



FCC PART 15 CLASS B

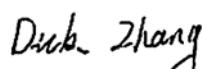
TEST REPORT

For

Grandstream Networks, INC

5F, Bldg #1, No.2 Kefa Rd., Science & Technology Park, Shenzhen, China

FCC ID: YZZGXV3662-FHD

Report Type: Original Report	Product Name: IP CAMERA
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Report Number: <u>RSZ120925003-00</u>	
Report Date: <u>2012-11-08</u>	
Reviewed By: <u>EMC Leader</u> 	
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* This report may contain data that are not covered by the NVLAP accreditation and shall be marked with an asterisk ★

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Grandstream Networks, INC*'s product, model number *GXV3662_FHD* (*FCC ID: YZZGXV3662-FHD*) or the "EUT" in this report was a *IP CAMERA*, which was measured approximately: 15.5 cm (L) x 13.5 cm (W) x 12.1 cm (H), rated input: DC 12.0V from adapter or PoE, the highest operating frequency of EUT is 296 MHz.

Adapter information: AC ADAPTER

Model: SEF1200100A1BB

Input: 100-240V~50/60 Hz, 0.3A

Output: DC 12.0V, 1.0A

**All measurement and test data in this report was gathered from production sample serial number: 1209120 (Assigned by BACL, Shenzhen). The EUT supplied by the applicant was received on 2012-09-25.*

Objective

The following test report is prepared on behalf of *Grandstream Networks, INC* in accordance with Part 2-Subpart J, and Part 15-Subparts A and B of the Federal Communication Commissions rules.

The objective of the manufacturer is to determine compliance with FCC Part 15B, Class B.

Related Submittal(s)/Grant(s)

No related submission.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2009, 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.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on December 06, 2010. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratories Corp. (Shenzhen) is an ISO/IEC 17025 accredited laboratory, and is accredited by National Voluntary Laboratory Accredited Program (Lab Code 200707-0).



The current scope of accreditations can be found at <http://ts.nist.gov/Standards/scopes/2007070.htm>.

SYSTEM TEST CONFIGURATION

Justification

The system was configured for testing in a typical fashion (as normally used by a typical user).

EUT Exercise Software

No exercise software was used.

Equipment Modifications

No modification was made to the EUT tested.

Remote and Support Equipment List and Details

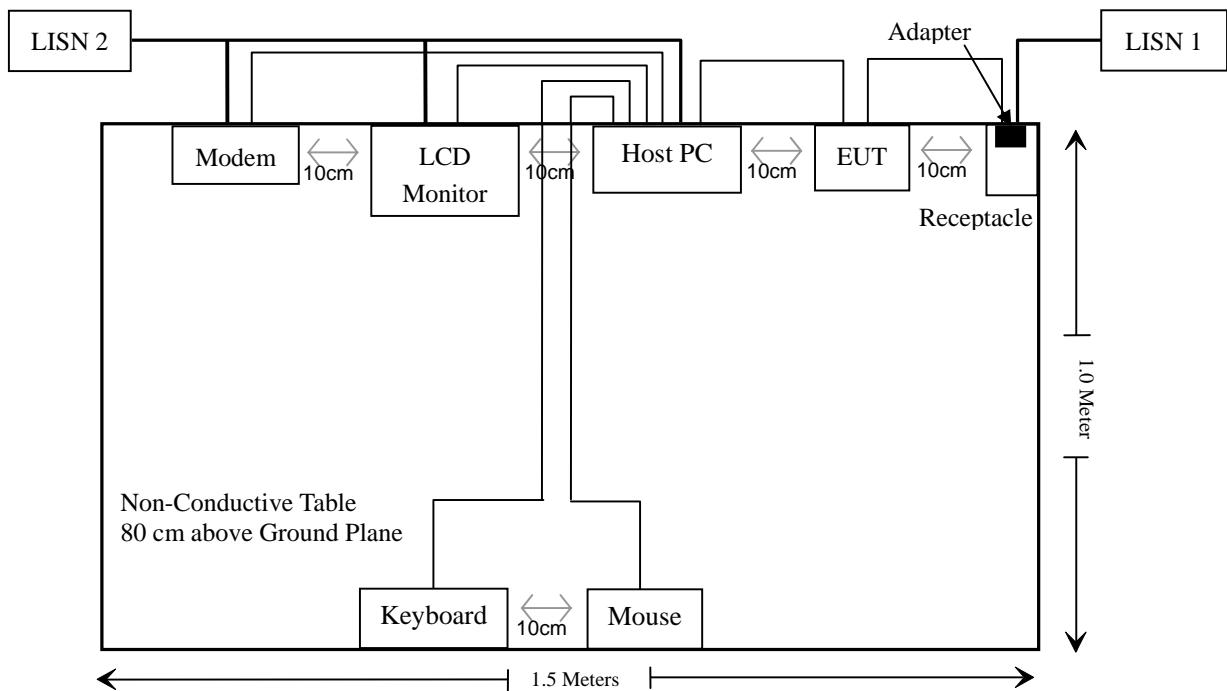
Manufacturer	Description	Model	Serial Number
DELL	PC	VOSTRO 220S	127BP2X
DELL	Keyboard	L100	CNORH656658907BL 05DC
DELL	Mouse	MOC5UO	G1900NKD
DELL	LCD Monitor	E178WFPC	CN-OWY564-64180-7 C4-2SQH
AST	Modem	AEM-2100	0293
DELL	PC	VOSTRO 220S	127BP2X
Netgear	PoE Switch	FS108P	N/A

External I/O Cable

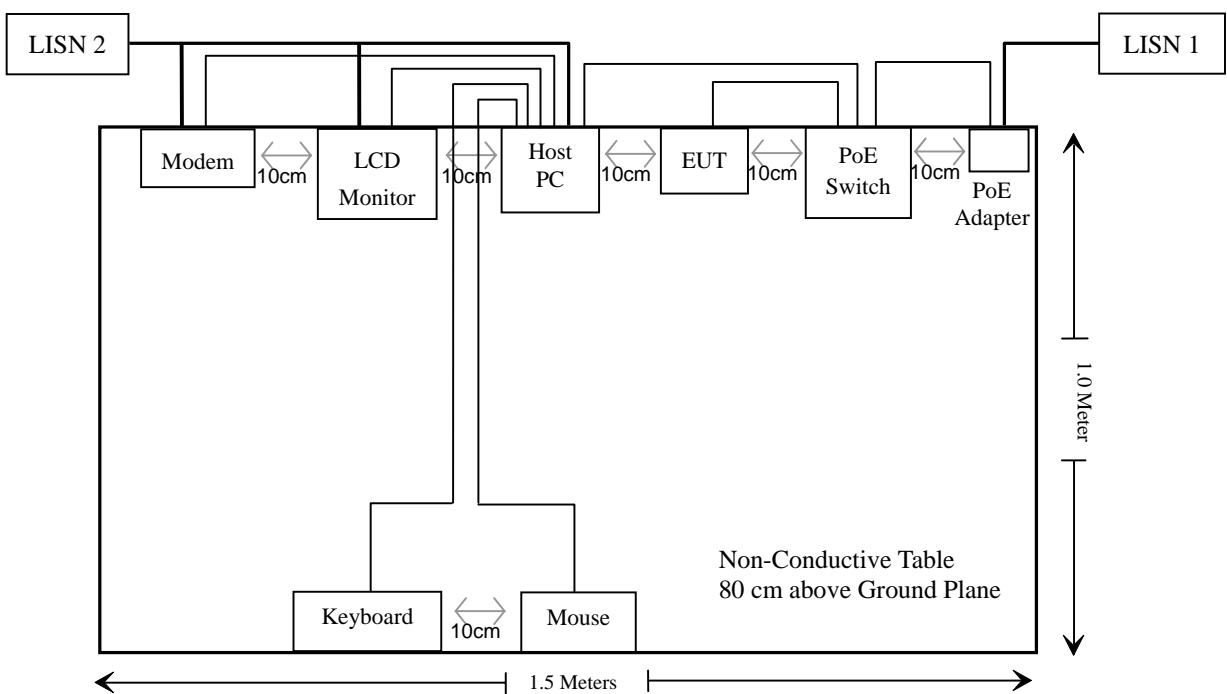
Cable Description	Length (m)	From/Port	To
Unshielded Detachable RJ45 Cable	1.5	EUT	Host PC
Unshielded Detachable DC Power Cable	1.5	EUT	Adapter
Shielded Detachable USB Cable	1.5	Host PC	Mouse
Shielded Detachable Serial Cable	1.2	Host PC	Modem
Shielded Detachable K/B Cable	1.5	Host PC	Keyboard
Shielded Detachable VGA Cable	1.5	Host PC	LCD Monitor
Unshielded Detachable RJ45 Cable	1.5	EUT	PoE Switch
Unshielded Detachable DC Power Cable	1.2	PoE Switch	PoE Adapter
Unshielded Detachable AC Cable	1.8	PoE Adapter	LISN 1
Unshielded Detachable RJ45 Cable	1.5	PoE Switch	Host PC

Block Diagram of Test Setup

Powered by adapter:



Powered by PoE:

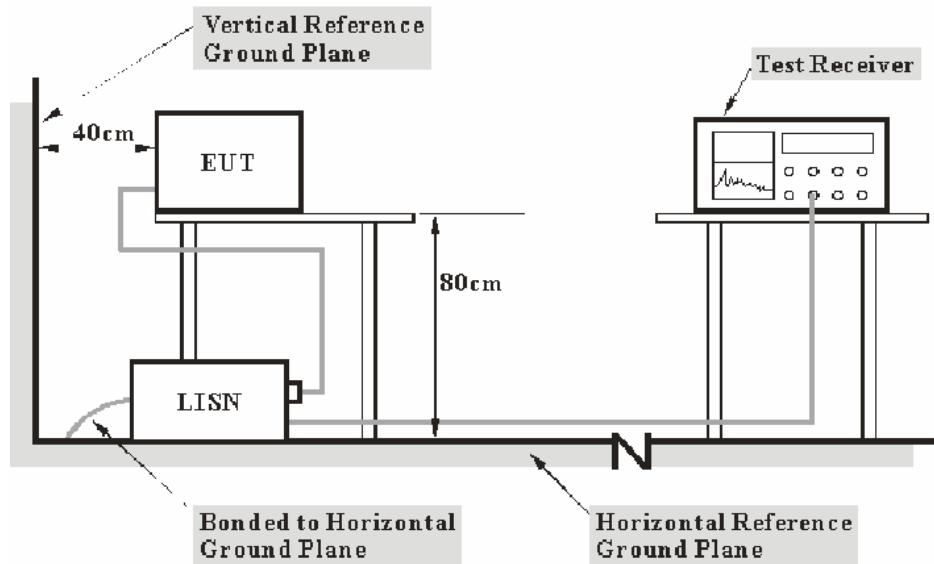


SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Results
§15.107	Conducted Emissions	Compliance
§15.109	Radiated Emissions	Compliance

FCC §15.107 – AC LINE CONDUCTED EMISSIONS

EUT Setup



The setup of EUT is according with per ANSI C63.4-2009 measurement procedure. The specification used was with the FCC Part 15.107 Class B limits.

The spacing between the peripherals was 10 cm.

The AC adapter was connected to a 120 VAC/60 Hz power source for AC adapter power supply.

The PoE adapter was connected to a 120 VAC/60 Hz power source for PoE power supply.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

<i>Frequency Range</i>	<i>IF B/W</i>
150 kHz – 30 MHz	9 kHz

Test Procedure

During the conducted emission test, the AC adapter or PoE adapter was connected to the first LISN.

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

All data was recorded in the Quasi-peak and average detection mode.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2011-11-24	2012-11-23
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2011-11-17	2012-11-16
Rohde & Schwarz	Attenuator	ESH3Z2	DE25985	2012-07-08	2013-07-07
BACL	CE Test software	BACL-CE	V1.0	-	-

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Corrected Factor & Margin Calculation

The Corrected factor is calculated by adding LISN/ISN VDF (Voltage Division Factor), Cable Loss and Pulse Limiter Attenuation. The basic equation is as follows:

$$\text{Correction Factor} = \text{LISN VDF} + \text{Cable Loss} + \text{Pulse Limiter Attenuation}$$

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 7 dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Results Summary

According to the recorded data in following table, the worst margin reading of:

3.24 dB at 0.490MHz in the **Neutral** conducted mode (powered by PoE)

Test Data

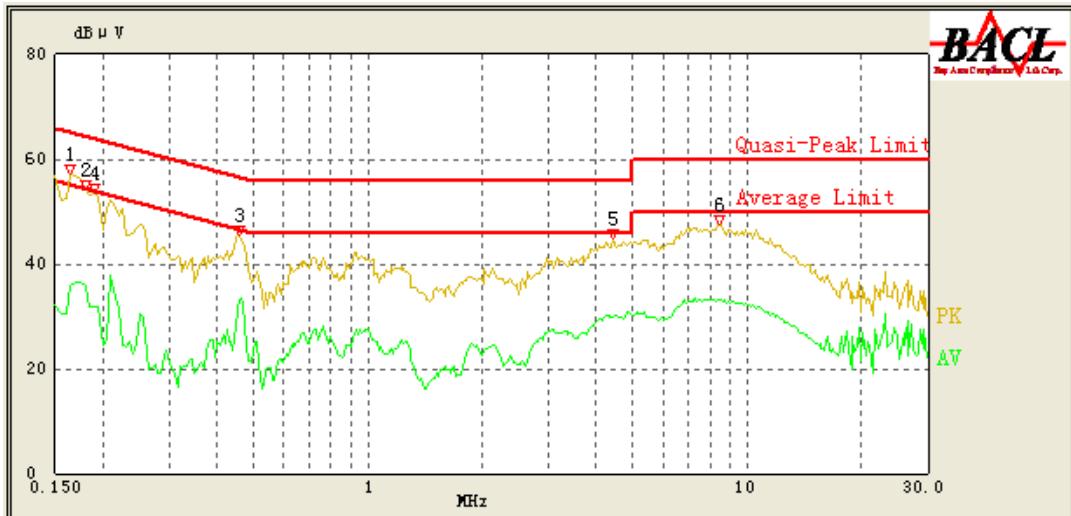
Environmental Conditions

Temperature:	25 °C
Relative Humidity:	50 %
ATM Pressure:	100.0 kPa

The testing was performed by Andrew Shu on 2012-11-05.

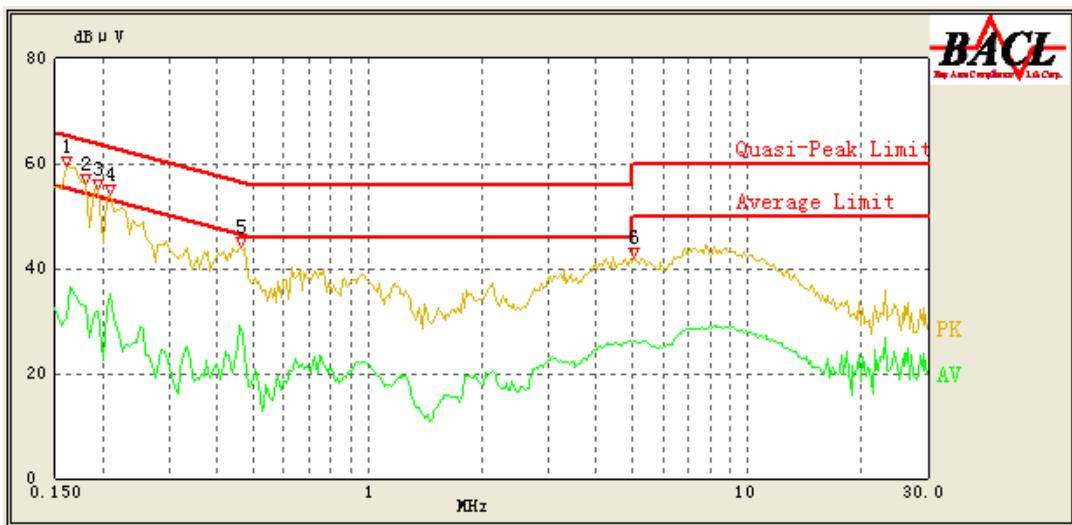
Test Mode: Video (Powered by AC adapter)

AC 120V/60 Hz, Line:



Frequency (MHz)	Corrected Amplitude (dB μ V)	Correction Factor (dB)	Limit (dB μ V)	Margin (dB)	Detector (PK/ QP/Ave.)
0.460	33.20	10.26	47.14	13.94	Ave.
0.165	51.47	10.27	65.57	14.10	QP
0.460	42.39	10.26	57.14	14.75	QP
0.180	49.95	10.27	65.14	15.19	QP
4.440	29.97	10.28	46.00	16.03	Ave.
8.445	33.06	10.43	50.00	16.94	Ave.
4.445	37.44	10.28	56.00	18.56	QP
0.190	45.83	10.27	64.86	19.03	QP
0.180	35.94	10.27	55.14	19.20	Ave.
0.165	35.95	10.27	55.57	19.62	Ave.
8.455	40.33	10.43	60.00	19.67	QP
0.190	31.80	10.27	54.86	23.06	Ave.

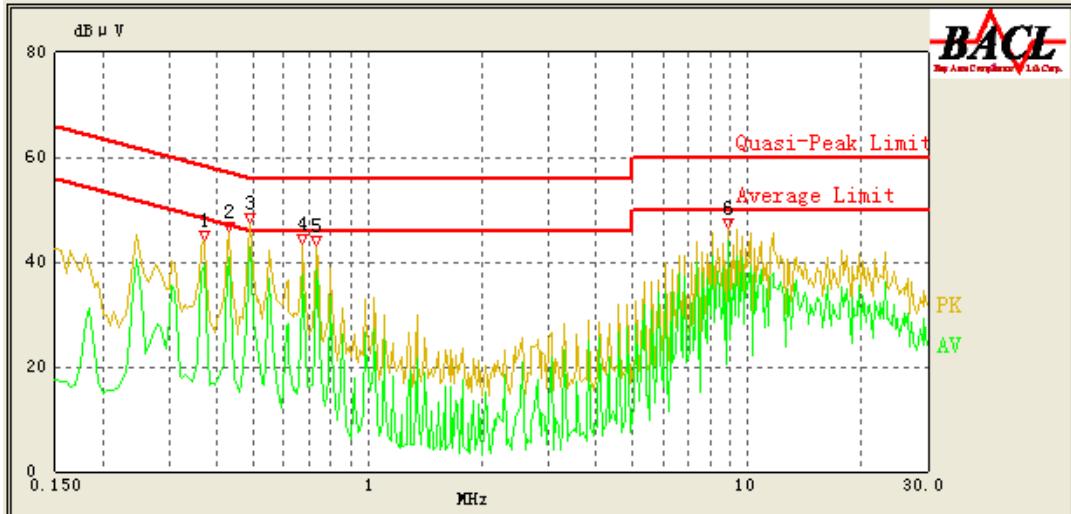
AC 120V/60 Hz, Neutral



Frequency (MHz)	Corrected Amplitude (dB μ V)	Correction Factor (dB)	Limit (dB μ V)	Margin (dB)	Detector (PK/ QP/Ave.)
0.180	50.84	10.27	65.14	14.30	QP
0.210	49.18	10.27	64.29	15.11	QP
0.160	49.66	10.27	65.71	16.05	QP
0.465	39.98	10.26	57.00	17.02	QP
0.465	28.39	10.26	47.00	18.61	Ave.
0.195	45.62	10.27	64.71	19.09	QP
0.210	35.15	10.27	54.29	19.14	Ave.
0.180	32.88	10.27	55.14	22.26	Ave.
0.195	31.70	10.27	54.71	23.01	Ave.
5.020	26.21	10.30	50.00	23.79	Ave.
0.160	30.47	10.27	55.71	25.24	Ave.
5.020	34.47	10.30	60.00	25.53	QP

Test Mode: Video (Powered by PoE)

AC 120V/60 Hz, Line:



Frequency (MHz)	Corrected Amplitude (dB μ V)	Correction Factor (dB)	Limit (dB μ V)	Margin (dB)	Detector (PK/ QP/Ave.)
0.490	42.78	10.25	46.29	3.51	Ave.
8.910	44.09	10.45	50.00	5.91	Ave.
0.430	40.96	10.26	48.00	7.04	Ave.
0.735	38.35	10.21	46.00	7.65	Ave.
0.675	37.51	10.22	46.00	8.49	Ave.
0.370	39.63	10.26	49.71	10.08	Ave.
0.490	45.95	10.25	56.29	10.34	QP
0.430	44.00	10.26	58.00	14.00	QP
0.735	41.83	10.21	56.00	14.17	QP
0.675	41.58	10.22	56.00	14.42	QP
8.910	44.61	10.45	60.00	15.39	QP
0.370	42.07	10.26	59.71	17.64	QP

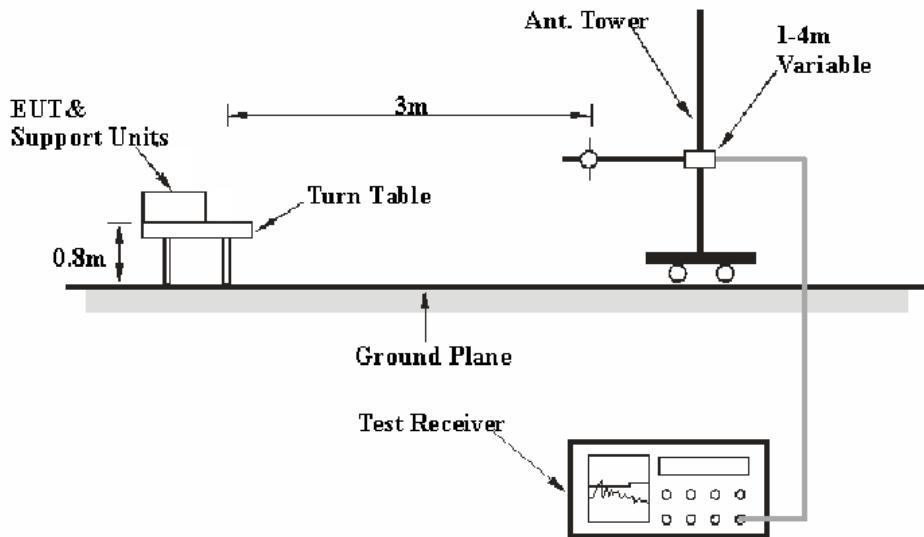
AC 120V/60 Hz, Neutral



Frequency (MHz)	Corrected Amplitude (dB μ V)	Correction Factor (dB)	Limit (dB μ V)	Margin (dB)	Detector (PK/ QP/Ave.)
0.490	43.05	10.24	46.29	3.24	Ave.
0.430	40.86	10.25	48.00	7.14	Ave.
0.735	38.56	10.21	46.00	7.44	Ave.
0.675	38.08	10.22	46.00	7.92	Ave.
0.490	46.41	10.24	56.29	9.88	QP
0.370	39.48	10.25	49.71	10.23	Ave.
0.245	40.97	10.25	53.29	12.32	Ave.
0.735	42.15	10.21	56.00	13.85	QP
0.675	42.11	10.22	56.00	13.89	QP
0.430	44.10	10.25	58.00	13.90	QP
0.370	42.46	10.25	59.71	17.25	QP
0.245	43.42	10.25	63.29	19.87	QP

FCC§15.109 - RADIATED EMISSIONS

EUT Setup



The radiated emission tests were performed in the 3 meters chamber B test site, using the setup accordance with the ANSI C63.4-2009. The specification used was the FCC Part 15 Class B limits.

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

The AC adapter or PoE adapter was connected to a 120 VAC/60 Hz power source.

EMI Test Receiver Setup

According to FCC 15.33 requirements, the EUT system was measured from 30 MHz to 2 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	Detector
30 MHz – 1000 MHz	120 kHz	300 kHz	QP
1000 MHz – 25 GHz	1 MHz	3 MHz	PK
1000 MHz – 25 GHz	1 MHz	10 Hz	Ave.

Test Procedure

For the radiated emissions test, the AC adapter or PoE adapter was connected to AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

The data was recorded in Quasi-peak detection mode for frequency range of 30 MHz to 1 GHz and peak and Average detection modes for frequencies above 1 GHz.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2012-08-08	2013-08-07
HP	Amplifier	8447E	1937A01046	2011-11-24	2012-11-23
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2011-11-28	2012-11-27
SUPER ULTRA	Amplifier	ZVA-213+	N/A	2011-11-24	2012-11-23
Sunol Sciences	Horn Antenna	DRH-118	A052304	2011-12-01	2012-11-30
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2011-11-24	2012-11-23
R&S	Auto test Software	EMC32	V6.30	-	-

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Corrected Amplitude & Margin Calculation

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

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

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 limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Results Summary

According to the data in the following table, the worst margin reading is below:

2.1 dB at 31.588850 MHz in the Vertical polarization (powered by PoE)

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	50 %
ATM Pressure:	100.0 kPa

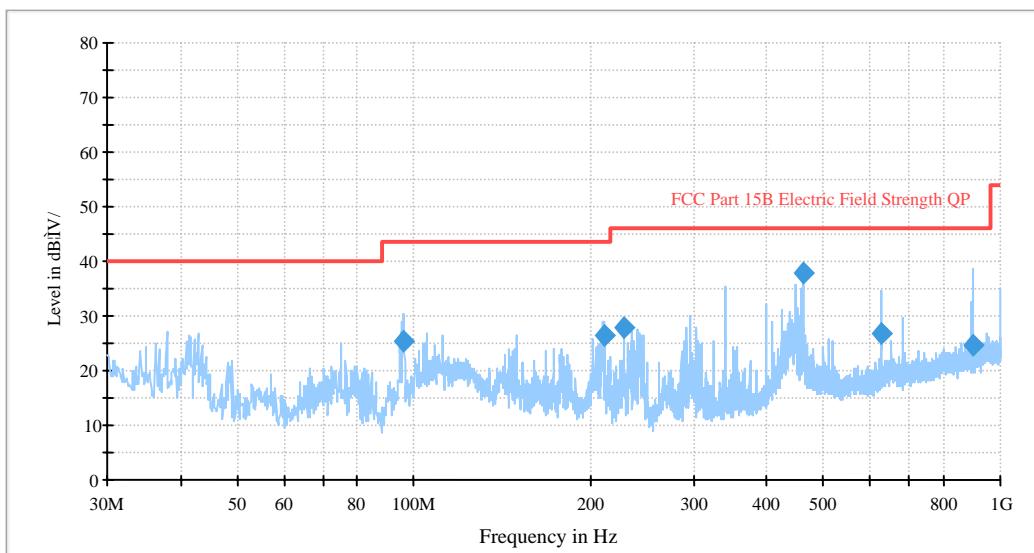
The testing was performed by Andrew Shu on 2012-11-05.

Test Mode: Video

Test Mode: Video (Powered by AC adapter)

1) 30 MHz ~ 1000 MHz

Auto Test (FCC Part15B)



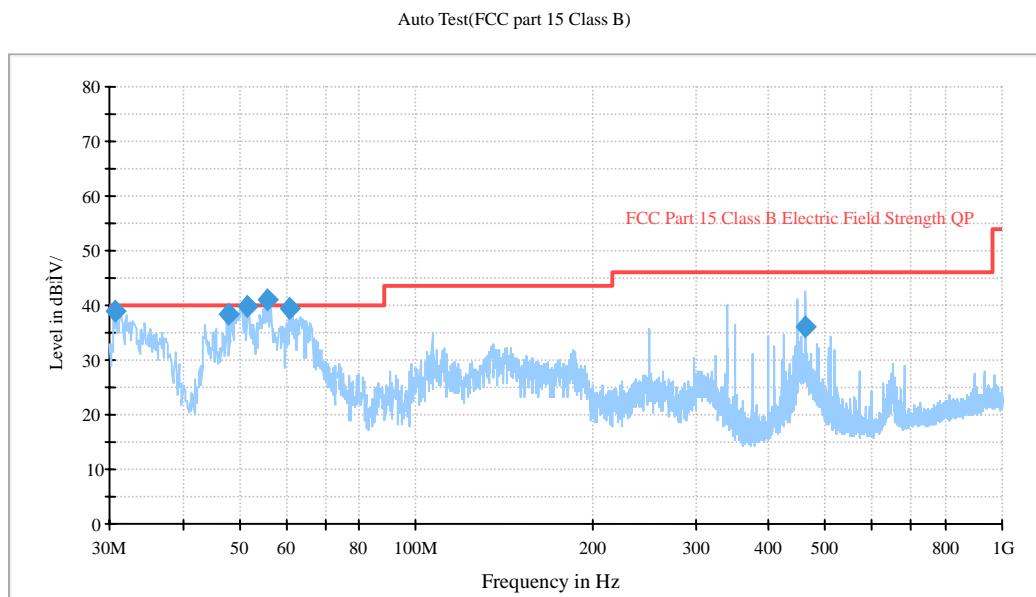
Frequency (MHz)	Corrected Amplitude (dB μ V/m)	Antenna Height (cm)	Ant. Polarity (H/V)	Turntable Position (degree)	Correction Factor (dB/m)	Limit (dB μ V/m)	Margin (dB)
462.373125	37.6	104	V	180	-10.7	46.0	8.4
96.855875	25.5	106	V	152	-18.4	40.0	14.5
210.915000	25.4	364	V	115	-16.5	40.0	14.6
227.901125	26.7	108	V	55	-16.2	43.5	16.8
896.440375	25.7	170	V	106	-4.1	46.0	20.3
625.580000	24.9	307	V	137	-4.2	46.0	21.1

2) 1 – 2 GHz

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dB μ V/m)	FCC Part 15B	
	Reading (dB μ V)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dB μ V/m)	Margin (dB)
1160.3	33.51	Ave.	56	1.3	V	0.13	33.64	54	20.36
1973.9	29.76	Ave.	125	1.3	H	3.07	32.83	54	21.17
1635.2	30.19	Ave.	36	1.2	V	1.77	31.96	54	22.04
1793.5	29.63	Ave.	55	1.2	H	2.32	31.95	54	22.05
1428.8	29.63	Ave.	15	1.3	H	0.74	30.37	54	23.63
1234.4	29.88	Ave.	22	1.2	V	0.16	30.04	54	23.96
1160.3	43.26	PK	56	1.3	V	0.13	43.39	74	30.61
1973.9	38.72	PK	125	1.3	H	3.07	41.79	74	32.21
1635.2	39.06	PK	36	1.2	V	1.77	40.83	74	33.17
1793.5	38.31	PK	55	1.2	H	2.32	40.63	74	33.37
1234.4	39.56	PK	22	1.2	V	0.16	39.72	74	34.28
1428.8	38.76	PK	15	1.3	H	0.74	39.50	74	34.50

Test Mode: Video (Powered by PoE)

1) 30 MHz ~ 1000 MHz



Frequency (MHz)	Corrected Amplitude (dB μ V/m)	Antenna Height (cm)	Ant. Polarity (H/V)	Turntable Position (degree)	Correction Factor (dB/m)	Limit (dB μ V/m)	Margin (dB)
31.588850	37.9	105	V	294	-7.2	40	2.1
56.012450	37.6	106	V	148	-20.9	40	2.4
47.126500	36.4	106	V	268	-11.6	40	3.6
61.631850	36.4	105	V	160	-20.7	40	3.6
51.443200	35.7	104	V	163	-20.3	40	4.3
463.017650	35.2	110	V	201	-10.7	46	10.8

2) 1 – 2 GHz

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dB μ V/m)	FCC Part 15B	
	Reading (dB μ V)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dB μ V/m)	Margin (dB)
1701.4	33.26	Ave.	15	1.2	H	2.24	35.50	54	18.50
1158.3	34.22	Ave.	225	1.3	H	0.16	34.38	54	19.62
1595.1	32.19	Ave.	66	1.3	V	1.70	33.89	54	20.11
1859.7	31.26	Ave.	230	1.2	H	2.63	33.89	54	20.11
1196.3	32.28	Ave.	13	1.3	V	0.13	32.41	54	21.59
1533.0	31.22	Ave.	26	1.2	H	1.15	32.37	54	21.63
1701.4	42.95	PK	15	1.2	H	2.24	45.19	74	28.81
1158.3	43.77	PK	225	1.3	H	0.16	43.93	74	30.07
1595.1	40.51	PK	66	1.3	V	1.70	42.21	74	31.79
1859.7	38.33	PK	230	1.2	H	2.63	40.96	74	33.04
1196.3	40.09	PK	13	1.3	V	0.13	40.22	74	33.78
1533.0	38.05	PK	26	1.2	H	1.15	39.20	74	34.80

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