

**FCC 47 CFR PART 15 SUBPART C &
INDUSTRY CANADA RSS-210**

TEST REPORT

For

HP 2.4G Wireless Mouse

Model Number: G66, G67

Trade Name: hp

Issued to

**Acrox Technologies Co., Ltd.
4F., No.89, Minshan St., Neihu Dist., Taipei City 114, Taiwan, 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.)
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service@ccsrf.com
Issued Date: February 22, 2018**



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Revision History

Rev.		Issue Date		Revisions	Effect Page	Revised By
00		January 9, 2018		Initial Issue	ALL	Allison Chen
01		February 22, 2018		1. Add Test summary table 2. Revised 99% bandwidth at middle and high channel. 3. Add IC rule section number in all test item.	5,13,16,17,18, 27,39	Allison Chen

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1. TEST RESULT CERTIFICATION

Applicant: Acrox Technologies Co., Ltd.
4F., No.89, Minshan St., Neihu Dist., Taipei City 114,
Taiwan, R.O.C.

Manufacturer: Acrox Technologies Co., Ltd.
No., 2, Xinmin Road, Changan Town, Dongguan City,
Guangdong, China

Equipment Under Test: HP 2.4G Wireless Mouse

Trade Name: hp

Model Number: G66, G67

Date of Test: December 18, 2017 ~ January 04, 2018; February 21, 2018

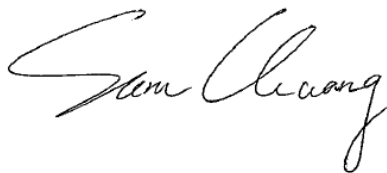
APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR Part 15 Subpart C & RSS-210 Issue 9	No non-compliance noted

We hereby certify that:

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.

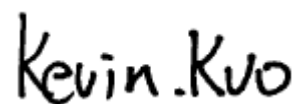
The test results of this report relate only to the tested sample (EUT) identified in this report. The test Report of full or partial shall not copy. Without written approval of CCS. Inc. The sample selected for test was production product and was provided by manufacturer.

Approved by:



Sam Chuang
Manager
Compliance Certification Services Inc.

Tested by:



Kevin Kuo
Engineer
Compliance Certification Services Inc.

2. TEST SUMMERY

FCC Standard Section	IC Standard Section	Report Section	Test Item	Result
15.203	RSS-GEN §8.3	3	Antenna Requirement	Pass
2.1049	-	8.1	20 dB Bandwidth	Pass
-	RSS-GEN §6.6	8.1	Occupied Bandwidth (99%)	Pass
15.209 15.249(a)	RSS-210 §B.10	8.2	Band Edge and Fundamental measurement	Pass
15.249(a)	RSS-210 §B.10	8.3	Radiation Spurious Emission	Pass
15.207(a)	RSS-GEN §8.8	8.4	Powerline Conducted Emission	N/A

3. EUT DESCRIPTION

Product	HP 2.4G Wireless Mouse			
Trade Name	hp			
Model Number	G66, G67			
Model Discrepancy	The two model numbers are difference from exterior size, just for marketing purpose only.			
Received Date	December 7, 2017			
Power Supply	Powered from Battery× 1 (DC: 1.5V)			
Frequency Range	2408 ~ 2474MHz			
	Channel	Frequency (MHz)	Channel	Frequency (MHz)
	1	2408	18	2442
	2	2410	19	2444
	3	2412	20	2446
	4	2414	21	2448
	5	2416	22	2450
	6	2418	23	2452
	7	2420	24	2454
	8	2422	25	2456
	9	2424	26	2458
	10	2426	27	2460
	11	2428	28	2462
	12	2430	29	2464
	13	2432	30	2466
	14	2434	31	2468
	15	2436	32	2470
	16	2438	33	2472
	17	2440	34	2474
Modulation Technique	GFSK			
Antenna Gain	Gain: -1.5532dBi			
Antenna Designation	PCB Antenna			
Software version	V1.0			
Hardware version	V1.0			

Remark:

1. The sample selected for test was production product and was provided by manufacturer.
2. This submittal(s) (test report) is intended for **FCC ID: PRDMU57** filing to comply with Section 15.203, 15.207, 15.215, 15.249.

4. TEST METHODOLOGY

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

The tests documented in this report were performed in accordance with IC RSS-210, IC RSS-Gen, IC RSS-102, IC RSS-212, and ANSI C63.10

This submittal(s) (test report) is intended for IC Certification with Industry Canada RSS-210.

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 DESCRIPTION OF TEST MODES

The EUT (model: G66) had been tested under operating condition.

Channel Low (2408MHz), Channel Mid (2440MHz) and Channel High (2474MHz) were chosen for the final testing.

3.3.1 The worst mode of measurement

Radiated Emission Measurement Above 1G	
Test Condition	Band edge, Emission for Unwanted and Fundamental
Voltage/Hz	1.5V
Test Mode	Mode 1:EUT (Model: G66) power by battery. Mode 2:EUT (Model: G67) 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	1.5V
Test Mode	Mode 1:EUT (Model: G66) power by battery. Mode 2:EUT (Model: G67) 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.

4.3 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

- (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	(²)
13.36 - 13.41	322 - 335.4		

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² Above 38.6

- (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

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

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

Conducted Emissions Test Site					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Power Meter	Anritsu	ML2495A	1012009	07/03/2017	07/02/2018
Power Sensor	Anritsu	MA2411B	917072	07/03/2017	07/02/2018
Spectrum Analyzer	R&S	FSV 40	101073	10/02/2017	10/01/2018
Directional Coupler	Agilent	87301D	MY44350252	07/25/2017	07/24/2018
SUCOFLEX Cable	HUBER SUHNER	SUCOFLEX 104PEA	25157	07/31/2017	07/30/2018
Divider	Solvang Technology	2-18GHz 4Way	ST108-0015	07/26/2017	07/25/2018

Wugu 966 Chamber A					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Bilog Antenna	Sunol Sciences	JB3	A030105	06/20/2017	06/19/2018
Pre-Amplifier	EMEC	EM330	60609	06/07/2017	06/06/2018
Spectrum Analyzer	Agilent	E4446A	US42510252	11/27/2017	11/26/2018
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
Pre-Amplifier	HP	8449B	3008A00965	06/27/2017	06/26/2018
Filter	N/A	2400-2500	N/A	N/A	N/A
Cable	HUBER SUHNER	SUCOFLEX 104PEA	25157	07/31/2017	07/30/2018
Cable	HUBER SUHNER	SUCOFLEX 104PEA	20995	07/31/2017	07/30/2018
Horn Antenna	EMCO	3117	55165	02/20/2017	02/19/2018
Software	EZ-EMC (CCS-3A1RE)				

Remark:

1. Each piece of equipment is scheduled for calibration once a year and Precision Dipole is scheduled for calibration once three years.
2. N.C.R. = No Calibration Request.

5.3 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
Powerline Conducted Emission	+/- 1.2575
3M Semi Anechoic Chamber / <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 $k=2$.

6. FACILITIES AND ACCREDITATIONS

6.1 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.

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

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

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

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.

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."

7. SETUP OF EQUIPMENT UNDER TEST

7.1 SETUP CONFIGURATION OF EUT

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

7.2 SUPPORT EQUIPMENT

No	Device Type	Brand	Model	Series No.	FCC ID	Power Cord
	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 15.249 REQUIREMENTS & RSS-210 REQUIREMENTS

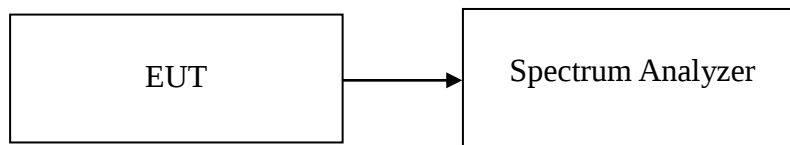
8.1 20DB BANDWIDTH AND OCCUPIED BANDWIDTH(99%)

LIMIT

20 dB Bandwidth : For reporting purposes only.

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

Test Configuration



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 20 dB Bandwidth and 99% Bandwidth.
4. SA set RBW = 1% ~ 5% OBW, VBW = three times the RBW and Detector = Peak, to measurement 99% Bandwidth
5. Measure and record the result of 20 dB Bandwidth and 99% Bandwidth. in the test report.

TEST RESULTS

No non-compliance noted

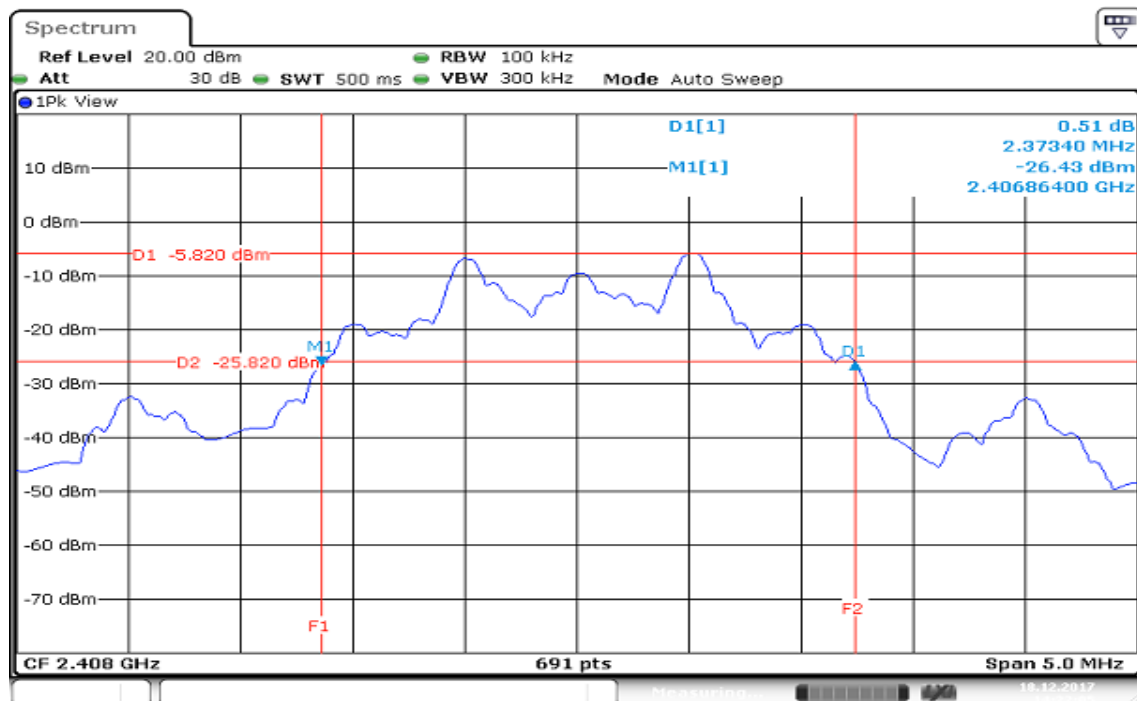
Test Data

Test mode: SRD mode / 2408 ~ 2474MHz			
Channel	Frequency (MHz)	OBW(99%) (MHz)	20dB BW (MHz)
Low	2408	2.2141	2.3734
Mid	2440	2.1852	2.3010
High	2474	2.2575	2.3155

Test Plot

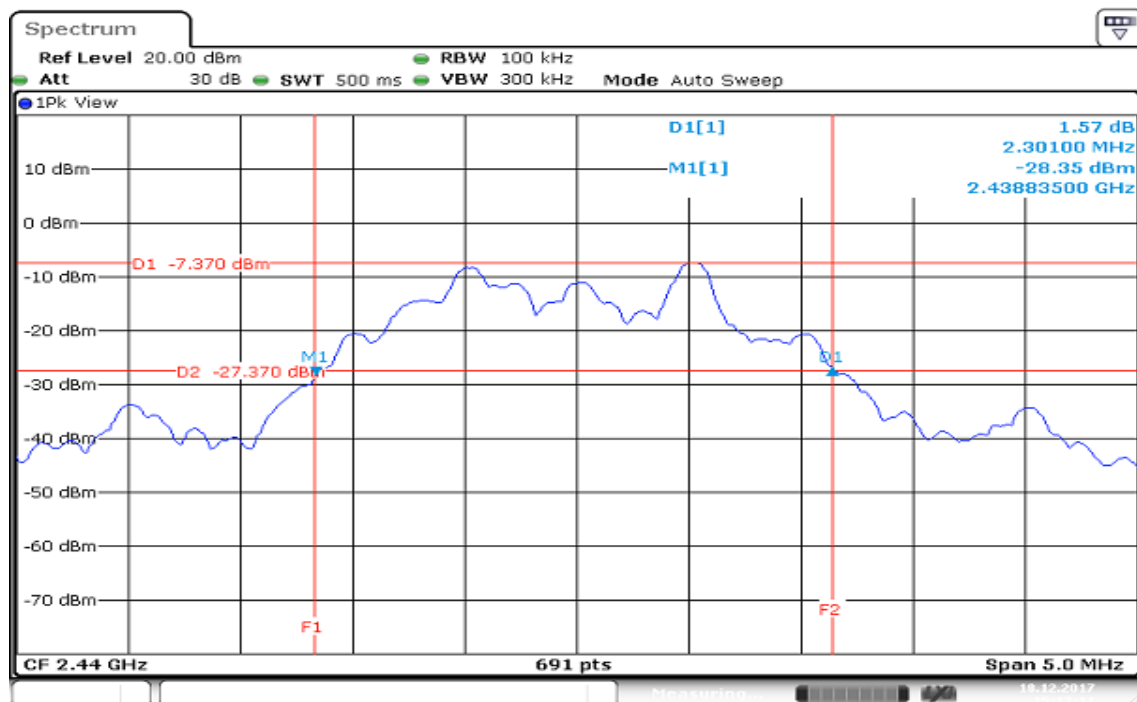
20dB BW(MHz)

CH Low



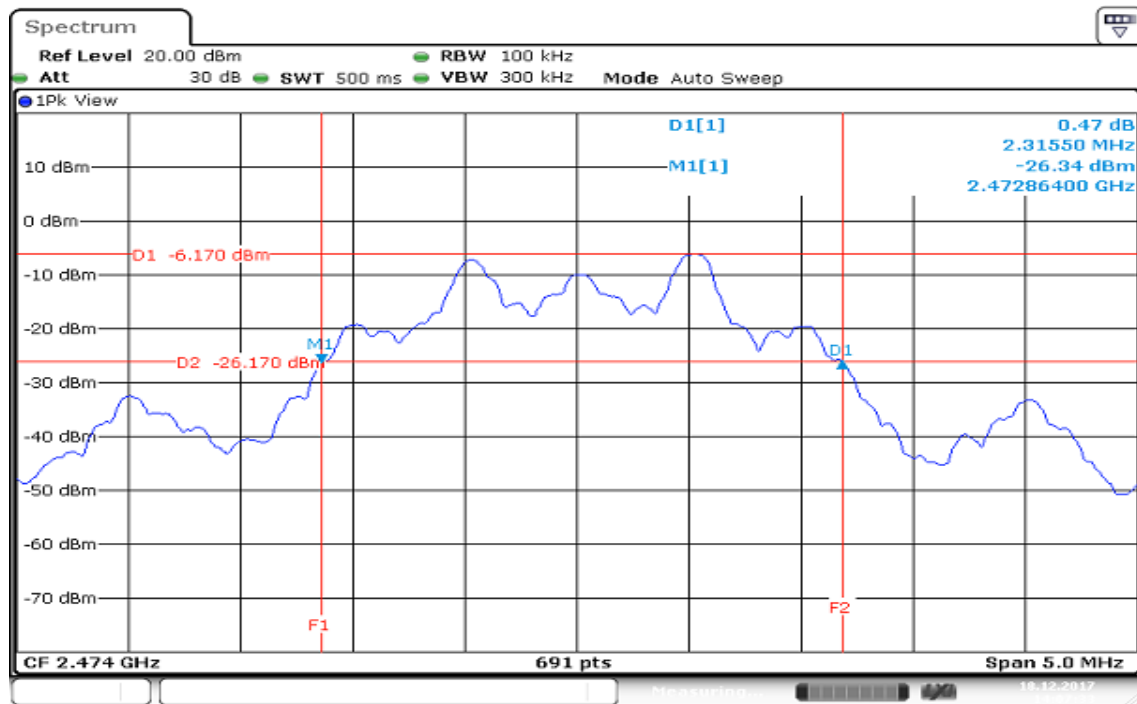
Date: 18.DEC.2017 14:22:05

CH Mid



Date: 18.DEC.2017 15:17:11

CH High



Date: 18.DEC.2017 14:07:33

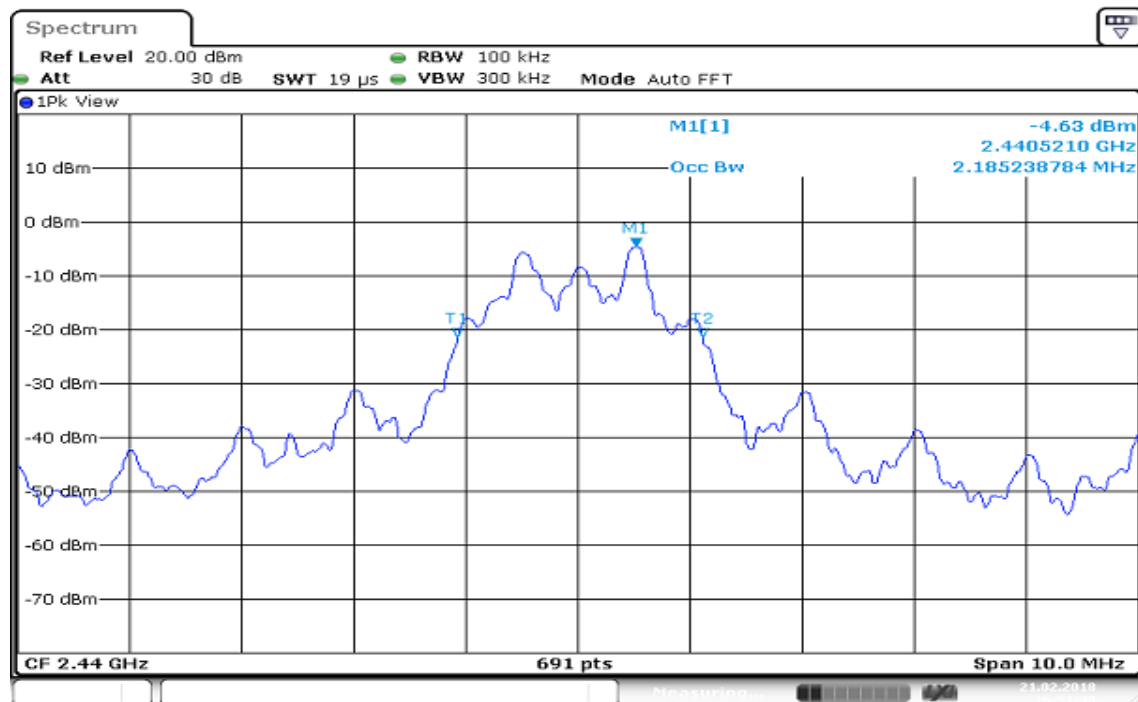
OBW(99%) (MHz)

CH Low



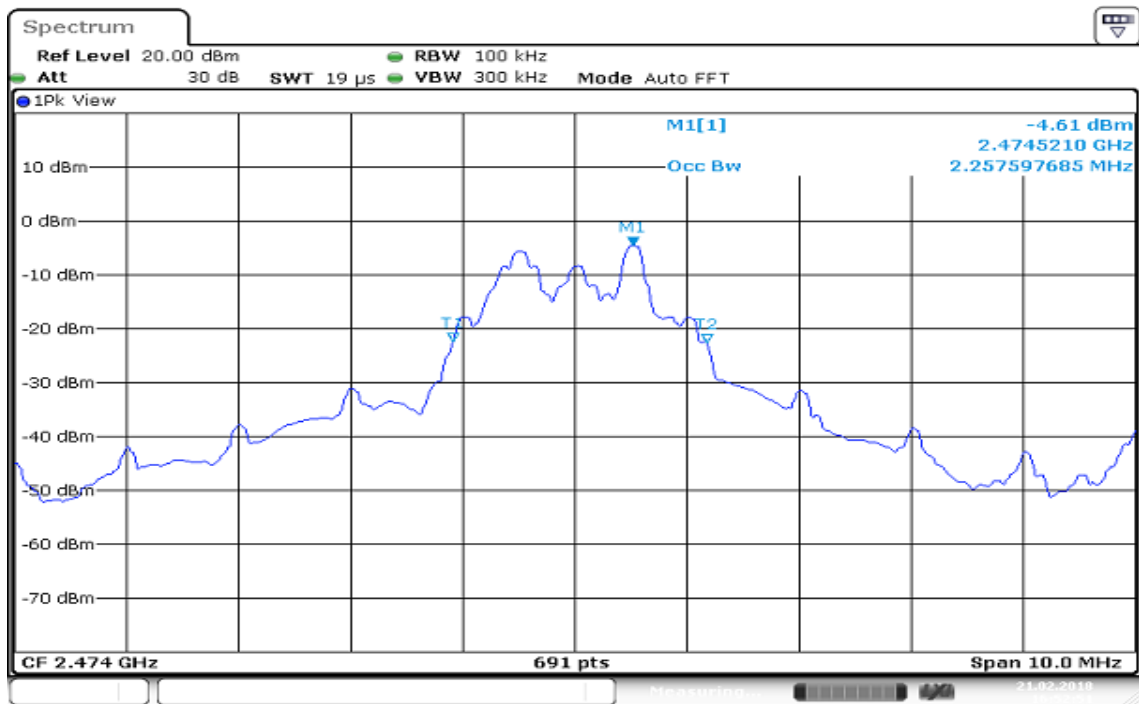
Date: 18.DEC.2017 13:54:34

CH Mid



Date: 21.FEB.2018 16:51:41

CH High



Date: 21.FEB.2018 16:52:52

8.2 BAND EDGES AND FUNDAMENTAL MEASUREMENT

LIMIT

According to §15.209, §15.249(a) and RSS 210 B.10

(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	93.98	113.98

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

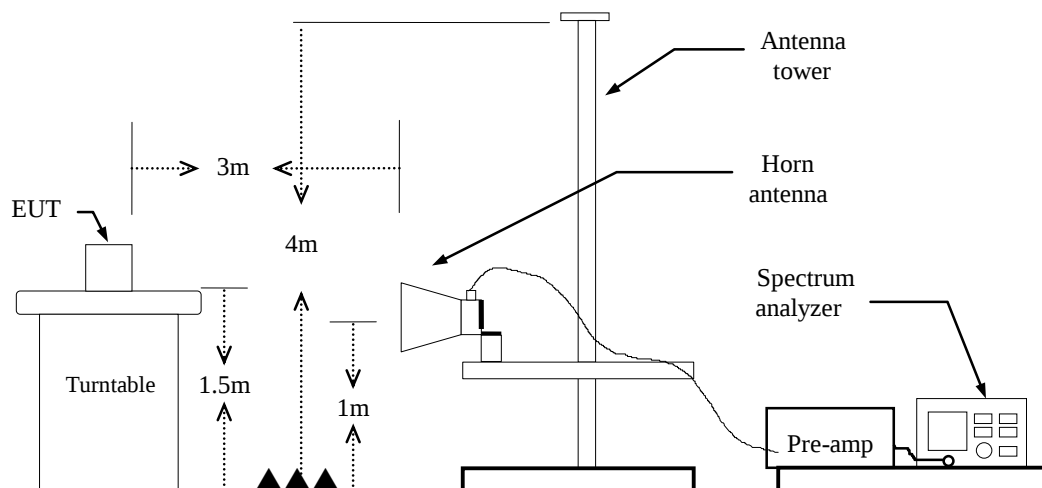
Below 30 MHz

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

Test Configuration



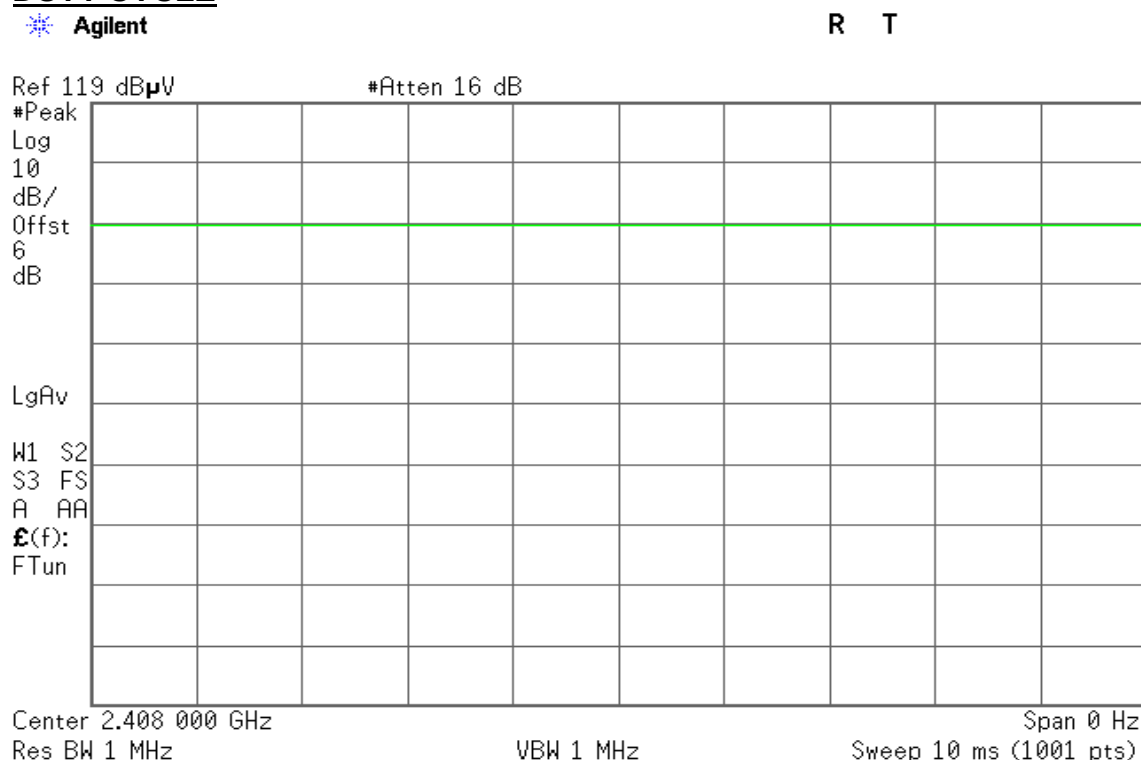
TEST PROCEDURE

1. The EUT is placed on a turntable, which is 1.5m above the ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
 - (a) PEAK: RBW=1MHz / VBW=3MHz / Sweep=AUTO
 - (b) AVERAGE: RBW=1MHz,
if duty cycle $\geq 98\%$, VBW=10Hz.
if duty cycle $< 98\%$ VBW=1/T.

About Test :

SRD: = 100%, VBW= 10Hz
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.
6. Result = Spectrum Reading + cable loss(spectrum to Amp) - Amp Gain + Cable loss(Amp to receive Ant)+ Receive Ant

DUTY CYCLE

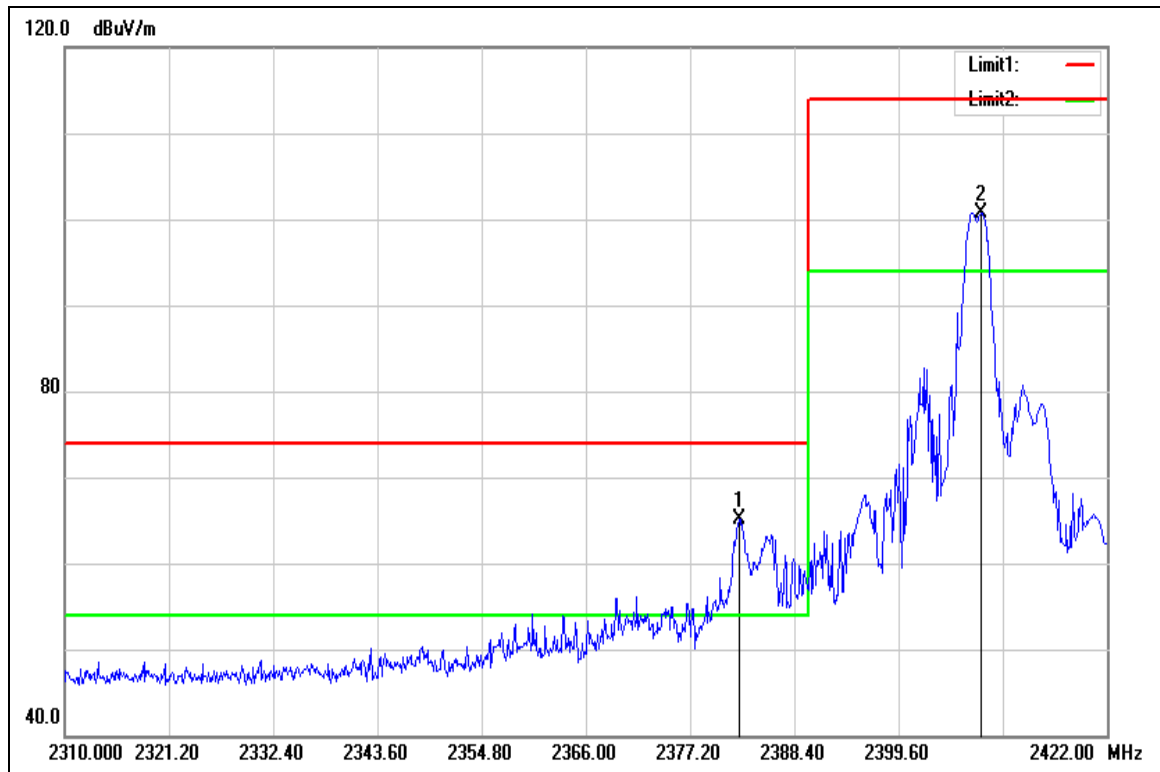


TEST RESULTS

Refer to attach spectrum analyzer data chart.

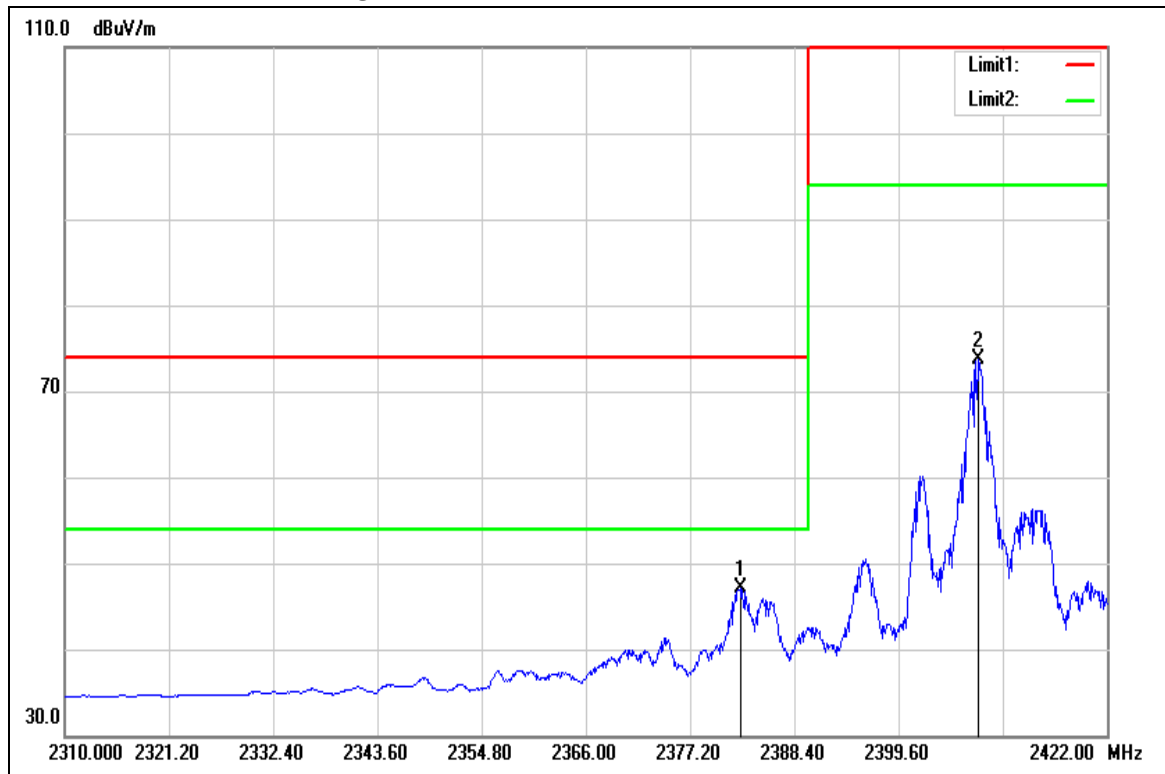
Band Edges (CH Low)

Detector mode: Peak



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2382.464	68.20	-3.01	65.19	74.00	-8.81	peak
2	2408.448	103.64	-2.92	100.72	114.00	-13.28	peak

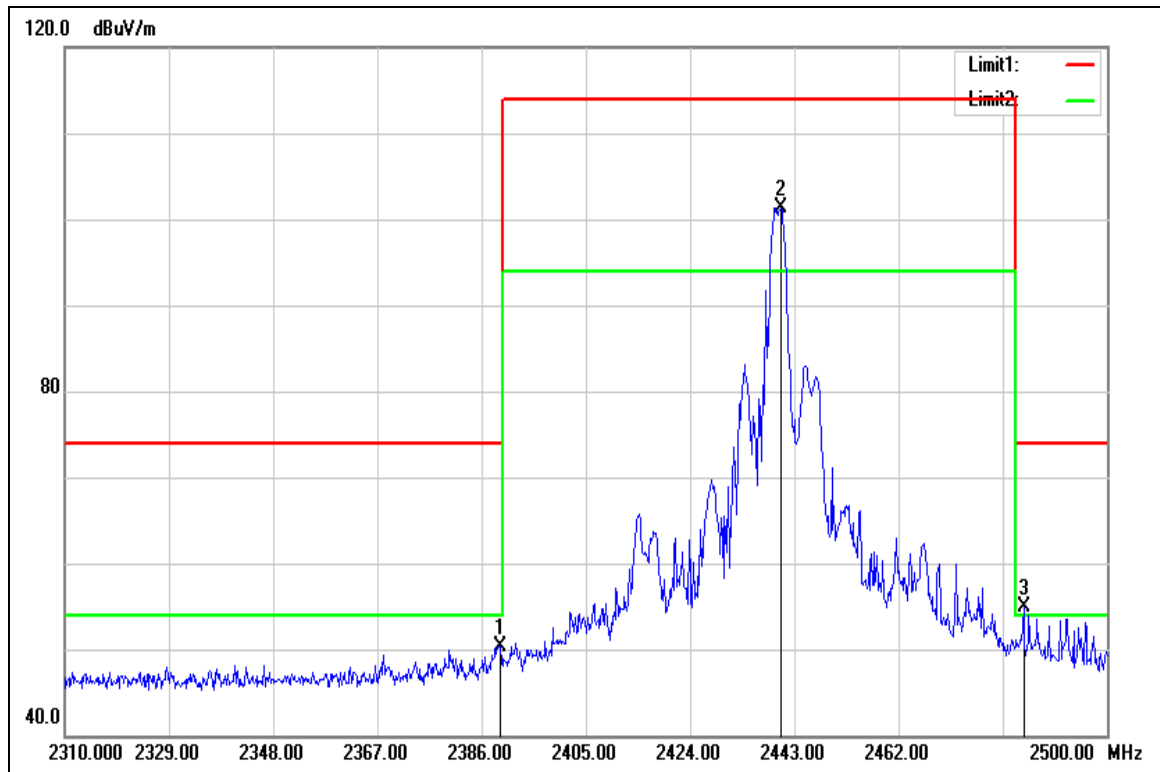
Detector mode: Average



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2382.576	50.01	-3.00	47.01	54.00	-6.99	AVG
2	2408.112	76.62	-2.92	73.70	94.00	-20.30	AVG

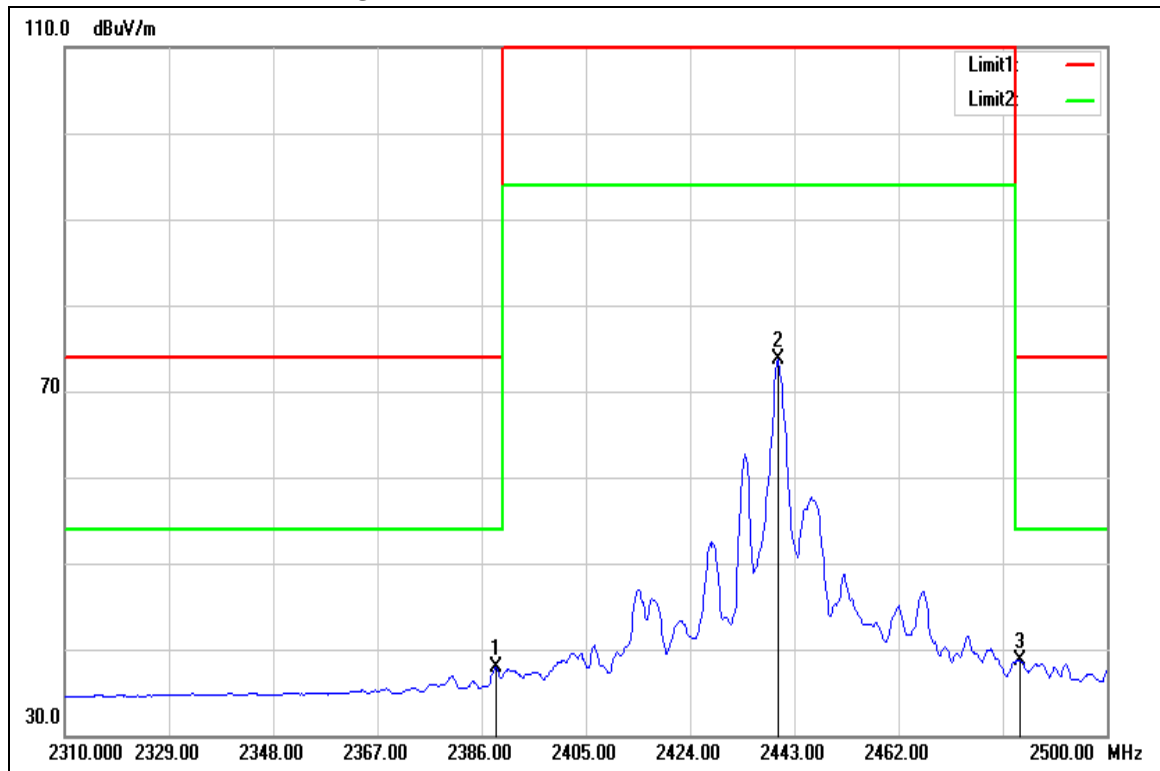
Band Edges (CH Mid)

Detector mode: Peak

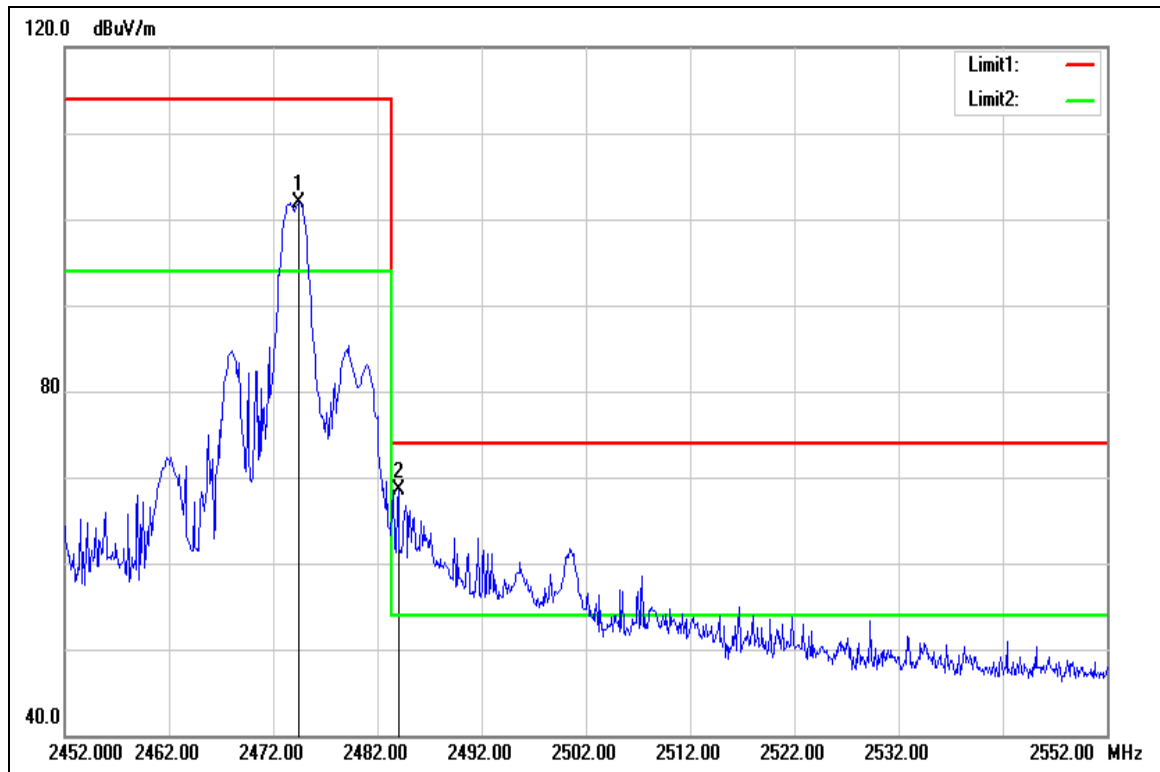


No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2389.420	53.38	-2.98	50.40	74.00	-23.60	peak
2	2440.530	104.08	-2.82	101.26	114.00	-12.74	peak
3	2484.800	57.68	-2.69	54.99	74.00	-19.01	peak

Detector mode: Average

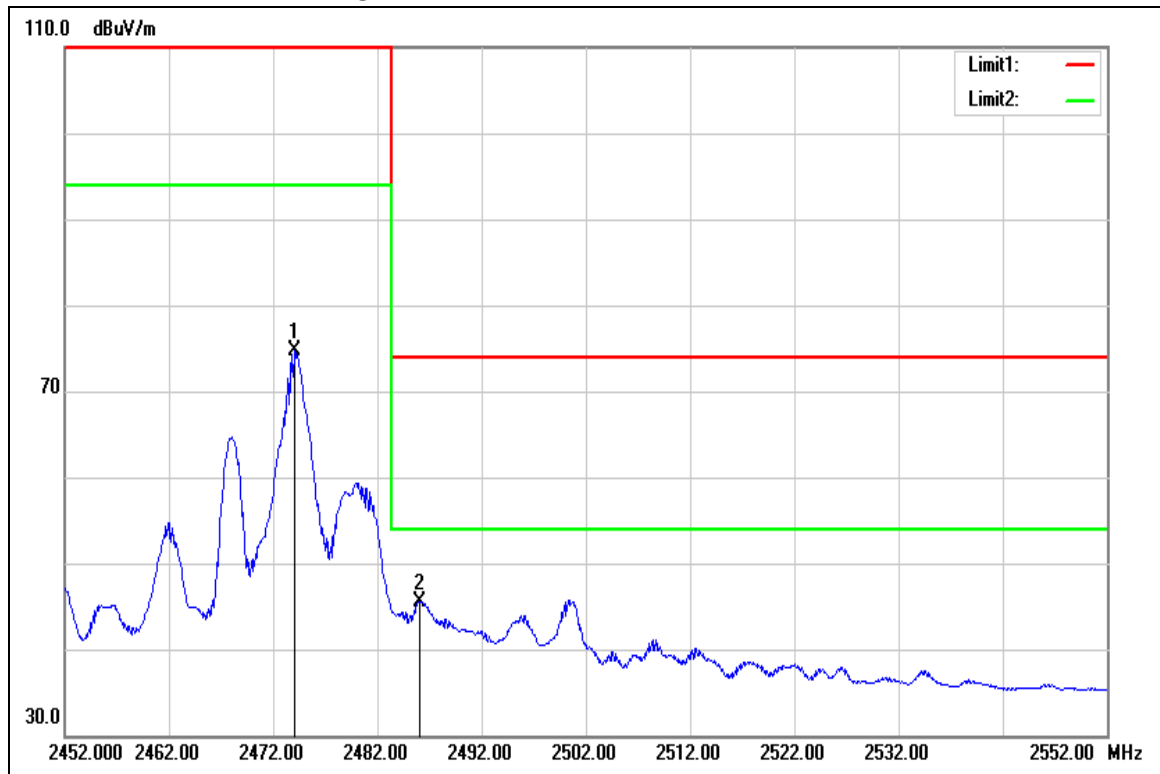


No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2388.660	40.86	-2.98	37.88	54.00	-16.12	AVG
2	2439.960	76.61	-2.82	73.79	94.00	-20.21	AVG
3	2484.040	41.46	-2.69	38.77	54.00	-15.23	AVG

Band Edges (CH High)**Detector mode: Peak**

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2474.500	104.65	-2.72	101.93	114.00	-12.07	peak
2	2484.000	71.19	-2.69	68.50	74.00	-5.50	peak

Detector mode: Average



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2474.000	77.41	-2.72	74.69	94.00	-19.31	AVG
2	2486.100	48.26	-2.69	45.57	54.00	-8.43	AVG

8.3 SPURIOUS EMISSION

LIMIT

According to §15.209, §15.249(a) and RSS 210 §B.10

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

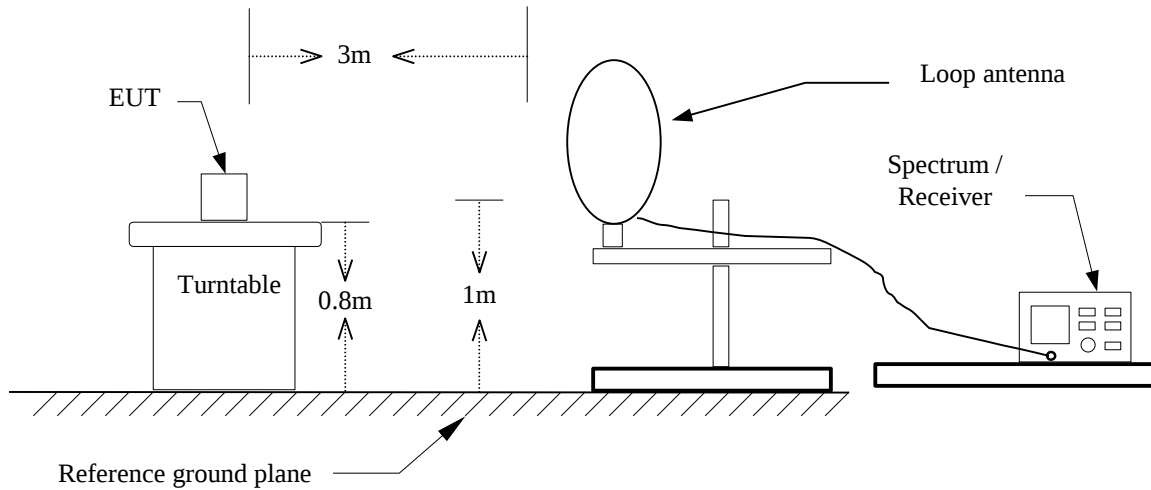
Frequency	Field Strength (microvolts/m)	Measurement Distance (metres)
9-490 kHz	2,400/F (F in kHz)	300
490-1,705 kHz	24,000/F (F in kHz)	30
1.705-30 MHz	30	30

Above 30 MHz

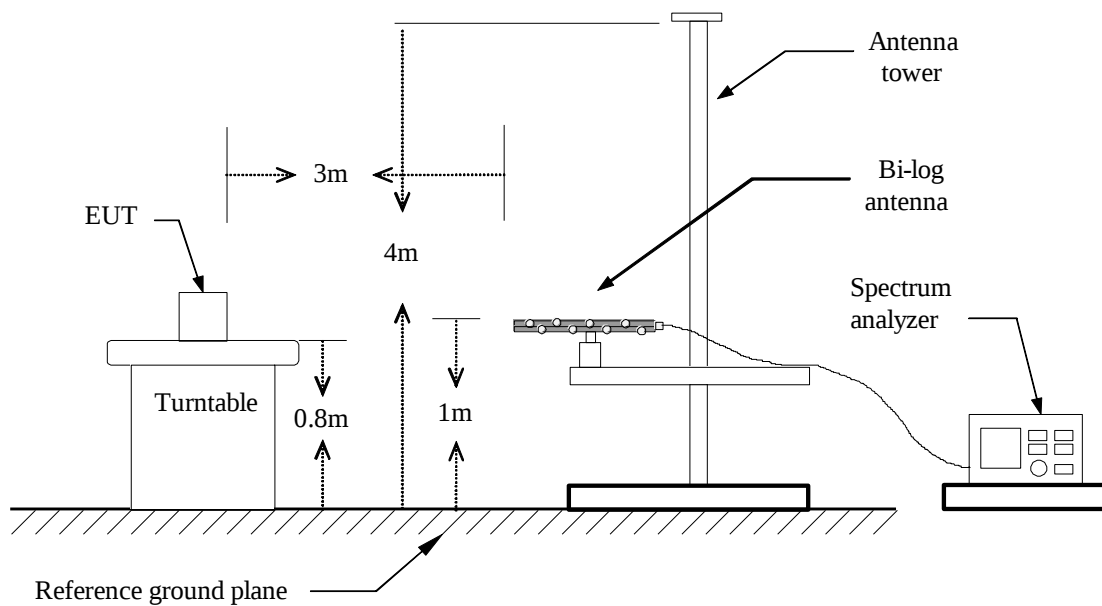
Frequency	Field Strength (microvolts/m)	Measurement Distance (metres)
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

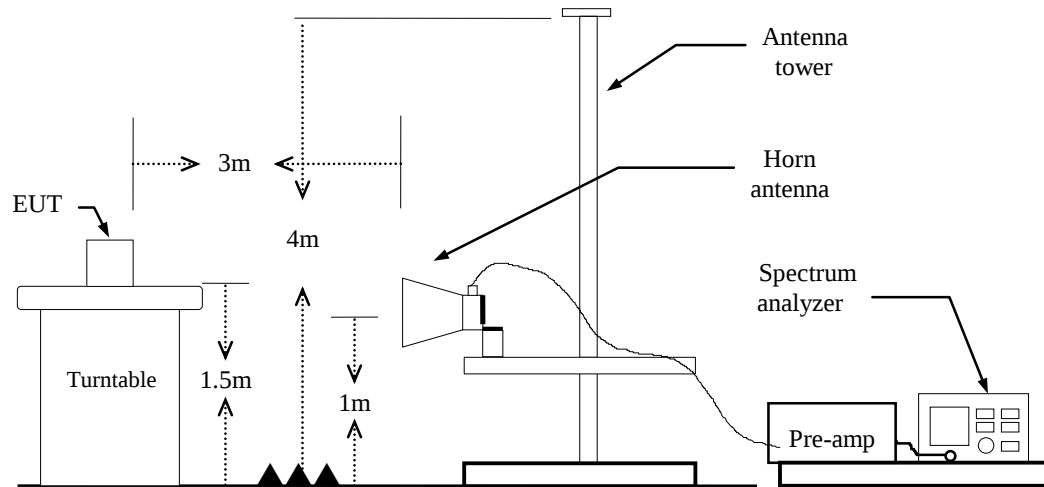
Test Configuration

9kHz ~ 30MHz



30MHz ~ 1GHz



Above 1 GHz

TEST PROCEDURE

1. The EUT is placed on a turntable, Above 1 GHz is 1.5m high and below 1 GHz is 0.8m high above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:

Below 1GHz:

RBW=100kHz / VBW=300kHz / Sweep=AUTO

Above 1GHz:

(a) PEAK: RBW=1MHz / VBW=3MHz / Sweep=AUTO

(b) AVERAGE: RBW=1MHz,

if duty cycle $\geq 98\%$, VBW=10Hz.

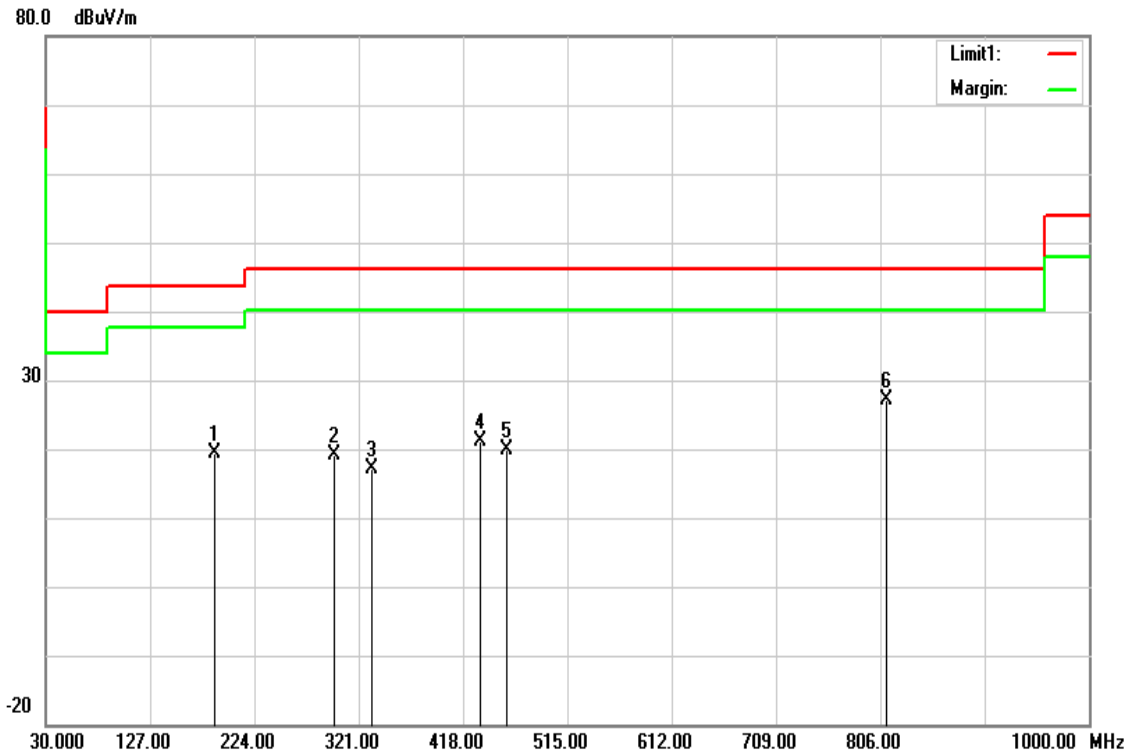
if duty cycle $< 98\%$ VBW=1/T.

About test

SRD: = 100%, VBW= 10Hz

7. Repeat above procedures until the measurements for all frequencies are complete.
8. Result = Spectrum Reading + cable loss(spectrum to Amp) - Amp Gain + Cable loss(Amp to receive Ant)+ Receive Ant

Note: We checked every harmonics frequencies from Fundamental frequencies with reduced VBW, and we mark a point to prove pass or not if we find any emission. For this case, there are no emissions hidden in the noise floor.

Below 1 GHz**Operation Mode:** Normal Link**Test Date:** December 28, 2017**Temperature:** 24°C**Tested by:** Kevin Kuo**Humidity:** 33% RH**Polarity:** Ver.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
187.1400	35.95	-16.49	19.46	43.52	-24.06	peak	V
297.7200	33.19	-14.09	19.10	46.02	-26.92	peak	V
333.6100	30.49	-13.34	17.15	46.02	-28.87	peak	V
433.5200	31.37	-10.19	21.18	46.02	-24.84	peak	V
458.7400	29.24	-9.41	19.83	46.02	-26.19	peak	V
811.8200	30.30	-3.25	27.05	46.02	-18.97	peak	V

Remark:

1. No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz)
2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using peak/quasi-peak detector mode.
3. Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit or as required by the applicant.
4. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
5. Margin (dB) = Remark result (dBuV/m) – Quasi-peak limit (dBuV/m).

Operation Mode: Normal Link

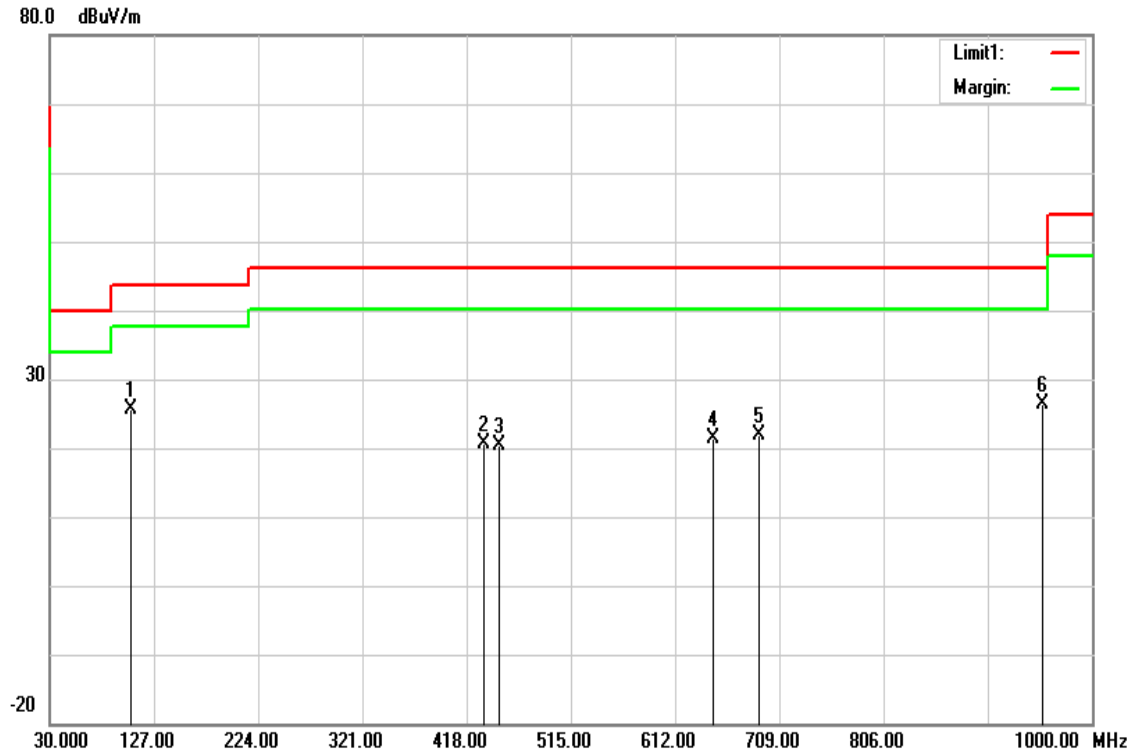
Test Date: December 28, 2017

Temperature: 24°C

Tested by: Kevin Kuo

Humidity: 33% RH

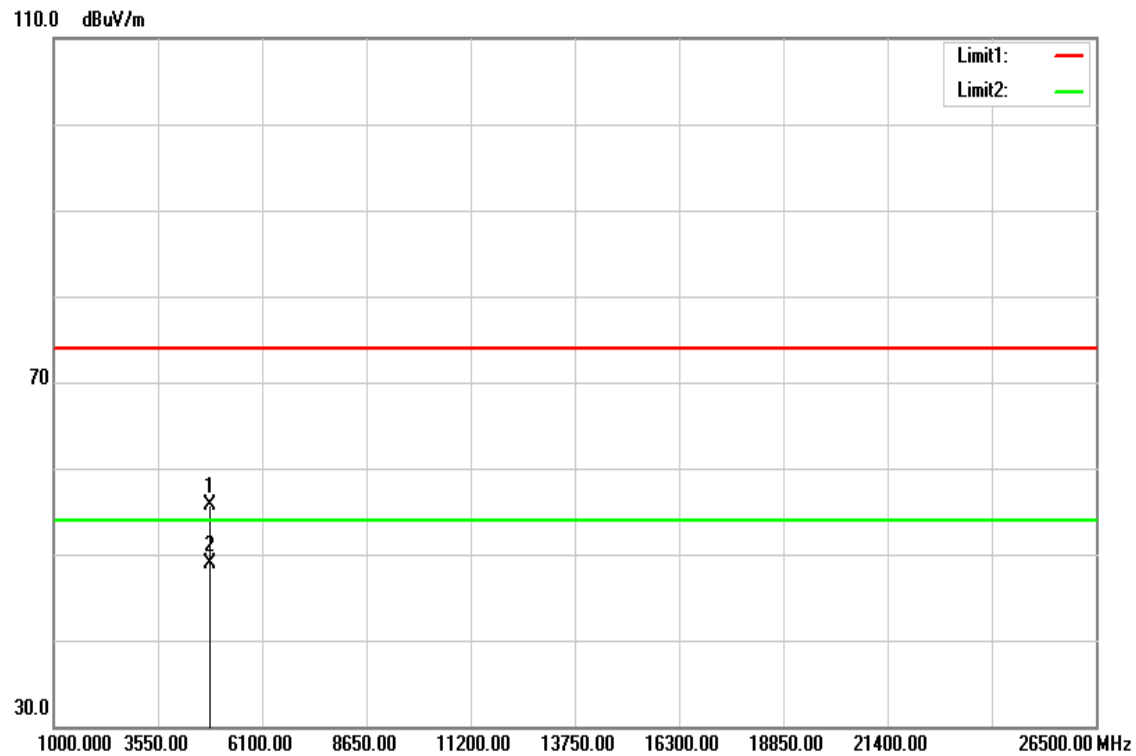
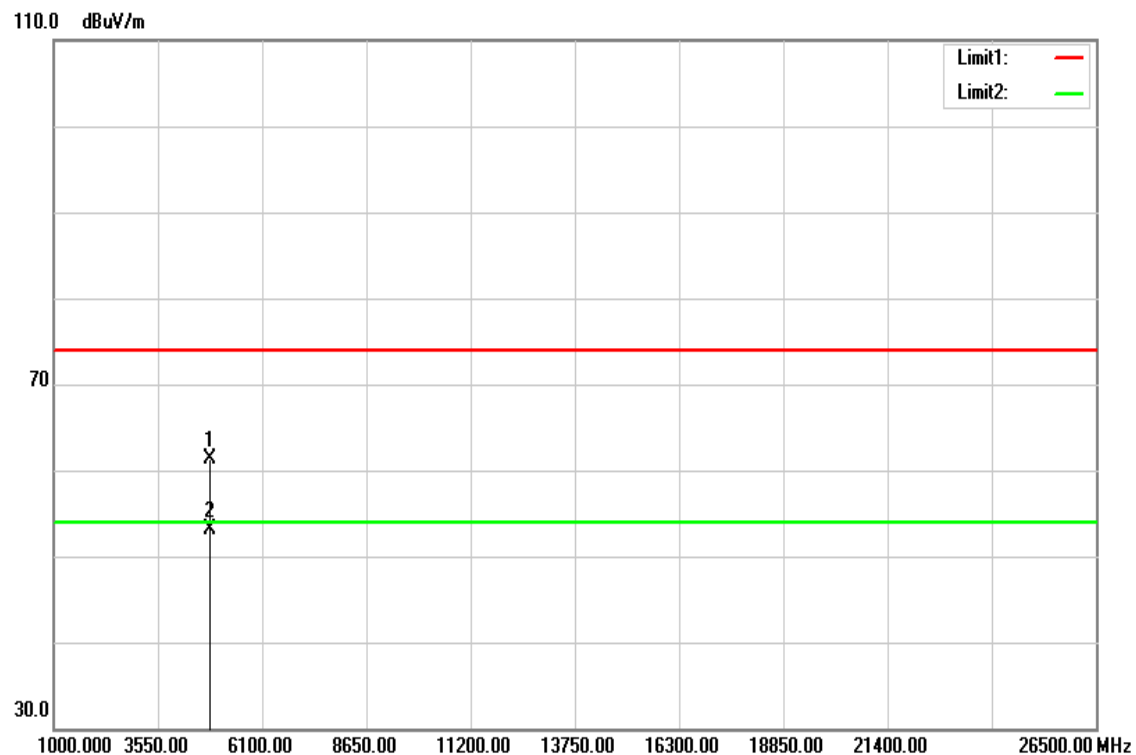
Polarity: Hor.



Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
105.6600	43.21	-17.56	25.65	43.52	-17.87	peak	H
433.5200	30.86	-10.19	20.67	46.02	-25.35	peak	H
448.0700	30.04	-9.67	20.37	46.02	-25.65	peak	H
647.8900	26.98	-5.61	21.37	46.02	-24.65	peak	H
689.6000	26.99	-5.02	21.97	46.02	-24.05	peak	H
954.4100	27.51	-1.14	26.37	46.02	-19.65	peak	H

Remark:

1. No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz)
2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using peak/quasi-peak detector mode.
3. Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit or as required by the applicant.
4. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
5. Margin (dB) = Remark result (dBuV/m) – Quasi-peak limit (dBuV/m).

Above 1 GHz**TX / CH Low****Polarity: Vertical****Polarity: Horizontal**

Above 1 GHz

Operation Mode: Tx / CH Low **Test Date:** December 28, 2017
Temperature: 24°C **Tested by:** Kevin Kuo
Humidity: 33% RH **Polarity:** Ver. / Hor.

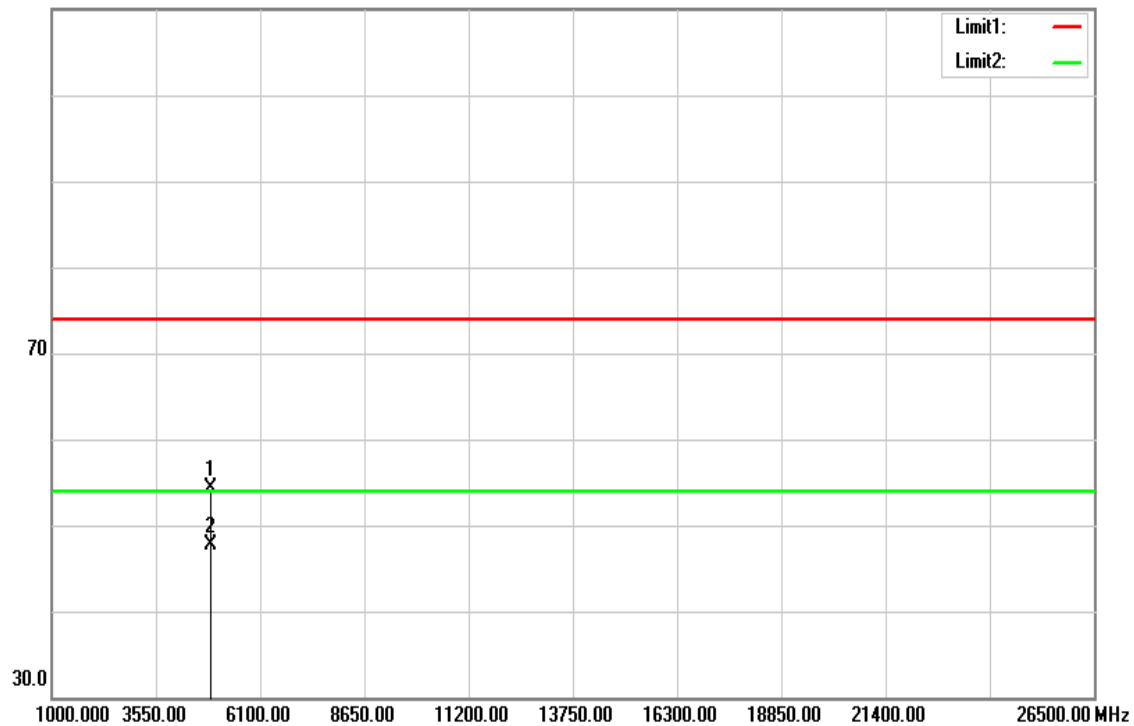
Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
4820.000	51.33	4.36	55.69	74.00	-18.31	peak	V
4820.000	44.55	4.36	48.91	54.00	-5.09	AVG	V
N/A							
4820.000	56.91	4.36	61.27	74.00	-12.73	peak	H
4820.000	48.83	4.36	53.19	54.00	-0.81	AVG	H
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. $\text{Margin (dB)} = \text{Result (dBuV/m)} - \text{limit (dBuV/m)}$.

TX / CH Mid**Polarity: Vertical**

110.0 dBuV/m

**Polarity: Horizontal**

110.0 dBuV/m



Operation Mode: Tx / CH Mid **Test Date:** December 28, 2017
Temperature: 24°C **Tested by:** Kevin Kuo
Humidity: 33% RH **Polarity:** Ver. / Hor.

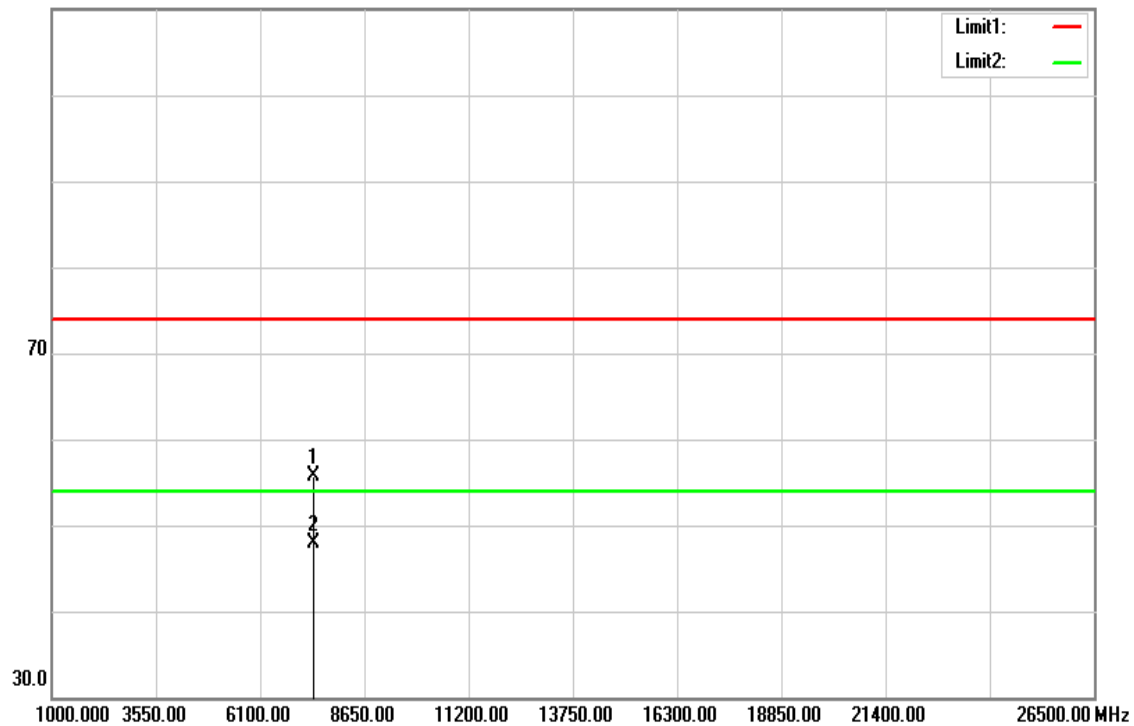
Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
4876.000	49.88	4.47	54.35	74.00	-19.65	peak	V
4876.000	43.18	4.47	47.65	54.00	-6.35	AVG	V
N/A							
4883.000	54.98	4.49	59.47	74.00	-14.53	peak	H
4883.000	46.54	4.49	51.03	54.00	-2.97	AVG	H
N/A							

Remark:

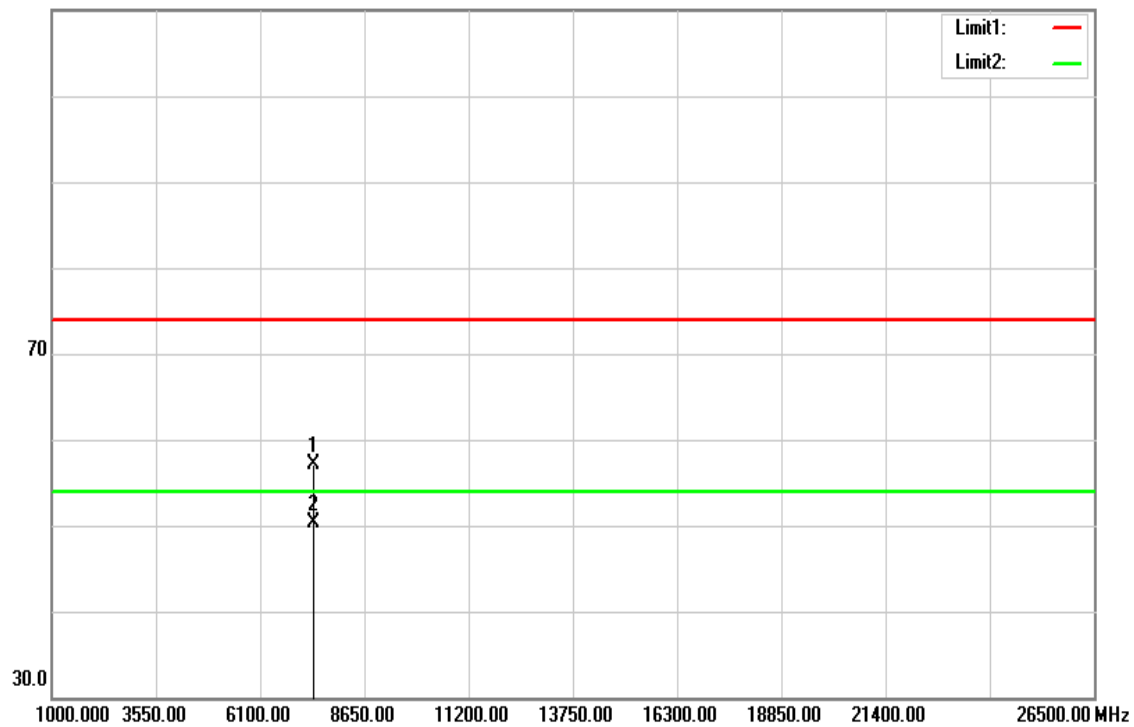
1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. $\text{Margin (dB)} = \text{Result (dBuV/m)} - \text{limit (dBuV/m)}$.

TX / CH High**Polarity: Vertical**

110.0 dBuV/m

**Polarity: Horizontal**

110.0 dBuV/m



Operation Mode: Tx / CH High

Test Date: December 28, 2017

Temperature: 24°C

Tested by: Kevin Kuo

Humidity: 33% RH

Polarity: Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
7424.000	45.27	10.50	55.77	74.00	-18.23	peak	V
7424.000	37.40	10.50	47.90	54.00	-6.10	AVG	V
N/A							
7424.000	46.58	10.50	57.08	74.00	-16.92	peak	H
7424.000	39.72	10.50	50.22	54.00	-3.78	AVG	H
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Result (dBuV/m) – limit (dBuV/m).

8.4 POWERLINE CONDUCTED EMISSIONS

LIMIT

According to §15.207(a) and RSS GEN §8.8, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency Range (MHz)	Limits (dB μ V)	
	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

Test Configuration

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

TEST PROCEDURE

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

TEST RESULTS

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

Test Data

Not applicable, because EUT not connect to AC Main Source direct.