



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

### **TEST REPORT**

**For**

**Intelligent Watching Dog (Animal Chaser)**

**Model Number: UP-45XX (X = 0 ~ 9 or A ~ Z)**

**Trade Name: DigiMax**

*Issued to*

**DIGIMAX INNOVATIVE PRODUCTS LTD.  
2F., No. 196, Sec. 2, Zhong-Xing Road, Hsin-Tien City,  
Taipei Hsien, Taiwan 231, R.O.C.**

*Issued by*

**Compliance Certification Services Inc.  
No. 81-1, Lane 210, Bade Rd. 2, Luchu Hsiang,  
Taoyuan Hsien, (338) Taiwan, R.O.C.  
<http://www.ccsemc.com.tw>  
[service@tw.ccsemc.com](mailto:service@tw.ccsemc.com)**



---

**Note:** This report shall not be reproduced except in full, without the written approval of Compliance Certification Services Inc. This document may be altered or revised by Compliance Certification Services Inc. personnel only, and shall be noted in the revision section of the document.



## **TABLE OF CONTENTS**

1. TEST RESULT CERTIFICATION.....	3
2. EUT DESCRIPTION.....	4
3. TEST METHODOLOGY .....	5
3.1 EUT CONFIGURATION .....	5
3.2 EUT EXERCISE.....	5
3.3 GENERAL TEST PROCEDURES.....	5
3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS.....	6
3.5 DESCRIPTION OF TEST MODES .....	6
4. INSTRUMENT CALIBRATION.....	7
4.1 MEASURING INSTRUMENT CALIBRATION.....	7
4.2 MEASUREMENT EQUIPMENT USED.....	7
5. FACILITIES AND ACCREDITATIONS .....	8
5.1 FACILITIES8	
5.2 EQUIPMENT.....	8
5.3 TABLE OF ACCREDITATIONS AND LISTINGS.....	9
6. SETUP OF EQUIPMENT UNDER TEST .....	10
6.1 SETUP CONFIGURATION OF EUT.....	10
6.2 SUPPORT EQUIPMENT .....	10
7. FCC PART 15.249 REQUIREMENTS .....	11
7.1 20 DB BANDWIDTH .....	11
7.2 BAND EDGES MEASUREMENT .....	14
7.3 SPURIOUS EMISSION .....	17
7.4 POWERLINE CONDUCTED EMISSIONS.....	24
APPENDIX I PHOTOGRAPHS OF TEST SETUP .....	27



## 1. TEST RESULT CERTIFICATION

**Applicant:** DIGIMAX INNOVATIVE PRODUCTS LTD.  
2F., No. 196, Sec. 2, Zhong-Xing Road, Hsin-Tien City,  
Taipei Hsien, Taiwan 231, R.O.C.

**Equipment Under Test:** Intelligent Watching Dog (Animal Chaser)

**Trade Name:** DigiMax

**Model Number:** UP-45XX (X = 0 ~ 9 or A ~ Z)

**Date of Test:** May 28 ~ November 23, 2007

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:*

*Reviewed by:*

---

Johnny Liu  
Section Manager  
Compliance Certification Services Inc.

---

Amanda Wu  
Section Manager  
Compliance Certification Services Inc.



## 2. EUT DESCRIPTION

<b>Product</b>	Intelligent Watching Dog (Animal Chaser)
<b>Trade Name</b>	DigiMax
<b>Model Number</b>	UP-45XX (X = 0 ~ 9 or A ~ Z)
<b>Model Discrepancy</b>	The suffix of UP-45XX (X = 0 ~ 9 or A ~ Z) on model number is just for marketing purpose only.
<b>Power Supply</b>	1. Power Adapter: Model Number: MKD-0900600J I/P: 100V, 50-60Hz, 0.15A O/P: 9V, 600mA 2. Powered by 6 * AA Batteries (Rating: DC 9V)
<b>Frequency Range</b>	2418 ~ 2433MHz
<b>Number of Channels</b>	15 Channels
<b>Channels Spacing</b>	1 MHz
<b>Antenna Gain</b>	0 dBi
<b>Antenna Designation</b>	Printed 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: **VLV45113049603** filing to comply with Section 15.107, 15.109, 15.207, 15.209, 15.249 (FCC Part 15, Subpart C Rules.)



### **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 (model: UP-45XX (X = 0 ~ 9 or A ~ Z)) 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. Channel Low (2418MHz), Channel Mid (2425MHz) and Channel High (2433MHz) were chosen for full testing.

During conducting testing, switch the button to the maximum of the sensitivity dial.



## 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.*

3M Semi Anechoic Chamber				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	US42510252	08/01/2008
Test Receiver	Rohde&Schwarz	ESCI	100064	11/04/2008
Switch Controller	TRC	Switch Controller	SC94050010	05/04/2008
4 Port Switch	TRC	4 Port Switch	SC94050020	05/04/2008
Horn-Antenna	TRC	HA-0502	06	06/05/2008
Horn-Antenna	TRC	HA-0801	04	05/14/2008
Horn-Antenna	TRC	HA-1201A	01	07/09/2008
Horn-Antenna	TRC	HA-1301A	01	07/17/2008
Bilog- Antenna	Sunol Sciences	JB3	A030205	03/08/2008
Turn Table	Max-Full	MFT-120S	T120S940302	N.C.R.
Antenna Tower	Max-Full	MFA-430	A440940302	N.C.R.
Controller	Max-Full	MF-CM886	CC-C-1F-13	N.C.R.
Site NSA	CCS	N/A	FCC: 965860 IC: IC 6106	09/26/2008
Test S/W	LABVIEW (V 6.1)			

*Remark: The measurement uncertainty is less than  $\pm 2.0065\text{dB}$  (30MHz ~ 1GHz),  $\pm 3.0958\text{dB}$  (Above 1GHz) which is evaluated as per the NAMAS NIS 81 and CISPR/A/291/CDV.*

Powerline Conducted Emission Test Site # 3				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI Test Receiver	R&S	ESCS30	845552/030	03/28/2008
Pulse Limiter	R&S	ESH3-Z2	100299	11/08/2008
LISN	R&S	ESH2-Z5	843285/010	01/08/2008
LISN	R&S	ESH3-Z5	848773/014	10/25/2008
ISN	FCC	FCC-TLISN-T2-02	20324	12/18/2008
ISN	FCC	FCC-TLISN-T4-02	20325	12/18/2008
ISN	FCC	FCC-TLISN-T8-02	20326	12/18/2008
Current Probe	FCC	F-35	506	06/01/2008
Test S/W	LabVIEW 6.1 (CCS Conduction Test SW Version_01)			

*Remark: The measurement uncertainty is less than  $\pm 1.7806\text{dB}$ , which is evaluated as per the NAMAS NIS 81 and CISPR/A/291/CDV.*



## **5. FACILITIES AND ACCREDITATIONS**

### **5.1 FACILITIES**

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

☐ No. 199, Chunghsen Road, Hsintien City, Auerbach / Opf GERMANY

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

☒ No.11, Wugong 6th Rd., Wugu Industrial Park, Taipei Hsien 248, Taiwan

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

☒ No.81-1, Lane 210, Bade 2nd Rd., Luchu Hsiang, Taoyuan Hsien 338, Taiwan

Tel: 886-3-324-0332 / Fax: 886-3-324-5235

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

### **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	A2LA	EN 55011, EN 55014-1/2, CISPR 11, CISPR 14-1/2, EN 55022, EN 55015, CISPR 22, CISPR 15, AS/NZS 3548, VCCI V3 (2001), CFR 47, FCC Part 15/18, CNS 13783-1, CNS 13439, CNS 13438, CNS 13803, CNS 14115, EN 55024, IEC 801-2, IEC 801-3, IEC 801-4, IEC/EN 61000-3-2, IEC/EN 61000-3-3, IEC/EN 61000-4-2/3/4/5/6/8/11, EN 50081-1/ EN 61000-6-3, EN 50081-2/EN 61000-6-4, EN 50081-2/EN 61000-6-1: 2001	 ACCREDITED No. 0824-01
USA	FCC	3/10 meter Open Area Test Sites (93105, 90471) / 3M Semi Anechoic Chamber (965860) to perform FCC Part 15/18 measurements	 93105, 90471 965860
Japan	VCCI	3/10 meter Open Area Test Sites to perform conducted/radiated measurements	 R-393/1066/725/879 C-402/747/912
Norway	NEMKO	EN 50081-1/2, EN 50082-1/2, IEC 61000-6-1/2, EN 50091-2, EN 50130-4, EN 55011, EN 55013, EN 55014-1/2, EN 55015, EN 55022, EN 55024, EN 61000-3-2/3, EN 61326-1, IEC 61000-4-2/3/4/5/6/8/11, EN 60601-1-2, EN 300 328, EN 300 422-2, EN 301 419-1, EN 301 489-01/03/07/08/09/17, EN 301 419-2/3, EN 300 454-2, EN 301 357-2	 ELA 124a ELA 124b ELA 124c
Taiwan	TAF	EN 300 328, EN 300 220-1, EN 300 220-2, EN 300 220-3, 47 CFR FCC Part 15 Subpart C, EN 61000-3-2, EN 61000-3-3, CNS 13439, CNS 13783-1, CNS 14115, CNS 13438, AS/NZS CISPR 22, CNS 13022-1, IEC 61000-4-2/3/4/5/6/8/11, CNS 13022-2/3	 Testing Laboratory 0363
Taiwan	BSMI	CNS 13438, CNS 13783-1, CNS 13439, CNS 14115	 SL2-IS-E-0014 SL2-IN-E-0014 SL2-A1-E-0014 SL2-R1-E-0014 SL2-R2-E-0014 SL2-L1-E-0014
Canada	Industry Canada	3/10 meter Open Area Test Sites (IC 2324C-3, IC 2324C-5) / 3M Semi Anechoic Chamber (IC 6106)	 IC 2324C-3 IC 2324C-5 IC 6106

\* 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 SETUP CONFIGURATION OF EUT

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

### 6.2 SUPPORT EQUIPMENT

No	Equipment	Model	Serial No.	FCC ID	Trade Name	Data Cable	Power Cord
	N/A	N/A	N/A	N/A	N/A	N/A	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.*



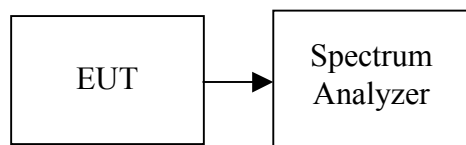
## 7. FCC PART 15.249 REQUIREMENTS

### 7.120 DB BANDWIDTH

#### LIMIT

None; for reporting purposes only.

#### Test Configuration



#### TEST PROCEDURE

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW=100kHz, VBW = RBW, Span = 5MHz, Sweep = auto.
4. Mark the peak frequency and 20dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

#### TEST RESULTS

*No non-compliance noted*

**Test Plot****(CH Low)**

\* Agilent 16:10:13 Nov 23, 2007

R T

▲ Mkr2 825 kHz  
-0.01 dBRef 96.99 dB $\mu$ V

#Atten 0 dB

#Peak

Log

10

dB/

DI

60.2

dB $\mu$ V

LgAv

V1 S2

Center 2.418 000 GHz

Span 5 MHz

#Res BW 100 kHz

#VBW 100 kHz

#Sweep 100 ms (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.418 042 GHz	80.18 dB $\mu$ V
2R	(1)	Freq	2.417 800 GHz	59.37 dB $\mu$ V
2Δ	(1)	Freq	825 kHz	-0.01 dB

**(CH Mid)**

\* Agilent 15:30:31 Nov 23, 2007

R T

▲ Mkr2 817 kHz  
-0.02 dBRef 96.99 dB $\mu$ V

#Atten 0 dB

#Peak

Log

10

dB/

DI

58.7

dB $\mu$ V

LgAv

V1 S2

Center 2.425 000 GHz

Span 5 MHz

#Res BW 100 kHz

#VBW 100 kHz

#Sweep 100 ms (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.425 017 GHz	78.74 dB $\mu$ V
2R	(1)	Freq	2.424 750 GHz	58.07 dB $\mu$ V
2Δ	(1)	Freq	817 kHz	-0.02 dB



(CH High)

Agilent 15:48:06 Nov 23, 2007

R T

▲ Mkr2 833 kHz  
-0.70 dB

Ref 96.99 dBμV

#Atten 0 dB

#Peak  
Log  
10  
dB/

DI  
53.2  
dBμV  
LgAv

V1 S2

Center 2.433 000 GHz

Span 5 MHz

#Res BW 100 kHz

#VBW 100 kHz

#Sweep 100 ms (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.432 942 GHz	73.24 dBμV
2R	(1)	Freq	2.432 633 GHz	52.85 dBμV
2Δ	(1)	Freq	833 kHz	-0.70 dB

## 7.2BAND EDGES MEASUREMENT

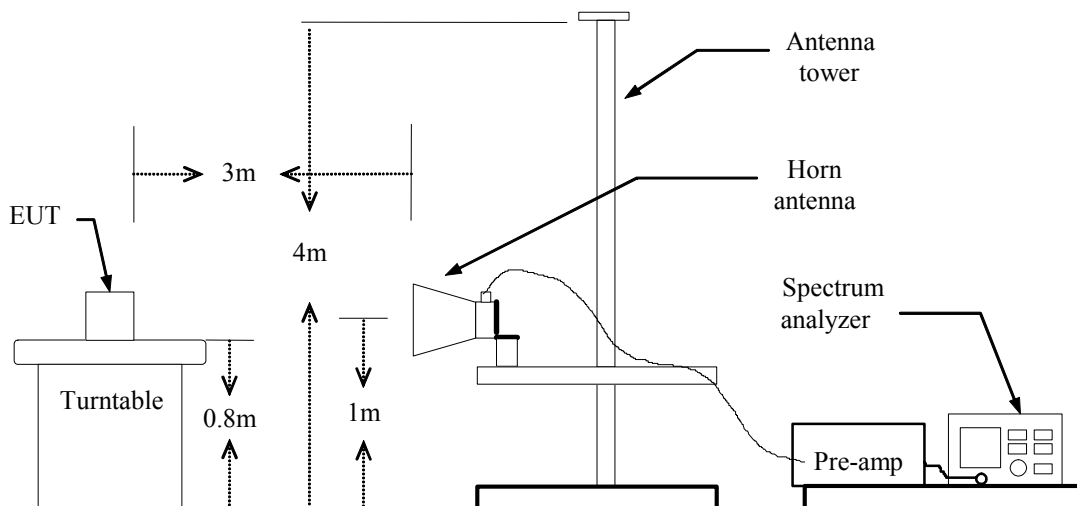
### LIMIT

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

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

2. 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) PEAK: RBW=VBW=1MHz / Sweep=AUTO
  - (b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.

### TEST RESULTS

Refer to attach spectrum analyzer data chart.



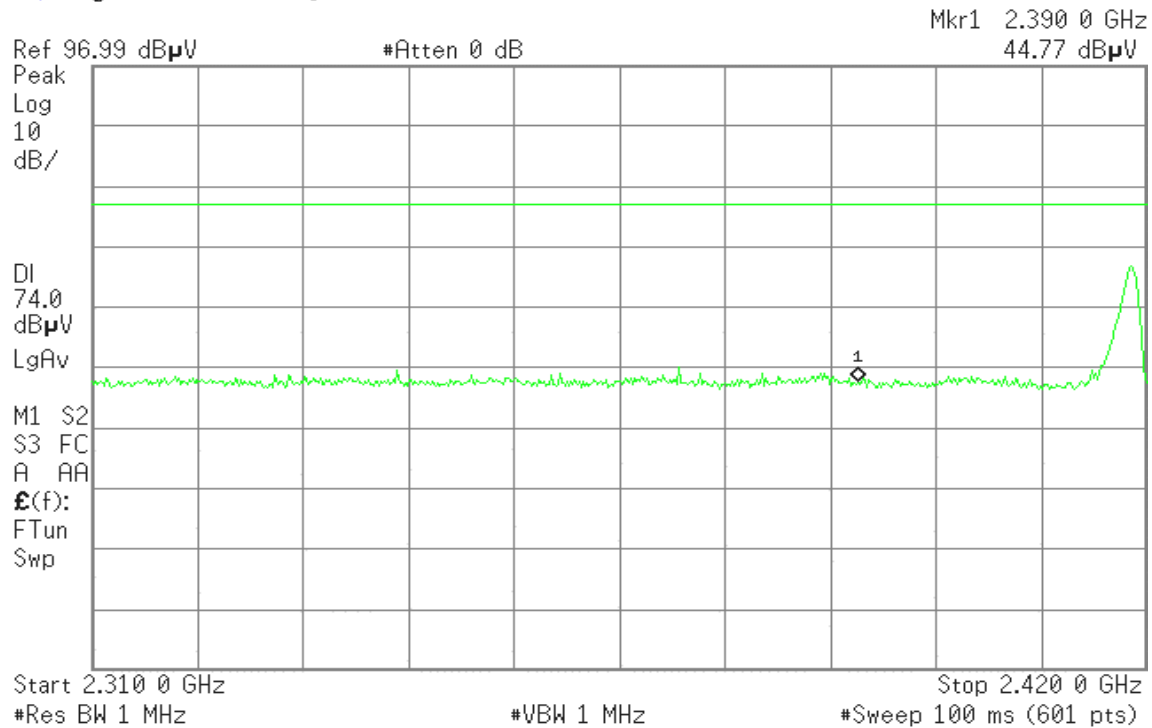
## Band Edges (CH Low)

Detector mode: Peak

Polarity: Vertical

Agilent 11:52:41 Aug 21, 2007

R T

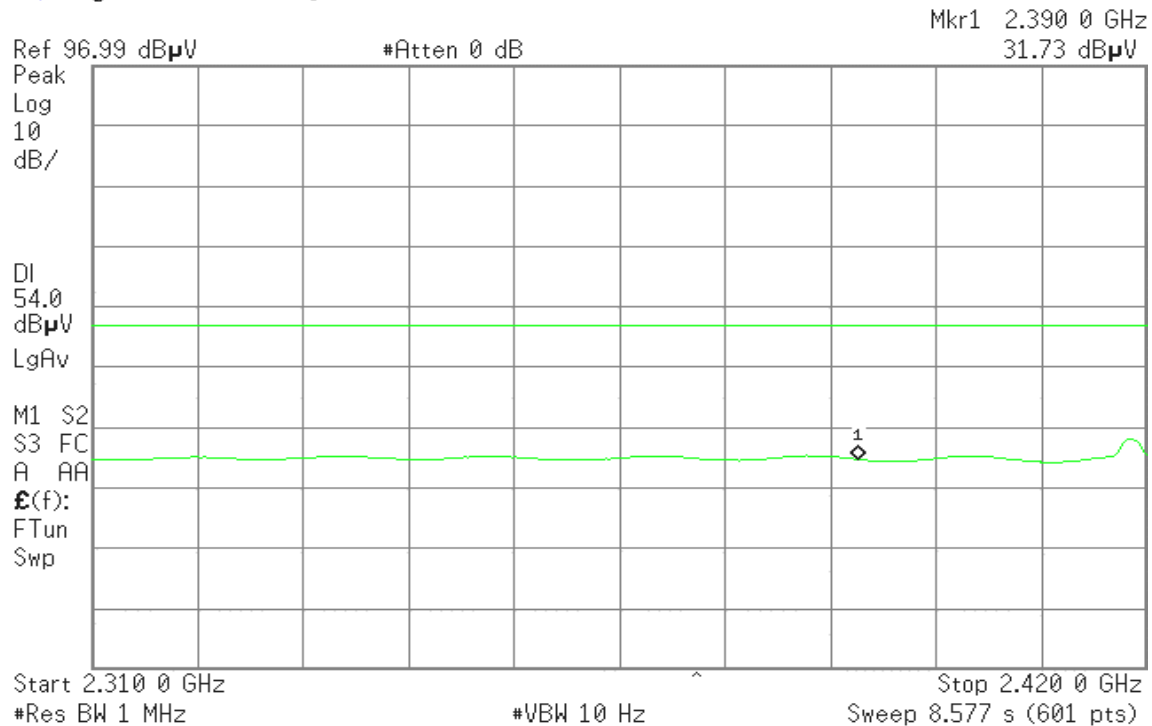


Detector mode: Average

Polarity: Vertical

Agilent 11:53:08 Aug 21, 2007

R T





**Detector mode: Peak**

**Polarity: Horizontal**

\* Agilent 11:48:14 Aug 21, 2007

R T

Mkr1 2.390 0 GHz  
43.45 dB $\mu$ V

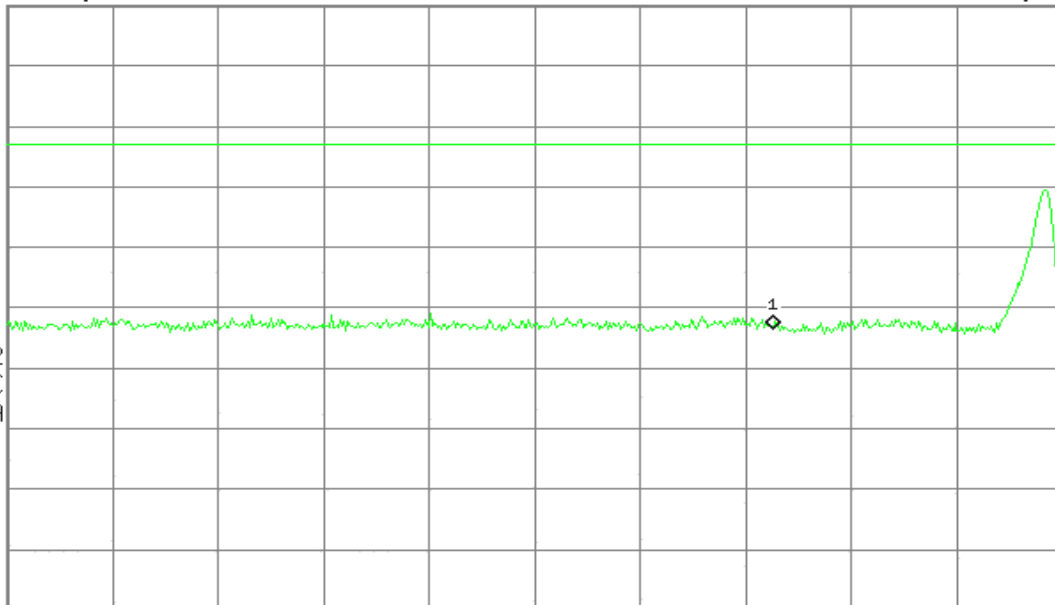
Ref 96.99 dB $\mu$ V

#Atten 0 dB

Peak  
Log  
10  
dB/

DI  
74.0  
dB $\mu$ V  
LgAv

M1 S2  
S3 FC  
A AA  
E(f):  
FTun  
Swp



Start 2.310 0 GHz

#Res BW 1 MHz

#VBW 1 MHz

Stop 2.420 0 GHz

#Sweep 100 ms (601 pts)

**Detector mode: Average**

**Polarity: Horizontal**

\* Agilent 11:47:37 Aug 21, 2007

R T

Mkr1 2.390 0 GHz  
31.82 dB $\mu$ V

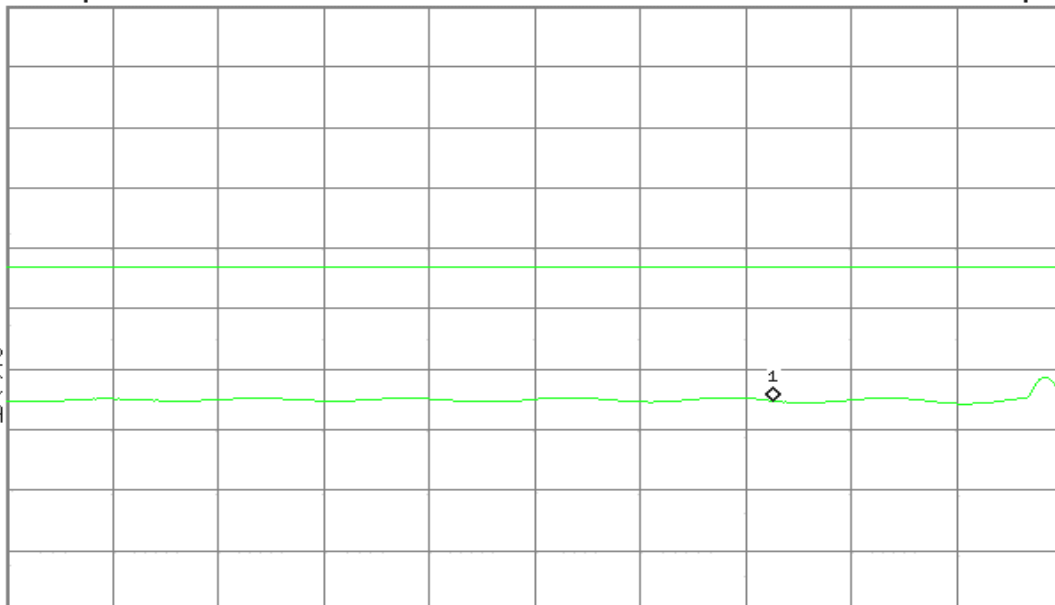
Ref 96.99 dB $\mu$ V

#Atten 0 dB

Peak  
Log  
10  
dB/

DI  
54.0  
dB $\mu$ V  
LgAv

M1 S2  
S3 FC  
A AA  
E(f):  
FTun  
Swp



Start 2.310 0 GHz

#Res BW 1 MHz

#VBW 10 Hz

Stop 2.420 0 GHz

Sweep 8.577 s (601 pts)





## 7.3 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)
30-88	100*	3
88-216	150*	3
216-960	200*	3
Above 960	500	3

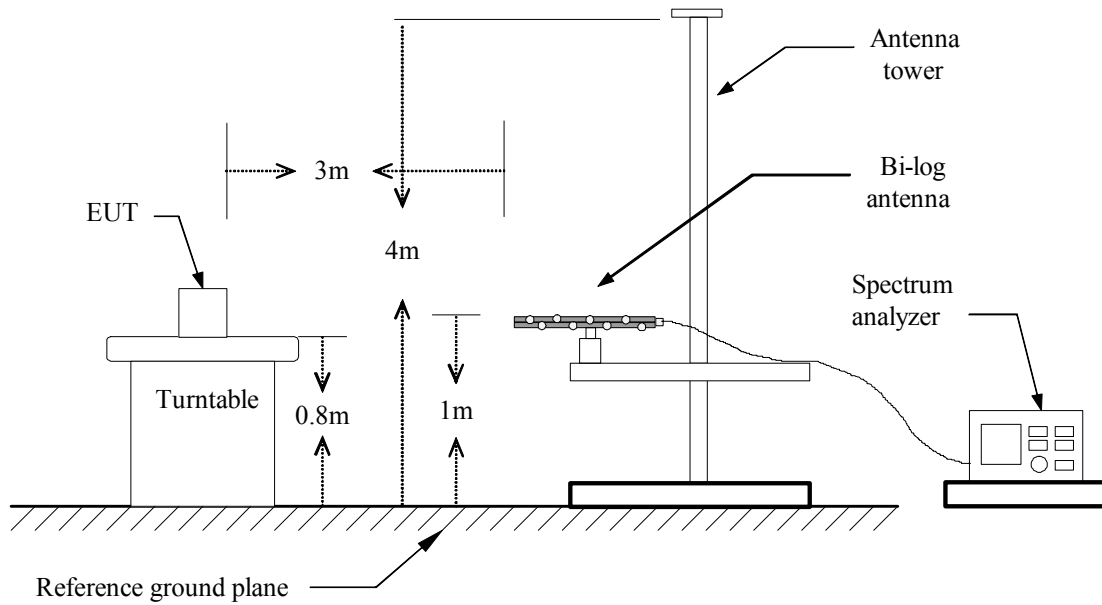
**Remark:** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections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

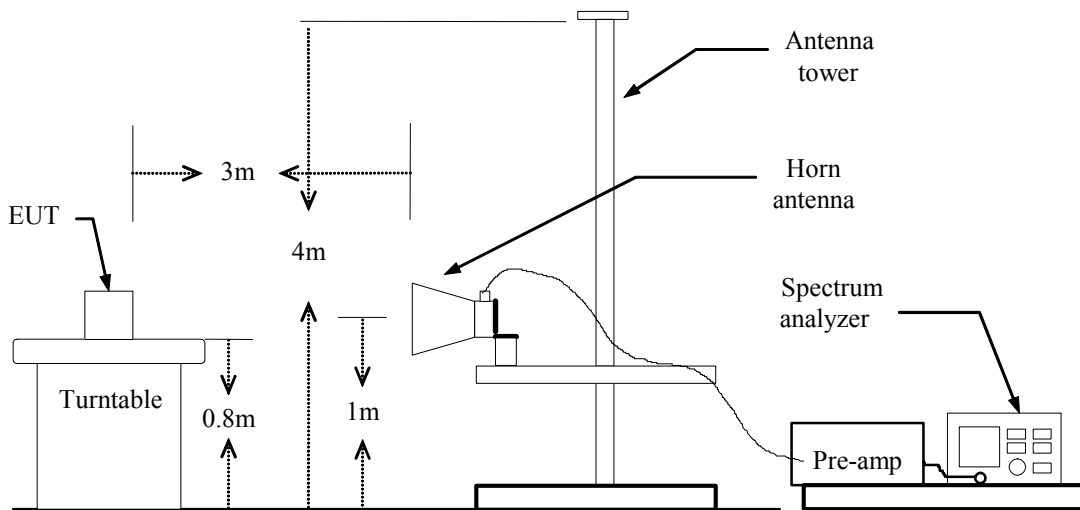
Frequency (MHz)	Field Strength (μV/m at 3-meter)	Field Strength (dBμV/m at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

## Test Configuration

### **Below 1 GHz**



### **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.



## TEST RESULTS

No non-compliance noted.

### Below 1 GHz

Operation Mode: Normal Link

Test Date: August 21, 2007

Temperature: 25°C

Tested by: Steven Young

Humidity: 55% RH

Polarity: Ver. / Hor.

Frequency (MHz)	Ant.Pol. (H/V)	Detector Mode (PK/QP)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit 3m (dBuV/m)	Margin (dB)
38.08	V	Peak	41.85	-11.60	30.26	40.00	-9.74
109.22	V	Peak	36.96	-14.22	22.74	43.50	-20.76
122.15	V	Peak	36.04	-12.95	23.09	43.50	-20.41
133.47	V	Peak	35.81	-13.41	22.39	43.50	-21.11
144.78	V	Peak	36.45	-13.88	22.58	43.50	-20.92
649.18	V	Peak	30.98	-5.22	25.76	46.00	-20.24
38.08	H	Peak	40.46	-11.60	28.87	40.00	-11.13
110.83	H	Peak	36.64	-13.90	22.73	43.50	-20.77
122.15	H	Peak	35.60	-12.95	22.65	43.50	-20.85
135.08	H	Peak	35.57	-13.47	22.10	43.50	-21.40
146.40	H	Peak	35.62	-13.95	21.67	43.50	-21.83
539.25	H	Peak	31.49	-6.98	24.51	46.00	-21.49

#### Remark:

1. Measuring frequencies from 30 MHz to the 1GHz.
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:** August 21, 2007**Temperature:** 25°C**Tested by:** Steven Young**Humidity:** 55% RH**Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Result		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
2417.00	V	74.65	---	-3.96	70.69	---	114.00	94.00	-23.31	Peak
N/A										
2417.00	H	79.10	---	-3.96	75.14	---	114.00	94.00	-18.86	Peak
1836.67	H	52.80	---	-6.63	46.18	---	74.00	54.00	-7.82	Peak
4833.33	H	46.90	---	0.56	47.46	---	74.00	54.00	-6.54	Peak
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) = Remark result (dBuV/m) – Average limit (dBuV/m).

**Operation Mode:** Tx / CH Mid**Test Date:** August 21, 2007**Temperature:** 25°C**Tested by:** Steven Young**Humidity:** 55% RH**Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Result		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
2426.67	V	71.86	---	-3.94	67.93	---	114.00	94.00	-26.07	Peak
6941.67	V	44.75	---	3.88	48.62	---	74.00	54.00	-5.38	Peak
N/A										
2426.67	H	75.48	---	-3.94	71.54	---	114.00	94.00	-22.46	Peak
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) = Remark result (dBuV/m) – Average limit (dBuV/m).

**Operation Mode:** Tx / CH High**Test Date:** August 21, 2007**Temperature:** 25°C**Tested by:** Steven Young**Humidity:** 55% RH**Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Result		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
2433.33	V	75.01	---	-3.92	71.09	---	114.00	94.00	-22.91	Peak
1423.33	V	50.16	---	-10.10	40.06	---	74.00	54.00	-13.94	Peak
N/A										
2433.33	H	51.87	---	-10.27	41.59	---	114.00	94.00	-52.41	Peak
1316.67	H	37.22	---	0.61	37.83	---	74.00	54.00	-16.17	Peak
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) = Remark result (dBuV/m) – Average limit (dBuV/m).



## 7.4 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

**Operation Mode:** Normal Link

**Test Date:** May 28, 2007

**Temperature:** 25°C

**Tested by:** Snake Shan

**Humidity:** 55% 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
0.179	25.870	25.790	0.142	26.012	25.932	64.531	54.531	-38.519	-28.599	L1
0.236	21.010	19.520	0.100	21.110	19.620	62.225	52.225	-41.115	-32.605	L1
0.298	19.860	13.300	0.100	19.960	13.400	60.298	50.298	-40.338	-36.898	L1
10.237	10.670	9.390	0.705	11.375	10.095	60.000	50.000	-48.625	-39.905	L1
19.833	15.920	14.060	1.187	17.107	15.247	60.000	50.000	-42.893	-34.753	L1
27.497	11.810	9.220	1.300	13.110	10.520	60.000	50.000	-46.890	-39.480	L1
0.179	25.940	24.900	0.143	26.083	25.043	64.544	54.544	-38.461	-29.501	L2
0.239	21.630	18.380	0.100	21.730	18.480	62.132	52.132	-40.402	-33.652	L2
10.239	9.310	8.090	0.705	10.015	8.795	60.000	50.000	-49.985	-41.205	L2
17.047	14.360	10.550	0.964	15.324	11.514	60.000	50.000	-44.676	-38.486	L2
19.833	5.920	4.050	1.187	7.107	5.237	60.000	50.000	-52.893	-44.763	L2
27.497	13.080	10.660	1.300	14.380	11.960	60.000	50.000	-45.620	-38.040	L2

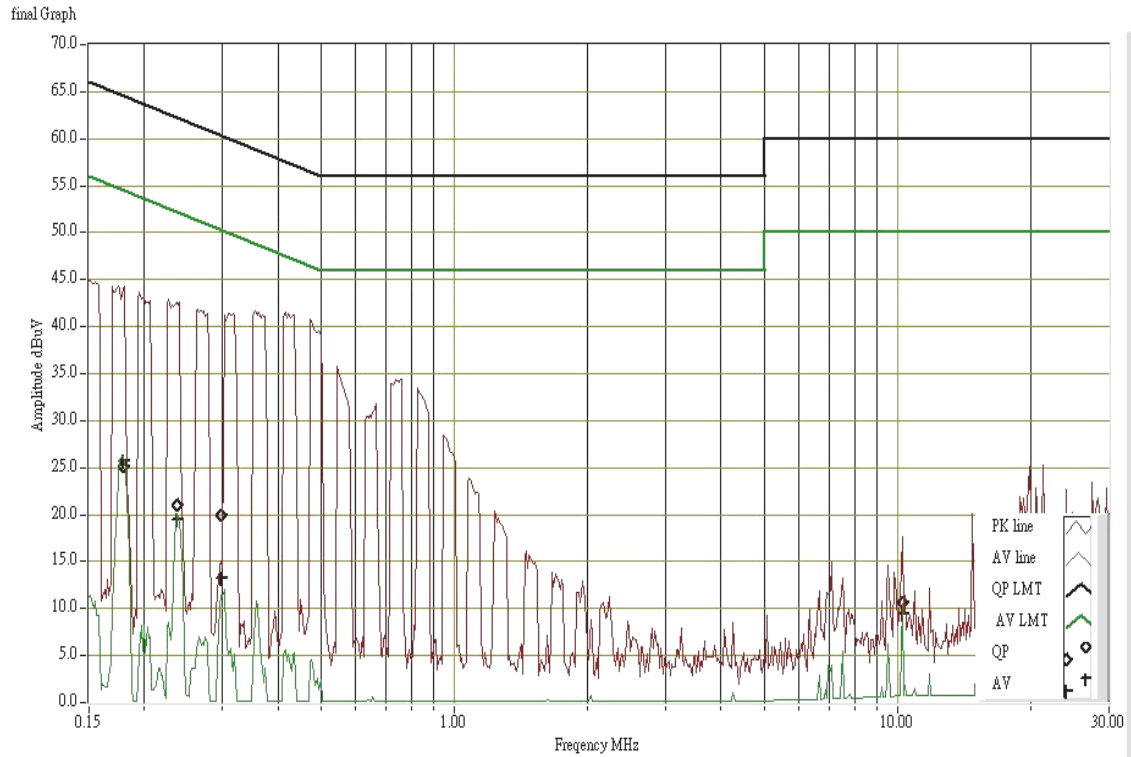
### Remark:

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)

