



## FCC PART 15.245

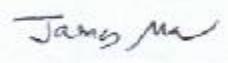
### MEASUREMENT AND TEST REPORT

For

**Shin Young TechVision Co., Ltd.**

1-1132, Naegok-dong, Seocho-gu  
Seoul City, 137-180, Korea

**FCC ID: USVAMS-1500**  
**Model Name: AMS-1500**

<b>Report Type:</b> <input checked="" type="checkbox"/> Original Report (rev.1)	<b>Equipment Type:</b> Microwave Infrared Motion Detector
<b>Test Engineer:</b> <u>Choon-Sian Ooi</u> 	
<b>Report Number:</b> <u>R0704126-245a</u>	
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## GENERAL INFORMATION

### Product Description for Equipment under Test (EUT)

This BACL measurement and test report has been complied on behalf of *Shin Young TechVision* and their product, model: AMS -1500 or the “EUT” as referred to in this report. AMS-1500 is the first super power-saving human motion detection sensor switch that detects human motion and thing's fine movement by humans within the human living space and turning of lights on and off of fluorescent lamps with the application of the micro wave motion sensor, a first in the world based on Doppler radar. It can be used in various inferior environments due to heat, temperature and humidity without causing errors in its operation. Furthermore, real-time lighting on and off can be realized because of the extension of its sensing scope and the enhancement of its sensitivity.

### EUT Photo



*Additional photos in exhibit C*

### EUT Mechanical Description

The EUT measures approximately 73.0mmW x 110mmH x 8.5mmL and weighs approximately 160.5 g.

## Objective

This type approval report is prepared on behalf of *Shin Young TechVision Co., Ltd.* in accordance with Part 2, Subpart J, Part 15, Subparts A, B, and C.

## Related Submittal(s)/Grant(s)

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## Test Methodology

All measurements contained in this report were conducted in accordance with ANSI C63.4-2003.

## Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the values range from  $\pm 2.0$  for Conducted Emissions tests and  $+4.0$  dB for Radiated Emissions tests are the most accurate estimates pertaining to uncertainty of EMC measurements at BACL.

Detailed instrumentation measurement uncertainties can be found in BACL report QAP-018.

## Test Facility

The semi-anechoic chambers used by BACL to collect radiated and conducted emissions measurement data is located in the building at it's facility in Sunnyvale, California, USA.

BACL's test sites have been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997 and Article 8 of the VCCI regulations on December 25, 1997. The facility complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission and Voluntary Control Council for Interference has the reports on file and is listed under FCC registration number: 90464 and VCCI Registration No.: C-1298 and R-1234. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200167-0). The current scope of accreditations can be found at <http://ts.nist.gov/ts/htdocs/210/214/scopes/2001670.htm>

## SYSTEM TEST CONFIGURATION

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### Justification

The EUT was configured for testing according to ANSI C63.4-2003.

The EUT was tested in the normal (native) operating mode to represent *worst-case* results during the final qualification test.

### Special Accessories

-

### Equipment Modifications

The Wurth Electronik Ferrite (74271142) was installed on the power line of EUT.

### EUT Configuration Details

Manufacturer	Description	Model Number	Part Number
DNS CO Ltd	RF Sensor	DNS-010	DNS010-060315-968-KR-SYT

### Power Supply

-

### Interface Ports and Cabling

-

### Local Support Equipment

-

**SUMMARY OF TEST RESULTS FOR FCC PART 15**

<b>FCC Rules</b>	<b>Description of Test</b>	<b>Result</b>
§15.207 (a)	Conducted Emissions	Compliant
§ 15.205	Restricted Bands	Compliant
§15.245 (b)	Radiated Emissions: Carrier Frequency	Compliant
§15.245 (b) (1)/ § 15.205	Radiated Emissions: Carrier Harmonic	Compliant
§15.245 (b) (1)/ § 15.209	Radiated Emissions: Out of Band Emission	Compliant

## §15.207 – CONDUCTED EMISSIONS

### Applicable Standard

According to FCC §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 frequencies ranges.

Frequency of emission (MHz)	Conducted limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*\*Decreases with the logarithm of the frequency*

### Test Setup

The measurement was performed at shield room, using the setup per ANSI C63.4 – 2003 measurement procedure. The specification used was FCC Class B limits.

External I/O cables were draped along the edge of the test table and bundle when necessary.

The EUT was connected the LISN and provided 120V 60 Hz.

### Test Equipment List and Details

Manufacturer	Description	Model Number	Serial Number	Calibration Date
Solar Electronics	LISN	9252-R-24-BNC	511205	2006-07-07
Rohde & Schwarz	EMI Test Receiver	ESCS30	100137	2007-03-08

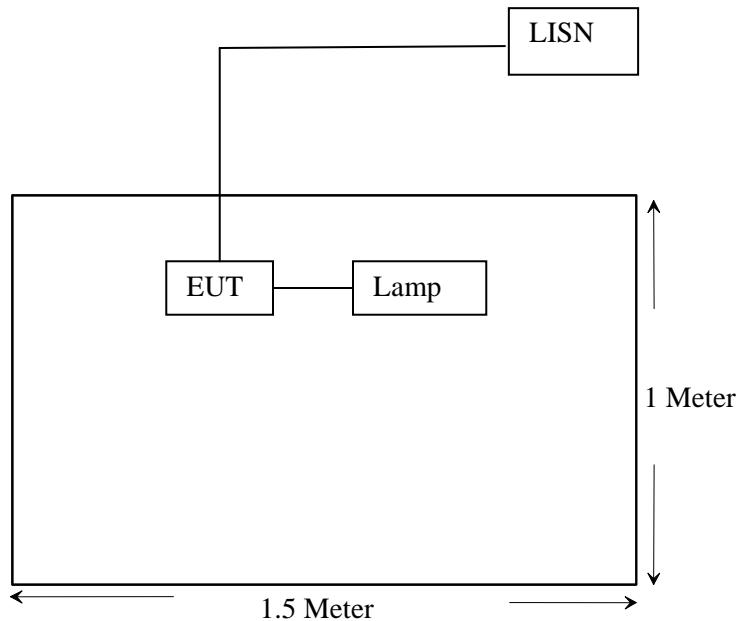
**\* Statement of Traceability:** BACL Corp. attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

### Test Procedure

During the conducted emissions test, the power cord of the EUT was connected to the mains outlet of the LISN-1.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the peak detection mode, quasi-peak and average. Quasi-Peak readings are distinguished with a “QP”. Average readings are distinguished with an “Ave”.

**Test Setup Diagram****Environmental Conditions**

Temperature:	24 ° C
Relative Humidity:	65 %
ATM Pressure:	102.0 kPa

\*The testing was performed by Choon Sian Ooi on 2007-04-26

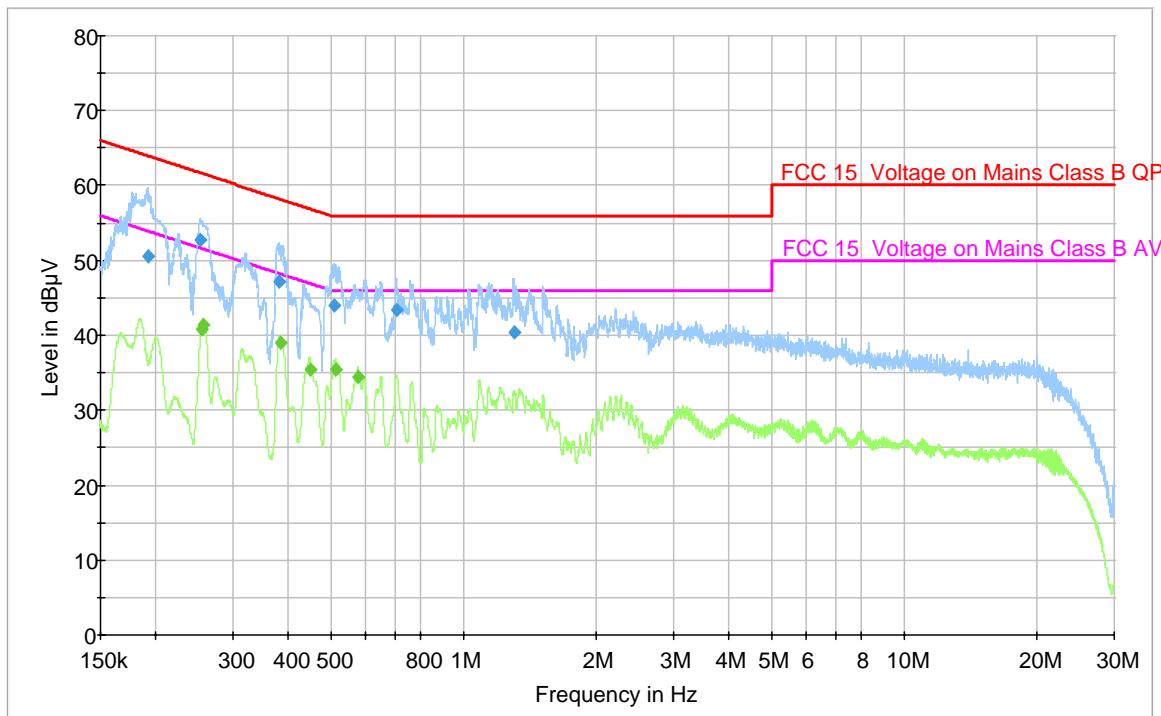
**Summary of Test Results**

According to the recorded data in following table, the EUT complied with the FCC standard's conducted emissions limits for Class B devices, with the *worst* margin reading of:

**-6.8 dB at 0.861574 MHz in the Neutral Conductor mode**

## Conducted Emissions Test plot & data

### Line

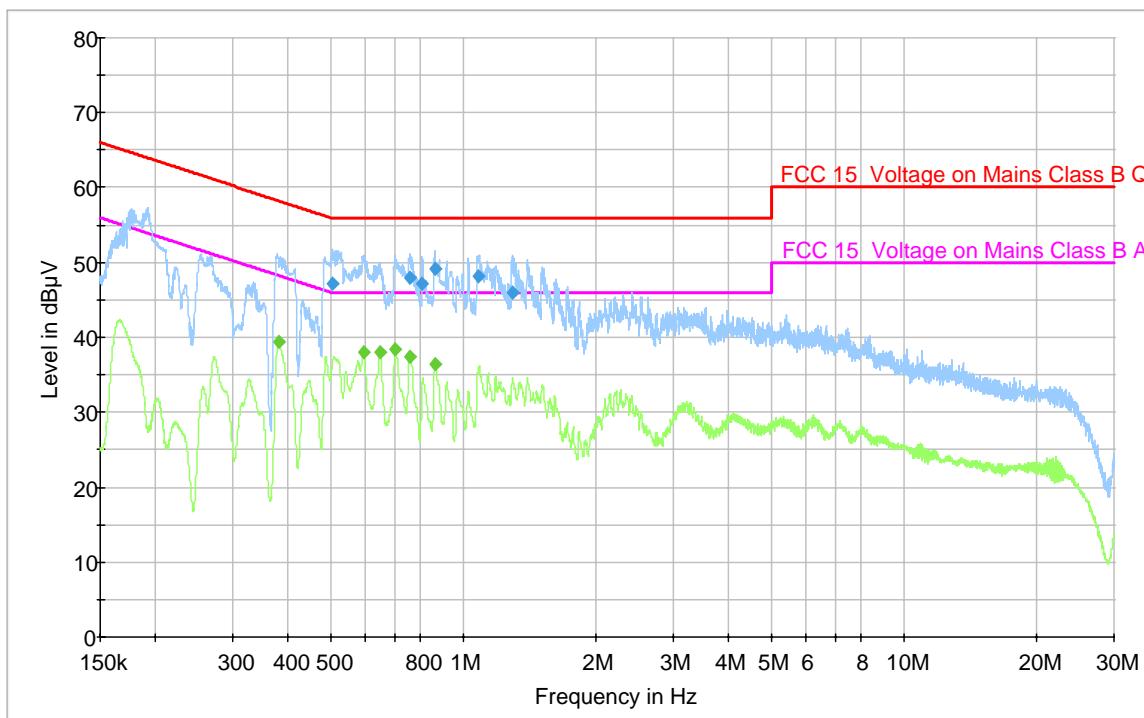


### QP Measurements

Frequency (MHz)	Quasi-Peak (dB $\mu$ V)	Conductor (L/N)	Limit (dB $\mu$ V)	Margin (dB)
0.192003	50.6	L1	63.9	-13.3
0.253249	52.7	L1	61.6	-9.0
0.381141	47.2	L1	58.3	-11.0
0.509803	43.9	L1	56.0	-12.1
0.703356	43.4	L1	56.0	-12.6
1.301867	40.5	L1	56.0	-15.5

### Average Measurements

Frequency (MHz)	Average (dB $\mu$ V)	Conductor (L/N)	Limit (dB $\mu$ V)	Margin (dB)
0.254772	40.8	L1	51.6	-10.8
0.257332	41.5	L1	51.5	-10.1
0.383433	39.0	L1	48.2	-9.2
0.448132	35.4	L1	46.9	-11.5
0.511334	35.5	L1	46.0	-10.5
0.577069	34.4	L1	46.0	-11.6

**Neutral****QP Measurements**

Frequency (MHz)	Quasi-Peak (dB $\mu$ V)	Conductor (L/N)	Limit (dB $\mu$ V)	Margin (dB)
0.505743	47.1	N	56.0	-8.9
0.755083	48.1	N	56.0	-7.9
0.807380	47.2	N	56.0	-8.8
0.861574	49.2	N	56.0	-6.8
1.086422	48.1	N	56.0	-7.9
1.292791	45.9	N	56.0	-10.1

**Average Measurements**

Frequency (MHz)	Average (dB $\mu$ V)	Conductor (L/N)	Limit (dB $\mu$ V)	Margin (dB)
0.381141	39.4	N	48.3	-8.9
0.593447	38.1	N	46.0	-7.9
0.646714	38.0	N	46.0	-8.0
0.701951	38.4	N	46.0	-7.6
0.757350	37.4	N	46.0	-8.6
0.864162	36.4	N	46.0	-9.6

## § 15.245, § 15.205 & §15.209 - RADIATED EMISSIONS

**§ 15.245 Operation within the bands 902–928 MHz, 2435–2465 MHz, 5785–5815 MHz, 10500–10550 MHz, and 24075–24175 MHz.**

(a) Operation under the provisions of this section is limited to intentional radiators used as field disturbance sensors, excluding perimeter protection systems.

(b) 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 (millivolts/meter)
902–928	500	1.6
2435–2465	500	1.6
5785–5815	500	1.6
10500–10550	2500	25.0
24075–24175	2500	25.0

(1) Regardless of the limits shown in the above table, harmonic emissions in the restricted bands below 17.7 GHz, as specified in §15.205, shall not exceed the field strength limits shown in §15.209.

Compliant

N/A

### Applicable Standard: FCC §15.205 Restricted bands of operation

(a) Except as shown in 15.205 paragraphs (d), only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	MHz	MHz	GHz	GHz
0.090 – 0.110	8.291 – 8.294	16.69475 – 16.69525	156.7 – 156.9	1435 – 1626.5	3.332 – 3.339	10.6 – 12.7
0.495 – 0.505	8.362 – 8.366	25.5 – 25.67	162.0125 – 167.17	1645.5 – 1646.5	3.3458 – 3.358	13.25 – 13.4
2.1735 – 2.1905	8.37625 – 8.38675	37.5 – 38.25	167.72 – 173.2	1660 – 1710	3.600 – 4.400	14.47 – 14.5
4.125 – 4.128	8.41425 – 8.41475	73 – 74.6	240 – 285	1718.8 – 1722.2	4.5 – 5.15	15.35 – 16.2
4.17725 – 4.17775	12.29 – 12.293	74.8 – 75.2	322 – 335.4	2200 – 2300	5.35 – 5.46	17.7 – 21.4
4.20725 – 4.20775	12.51975 – 12.52025	108 – 121.94	399.9 – 410	2310 – 2390	7.25 – 7.75	22.01 – 23.12
6.215 – 6.218	12.57675 – 12.57725	123 – 138	608 – 614	2483.5 – 2500	8.025 – 8.5	23.6 – 24.0
6.26775 – 6.26825	13.36 – 13.41	149.9 – 150.05	960 – 1240	2690 – 2900	9.0 – 9.2	31.2 – 31.8
6.31175 – 6.31225	16.42 – 16.423	156.52475 – 156.52525	1300 – 1427	3260 – 3267	9.3 – 9.5	36.43 – 36.5
						Above 38.6

(b) Except as provided in 15.205 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.

(c) Except as provided in paragraphs (d) and (e), regardless of the field strength limits specified elsewhere in this Subpart, the provisions of this Section apply to emissions from any intentional radiator.

Compliant

N/A

**Applicable Standard: FCC §15.209 Radiated emission limits, general requirements.**

**(a)** 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 (microvolts/meter)	Measurement Distance (meters)
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

*\*\* 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.*

**(b)** In the emission table above, the tighter limit applies at the band edges.

Compliant

N/A

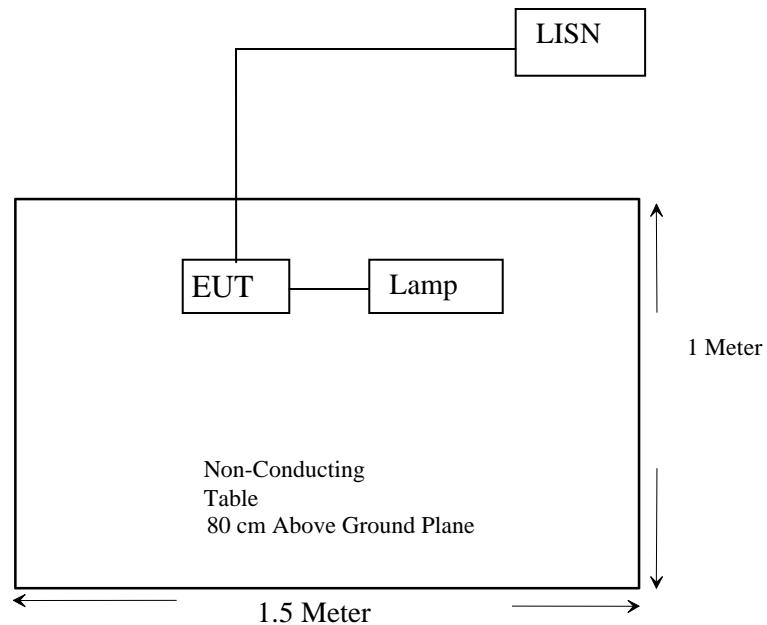
**Test Setup**

The radiated emissions tests were performed in the 3-meter semi-anechoic chamber test site, using the setup in accordance with ANSI C63.4-2003. The specification used was the FCC 15 Subpart C limits.

**Test Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date
Sonoma Instruments	Pre amplifier	317	260406	2007-02-03
Sunol Sciences	Combination Antenna	JB3 Antenna	A013105	2007-02-11
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.595 OK03	100044	2007-02-07
Sunol Sciences	System Controller	SC99V	122303-1	N/R
Agilent	Analyzer, Spectrum	8565EC	3946A00131	2007-01-24
HP	Pre, Amplifier (1 ~ 26.5 GHz)	8449B	3147A00400	2006-08-10
A. R.A	Horn Antenna	DRG-118/A	1132	2005-08-17
WiseWave	Horn Antenna	ARH 4223-02	10555-02	-

\* **Statement of Traceability:** **BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

**Test Setup Diagram**

## Environmental Conditions

Temperature:	24 °C
Relative Humidity:	65 %
ATM Pressure:	1020 mbar

\*The testing was performed by Choon Sian Ooi on 2007-04-26

## Test Procedure

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations.

All data were recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limits), and are distinguished with a "QP" in the data table.

## Corrected Amplitude & Margin Calculation

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

$$\text{Cord. Amp.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The "Margin" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Cord. Amp.} - \text{Class B Limit}$$

## Summary of Test Results

According to the data hereinafter, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.209 and 15.245 standard's radiated emissions limits for class B devices, and had the worst margin of:

**-25.8 dB at 10525 MHz** in the **Horizontal** polarization at **Carrier Frequency**

**-27.0 dB at 21050 MHz** in the **Horizontal** polarization at **Carrier Frequency Harmonic**

**-4.3 dB at 51.0375 MHz** in the **Vertical** polarization at **Out of Band Emission**

Please refer to the following tables for full test results

**Radiated Emissions Test Result Data: RF Carrier Frequency**

Measured at 3 meter

Frequency (MHz)	Reading (dBuV)	Azimuth Degrees	Height (m)	Polarization (H / V)	Antenna Factor (dB/m)	Cable Loss (dB)	Pre-Amplifier Gain (dB)	Corrected Reading dBuV/m	Limit (dBuV/m)	Margin (dB)	Comments
10525.0000	92.7	180	2.2	H	38.7	3.9	33.2	102.2	128	-25.8	Ave
10525.0000	91.5	270	2.4	V	38.7	3.9	33.2	101.0	128	-27.0	Ave
10525.0000	99.9	180	2.2	H	38.7	3.9	33.2	109.4	148	-38.6	Peak
10525.0000	98.3	270	2.4	V	38.7	3.9	33.2	107.8	148	-40.2	Peak

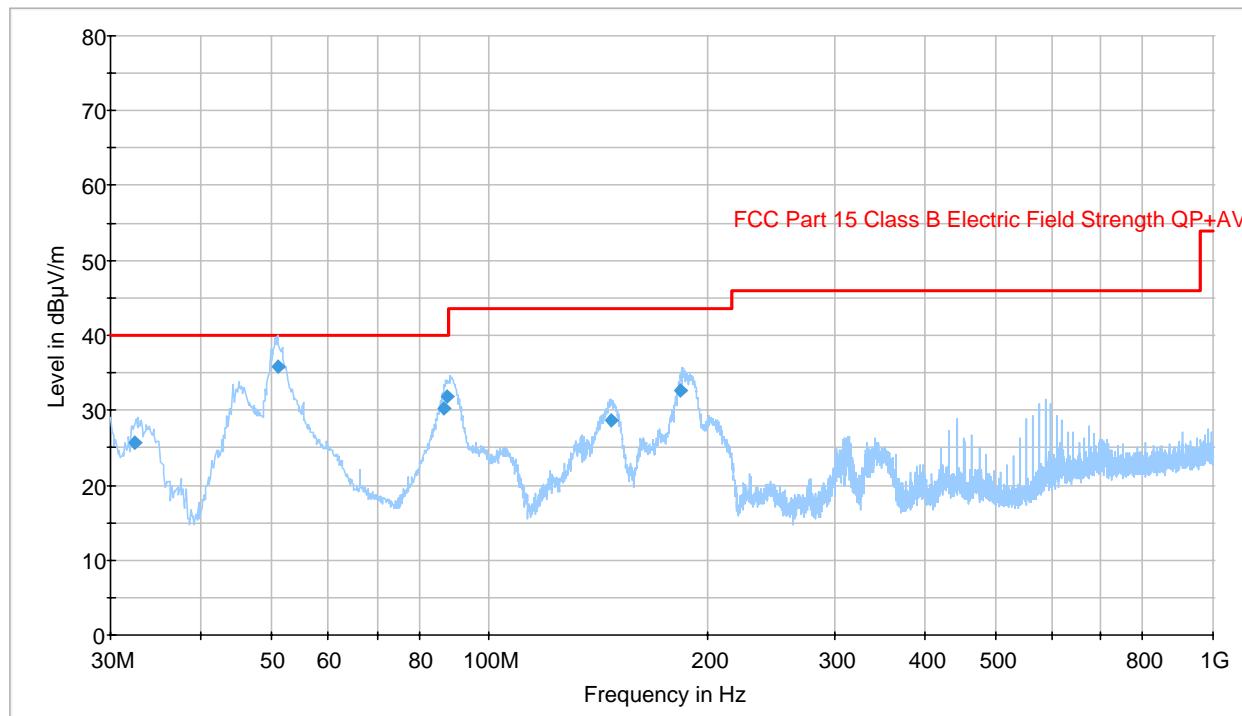
**Radiated Emissions Test Result Data: RF Carrier Harmonic**

Measured at 3 meter

Frequency (MHz)	Reading (dBuV)	Azimuth Degrees	Height (m)	Polarization (H / V)	Antenna Factor (dB/m)	Cable Loss (dB)	Pre-Amplifier Gain (dB)	Corrected Reading dBuV/m	Limit (dBuV/m)	Margin (dB)	Comments
21050.0000	64.4	180	2.1	H	23.0	4.3	30.7	61.0	88	-27.0	Ave
21050.0000	62.4	270	2.4	V	23.0	4.3	30.7	59.0	88	-29.0	Ave
21050.0000	81.3	180	2.3	H	23.0	4.3	30.7	77.9	108	-30.1	Peak
21050.0000	76.4	270	2.4	V	23.0	4.3	30.7	73.0	108	-35.0	Peak

**Radiated Emissions Test Result Data: Out of Band Emission**

Measured at 3 meter



Frequency (MHz)	Quasi-Peak (dB $\mu$ V/m)	Meas. Time (ms)	Polarity (H/V)	Turntable position (deg)	Correction Factor (dB)	Limit (dB $\mu$ V/m)	Margin (dB)
51.037500	35.7	1000.000	V	193.0	-17.9	40.0	-4.3
87.532500	31.9	1000.000	H	75.0	-16.7	40.0	-8.1
86.375000	30.3	1000.000	H	75.0	-16.8	40.0	-9.7
184.173750	32.6	1000.000	H	18.0	-13.3	43.5	-10.9
32.428750	25.7	1000.000	V	26.0	-6.3	40.0	-14.3
147.730000	28.7	1000.000	H	288.0	-12.2	43.5	-14.8