FCC PART 15B, CLASS B

MEASUREMENT AND TEST REPORT

For

invoxia

87 rue du Gouverneur General Eboue, Issy-Les-Moulineaux, France

FCC ID: ZVS-E169

Report Type:	**Product Type:**
Original Report	Media Station

Test Engineer:	Joson Xiao
Report Number:	RSZ131209003-00
Report Date:	2014-01-10
Reviewed By:	Dick Zhang EMC Leader
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Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *invoxia*'s product, model number: *E169 (FCC ID: ZVS-E169)* or the "EUT" in this report is a Media Station , *named as DTP2 by applicant,* which was measured approximately: 29.2 cm (L) x 11.5 cm (W) x 6.0 cm (H), rated with input voltage: DC 12 V from adapter.

Adapter Information: AC ADAPTOR
Model: KSAP0361200300D5
Input: 100-240V~50/60Hz, 0.8A
Output: DC 12.0V, 3.0A

** All measurement and test data in this report was gathered from production sample serial number: YYIEWWDXXXXX (Assigned by applicant). The EUT supplied by the applicant was received on 2013-12-09.*

Objective

This report is prepared on behalf of *invoxia* in accordance with Part 2-Subpart J, Part 15- Subparts A and B of the Federal Communication Commissions rules.

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

Related Submittal(s)/Grant(s)

Part 15.247 DSS submission with ID: ZVS-E169.

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.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in a typical mode which is provided by manufacture.

EUT Exercise Software

No exercise software was used.

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

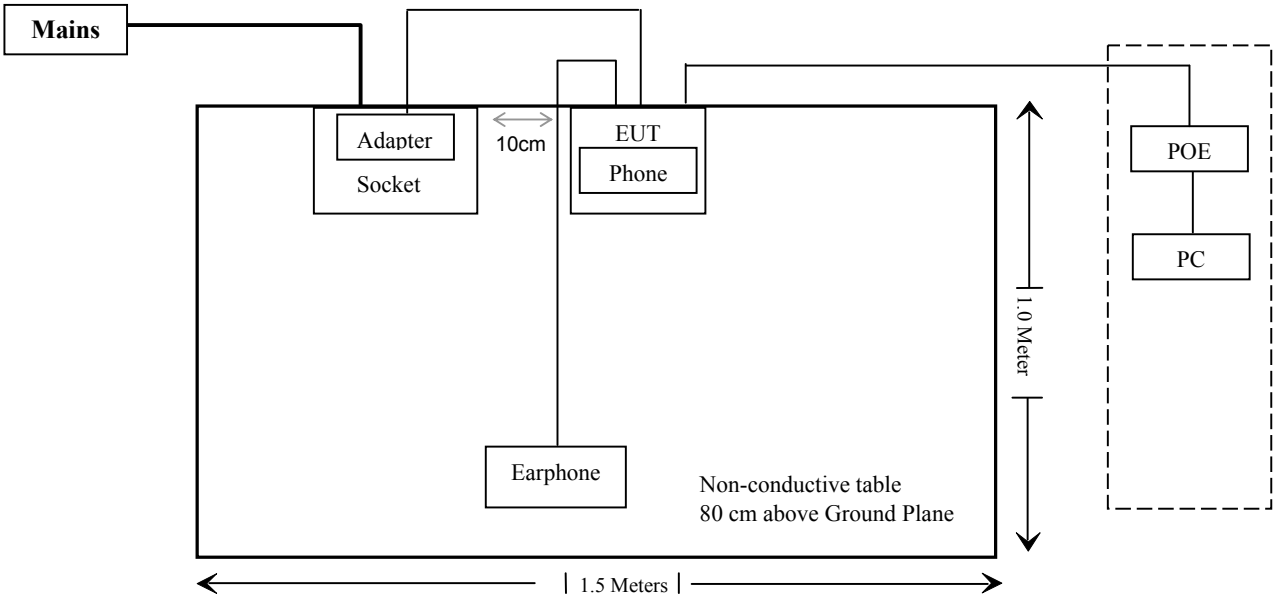
Manufacturer	Description	Model	Serial Number
N/A	Earphone	N/A	CT12-073320
N/A	Earphone	N/A	N/A14589653145
APPLE	iphone	4S	12182566
ASUS	PC	N750	14568925
NOKIA	Mobile phone	5250	RM-648
DELL	PC	Insprion 660	110634-11
CAUTION	POE	GRT-480050	120713114
BULL	Socket	GN-B07	550460004

External I/O Cable

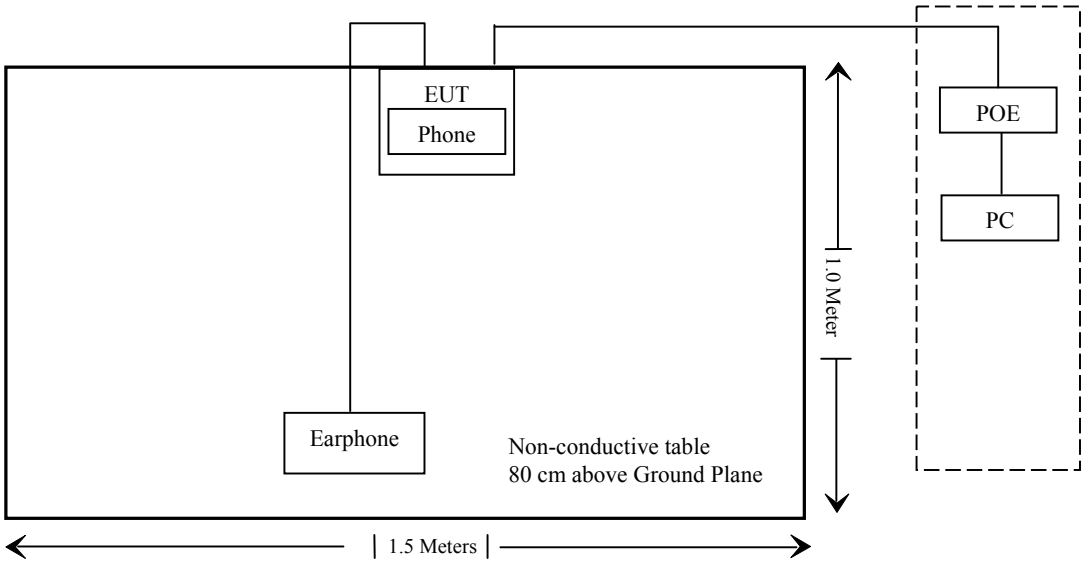
Cable Description	Length (m)	From/Port	To
Unshielded Detachabled RJ45 Cable	5.0	POE	EUT
Unshielded Undetachabled Audio Cable	1.2	Earphone	EUT
Unshielded Undetachabled DC Cable	1.5	Adapter	EUT
Unshielded Undetachabled AC Cable	1.5	Mains	Socket
Unshielded Detachabled RJ45 Cable	1.5	POE	PC

Block Diagram of Test Setup

1) Adapter power supply:



2) PoE power supply:



SUMMARY OF TEST RESULTS

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

FCC §15.107 – AC LINE CONDUCTED EMISSIONS

Applicable Standard

According to FCC §15.107

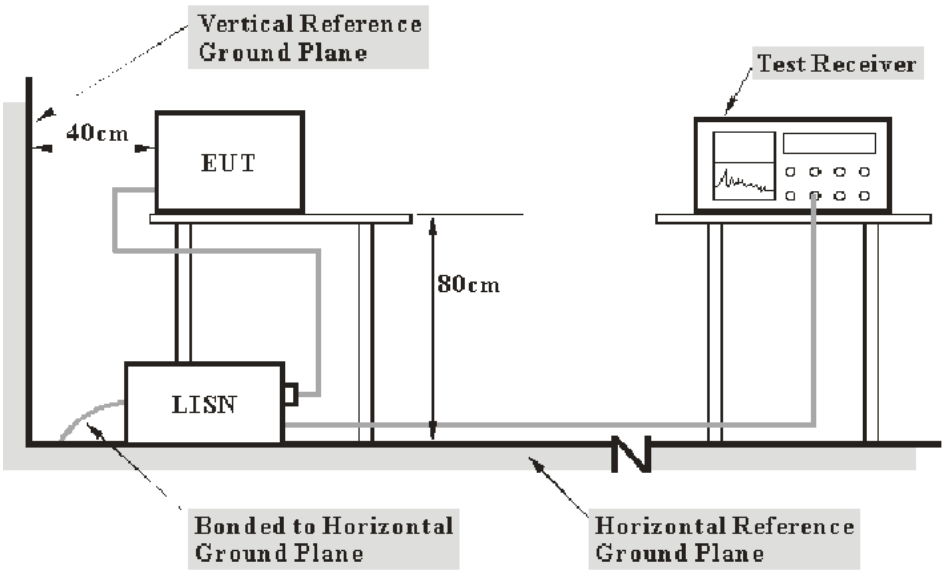
Measurement Uncertainty

Input quantities to be considered for conducted disturbance measurements maybe receiver reading, attenuation of the connection between AMN/ISN and receiver, AMN/ISN voltage division factor, AMN/ISN VDF frequency interpolation and receiver related input quantities, etc.

Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of conducted disturbance test at Bay Area Compliance Laboratories Corp. (Shenzhen) is shown as below. And the uncertainty will not be taken into consideration for the test data recorded in the report

Port	Measurement uncertainty
AC Mains	3.26 dB (k=2, 95% level of confidence)
CAT 3	3.70 dB (k=2, 95% level of confidence)
CAT 5	3.86 dB (k=2, 95% level of confidence)
CAT 6	4.64 dB (k=2, 95% level of confidence)

EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The measurement procedure of EUT setup is according with ANSI C63.4-2009. The related limit was specified in FCC Part 15.107 Class B.

The spacing between the peripherals was 10 cm.

The adapter was connected to an AC 120V/60 Hz power source

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:

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

Test Procedure

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	2013-06-17	2014-06-17
Rohde & Schwarz	1st LISN	ENV216	3560.6650.12-101613-Yb	2013-05-07	2014-05-07
Rohde & Schwarz	2nd LISN	ESH2-Z5	892107/021	2013-08-22	2014-08-22
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2013-10-15	2014-10-15
Rohde & Schwarz	CE Test software	EMC 32	V8.53	--	--

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Corrected Factor & Margin Calculation

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

Correction Factor = LISN VDF + Cable Loss + 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:

Margin = Limit – Corrected Amplitude

Test Results Summary

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

0.8 dB at **29.842000 MHz** in the **Line** conducted mode for PoE power supply mode

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level is in compliance with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

in BACL, $U_{(Lm)}$ is less than U_{cispr}, if L_m is less than L_{lim}, it implies that the EUT complies with the limit.

Test Data

Environmental Conditions

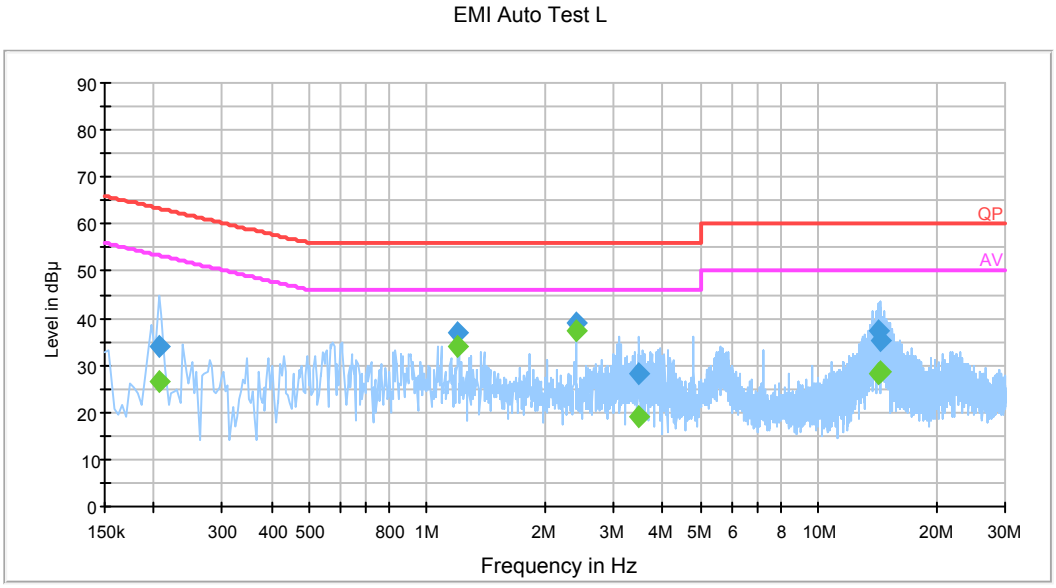
Temperature:	20 ℃
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Joson Xiao on 2013-12-10.

Test Mode: Running

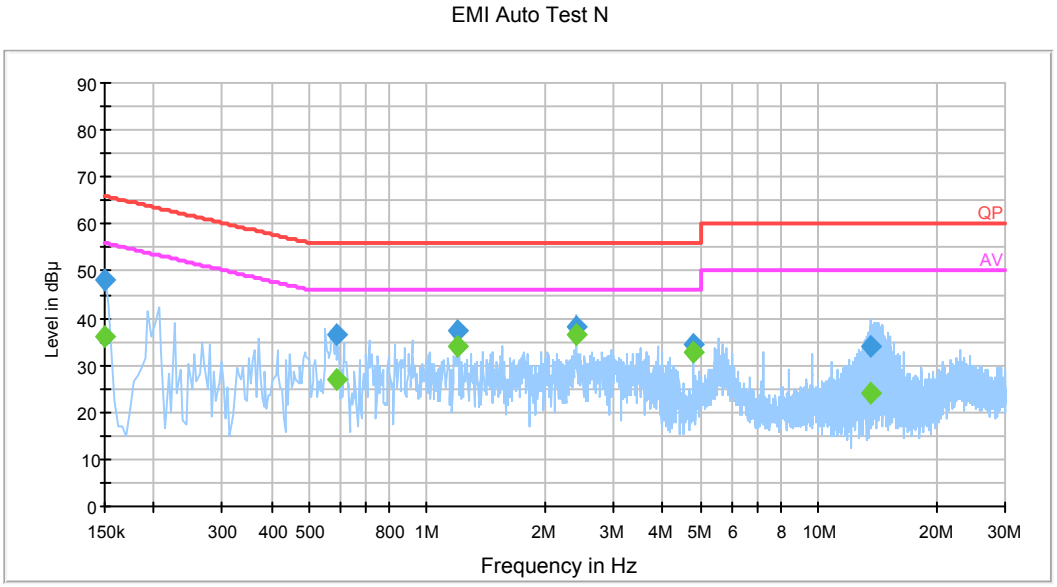
1) Adapter power supply:

AC 120V/60 Hz, Line



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.206000	33.9	19.6	63.4	29.4	QP
0.206000	26.6	19.6	53.4	26.8	Ave.
1.202000	36.8	19.5	56.0	19.2	QP
1.202000	34.0	19.5	46.0	12.0	Ave.
2.402000	39.1	19.6	56.0	16.9	QP
2.402000	37.5	19.6	46.0	8.5	Ave.
3.490000	28.4	19.7	56.0	27.6	QP
3.490000	18.9	19.7	46.0	27.1	Ave.
14.210000	37.5	19.8	60.0	22.5	QP
14.210000	28.4	19.8	50.0	21.6	Ave.
14.466000	35.2	19.8	60.0	24.8	QP
14.466000	28.8	19.8	50.0	21.2	Ave.

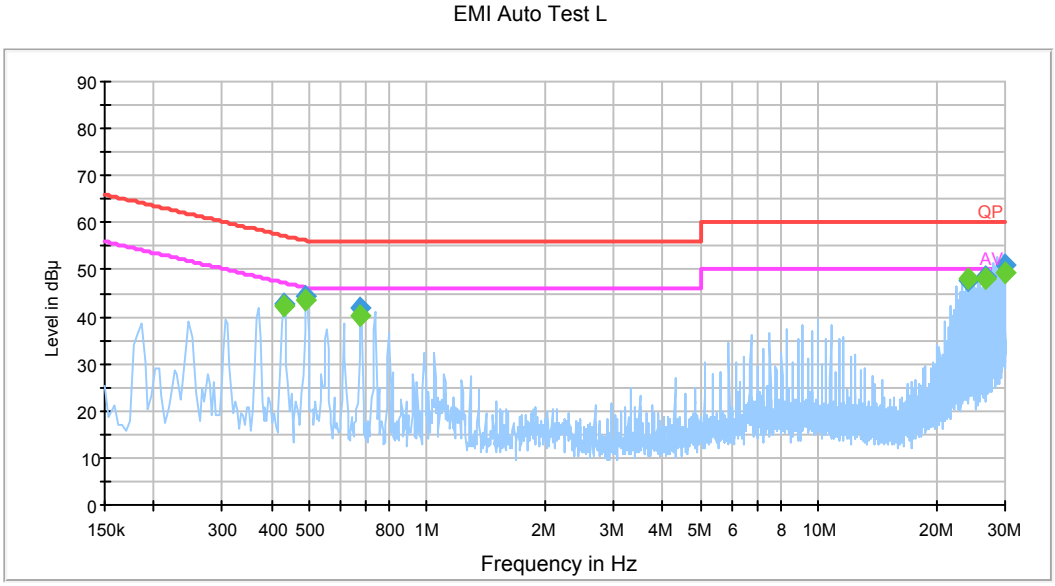
AC 120V/60 Hz, Neutral:



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.150000	48.1	19.6	66.0	17.9	QP
0.150000	36.2	19.6	56.0	19.8	Ave.
0.586000	36.4	19.6	56.0	19.6	QP
0.586000	26.8	19.6	46.0	19.2	Ave.
1.202000	37.1	19.5	56.0	18.9	QP
1.202000	34.0	19.5	46.0	12.0	Ave.
2.406000	38.1	19.7	56.0	17.9	QP
2.406000	36.4	19.7	46.0	9.6	Ave.
4.806000	34.4	19.7	56.0	21.6	QP
4.806000	32.8	19.7	46.0	13.2	Ave.
13.626000	34.2	19.8	60.0	25.8	QP
13.626000	24.2	19.8	50.0	25.8	Ave.

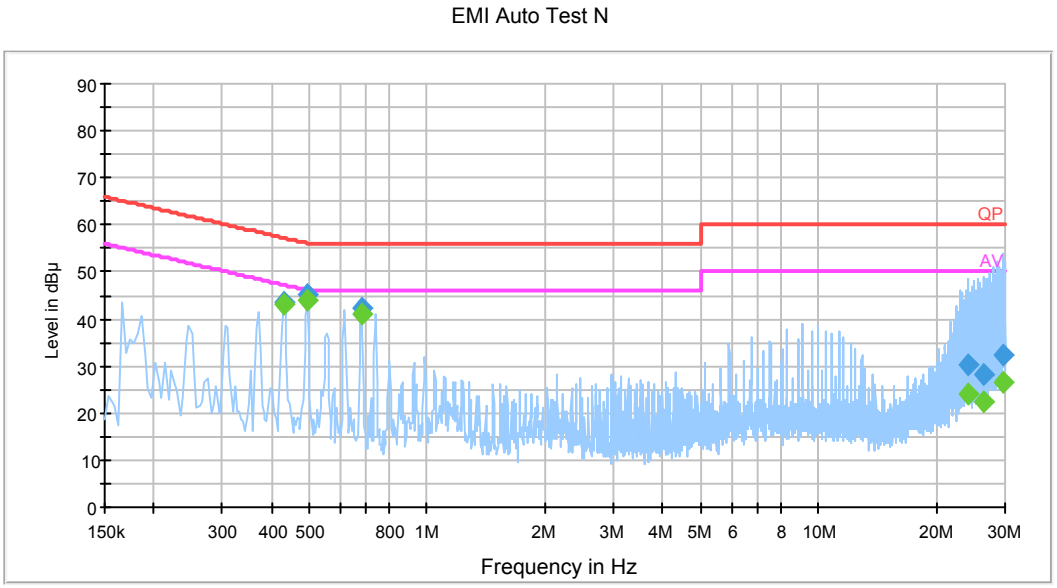
2) PoE power supply:

AC 120V/60 Hz, Line:



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.430000	42.8	19.6	57.3	14.4	QP
0.430000	42.2	19.6	47.3	5.1	Ave.
0.490000	44.6	19.6	56.2	11.6	QP
0.490000	43.7	19.6	46.2	2.4*	Ave.
0.674000	41.8	19.6	56.0	14.2	QP
0.674000	40.4	19.6	46.0	5.6	Ave.
24.194000	47.9	20.0	60.0	12.1	QP
24.194000	48.3	20.0	50.0	1.7*	Ave.
26.614000	48.4	20.1	60.0	11.6	QP
26.614000	48.0	20.1	50.0	2.0*	Ave.
29.842000	51.0	20.2	60.0	9.0	QP
29.842000	49.2	20.2	50.0	0.8*	Ave.

AC 120V/60 Hz, Neutral:



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.430000	43.4	19.6	57.3	13.8	QP
0.494000	45.1	19.7	56.1	11.0	QP
0.678000	42.5	19.6	56.0	13.5	QP
24.210000	30.4	20.2	60.0	29.6	QP
26.362000	28.4	20.2	60.0	31.6	QP
29.590000	32.2	20.3	60.0	27.8	QP
0.430000	43.0	19.6	47.3	4.3	Ave.
0.494000	44.0	19.7	46.1	2.1*	Ave.
0.678000	40.9	19.6	46.0	5.1	Ave.
24.210000	23.9	20.2	50.0	26.1	Ave.
26.362000	22.5	20.2	50.0	27.5	Ave.
29.590000	26.7	20.3	50.0	23.3	Ave.

Note:
1) Corrected Amplitude = Reading + Correction Factor
2) Correction Factor =LISN VDF (Voltage Division Factor) + Cable Loss + Transient Limiter Attenuation
The corrected factor has been input into the transducer of the test software.
3) Margin = Limit – Corrected Amplitude
4) *Within measurement uncertainty.

FCC §15.109 - RADIATED EMISSIONS

Applicable Standard

According to FCC §15.109

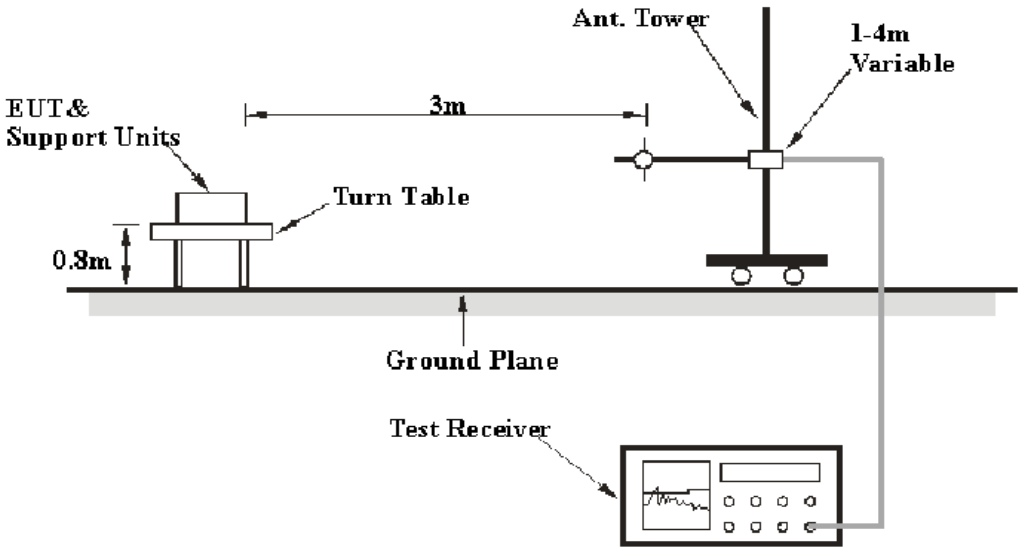
Measurement Uncertainty

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 CISPR 16-4-2:2011, the expended combined standard uncertainty of radiation emissions at Bay Area Compliance Laboratories Corp. (Shenzhen) is shown in below table. And the uncertainty will not be taken into consideration for the test data recorded in the report

Frequency	Polarity	Measurement uncertainty
30MHz~200MHz	Horizontal	4.62 dB (k=2, 95% level of confidence)
	Vertical	4.54 dB (k=2, 95% level of confidence)
200MHz~1GHz	Horizontal	4.84 dB (k=2, 95% level of confidence)
	Vertical	5.91 dB (k=2, 95% level of confidence)
1 GHz~6 GHz	Horizontal/ Vertical	4.68 dB (k=2, 95% level of confidence)
Above 6 GHz	Horizontal/ Vertical	4.92 dB (k=2, 95% level of confidence)

EUT Setup



The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.4-2009. The specification used was the FCC Part 15.109 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 spacing between the peripherals was 10 cm.

The adapter was connected to an AC 120V/60 Hz power source

EMI Test Receiver Setup

The system was investigated from 30 MHz to 18 GHz.

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

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	Ave.

Test Procedure

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

All data was recorded in the Quasi-peak detection mode from 30 MHz to 1 GHz, Peak and average detection mode above 1 GHz.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	8447E	1937A01046	2013-09-30	2014-09-30
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2013-09-17	2014-09-17
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2011-11-28	2014-11-27
Mini	Amplifier	ZVA-183-S+	5969001149	2013-04-03	2014-04-03
A.H. System	Horn Antenna	SAS-200/571	135	2012-02-11	2015-02-10
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2013-11-12	2014-11-12
the electro-Mechanics Co.	Horn Antenna	3116	9510-2270	2013-10-14	2016-10-13
R&S	Auto test Software	EMC32	V9.10	--	--

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Corrected Amplitude & Margin Calculation

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

Correction Factor = Antenna Loss + Cable Loss - 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:

Margin = Limit – Corrected Amplitude

Test Results Summary

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

2.1 dB at **244.250500 MHz** in the **Horizontal** polarization for Adapter power supply mode

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level is in compliance with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

in BACL, $U_{(Lm)}$ is less than U_{cispr}, if L_m is less than L_{lim}, it implies that the EUT complies with the limit.

Test Data

Environmental Conditions

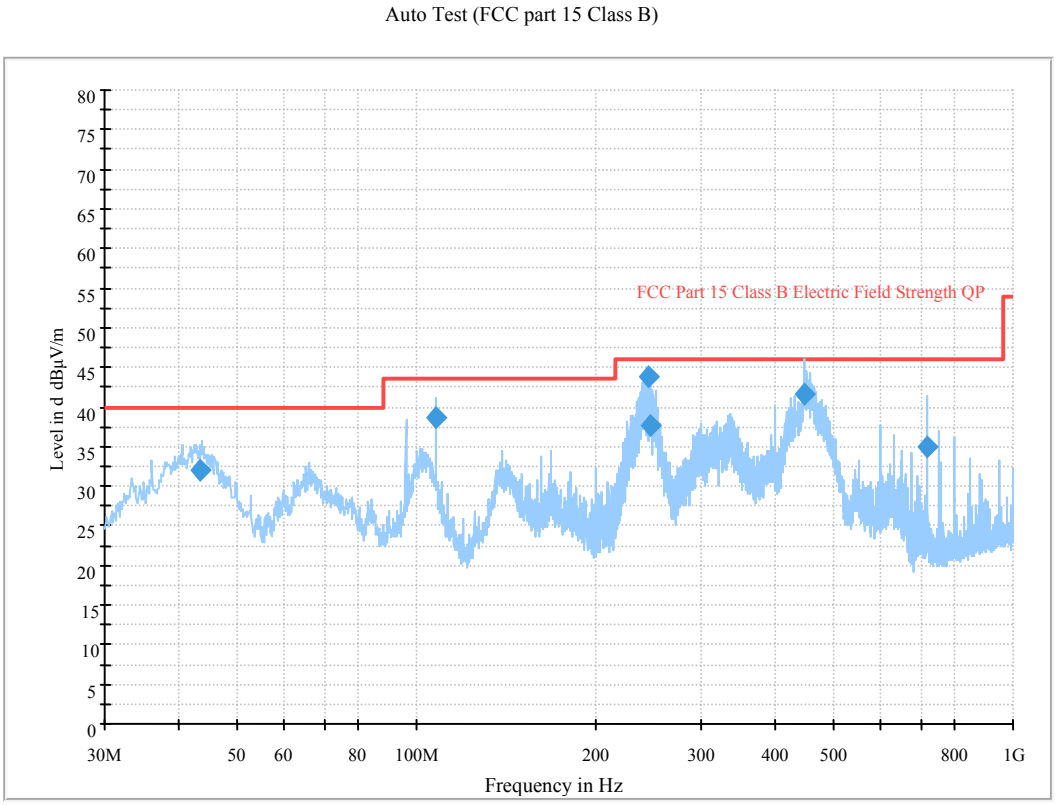
Temperature:	20 ℃
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Joson Xiao on 2013-12-10.

Test mode: Running

1) Adapter power supply:

Below 1 GHz:



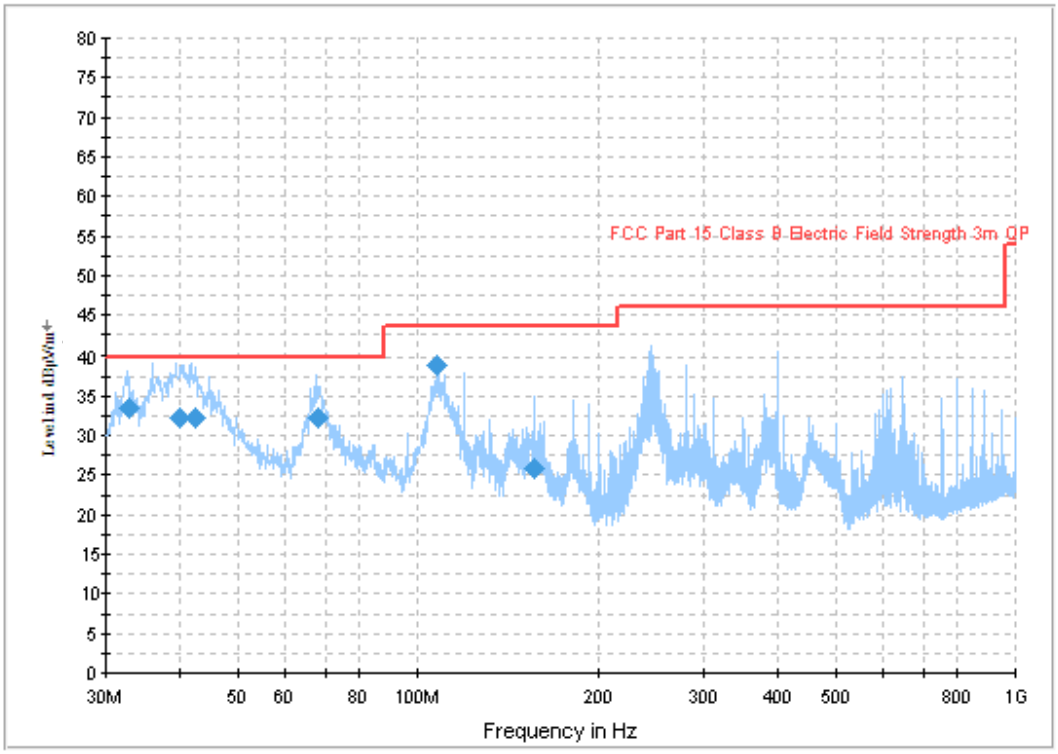
Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna height (cm)	Antenna Polarity	Turntable position (degree)	Correction Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
43.521750	32.0	100.0	V	277.0	-16.4	40.0	8.0
107.998375	38.7	273.0	H	64.0	-15.1	43.5	4.8
244.250500	43.9	134.0	H	221.0	-15.0	46.0	2.1*
246.406000	37.6	162.0	H	210.0	-15.0	46.0	8.4
447.485500	41.5	100.0	H	246.0	-10.5	46.0	4.5
720.061625	35.1	100.0	V	238.0	-6.3	46.0	10.9

Above 1 GHz:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)				
1802.0	45.89	PK	140	1.3	H	2.63	48.52	74	25.48
1802.0	33.48	Ave.	140	1.3	H	2.63	36.11	54	17.89
5456.4	33.48	PK	249	1.3	V	11.99	45.47	74	28.53
5456.4	22.46	Ave.	249	1.3	V	11.99	34.45	54	19.55

2) PoE power supply:

Below 1 GHz:



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna height (cm)	Antenna Polarity	Turntable position (degree)	Correction Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
32.812875	33.4	101.0	V	0.0	-8.6	40.0	6.6
39.791750	32.2	101.0	V	52.0	-13.7	40.0	7.8
42.369625	32.1	114.0	V	180.0	-15.6	40.0	7.9
67.998625	32.1	401.0	H	234.0	-20.1	40.0	7.9
108.013750	38.8	257.0	H	229.0	-15.1	43.5	4.7
155.602000	25.8	201.0	H	63.0	-14.7	43.5	17.7

Above 1 GHz:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)				
1611.4	47.46	PK	140	1.3	H	1.77	49.23	74	24.77
1611.4	32.76	Ave.	140	1.3	H	1.77	34.53	54	19.47
5648.2	35.90	PK	249	1.3	V	12.98	48.88	74	25.12
5648.2	22.47	Ave.	249	1.3	V	12.98	35.45	54	18.55

Note: *Within measurement uncertainty.

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