



## **FCC 47 CFR PART 15 Subpart C**

### **TEST REPORT**

**For**

**Asset Protection System**

**Model Number: WG APS RAD-POS**

**Trade Name: WG**

*Issued to*

**WG Security Products, Inc.**  
3031 Tisch Way, Suite 602, San Jose, CA 95128 USA

*Issued by*

**Compliance Certification Services Inc.**  
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## 1. TEST RESULT CERTIFICATION

**Applicant:** WG Security Products, Inc.  
3031 Tisch Way, Suite 602, San Jose, CA 95128 USA

**Equipment Under Test:** Asset Protection System

**Trade Name:** WG

**Model Number:** WG APS RAD-POS

**Date of Test:** September 26 ~ October 10, 2010

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR Part 15 Subpart C	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 ANSI C63.4: 2003 and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements emission limits of FCC Rules Part 15.107, 15.109, 15.207, 15.209 and 15.249.

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

*Approved by:*

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Spring Zhou  
RF Manager  
Compliance Certification Service Inc.

*Reviewed by:*

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Jeff Fang  
RF Section Manager  
Compliance Certification Service Inc.



## 2. EUT DESCRIPTION

<b>Product</b>	Asset Protection System
<b>Trade Name</b>	WG
<b>Model Number</b>	WG APS RAD-POS
<b>Model Discrepancy</b>	N/A
<b>Power Supply</b>	AC/24V
<b>Frequency Range</b>	902.14MHz ~ 927.73MHz
<b>Modulation Technique</b>	MSK
<b>EUT Type</b>	<input type="checkbox"/> Engineering Sample. <input checked="" type="checkbox"/> Product Sample, <input type="checkbox"/> Mass Product Sample.
<b>Antenna Gain</b>	Printed Antenna TX:5.29dBi Printed Antenna RX:5.29dBi
<b>Antenna Designation</b>	PCB Antenna

**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: P9I-APSRAD-P filing to comply with Section 15.107 & 15.109 (FCC Part 15, Subpart B) and Section 15.207, 15.209, 15.249.



### **3. TEST METHODOLOGY**

The tests documented in this report were performed in accordance with ANSI C63.4 and FCC CFR 47 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057, 15.207, 15.209 and 15.249.

#### **3.1 EUT CONFIGURATION**

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

#### **3.2 EUT EXERCISE**

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

According to its specifications, the EUT must comply with the requirements of the Section 15.107 and 15.109 under the FCC Rules Part 15 Subpart B and Section 15.207, 15.209, 15.249 under the FCC Rules Part 15 Subpart C.

#### **3.3 GENERAL TEST PROCEDURES**

##### **Conducted Emissions**

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

##### **Radiated Emissions**

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4.



### 3.4 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
<sup>1</sup> 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	( <sup>2</sup> )
13.36 - 13.41	322 - 335.4		

<sup>1</sup> Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

<sup>2</sup> 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.

### 3.5 DESCRIPTION OF TEST MODES

The EUT had been tested under operating condition.

After verification, all tests were carried out with the worst case test modes as shown below except radiated spurious emission below 1GHz, which worst case was in normal link mode only, and powerline conducted emission below 30MHz, which worst case was in normal link mode.



## 4. INSTRUMENT CALIBRATION

### 4.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

### 4.2 MEASUREMENT EQUIPMENT USED

#### Equipment Used for Emissions Measurement

*Remark: Each piece of equipment is scheduled for calibration once a year and Loop Antenna is scheduled for calibration once three years.*

Conducted Emissions Test Site				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY44020154	04/24/2011

3M Semi Anechoic Chamber				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY44020154	04/24/2011
EMI Test Receiver	R&S	ESCI3	100781	04/24/2011
Pre-Amplifier	MINI	ZFL-1000VH2	d041703	02/28/2011
Pre-Amplifier	Miteq	NSP4000-NF	870731	02/28/2011
Bilog Antenna	Sunol	JB1	A110204-2	11/22/2010
Horn-antenna	SCHWARZBECK	BBHA9120D	D:266	12/04/2010
Loop Antenna	EMCO	6502	8905/2356	06/10/2011
Turn Table	CT	CT123	4165	N.C.R
Antenna Tower	CT	CTERG23	3256	N.C.R
Controller	CT	CT100	95637	N.C.R
Site NSA	CCS	N/A	N/A	04/06/2011
Test S/W	EZ-EMC -RE			

Powerline Conducted Emissions Test Site				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMC Receiver	R&S	ESCI3	100781	04/24/2011
V (V-LISN)	Schwarzbeck	NNLK 8129	8129-143	04/24/2011
LISN (EUT)	FCC	FCC-LISN-50/250-50-2-02	SN:05012	04/24/2011
TRANSIENT LIMITER	SCHAFFNER	CFL9206	1710	04/24/2011
Test S/W	EZ-EMC -CE			



### 4.3 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
Powerline Conducted Emission	+/- 1.6202
3M Semi Anechoic Chamber / 30M~200M	+/- 4.0606
3M Semi Anechoic Chamber / 200M~1000M	+/- 3.9979
3M Semi Anechoic Chamber / 1G~8G	+/- 2.5790
3M Semi Anechoic Chamber / 8G~18G	+/- 2.5928
3M Semi Anechoic Chamber / 18G~26G	+/- 2.7212
3M Semi Anechoic Chamber / 26G~40G	+/- 2.9520

**Remark:** This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=2$ .



## **5. FACILITIES AND ACCREDITATIONS**

### **5.1 FACILITIES**

All measurement facilities used to collect the measurement data are located at

No.10Weiye Rd., Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China.

The sites are constructed in conformance with the requirements of ANSI C63.4:2003 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

### **5.2 EQUIPMENT**

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

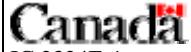
Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."



### 5.3 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3M Semi Anechoic Chamber (FCC Registration Number: 238958) and 10M Semi Anechoic Chamber (FCC Registration Number: 424105) to perform FCC Part 15 measurements	 FCC Registration Number: 238958 FCC Registration Number: 424105
Taiwan	TAF	FCC Method-47 CFR Part 15 Subpart C, D, E, RSS-210, RSS-310 IDA TS SRD, AS/NZS 4268, AS/NZS 4771, TS 12.1 & 12.2, ETSI EN 300 440-1, ETSI EN 300 440-2, ETSI EN 300 328, ETSI EN 300 220-1, ETSI EN 300 220-2, ETSI EN 301 893, ETSI EN 301 489-1/3/7/17 FCC OET Bulletin 65 + Supplement C, EN 50360, EN 50361, EN 50371, RSS 102, EN 50383, EN 50385, EN 50392, IEC 62209, CNS 14958-1, CNS 14959 FCC Method -47 CFR Part 15 Subpart B IEC / EN 61000-3-2, IEC / EN 61000-3-3, IEC / EN 61000-4-2/3/4/5/6/8/11	 Testing Laboratory 0363
USA	A2LA	EN55022,EN55024,EN55013,EN55020,EN55011, FCC Method-47 CFR Part 15 Subpart C, D, E, RSS-210, RSS-310 IDA TS SRD, AS/NZS 4268, AS/NZS 4771, TS 12.1 & 12.2, ETSI EN 300 440-1, ETSI EN 300 440-2, ETSI EN 300 328, ETSI EN 300 220-1, ETSI EN 300 220-2, ETSI EN 301 893, ETSI EN 301 511, ETSI EN 301908-1/2 ETSI EN 301 489-1/3/7/17 FCC OET Bulletin 65 + Supplement C, EN 50360, EN 50361, EN 50371, RSS 102, EN 50383, EN 50385, EN 50392, IEC 62209, CNS 14958-1, CNS 14959 FCC Method -47 CFR Part 15 Subpart B IEC / EN 61000-3-2, IEC / EN 61000-3-3, IEC / EN 61000-4-2/3/4/5/6/8/11	 ACCREDITED TESTING CERT #2541.01
Canada	Industry Canada	3M Semi Anechoic Chamber (IC 2324E-2) and 10M Semi Anechoic Chamber (IC 2324E-1) to perform	 IC 2324E-1 IC 2324E-2

\* No part of this report may be used to claim or imply product endorsement by A2LA or any agency of the US Government.



## 6. SETUP OF EQUIPMENT UNDER TEST

### 6.1 DESCRIPTION OF SUPPORT UNITS

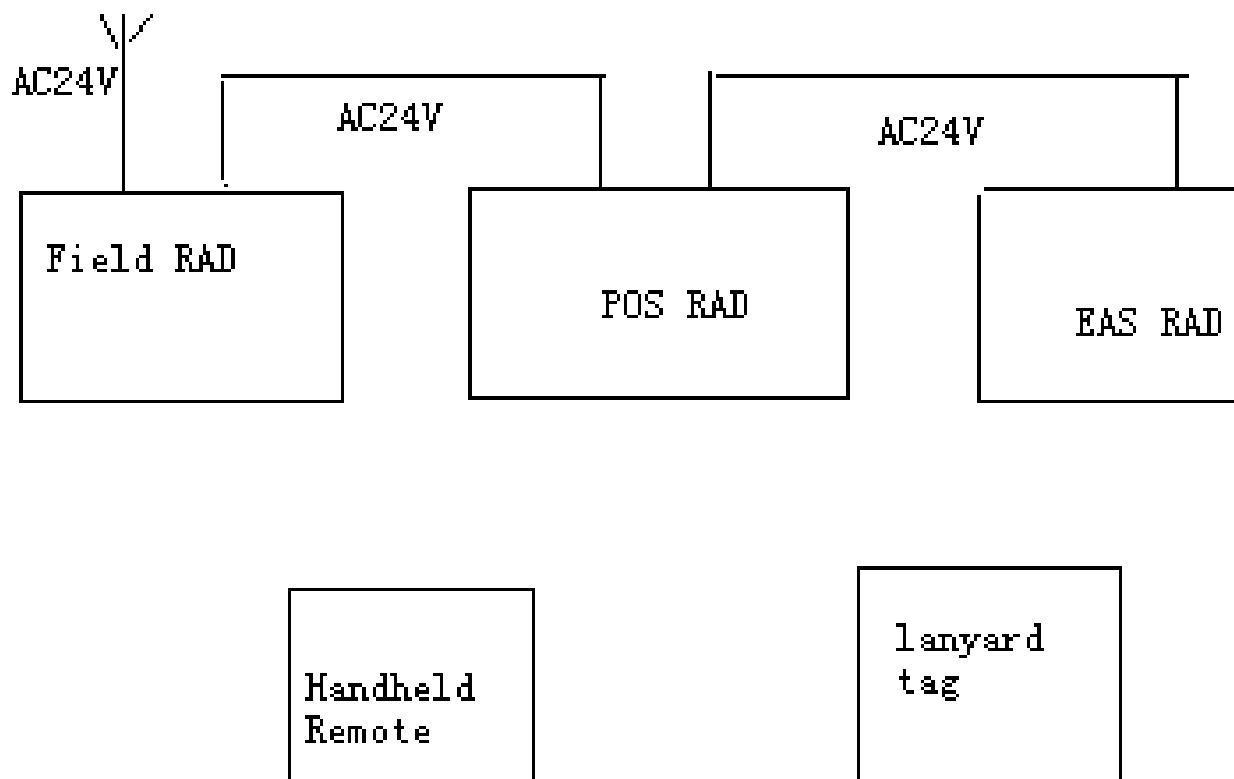
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Equipment	Model No.	Serial No.	Trade Name	Data Cable	Power Cord
1	Field/EAS RAD	N/A	N/A	N/A	N/A	24V
2	Handheld remoto	N/A	N/A	N/A	N/A	3V
3	Lanyard tag	N/A	N/A	N/A	N/A	3V

**Note:**

- 1) All the equipment/cables were placed in the all 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.

### 6.2 CONFIGURATION OF SYSTEM UNDER TEST



## 7. FCC PART 15.249 REQUIREMENTS

### 7.1 BAND EDGES MEASUREMENT

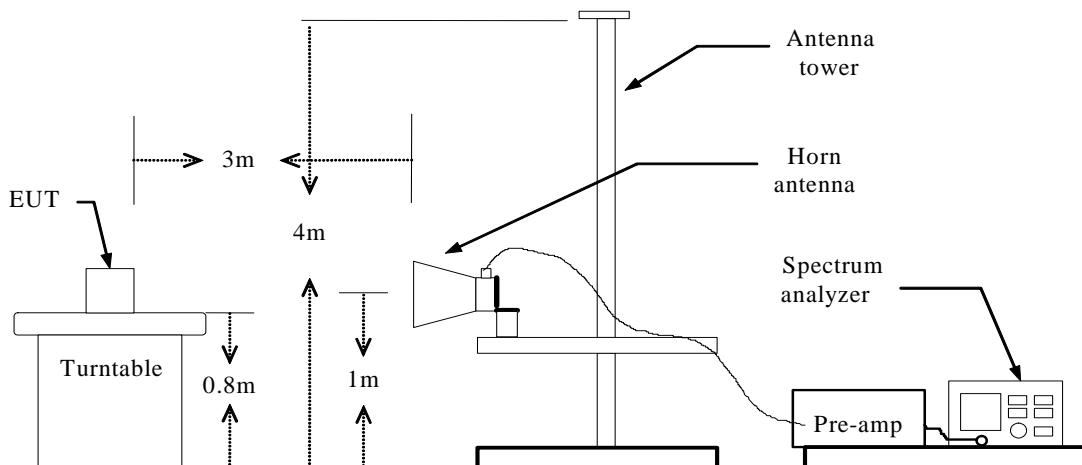
#### LIMIT

1. Emissions radiated outside of specified bands, except for harmonic, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, which is the lesser attenuation.
2. In the below emission table, the tighter limit applies at the band edges.

Frequency (MHz)	Field Strength ( $\mu$ V/m at 3-meter)	Field Strength (dB $\mu$ V/m at 3-meter)
30-88	100	40
88-216	<b>150</b>	<b>43.5</b>
216-960	200	46
Above 960	500	54

3. As shown in Section 15.35(b), for frequencies above 1000 MHz, the above field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For point-to-point operation under paragraph (b) of this section, the peak field strength shall not exceed 2500 millivolts/meter at 3 meters along the antenna azimuth.

#### Test Configuration



#### TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8m 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) AVERAGE: RBW=100KHz / VBW=100KHz / SPAN=1M, F(center)=902MHz
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.



6. Change F(center) to 928MHz, repeat step-5 to complete measurement.

## **TEST RESULTS**

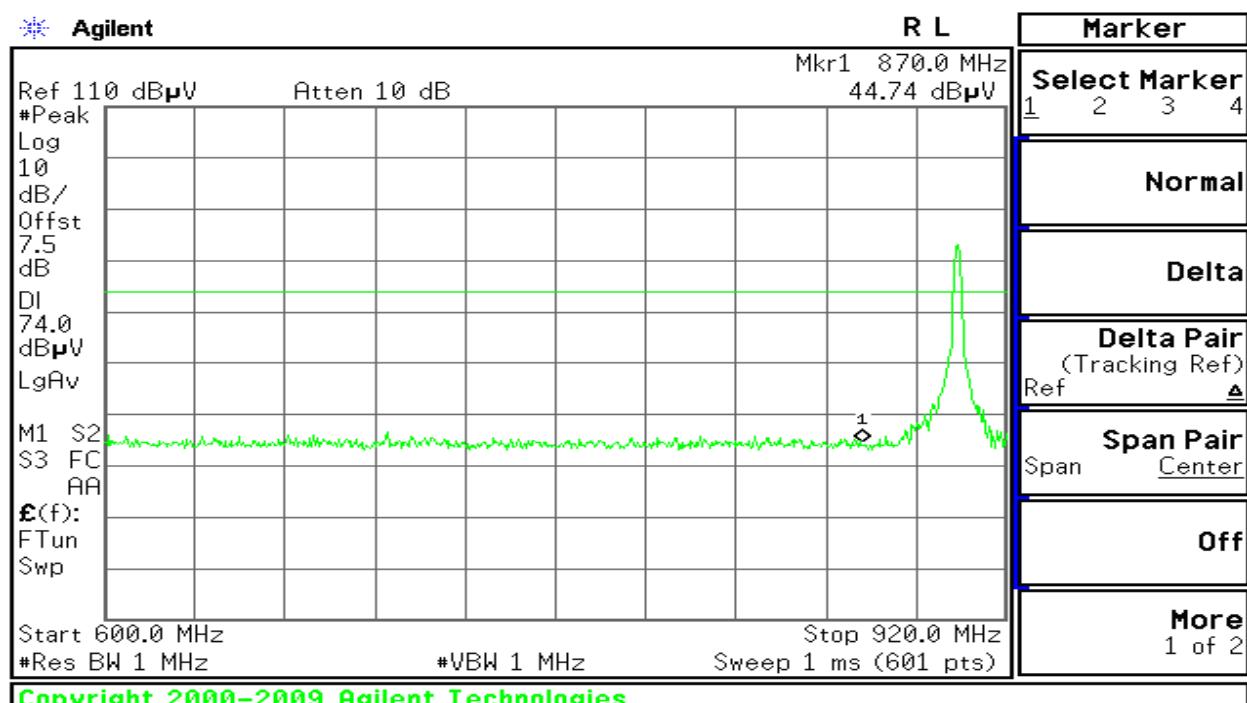
Refer to attach spectrum analyzer data chart.



## Band Edges (CH Low)

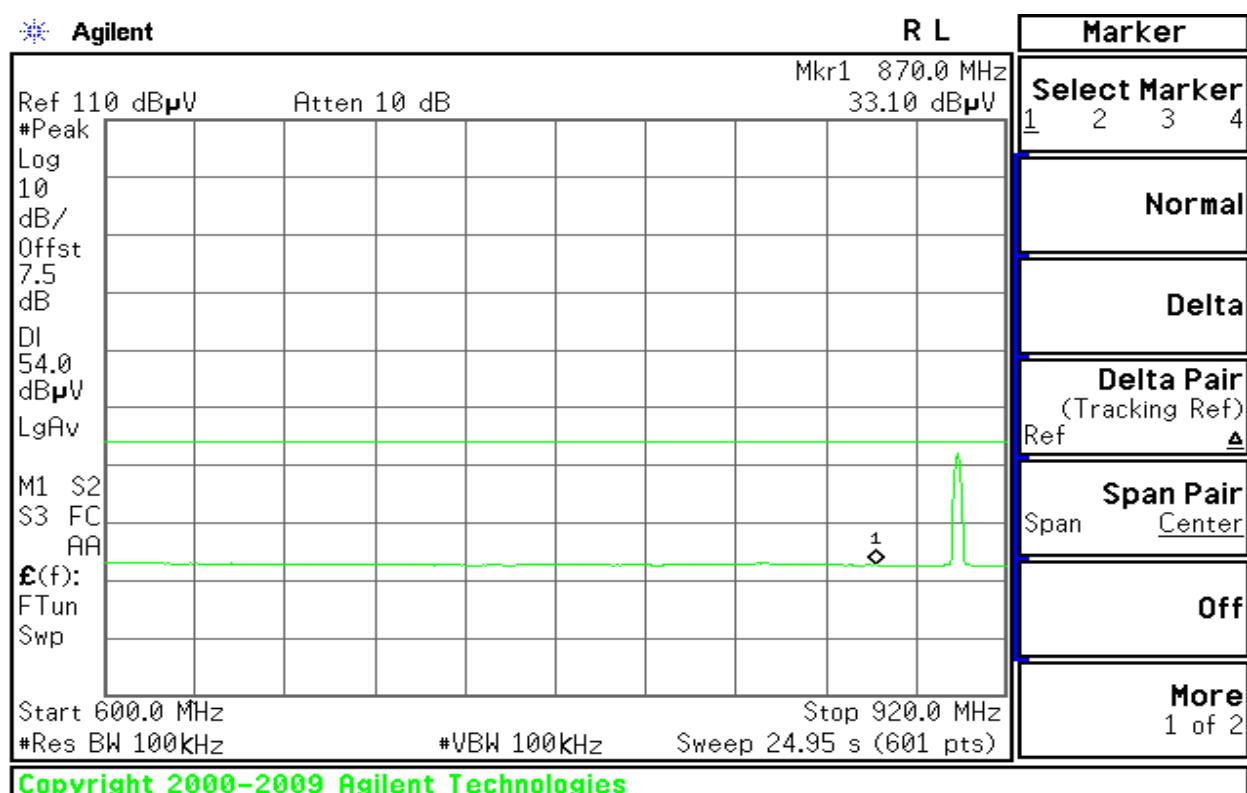
Detector mode: Peak

Polarity: Vertical



Detector mode: Average

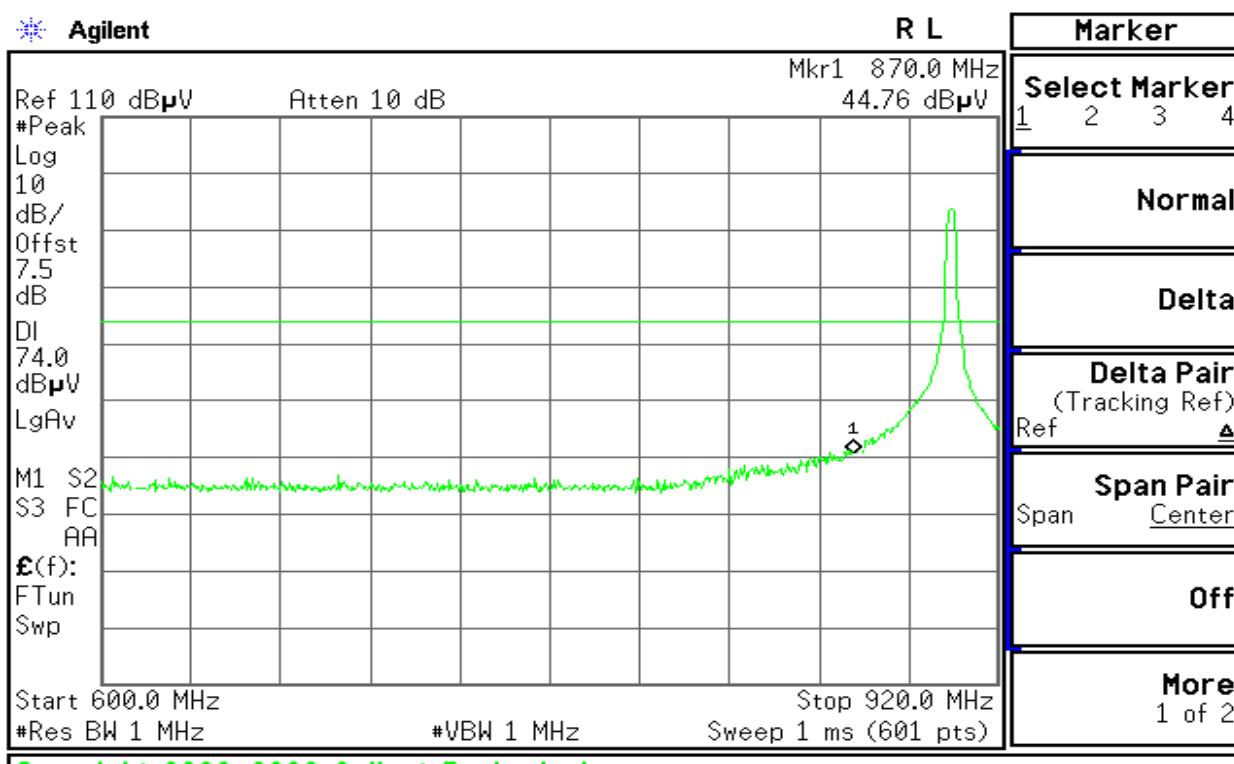
Polarity: Vertical





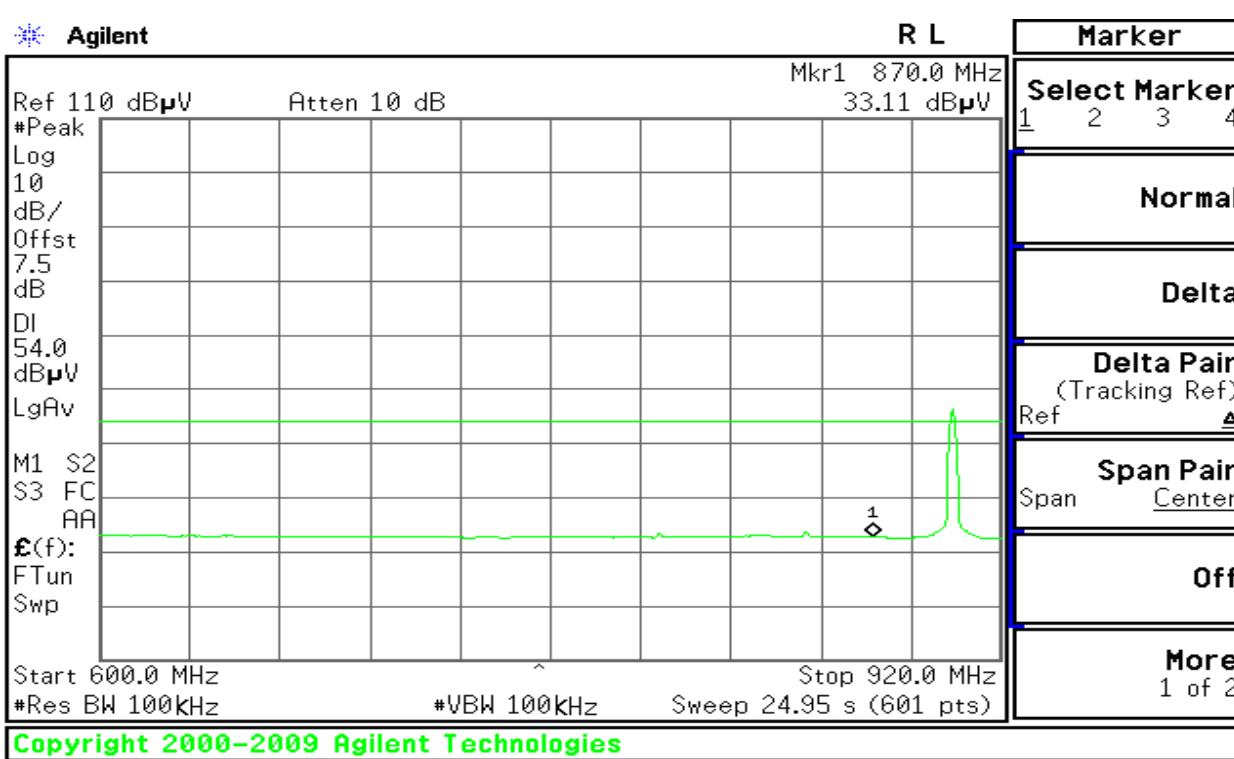
Detector mode: Peak

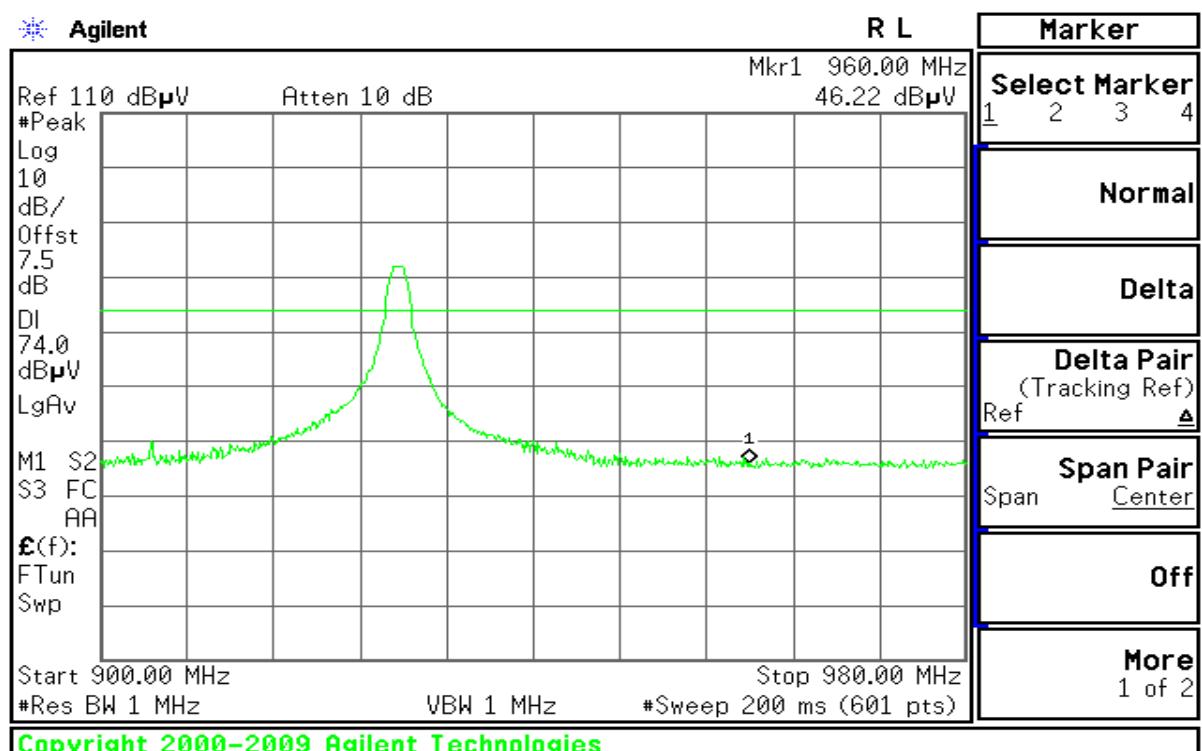
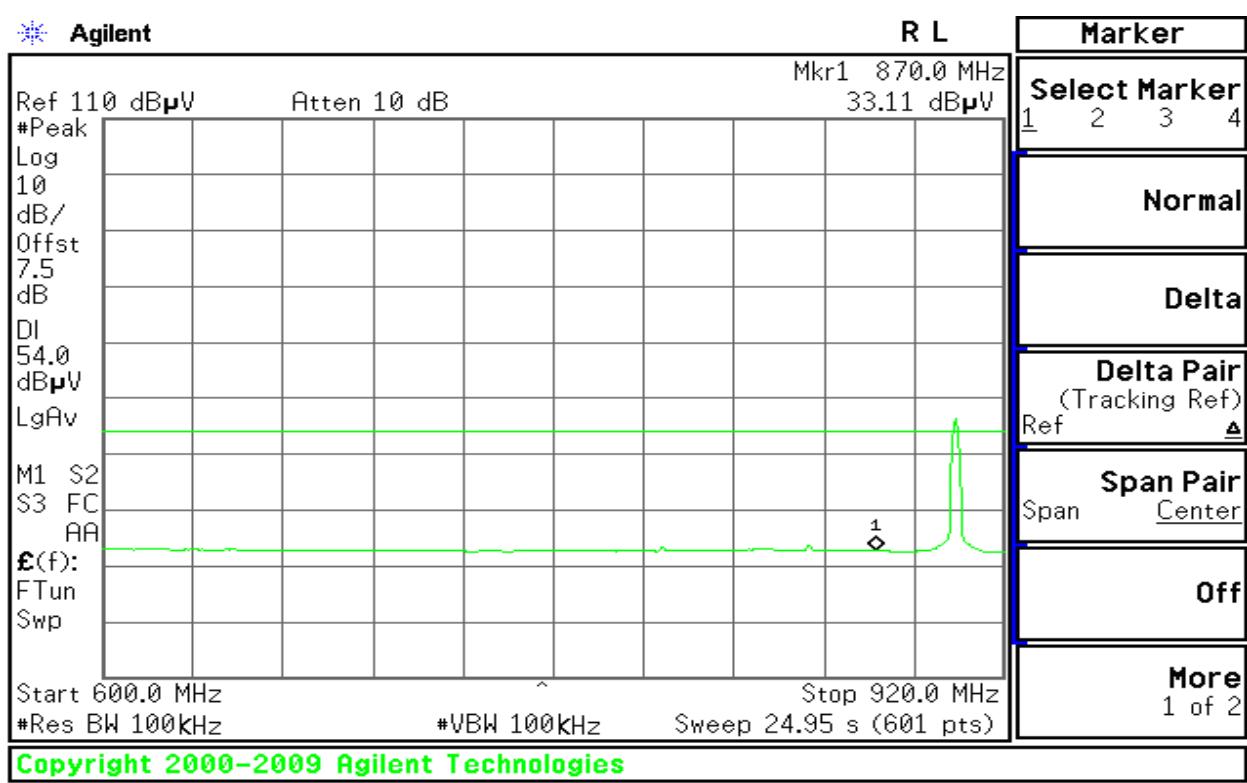
Polarity: Horizontal



Detector mode: Average

Polarity: Horizontal

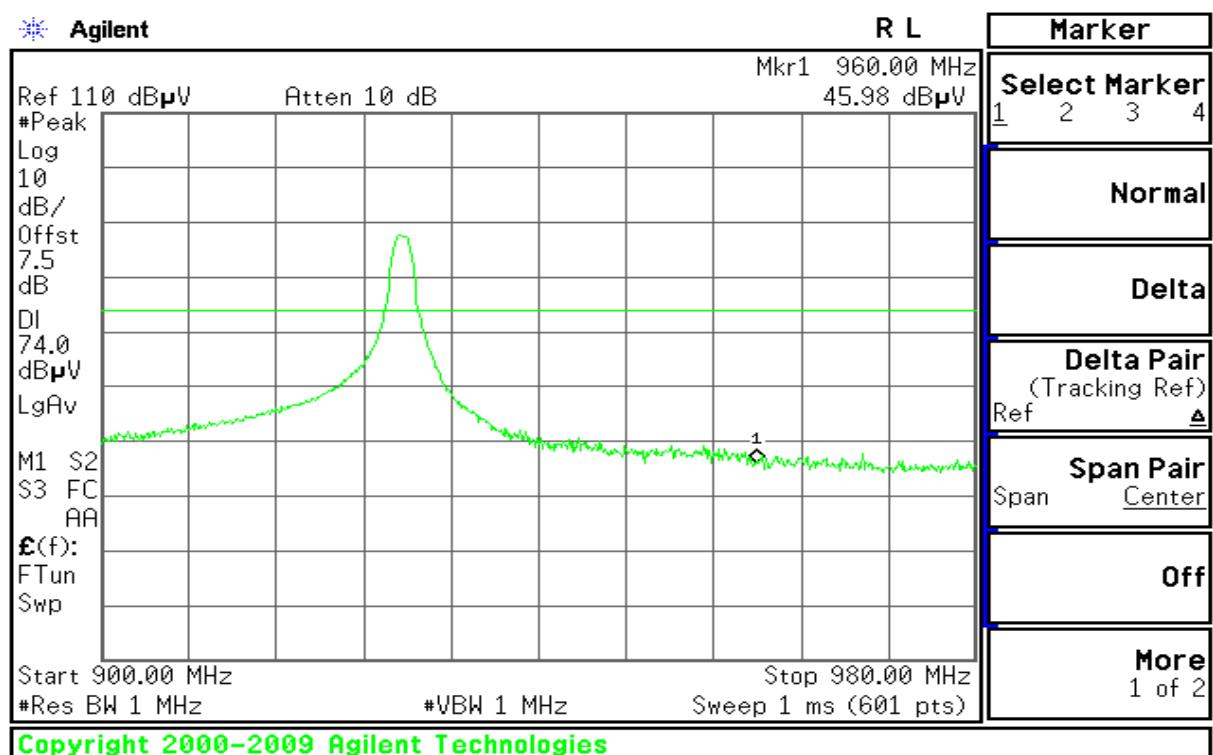


**Band Edges (CH High)****Detector mode: Peak****Polarity: Vertical****Detector mode: Average****Polarity: Vertical**



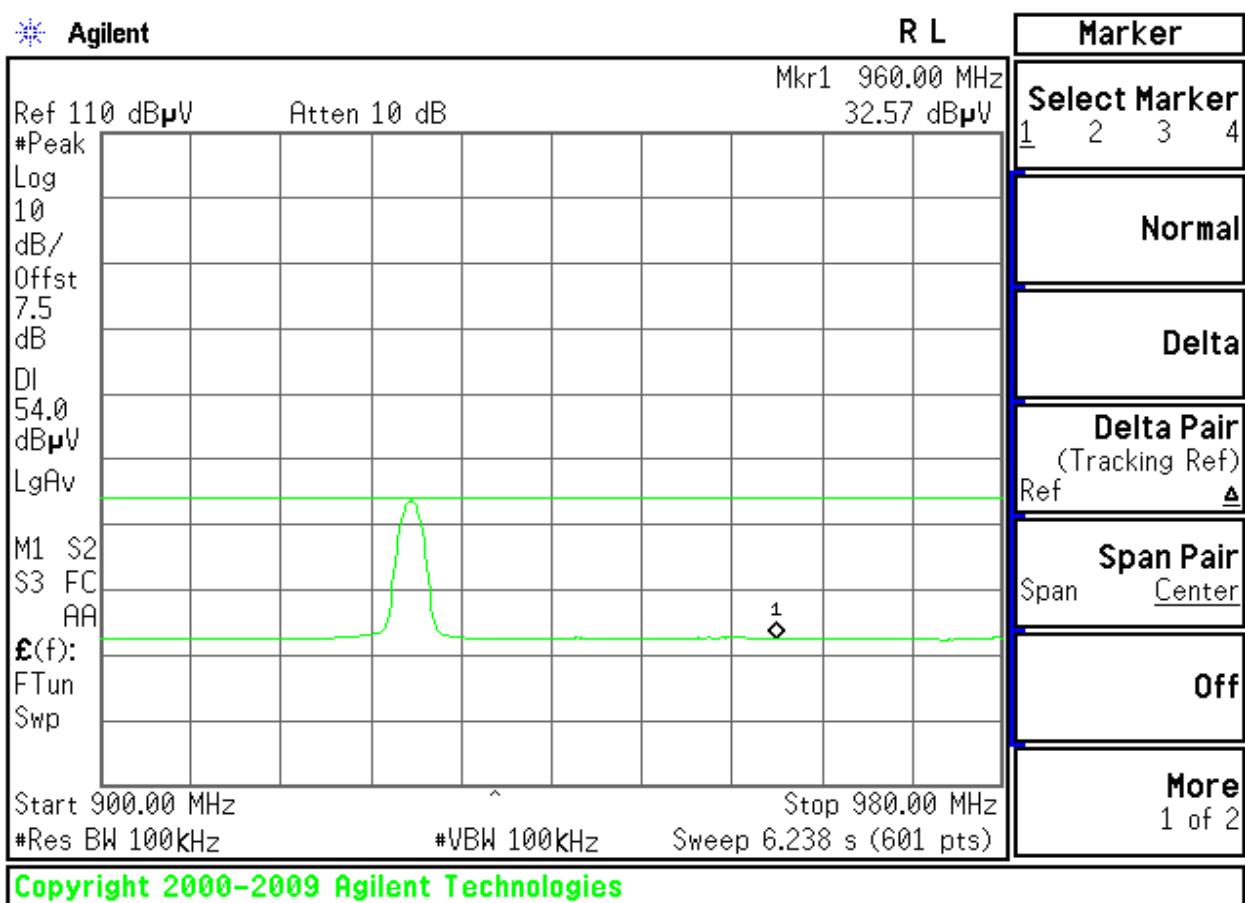
Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

Polarity: Horizontal





## 7.2 SPURIOUS EMISSION

### LIMIT

1. In the section 15.249(a):

Except as provided in paragraph (b) of this section, 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 Field Strength (mV/m)	Field Strength of Harmonics (μV/m)
902-928 MHz	50	500
2400 - 2483.5 MHz	50	500
5725 - 5875 MHz	50	500
24.0 - 24.25 GHz	250	2500

2. Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30-88	100*	3
88-216	150*	3
216-960	200*	3
Above 960	500	3

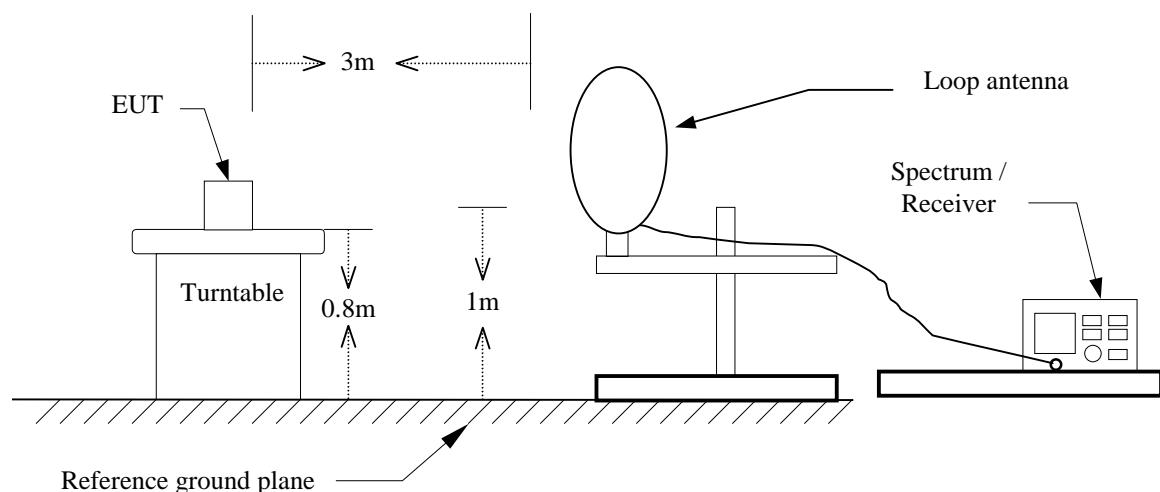
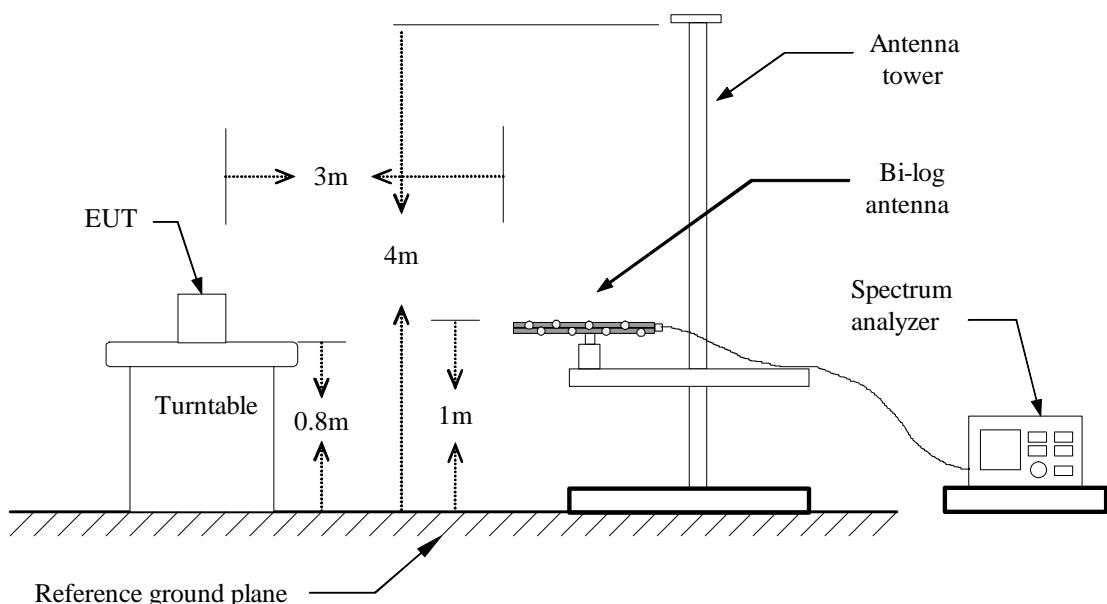
**Remark:** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

3. In the above emission table, the tighter limit applies at the band edges.

Frequency (MHz)	Field Strength (μV/m at 3-meter)	Field Strength (dBμV/m at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

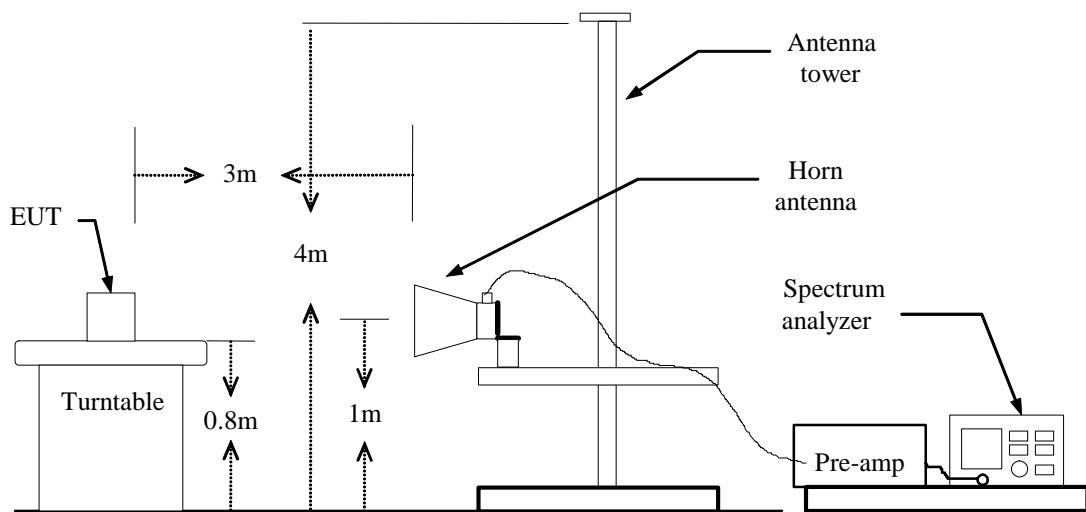
**NOTE:** (1) The lower limit shall apply at the transition frequencies.

(2) Emission level (dB $\mu$ V/m) = 20 log Emission level (uV/m).

**Test Configuration****9kHz ~ 30MHz****30MHz ~ 1GHz**



**Above 1 GHz**





## **TEST PROCEDURE**

1. The EUT is placed on a turntable, which is 0.8m 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=VBW=1MHz / Sweep=AUTO

(b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO

7. Repeat above procedures until the measurements for all frequencies are complete.

**Below 1 GHz****Operation Mode:** TX Link**Test Date:** October 27, 2010**Temperature:** 24°C**Tested by:** Jeff Fang fang**Humidity:** 50% RH**Polarity:** Ver. / Hor.***CH LOW***

<b>Freq. (MHz)</b>	<b>Ant.Pol.</b>	<b>Detector Mode (PK/QP)</b>	<b>Reading (dBuV)</b>	<b>Factor (dB)</b>	<b>Actual FS (dBuV/m)</b>	<b>Limit 3m (dBuV/m)</b>	<b>Safe Margin (dB)</b>
38.43	V	Peak	35.45	-4.23	31.22	40.0	-8.78
55.69	V	Peak	39.47	-11.15	28.32	40.0	-11.68
190.24	V	Peak	40.75	-6.26	34.49	43.5	-9.01
215.16	V	Peak	42.42	-6.28	36.14	43.5	-7.36
281.45	V	Peak	40.41	-4.45	35.96	46.0	-10.04
468.75	V	Peak	36.12	0.41	36.53	46.0	-9.47
902.14	V	QP	77.75	3.56	81.31	94.0	-12.69
30.74	H	Peak	29.46	1.24	30.7	40.0	-9.3
55.42	H	Peak	41.75	-11.15	30.60	40.0	-9.40
79.36	H	Peak	39.46	-11.21	28.25	40.0	-11.75
204.75	H	Peak	46.47	-5.90	40.57	43.5	-2.93
217.71	H	Peak	48.58	-6.35	42.23	46.0	-3.77
282.47	H	QP	48.79	-4.43	44.36	46.0	-1.64
902.14	H	QP	79.46	3.56	83.02	94.0	-10.98

***CH MID***

<b>Freq. (MHz)</b>	<b>Ant.Pol.</b>	<b>Detector Mode (PK/QP)</b>	<b>Reading (dBuV)</b>	<b>Factor (dB)</b>	<b>Actual FS (dBuV/m)</b>	<b>Limit 3m (dBuV/m)</b>	<b>Safe Margin (dB)</b>
38.58	V	Peak	35.54	-4.23	31.31	40.0	-8.69
55.45	V	Peak	35.26	-11.15	24.11	40.0	-15.89
190.45	V	Peak	38.26	-6.26	32	43.5	-11.50
215.55	V	Peak	41.55	-6.28	35.27	43.5	-8.23
281.25	V	Peak	40.14	-4.45	35.69	46.0	-10.31
468.47	V	Peak	36.75	0.41	37.16	46.0	-8.84
915.75	V	QP	67.45	3.56	71.01	94.0	-22.99
30.42	H	Peak	29.42	1.24	30.66	40.0	-9.34
55.45	H	Peak	41.42	-11.15	30.27	40.0	-9.73
79.46	H	Peak	39.75	-11.21	28.54	40.0	-11.46
204.45	H	Peak	46.46	-5.90	40.56	43.5	-2.94
217.25	H	Peak	41.25	-6.35	34.9	46.0	-11.1
282.85	H	QP	48.75	-4.43	44.32	46.0	-1.68
915.75	H	QP	65.32	3.56	68.88	94.0	-25.12

**CH HIGH**

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit 3m (dBuV/m)	Safe Margin (dB)
38.78	V	Peak	35.74	-4.23	31.51	40.0	-8.49
55.54	V	Peak	38.66	-11.15	27.51	40.0	-12.49
190.42	V	Peak	40.42	-6.26	34.16	43.5	-9.34
215.15	V	Peak	42.15	-6.28	35.87	43.5	-7.63
281.72	V	Peak	40.24	-4.45	35.79	46.0	-10.21
468.15	V	Peak	36.75	0.41	37.16	46.0	-8.84
927.73	V	QP	55.32	3.56	58.88	94.0	-35.12
30.15	H	Peak	29.72	1.24	30.96	40.0	-9.04
55.72	H	Peak	41.55	-11.15	30.40	40.0	-9.60
79.14	H	Peak	39.75	-11.21	28.54	40.0	-11.46
204.42	H	Peak	46.15	-5.90	40.25	43.5	-3.25
217.74	H	Peak	48.75	-6.35	42.4	46.0	-3.6
282.15	H	QP	48.41	-4.43	43.98	46.0	-2.02
927.74	H	QP	59.75	3.56	63.31	94.0	-30.69

**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****Operation Mode:** Tx / CH Low**Test Date:** October 27, 2010**Temperature:** 24°C**Tested by:** Jeff Fang**Humidity:** 50% RH**Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	PK Margin (dB)	AVG Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)				
2706.42	V	54.97	37.65	-2.64	52.33	35.01	74	54	-21.67	-18.99
4510.70	V	47.53	38.01	-2.48	45.05	35.53	74	54	-28.95	-18.47
2706.42	H	51.24	36.11	-2.64	48.60	33.47	74	54	-25.40	-20.53
4510.70	H	47.48	35.20	-2.54	44.94	32.66	74	54	-29.06	-21.34

**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) = Remark result (dBuV/m) – Average limit (dBuV/m). Peak detector mode and average detector mode of the emission shown in Result column.

**Operation Mode:** Tx / CH Mid**Test Date:** October 27, 2010**Temperature:** 24°C**Tested by:** Jeff Fang**Humidity:** 50% RH**Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	PK Margin (dB)	AVG Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)				
2746.50	V	49.71	33.69	-2.64	47.07	31.05	74	54	-26.93	-22.95
4577.50	V	45.70	34.26	-2.48	43.22	31.78	74	54	-30.78	-22.22
2746.50	H	52.42	35.69	-2.63	49.79	33.06	74	54	-24.21	-20.94
4577.50	H	47.73	36.12	-2.48	45.25	33.64	74	54	-28.75	-20.36

**Remark:**

7. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
8. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
9. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
10. 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.
11. 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.
12. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m). Peak detector mode and average detector mode of the emission shown in Result column.

**Operation Mode:** Tx / CH High**Test Date:** October 27, 2010**Temperature:** 24°C**Tested by:** Jeff Fang**Humidity:** 50% RH**Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	PK Margin (dB)	AVG Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)				
2783.19	V	52.94	34.65	-2.64	50.30	32.01	74	54	-23.70	-21.99
4638.60	V	46.55	37.98	-2.48	44.07	35.50	74	54	-29.93	-18.50
2783.19	H	50.29	34.62	-2.64	47.65	31.98	74	54	-26.35	-22.02
4638.60	H	45.85	35.88	-2.55	43.30	33.33	74	54	-30.70	-20.67

**Remark:**

13. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
14. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
15. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
16. 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.
17. 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.
18. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m). Peak detector mode and average detector mode of the emission shown in Result column.



## 7.3 POWERLINE CONDUCTED EMISSIONS

### LIMIT

According to §15.207(a), except as shown in paragraphs (b) and (c) of this section, 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  $\mu$ 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 $\mu$ 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

\* Decreases with the logarithm of the frequency.

### 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**

<b>Operation Mode:</b>	Normal Link	<b>Test Date:</b>	October 30, 2010
<b>Temperature:</b>	23°C	<b>Tested by:</b>	Jeff Fang
<b>Humidity:</b>	51% RH		

Freq. (MHz)	QP Reading (dBuV)	AV Reading (dBuV)	Corr. factor (dB)	QP Result (dBuV)	AV Result (dBuV)	QP Limit (dBuV)	AV Limit (dBuV)	QP Margin (dB)	AV Margin (dB)	Note
0.5383	16.63	6.79	10.84	27.47	17.63	56.00	46.00	-28.53	-28.37	L1
0.6681	13.55	7.57	10.92	24.47	18.49	56.00	46.00	-31.53	-27.51	L1
3.2258	19.06	5.06	11.15	30.21	16.21	56.00	46.00	-25.79	-29.79	L1
3.7636	12.13	2.68	11.17	23.30	13.85	56.00	46.00	-32.70	-32.15	L1
4.3020	16.41	2.95	11.18	27.59	14.13	56.00	46.00	-28.41	-31.87	L1
11.2374	19.12	11.01	11.23	30.35	22.24	60.00	50.00	-29.65	-27.76	L1
0.6684	12.79	8.08	10.15	22.94	18.23	56.00	46.00	-33.06	-27.77	L2
1.0863	9.42	4.65	10.24	19.66	14.89	56.00	46.00	-36.34	-31.11	L2
1.4280	13.95	7.82	10.36	24.31	18.18	56.00	46.00	-31.69	-27.82	L2
3.7647	18.04	2.82	10.82	28.86	13.64	56.00	46.00	-27.14	-32.36	L2
11.1449	17.50	9.64	11.26	28.76	20.90	60.00	50.00	-31.24	-29.10	L2
12.5756	17.76	9.38	11.31	29.07	20.69	60.00	50.00	-30.93	-29.31	L2

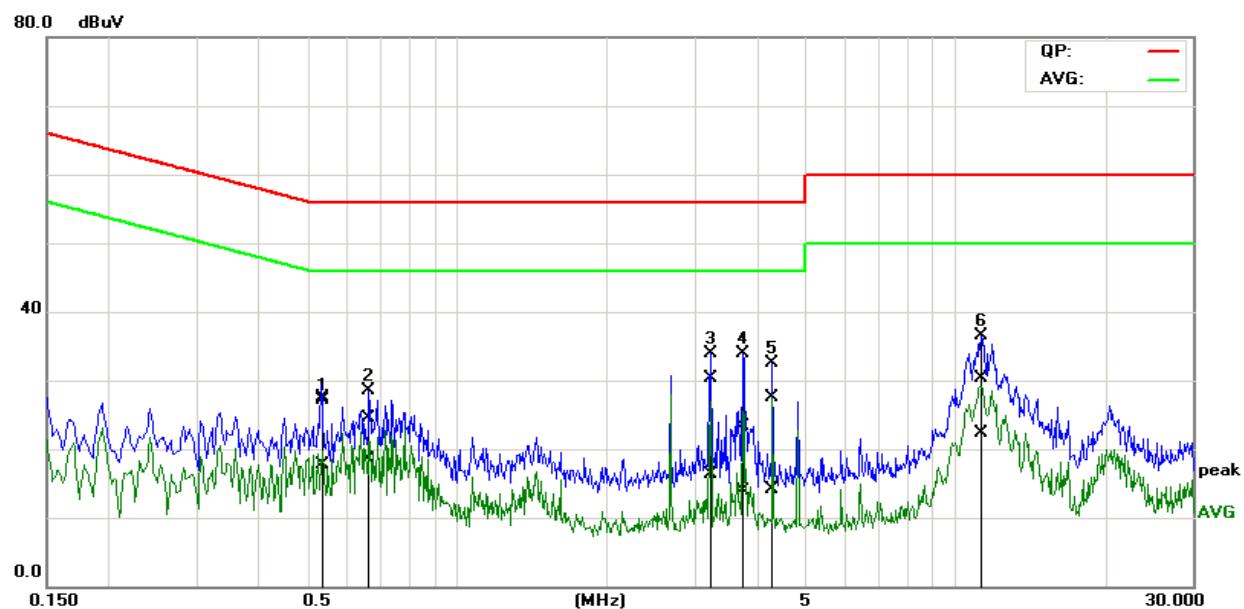
### ***Remark:***

1. *Measuring frequencies from 0.15 MHz to 30MHz.*
2. *The emissions measured in frequency range from 0.15 MHz to 30MHz were made with an instrument using Quasi-peak detector and average detector.*
3. *The IF bandwidth of SPN between 0.15MHz to 30MHz was 10kHz; the IF bandwidth of Test Receiver between 0.15MHz to 30MHz was 9kHz;*
4. *L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)*

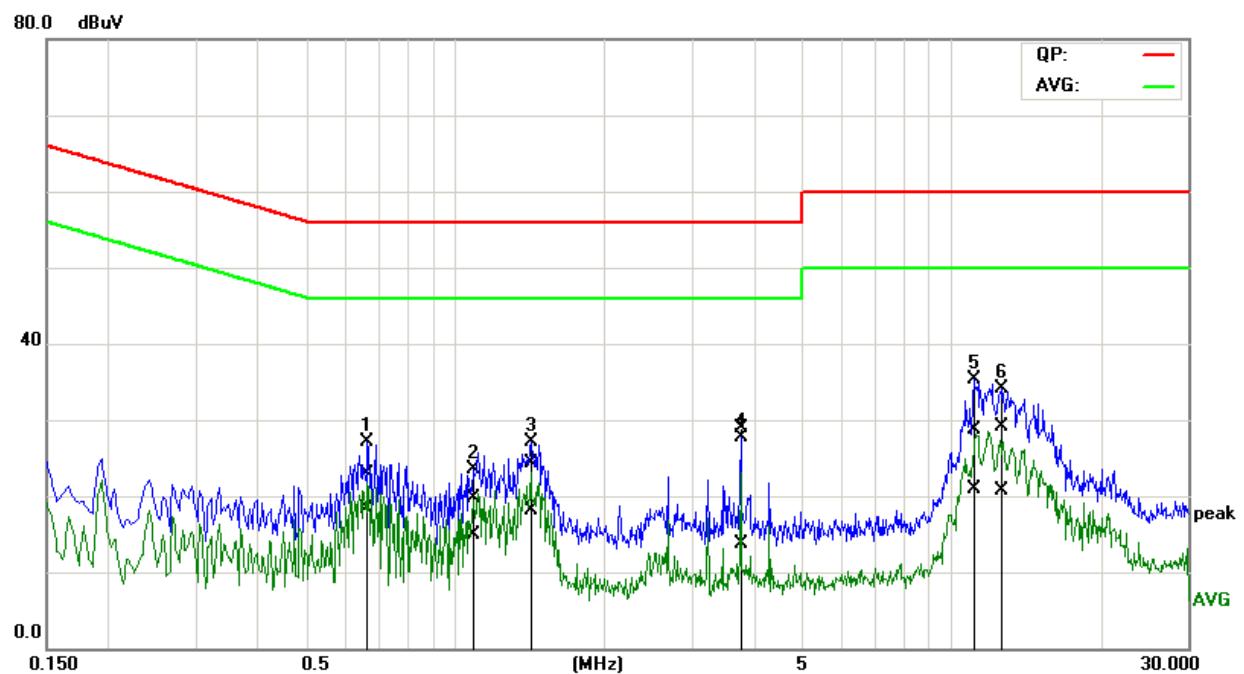


## Test Plots

### *Conducted emissions (Line 1)*



### *Conducted emissions (Line 2)*





***Compliance Certification Services Inc.***

Report No.: KS101021B02

FCC ID: P9I-APSRAD-P

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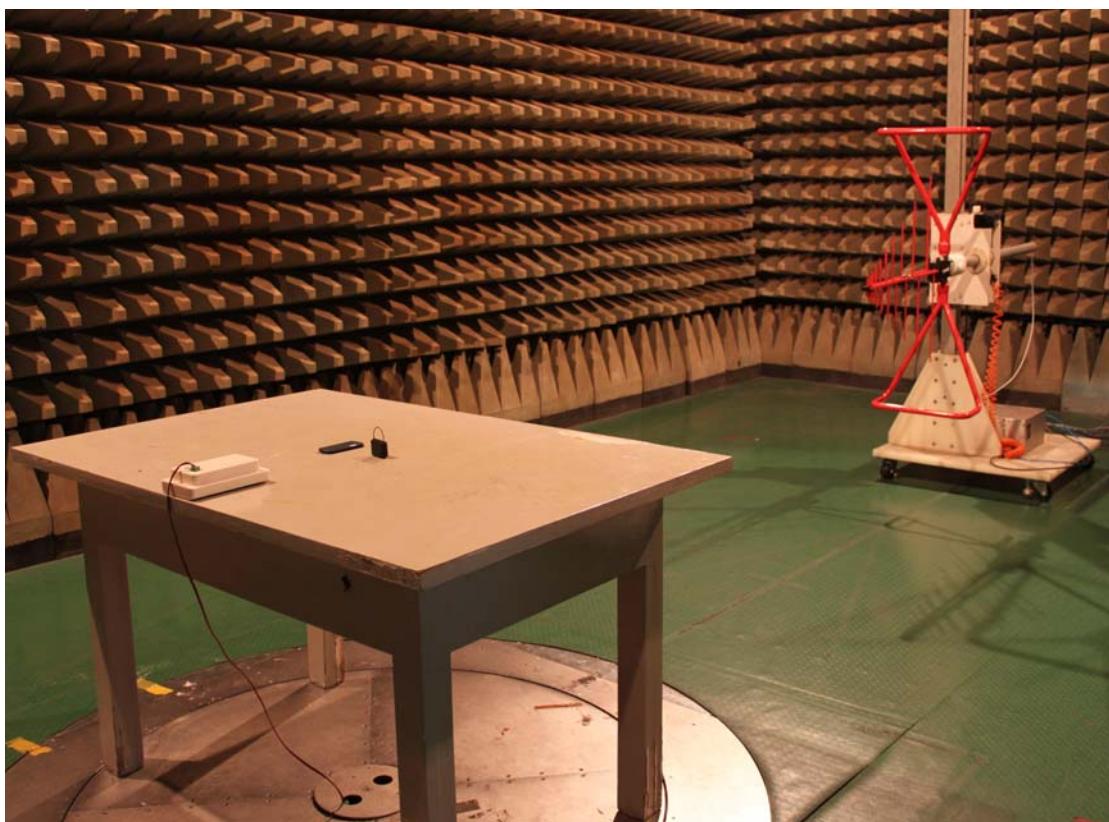
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## **APPENDIX I**

### **PHOTOGRAPHS OF TEST SETUP**



## Radiated Emission Set up Photos





## Powerline Conducted Emissions Setup Photos

