
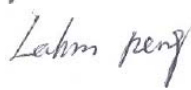



FCC PART 15.249
MEASUREMENT AND TEST REPORT
FOR

Coolit Systems, Inc.

3920-29th St., Calgary, Alberta, Canada

FCC ID: YIQ83000021

Report Concerns: Original Report	Equipment Type: ESP WIRELESS MODULE
Model:	<u>830-00021</u>
Report No.:	<u>STR10068136I</u>
Test Date:	<u>2010-06-14 to 2010-06-28</u>
Issue Date:	<u>2010-07-05</u>
Test Engineer:	<u>John Zhi</u> 
Reviewed By:	<u>Lahm Peng</u> 
Approved & Authorized By:	<u>Jandy so/PSQ Manager</u> 
Prepared By:	SEM.Test Compliance Service Co., Ltd 3/F, Jinbao Commerce Building, Xin'an Fanshen Road, Bao'an District, Shenzhen, P.R.C. (518101) Tel.: +86-755-33663308 Fax.: +86-755-33663309 Website: www.semtest.com.cn

Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by SEM.Test Compliance Service Co., Ltd.

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: Coolit Systems, Inc.
Address of applicant: 3920-29th St., Calgary, Alberta, Canada

Manufacturer: SIMPS TECHNOLOGIES CO., LTD.
Address of manufacturer: BLDG 11, WANGFENG INDUSTRIAL ZONE, RANGWEI VILLAGE, GONGMIN TOWN, SHENZHEN, GUANGDONG 518106, CHINA

General Description of E.U.T

Items	Description
EUT Description:	ESP WIRELESS MODULE
Trade Name:	COOLIT SYSTEMS
Model No.:	830-00021
Add Model:	ESPMOUDLE
Rated Voltage:	DC 3.3V
Output Power:	<10mW
Frequency Range:	2405~2475 MHz
No. of Channel:	16
Antenna Type:	Integral Antenna
Size:	2.5X2.0X0.2cm
For more information refer to the circuit diagram form and the user's manual.	

The test data is gathered from a production sample, provided by the manufacturer. Test is carried out with 830-00021 since the others listed in the report have the different appearances only without electronic construction changed, declared by the manufacturer.

1.2 Test Standards

The following report is prepared on behalf of the Coolit Systems, Inc. in accordance with FCC Part 15, Subpart B, Subpart C, and section 15.107, 15.203, 15.205, 15.207, 15.209 and 15.249 of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15, Subpart C, and section 15.107, 15.203, 15.205, 15.207, 15.209 and 15.249 of the Federal Communication Commissions rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which results in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Related Submittal(s)/Grant(s)

No Related Submittal(s).

1.4 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted according to the Operating Instructions and let the EUT keep transmitting.

1.5 Test Facility

- **FCC – Registration No.: 994117**

SEM.Test Compliance Services Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files and the Registration is 994117.

- **Industry Canada (IC) Registration No.: 7673A**

The 3m Semi-anechoic chamber of SEM.Test Compliance Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 7673A.

1.6 EUT Exercise Software

The EUT exercise program used during the testing was designed to exercise the system components. The test software is started while the whole system is on.

1.7 Accessories Equipment List and Details

Manufacturer	Description	Model	Serial Number
/	/	/	/

1.8 EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
/	/	/	/

2. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.203	Antenna Requirement	Compliant
§15.207 (a)	Conducted Emission	N/A
§15.205	Restricted Band of Operation	Compliant
§15.209	Radiated Emission	Compliant
§15.249(a)	Field Strength	Compliant
§15.249(d)	Out of Band Emission	Compliant

3. §15.203 - ANTENNA REQUIREMENT

3.1 Standard Applicable

According to FCC 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

3.2 Test Result

This product has an integral antenna, fulfill the requirement of this section.

4. §15.205, §15.209, §15.249 (a)- RADIATED EMISSION

4.1 Measurement Uncertainty

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement is ± 5.10 dB.

4.2 Standard Applicable

According to §15.249(a), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental Frequency	Field strength of fundamental (milli-volts/meter)	Field strength of fundamental (micro-volts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply.

EMISSIONS RADIATED OUTSIDE OF THE SPECIFIED FREQUENCY BANDS, EXCEPT FOR HARMONICS, SHALL BE ATTENUATED BY AT LEAST 20 dB BELOW THE LEVEL OF THE FUNDAMENTAL OR TO THE GENERAL RADIATED EMISSION LIMITS IN 15.209,WHICHEVER IS THE LESSER ATTENUATION.

Emissions that fall in the restricted bands (15.205) must be less than 54dBuV/m otherwise the spurious and harmonics must be attenuated by at least 20dB.

4.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	ROHDE&SCHWARZ	FSEA20	DE25181	2009-08-12	2010-08-11
Positioning Controller	C&C	CC-C-1F	N/A	2009-08-12	2010-08-11
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2009-07-21	2010-07-20
Horn Antenna	SCHWARZBECK	BBHX 9120	9120-426	2009-07-21	2010-07-20
RF Switch	EM	EMSW18	SW060023	2009-08-12	2010-08-11
Amplifier	Agilent	8447F	3113A06717	2009-08-12	2010-08-11
Coaxial Cable	SCHWARZBECK	AK9513	9513-10	2009-08-12	2010-08-11
Spectrum Analyzer	ROHDE&SCHWARZ	FSP	N/A	2010-04-16	2011-04-15

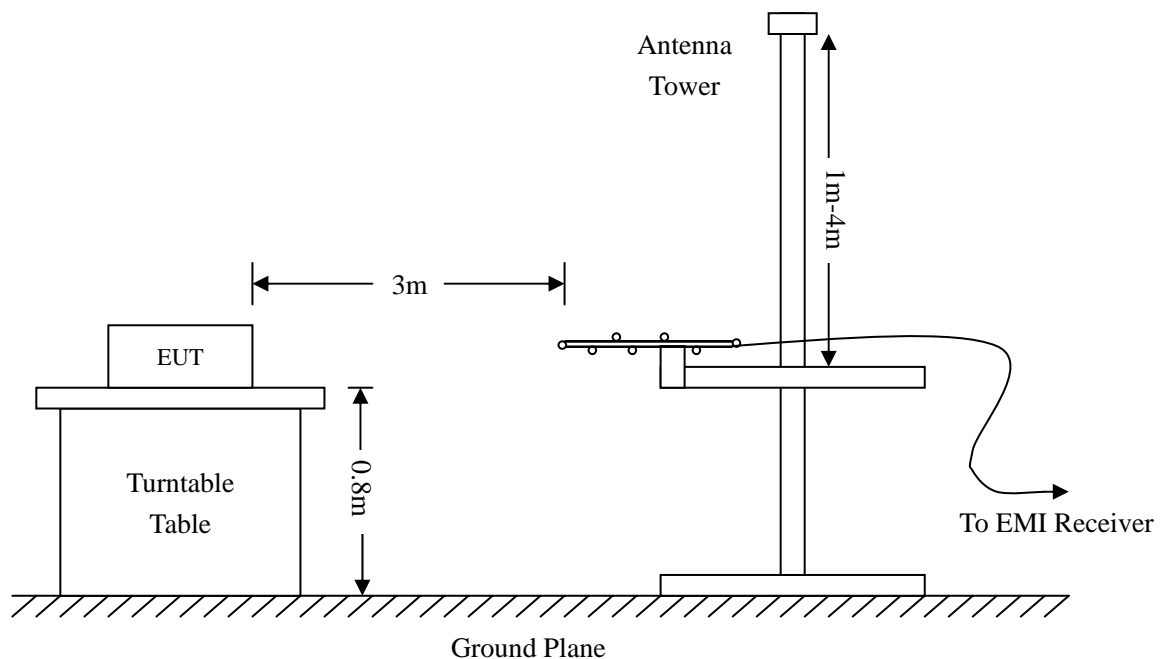
Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

4.4 Test Procedure

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.205 15.247(a) and FCC Part 15.209 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.



4.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Ant. Factor} + \text{Cable Loss} - \text{Ampl. Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dBμV means the emission is 6dBμV below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15 Limit}$$

4.6 Environmental Conditions

Temperature:	22 °C
Relative Humidity:	50 %
ATM Pressure:	1012 mbar

4.7 Summary of Test Results/Plots

According to the data below, the FCC Part 15.205, 15.209 and 15.249 standards, and had the worst margin of:

-12.23 dBμV at 906.4824 MHz in the Horizontal polarization for Low Channel, 30 MHz to 25 GHz, 3 Meters

Note: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.

Plot of Radiation Emissions Test

Radiated Disturbance

EUT: ESP WIRELESS MODULE

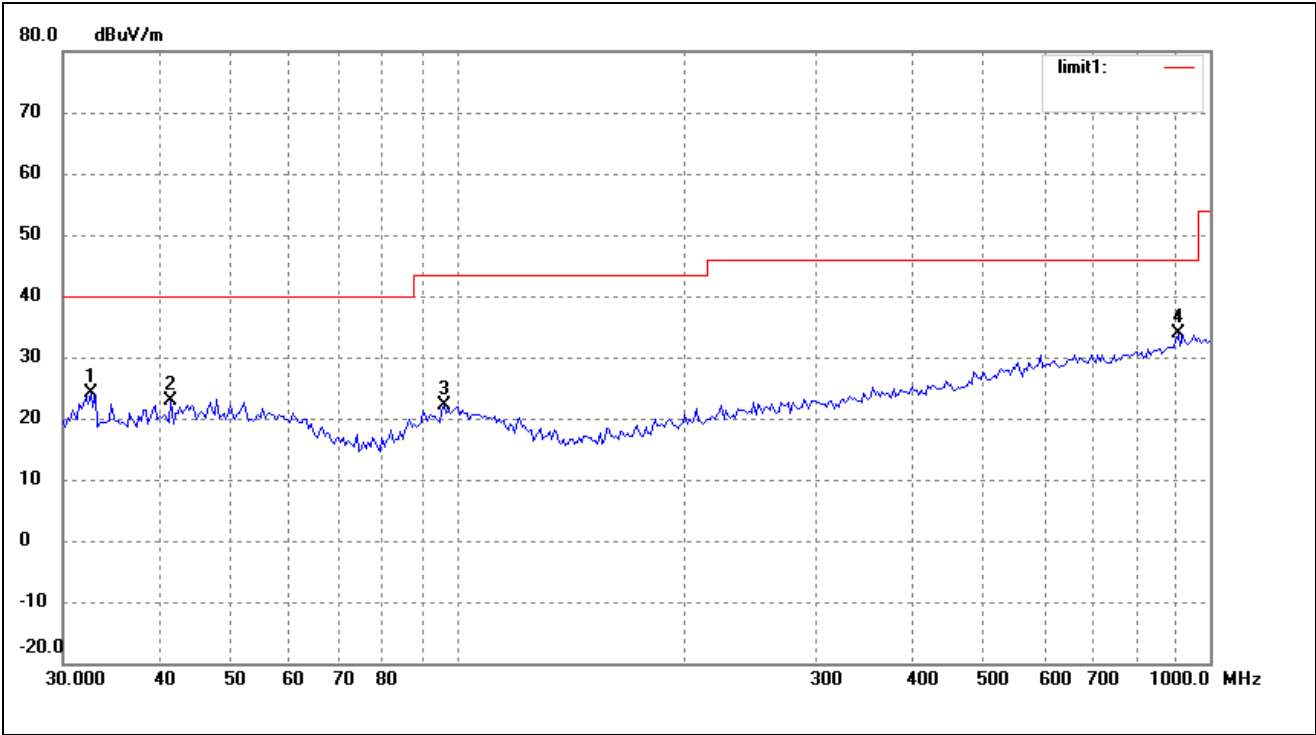
M/N: 830-00021

Operating Condition: Transmitting below 1GHz

Test Specification: Horizontal & Vertical

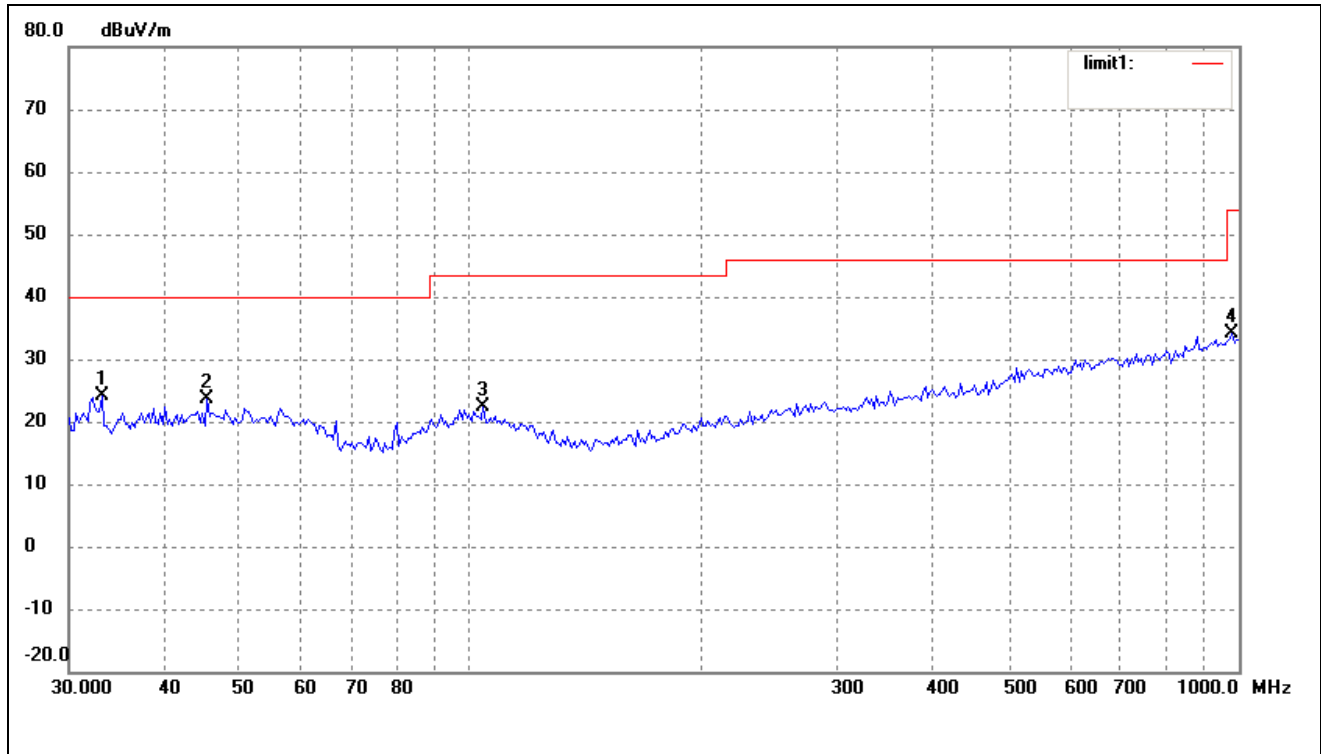
Low Channel

Horizontal:



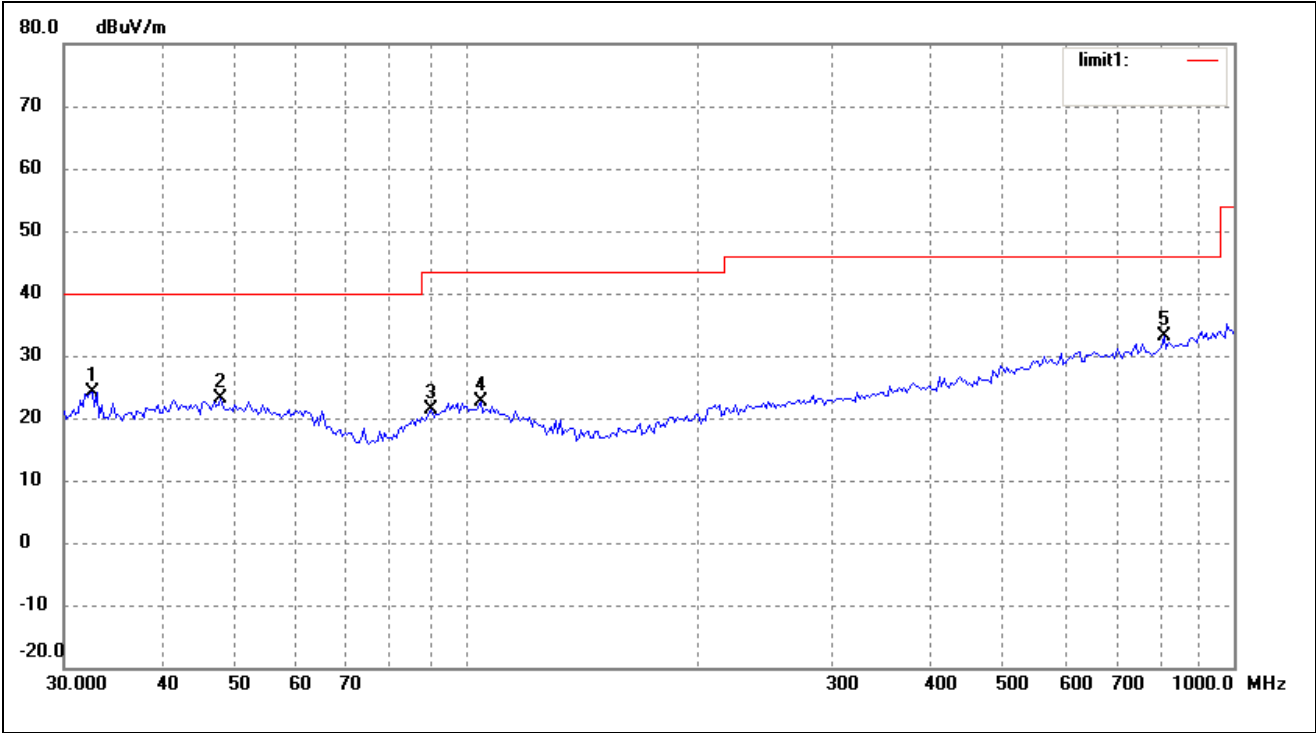
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	32.6340	17.62	6.61	24.23	40.00	-15.77	123	100	Peak
2	41.7130	14.95	7.95	22.90	40.00	-17.10	14	100	Peak
3	96.0986	14.65	7.54	22.19	43.50	-21.31	250	100	Peak
4	906.4824	16.78	16.99	33.77	46.00	-12.23	360	100	Peak

Vertical:



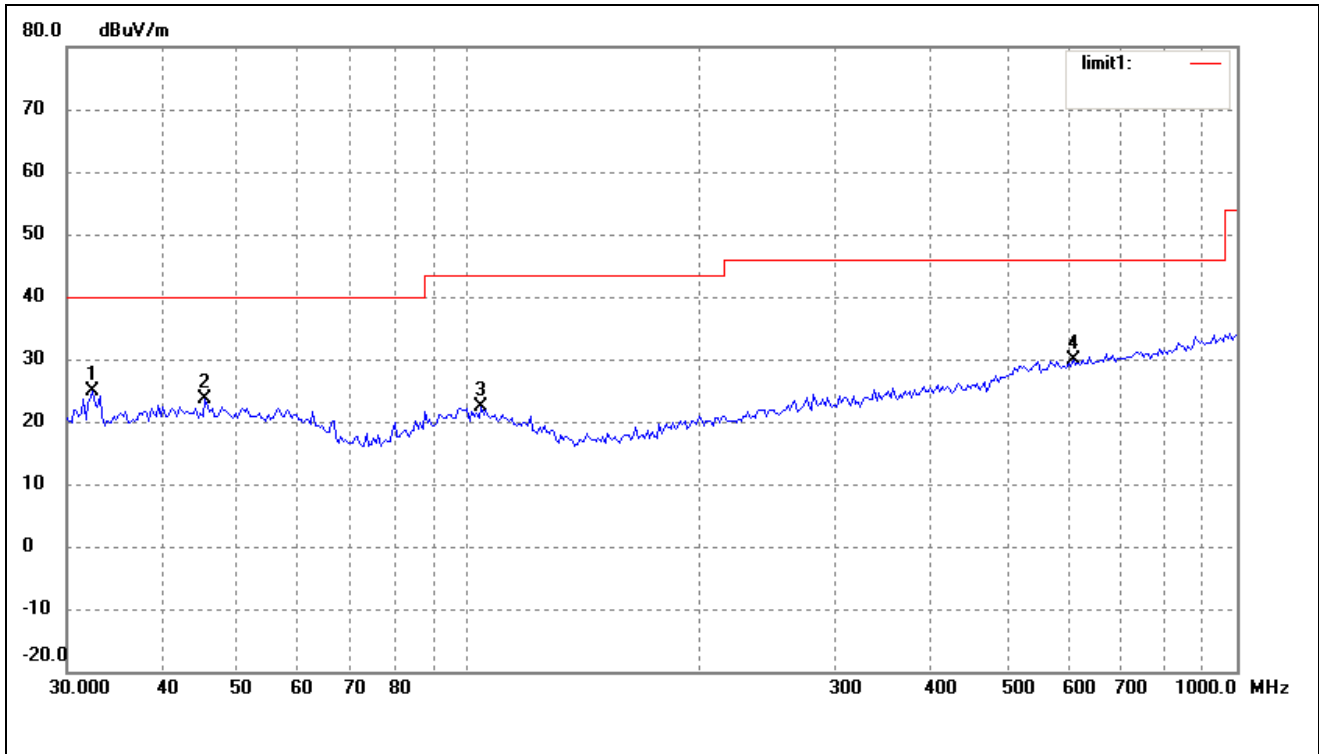
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	33.0950	17.48	6.61	24.09	40.00	-15.91	360	100	Peak
2	45.3755	15.76	7.97	23.73	40.00	-16.27	250	100	Peak
3	103.8055	14.95	7.48	22.43	43.50	-21.07	254	100	Peak
4	979.1804	16.04	17.97	34.01	54.00	-19.99	1	100	Peak

Middle Channel
Horizontal:



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	32.6340	17.62	6.61	24.23	40.00	-15.77	123	100	Peak
2	47.9940	15.29	7.81	23.10	40.00	-16.90	14	100	Peak
3	90.2205	14.81	6.57	21.38	43.50	-22.12	250	100	Peak
4	104.5361	15.27	7.41	22.68	43.50	-20.82	360	100	Peak
5	810.2654	17.38	15.65	33.03	46.00	-12.97	100	100	Peak

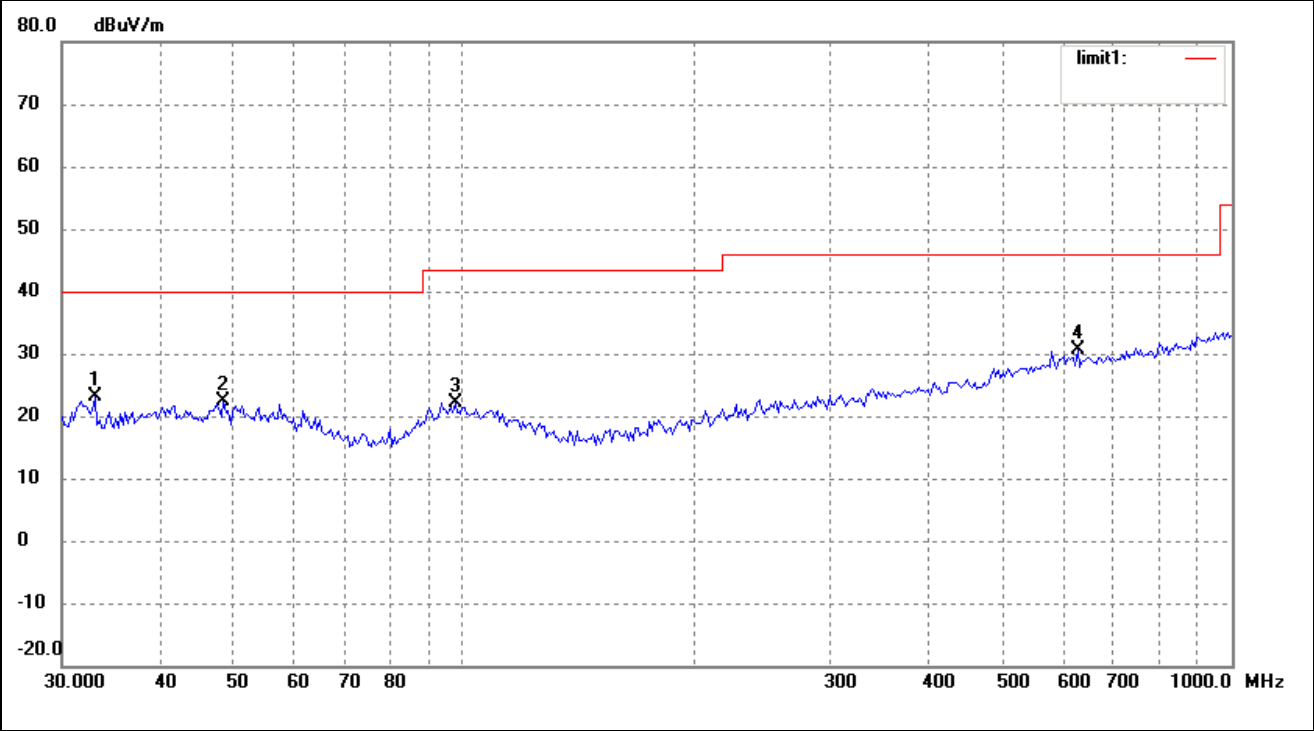
Vertical:



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	32.4059	18.16	6.62	24.78	40.00	-15.22	36	100	Peak
2	45.3755	15.76	7.97	23.73	40.00	-16.27	25	100	Peak
3	103.8055	14.95	7.48	22.43	43.50	-21.07	25	100	Peak
4	612.0642	15.63	14.21	29.84	46.00	-16.16	61	100	Peak

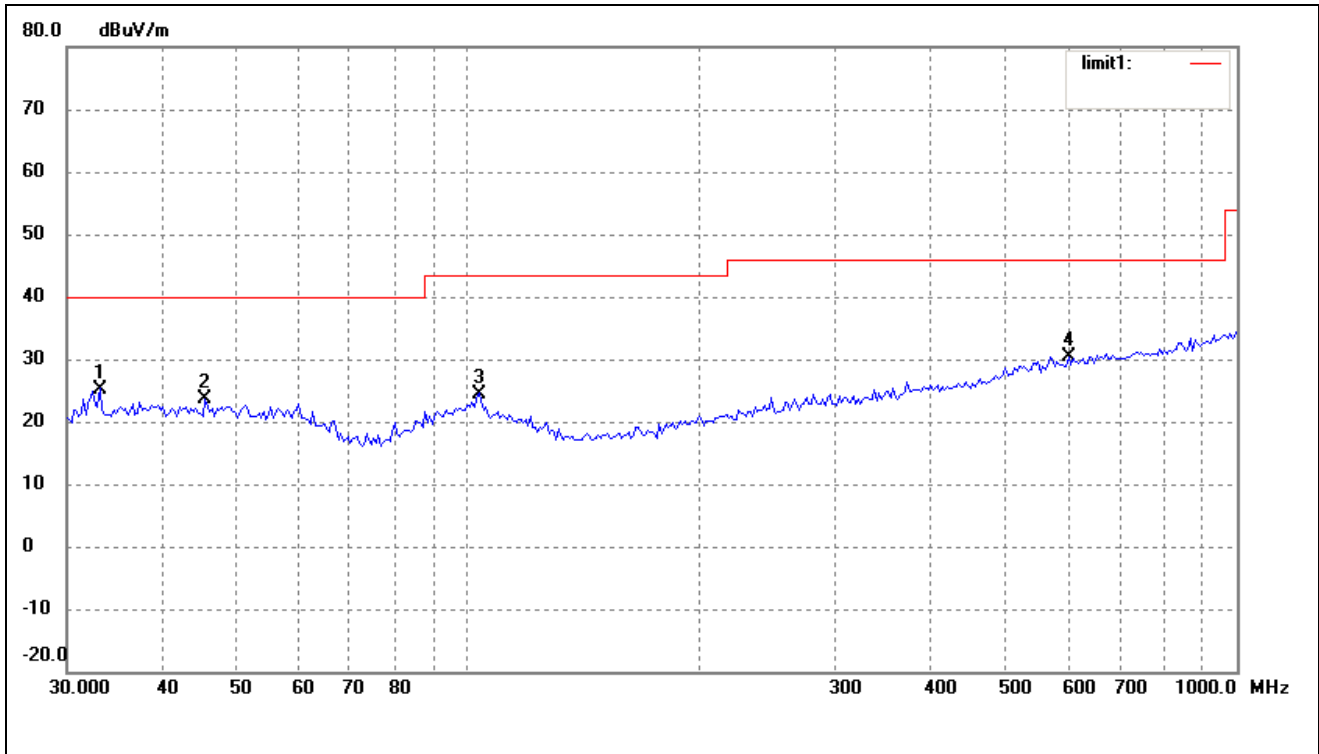
High Channel

Horizontal:



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	33.0950	16.49	6.61	23.10	40.00	-16.90	65	100	Peak
2	48.6719	14.56	7.77	22.33	40.00	-17.67	250	100	Peak
3	97.4560	14.58	7.63	22.21	43.50	-21.29	24	100	Peak
4	629.4772	16.37	14.27	30.64	46.00	-15.36	30	100	Peak

Vertical:



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	33.0950	18.64	6.61	25.25	40.00	-14.75	360	100	Peak
2	45.3755	15.76	7.97	23.73	40.00	-16.27	12	100	Peak
3	103.0800	16.95	7.55	24.50	43.50	-19.00	36	100	Peak
4	603.5392	16.29	14.18	30.47	46.00	-15.53	14	100	Peak

*Spurious Emission Above 1GHz**Low Channel*

Frequency MHz	Detector	Meter Reading dBuV	Direction Degree	Polar H / V	Antenna Loss dB	Cable loss dB	Amplifier dB	Correction Amplitude dBuV/m	Limit dBuV/m	Margin dB
4810	AV	22.4	86	V	34.1	5.2	33	28.7	54	-25.3
4810	AV	23.2	35	H	34.1	5.2	33	29.5	54	-24.5
4810	PK	42.2	245	V	34.1	5.2	33	48.5	74	-25.5
4810	PK	44.6	60	H	34.1	5.2	33	50.9	74	-23.1
7215	AV	20.4	245	V	37.4	6.1	33.5	30.4	54	-23.6
7215	AV	22.8	198	H	37.4	6.1	33.5	32.8	54	-21.2
7215	PK	39.8	56	V	37.4	6.1	33.5	49.8	74	-24.2
7215	PK	40.9	60	H	37.4	6.1	33.5	50.9	74	-23.1
2405	AV	78.7	266	V	29.1	3.7	34	77.5	94	-16.5
2405	AV	81	185	H	29.1	3.7	34	79.8	94	-14.2
2405	PK	85.5	90	V	29.1	3.7	34	84.3	114	-29.7
2405	PK	87.6	43	H	29.1	3.7	34	86.4	114	-27.6

Middle Channel

Frequency MHz	Detector	Meter Reading dBuV	Direction Degree	Polar H / V	Antenna Loss dB	Cable loss dB	Amplifier dB	Correction Amplitude dBuV/m	Limit dBuV/m	Margin dB
4880	AV	23.4	126	V	34.1	5.2	33	29.7	54	-24.3
4880	AV	24.2	32	H	34.1	5.2	33	30.5	54	-23.5
4880	PK	46.1	20	V	34.1	5.2	33	52.4	74	-21.6
4880	PK	48.3	265	H	34.1	5.2	33	54.6	74	-19.4
7320	AV	20.9	322	V	37.4	6.1	33.5	30.9	54	-23.1
7320	AV	22.5	257	H	37.4	6.1	33.5	32.5	54	-21.5
7320	PK	42.4	44	V	37.4	6.1	33.5	52.4	74	-21.6
7320	PK	43.9	78	H	37.4	6.1	33.5	53.9	74	-20.1
2440	AV	76.7	49	V	29.1	3.7	34	75.5	94	-18.5
2440	AV	78.5	89	H	29.1	3.7	34	77.3	94	-16.7
2440	PK	91.3	266	V	29.1	3.7	34	90.1	114	-23.9
2440	PK	94	42	H	29.1	3.7	34	92.8	114	-21.2

High Channel

Frequency MHz	Detector	Meter Reading dBuV	Direction Degree	Polar H / V	Antenna Loss dB	Cable loss dB	Amplifier dB	Correction Amplitude dBuV/m	Limit dBuV/m	Margin dB
4950	AV	23.2	146	V	34.1	5.2	33	29.5	54	-24.5
4950	AV	24.9	56	H	34.1	5.2	33	31.2	54	-22.8
4950	PK	44	274	V	34.1	5.2	33	50.3	74	-23.7
4950	PK	46.7	85	H	34.1	5.2	33	53	74	-21
7425	AV	22.1	69	V	37.4	6.1	33.5	32.1	54	-21.9
7425	AV	24.5	53	H	37.4	6.1	33.5	34.5	54	-19.5
7425	PK	45.6	64	V	37.4	6.1	33.5	55.6	74	-18.4
7425	PK	46.6	67	H	37.4	6.1	33.5	56.6	74	-17.4
2475	AV	73.8	155	V	29.1	3.7	34	72.6	94	-21.4
2475	AV	74.6	58	H	29.1	3.7	34	73.4	94	-20.6
2475	PK	88.8	124	V	29.1	3.7	34	87.6	114	-26.4
2475	PK	91.1	159	H	29.1	3.7	34	89.9	114	-24.1

Note: Testing is carried out with frequency rang 30MHz to the tenth harmonics, which above 5th Harmonics is close to the noise base even antenna close up to 1meter distance according the measurement of ANSI C63.4. Emissions 20dB lower than the limit are not reported.

5. §15.249(b) OUT OF BAND EMISSIONS

5.1 Standard Applicable

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, whichever is the lesser attenuation.

5.2 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	ROHDE&SCHWARZ	FSEA20	DE25181	2009-08-12	2010-08-11
Positioning Controller	C&C	CC-C-1F	N/A	2009-08-12	2010-08-11
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2009-07-21	2010-07-20
Horn Antenna	SCHWARZBECK	BBHX 9120	9120-426	2009-07-21	2010-07-20
RF Switch	EM	EMSW18	SW060023	2009-08-12	2010-08-11
Amplifier	Agilent	8447F	3113A06717	2009-08-12	2010-08-11
Coaxial Cable	SCHWARZBECK	AK9513	9513-10	2009-08-12	2010-08-11
Spectrum Analyzer	ROHDE&SCHWARZ	FSP	N/A	2010-04-16	2011-04-15
Agilent	Spectrum Analyzer	E4402B	US41192821	2009-08-12	2010-08-11

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

5.3 Test Procedure

As the radiation test, set the Lowest and Highest Transmitting Channel, observed the outside band of 2400MHz to 2438.5MHz, than mark the higher-level emission for comparing with the FCC rules.

5.4 Environmental Conditions

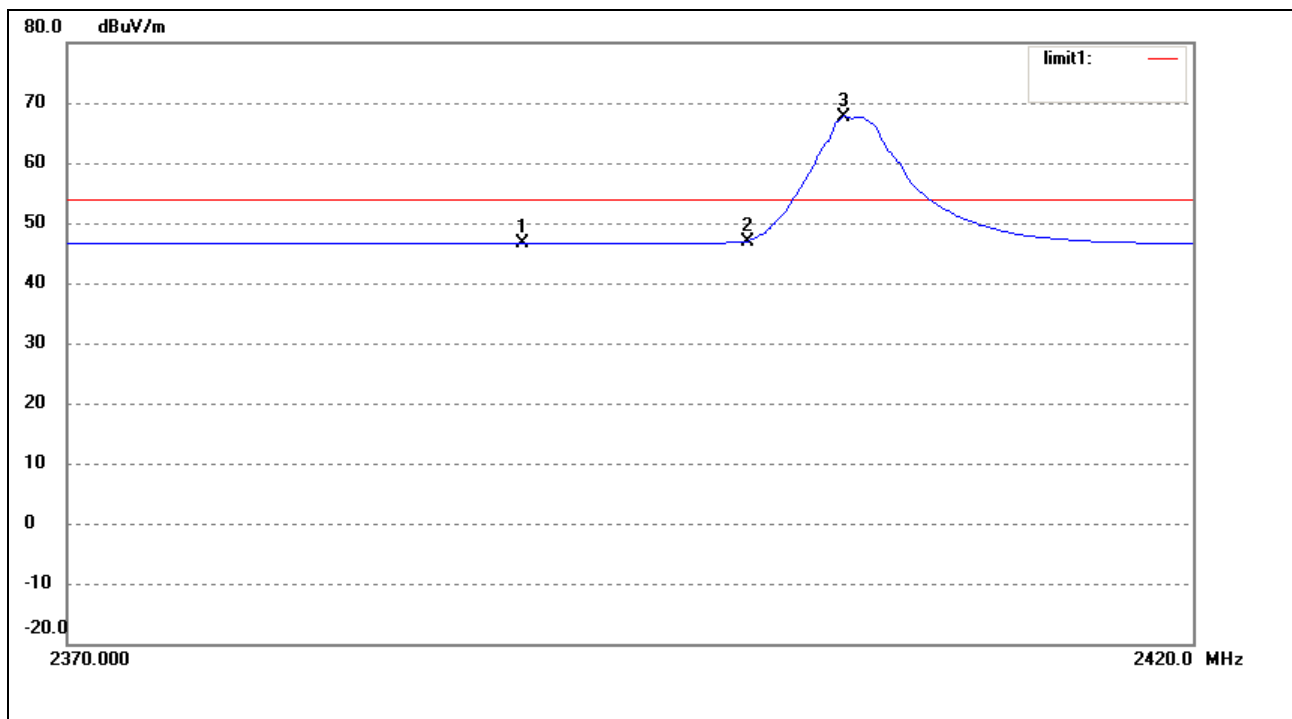
Temperature:	23 °C
Relative Humidity:	52 %
ATM Pressure:	1012 mbar

5.5 Summary of Test Results/Plots

Frequency MHz	Limit dBuv	Result
Low Edge	<54	Pass
High Edge	<54	Pass

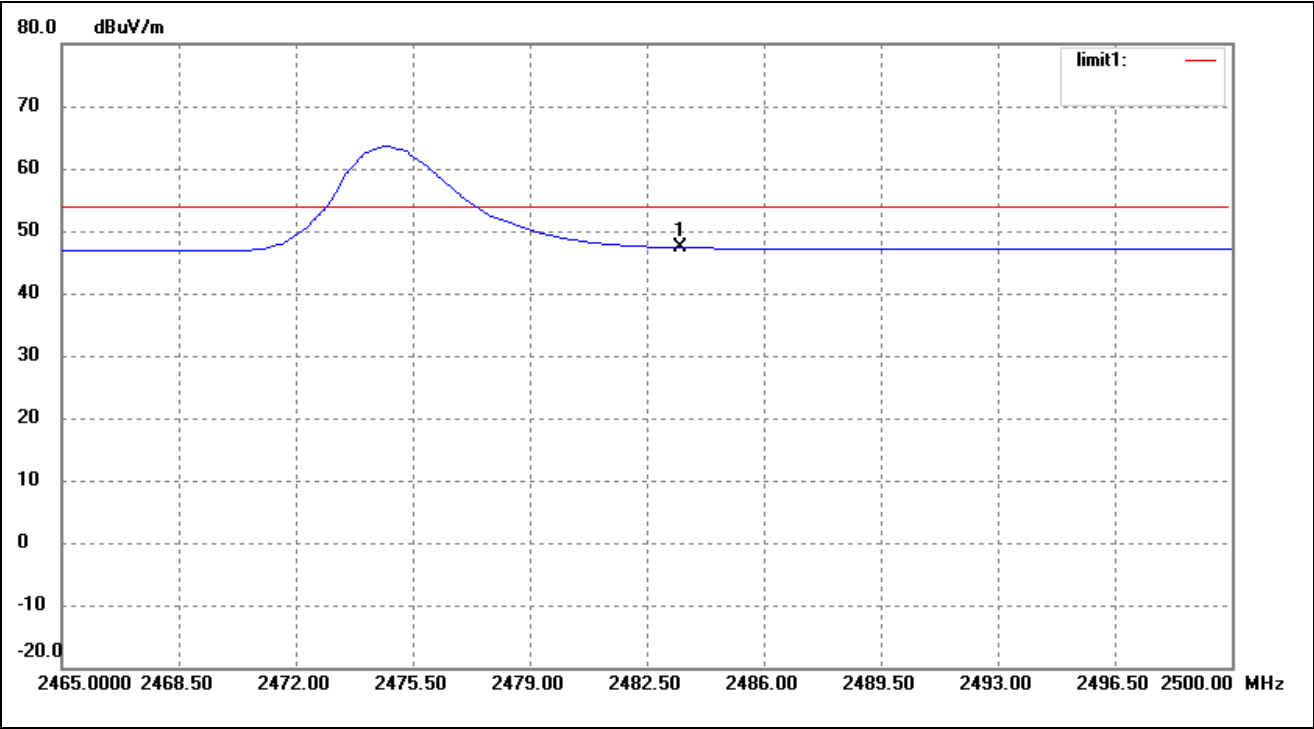
The edge emissions are below the FCC 15.209 Limits. Please refer to the test plots below.

Lowest Band edge



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2390.000	12.05	34.59	46.64	54.00	-7.36	Ave
1	2390.000	19.15	34.59	53.74	74.00	-20.26	Peak
2	2400.000	12.30	34.68	46.98	54.00	-7.02	Ave
2	2400.000	18.50	34.68	53.18	74.00	-20.82	Peak
3	2404.388	33.05	34.70	67.75	54.00	13.75	Ave

Highest Band edge



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2483.500	12.37	34.97	47.34	54.00	-6.66	Ave
1	2483.500	18.38	34.97	53.35	74.00	-20.65	Peak

***** END OF REPORT *****