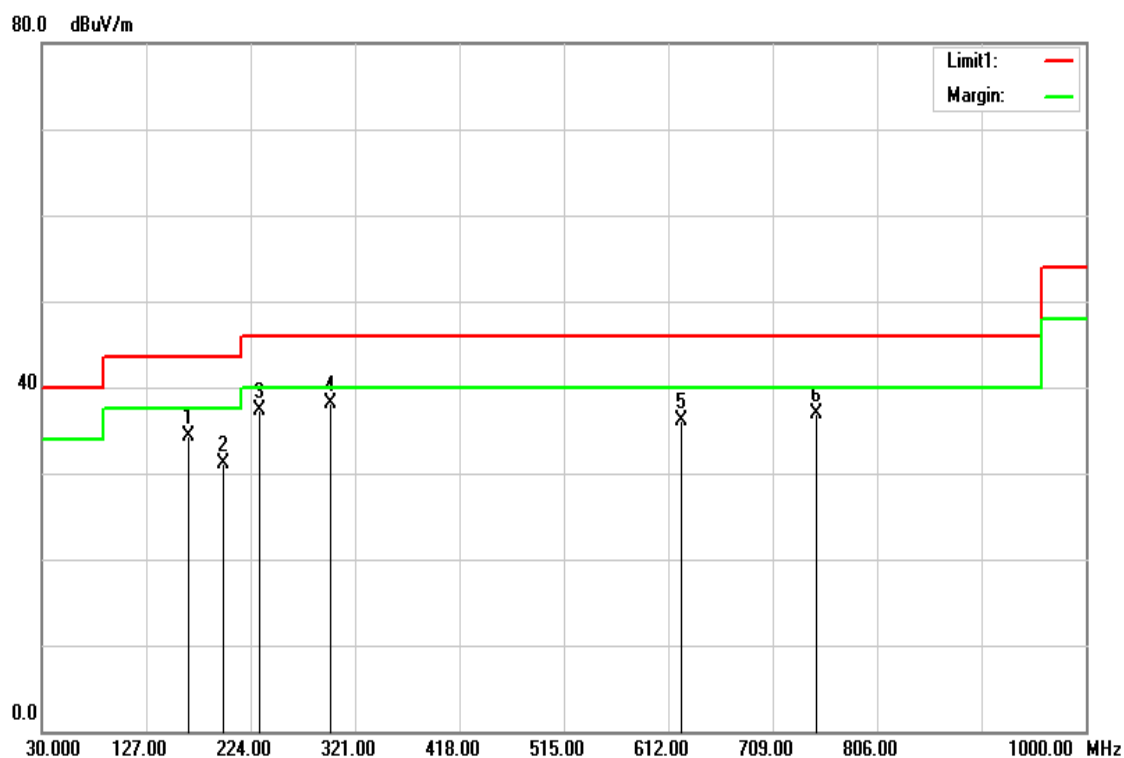
Below 1G Test Data

Test Mode:	Mode 1	Temp/Hum	27(°C)/ 53%RH
Test Item	30MHz-1GHz	Test Date	Dec 05, 2016
Polarize	Vertical	Test Engineer	Dennis Li
Detector	Peak and Qusi-peak	Test Voltage:	120Vac / 60Hz



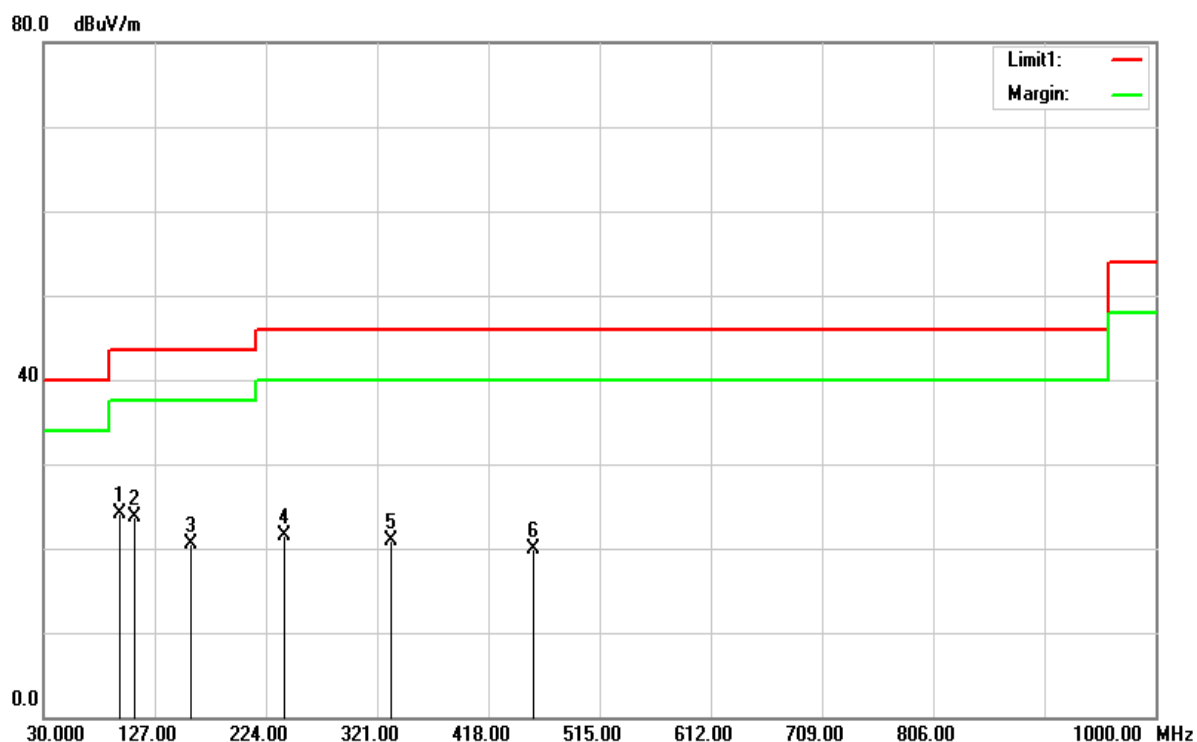
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
129.9100	50.01	-15.64	34.37	43.50	-9.13	peak
166.7700	47.70	-16.69	31.01	43.50	-12.49	QP
195.8700	53.20	-15.92	37.28	43.50	-6.22	peak
232.7300	54.80	-16.67	38.13	46.00	-7.87	peak
433.5200	46.85	-10.69	36.16	46.00	-9.84	peak
911.7300	39.86	-3.00	36.86	46.00	-9.14	peak

Test Mode:	Mode 1	Temp/Hum	27(°C)/ 53%RH
Test Item	30MHz-1GHz	Test Date	Dec 05, 2016
Polarize	Horizontal	Test Engineer	Dennis Li
Detector	Peak and Qusi-peak	Test Voltage:	120Vac / 60Hz



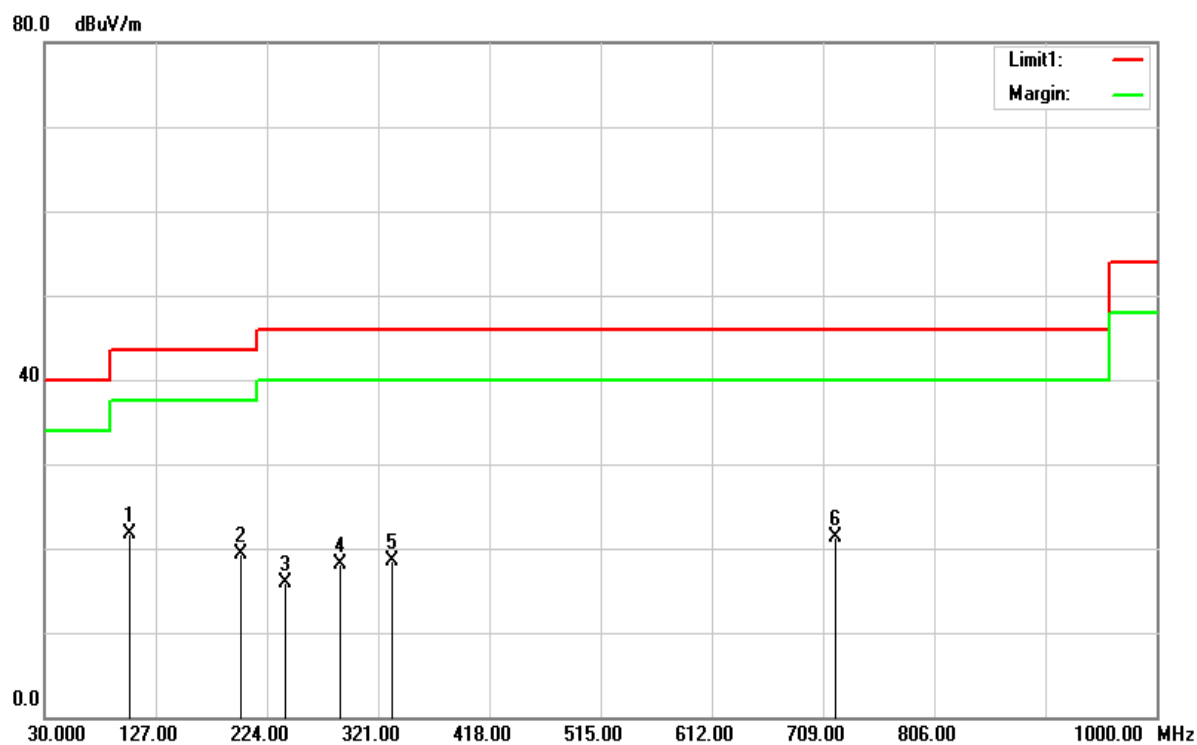
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
166.7700	51.06	-16.69	34.37	43.50	-9.13	peak
198.7800	46.67	-15.66	31.01	43.50	-12.49	peak
232.7300	53.95	-16.67	37.28	46.00	-8.72	peak
298.6900	52.39	-14.26	38.13	46.00	-7.87	peak
624.6100	43.33	-7.17	36.16	46.00	-9.84	peak
749.7400	41.79	-4.93	36.86	46.00	-9.14	peak

Test Mode:	Mode 2	Temp/Hum	27(°C)/ 53%RH
Test Item	30MHz-1GHz	Test Date	Dec 05, 2016
Polarize	Vertical	Test Engineer	Dennis Li
Detector	Peak and Qusi-peak	Test Voltage:	120Vac / 60Hz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
95.9600	44.16	-20.03	24.13	43.50	-19.37	peak
109.5400	41.14	-17.35	23.79	43.50	-19.71	peak
159.0100	36.85	-16.33	20.52	43.50	-22.98	peak
240.4900	38.05	-16.50	21.55	46.00	-24.45	peak
333.6100	34.15	-13.33	20.82	46.00	-25.18	peak
457.7700	29.92	-10.04	19.88	46.00	-26.12	peak

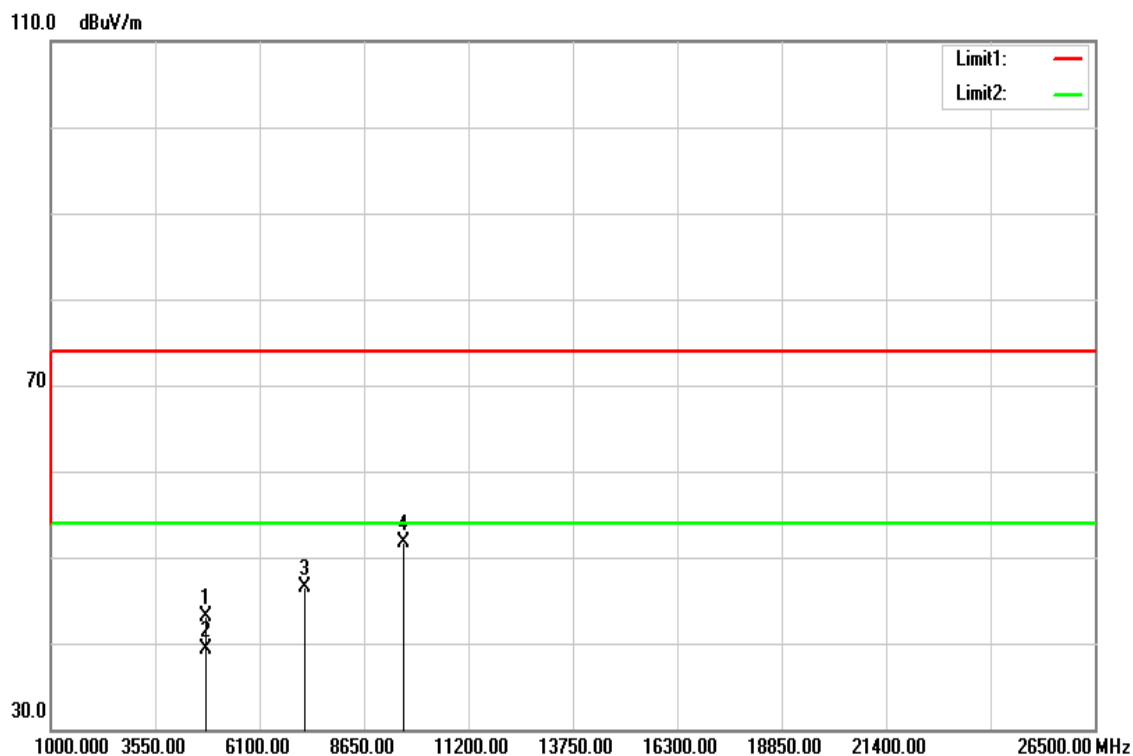
Test Mode:	Mode 2	Temp/Hum	27(°C)/ 53%RH
Test Item	30MHz-1GHz	Test Date	Dec 05, 2016
Polarize	Horizontal	Test Engineer	Dennis Li
Detector	Peak and Qusi-peak	Test Voltage:	120Vac / 60Hz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
103.7200	40.00	-18.37	21.63	43.50	-21.87	peak
200.7200	34.93	-15.60	19.33	43.50	-24.17	peak
239.5200	32.40	-16.52	15.88	46.00	-30.12	peak
288.0200	32.58	-14.46	18.12	46.00	-27.88	peak
333.6100	31.77	-13.33	18.44	46.00	-27.56	peak
719.6700	26.94	-5.62	21.32	46.00	-24.68	peak

Above 1G Test Data

Test Mode:	SRD Low CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Harmonic	Test Date	Dec 05, 2016
Polarize	Vertical	Test Engineer	Dennis Li
Detector	Peak and Average	Test Voltage:	120Vac / 60Hz

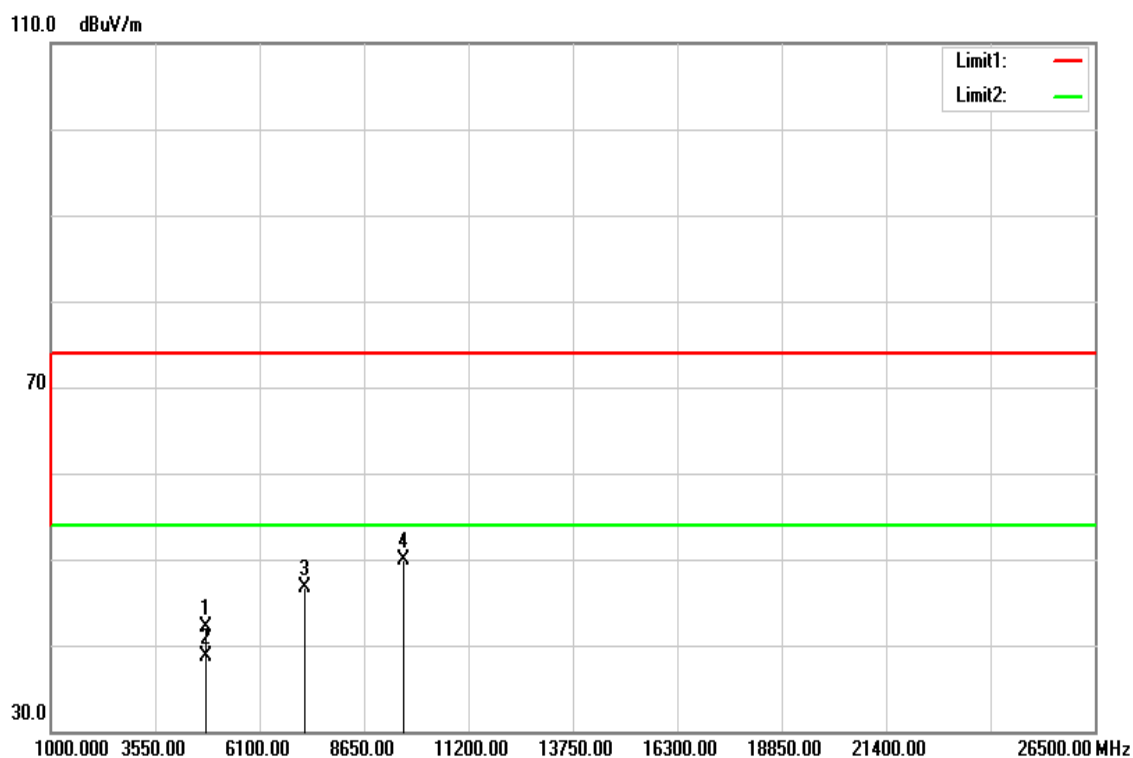


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4804.000	38.14	5.04	43.18	74.00	-30.82	peak
4804.000	34.32	5.04	39.36	54.00	-14.64	AVG
7206.000	33.97	12.62	46.59	74.00	-27.41	peak
9608.000	34.11	17.60	51.71	74.00	-22.29	peak

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode:	SRD Low CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Harmonic	Test Date	Dec 05, 2016
Polarize	Horizontal	Test Engineer	Dennis Li
Detector	Peak and Average	Test Voltage:	120Vac / 60Hz

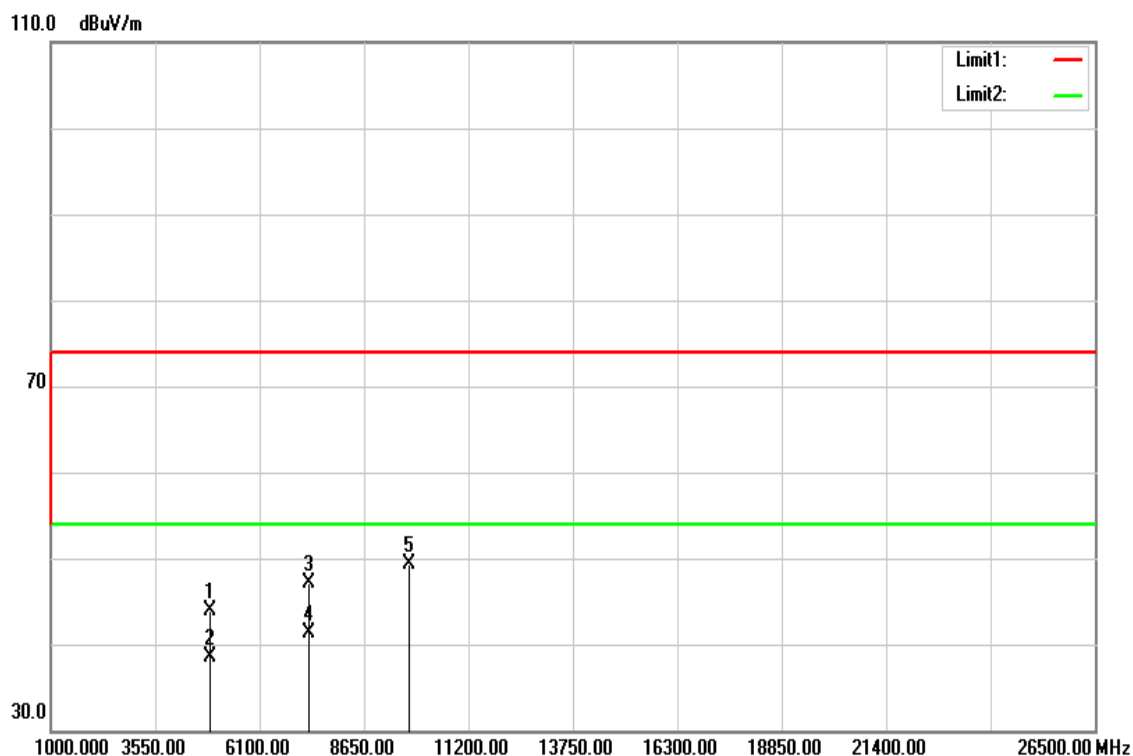


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4804.000	37.03	5.04	42.07	74.00	-31.93	peak
4804.000	33.65	5.04	38.69	54.00	-15.31	AVG
7206.000	34.06	12.62	46.68	74.00	-27.32	peak
9608.000	32.40	17.60	50.00	74.00	-24.00	peak

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode:	SRD Mid CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Harmonic	Test Date	Dec 05, 2016
Polarize	Vertical	Test Engineer	Dennis Li
Detector	Peak and Average	Test Voltage:	120Vac / 60Hz

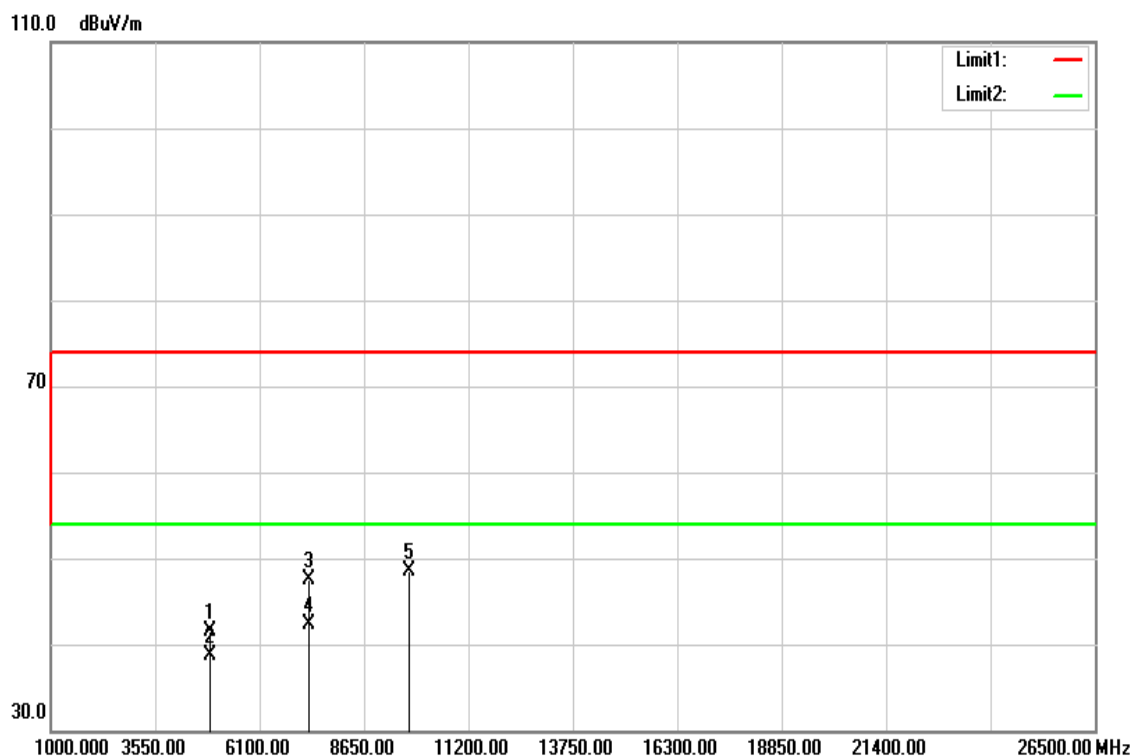


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4880.000	38.63	5.25	43.88	74.00	-30.12	peak
4880.000	33.19	5.25	38.44	54.00	-15.56	AVG
7320.000	34.18	12.97	47.15	74.00	-26.85	peak
7320.000	28.39	12.97	41.36	54.00	-12.64	AVG
9760.000	31.78	17.60	49.38	74.00	-24.62	peak

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode:	SRD Mid CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Harmonic	Test Date	Dec 05, 2016
Polarize	Horizontal	Test Engineer	Dennis Li
Detector	Peak and Average	Test Voltage:	120Vac / 60Hz

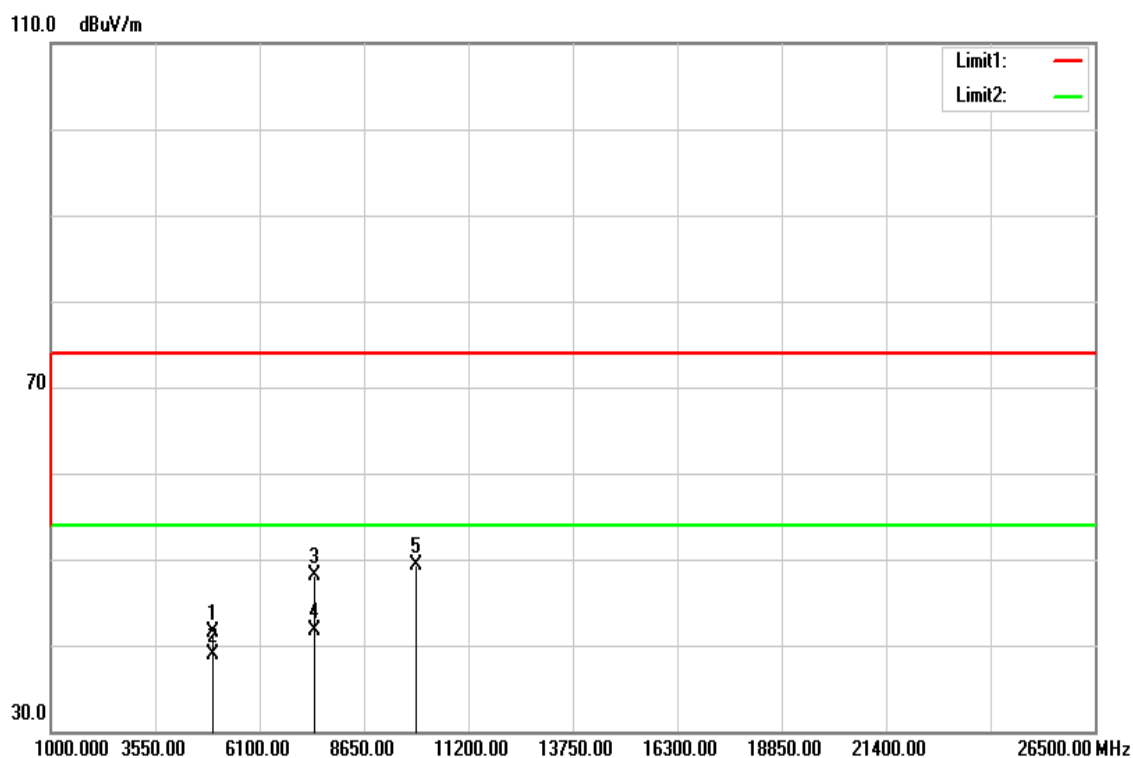


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4880.000	36.24	5.25	41.49	74.00	-32.51	peak
4880.000	33.44	5.25	38.69	54.00	-15.31	AVG
7320.000	34.53	12.97	47.50	74.00	-26.50	peak
7320.000	29.39	12.97	42.36	54.00	-11.64	AVG
9760.000	30.85	17.60	48.45	74.00	-25.55	peak

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode:	SRD High CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Harmonic	Test Date	Dec 05, 2016
Polarize	Vertical	Test Engineer	Dennis Li
Detector	Peak and Average	Test Voltage:	120Vac / 60Hz

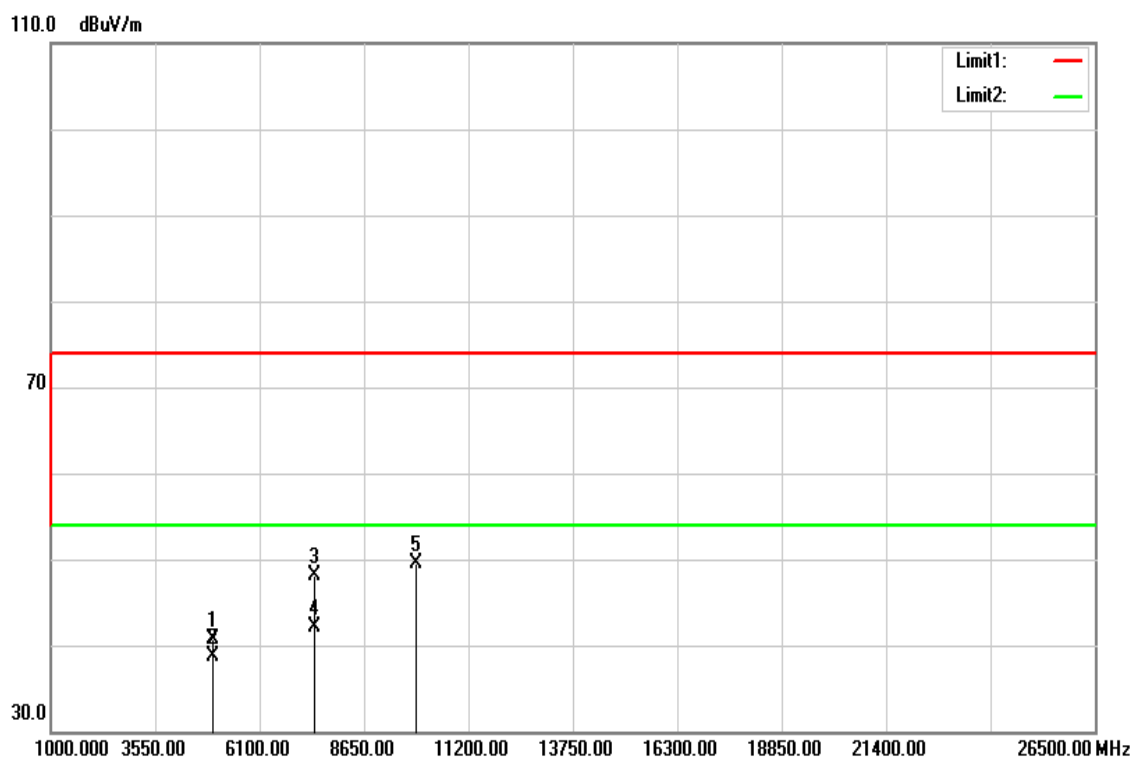


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4960.000	36.07	5.46	41.53	74.00	-32.47	peak
4960.000	33.50	5.46	38.96	54.00	-15.04	AVG
7440.000	34.68	13.33	48.01	74.00	-25.99	peak
7440.000	28.33	13.33	41.66	54.00	-12.34	AVG
9920.000	31.60	17.60	49.20	74.00	-24.80	peak

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode:	SRD High CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Harmonic	Test Date	Dec 05, 2016
Polarize	Horizontal	Test Engineer	Dennis Li
Detector	Peak and Average	Test Voltage:	120Vac / 60Hz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4960.000	35.23	5.46	40.69	74.00	-33.31	peak
4960.000	33.23	5.46	38.69	54.00	-15.31	AVG
7440.000	34.83	13.33	48.16	74.00	-25.84	peak
7440.000	28.79	13.33	42.12	54.00	-11.88	AVG
9920.000	31.93	17.60	49.53	74.00	-24.47	peak

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit