FCC PART 15 CLASS B

MEASUREMENT AND TEST REPORT

For

ZYCOO Co., LTD.

7F, B7, Tianfu Software park, Chengdu, China

FCC ID: 2ADWH-COOVOXU50V2

Model Number: CooVox-U50

Report Type:	**Equipment Name:**
Original Report	IP Phone System

Test Engineer:	Kevin Hu
Report Number:	RSC160316006
Report Date:	2016-03-24
Reviewed By:	Fidel Zhou Engineering Leader
Prepared By:	Bay Area Compliance Laboratories Corp. (Chengdu) 5040, Huilongwan Plaza, No. 1, Shawan Road, Jinniu District, Chengdu, Sichuan, China Tel: +86-28-65525123 Fax: +86-28-65525125 www.baclcorp.com

TABLE OF CONTENTS

GENERAL INFORMATION **3**
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) 3
MECHANICAL DESCRIPTION OF EUT 3
OBJECTIVE 3
RELATED SUBMITTAL(S)/GRANT(S) 3
TEST METHODOLOGY 3
TEST FACILITY 4
SYSTEM TEST CONFIGURATION **5**
JUSTIFICATION 5
EUT EXERCISE SOFTWARE 5
SPECIAL ACCESSORIES 5
EQUIPMENT MODIFICATIONS 5
LOCAL SUPPORT EQUIPMENT LIST AND DETAILS 5
EXTERNAL I/O CABLE 6
BLOCK DIAGRAM OF TEST SETUP 7
SUMMARY OF TEST RESULTS **8**
FCC §15.107 CONDUCTED EMISSION TEST **9**
APPLICABLE STANDARD 9
MEASUREMENT UNCERTAINTY 9
EUT SETUP 9
EMI TEST RECEIVER SETUP 10
TEST PROCEDURE 10
TEST EQUIPMENT LIST AND DETAILS 10
SUMMARY OF TEST RESULTS 10
CONDUCTED EMISSION TEST DATA AND PLOTS 11
FCC §15.109 RADIATED EMISSION TEST **14**
APPLICABLE STANDARD 14
MEASUREMENT UNCERTAINTY 14
EUT SETUP 14
EMI TEST RECEIVER SETUP 15
TEST PROCEDURE 15
CORRECTED AMPLITUDE & MARGIN CALCULATION 16
TEST EQUIPMENT LIST AND DETAILS 16
TEST SOFTWARE 16
SUMMARY OF TEST RESULTS 16
RADIATED EMISSION TEST 17

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The **ZYCOO Co., LTD.***'s* product, model number: **CooVox-U50, (FCC ID: 2ADWH-COOVOXU50V2**) or the "EUT" as referred to in this report was the **IP Phone System,** which has the metallic enclosure. The highest frequency was 1GHz.

Mechanical Description of EUT

The EUT was measured approximately 345 mm L x 162 mm W x 37 mm H.
Rated input voltage: DC 12V

Adapter Information:
Manufacturer: GOLDEN PROFIT ELECTRONICS LTD
Model: GPE024D-120200D
Input: 100-240V AC
Output: 12V DC

**All measurement and test data in this report was gathered from final production sample, serial number: 160104005/01 (assigned by the BACL, Chengdu). It may have deviation from any other sample. The EUT supplied by the applicant was received on 2015-12-25, and EUT conformed to test requirement.*

Objective

The following Class B report was prepared on behalf of **ZYCOO Co., LTD.**, 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 demonstrate compliance with FCC Part 15 Class B limits.

Related Submittal(s)/Grant(s)

No Related Submittals.

Test Methodology

All measurements contained in this report are conducted with ANSI C63.4-2014, 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 is performed at BACL. The radiated testing is performed at an antenna-to-EUT distance of 3 Meters.

Test Facility

The test site used by BACL to collect test data is located in the 5040, HuiLongWan Plaza, No. 1, ShaWan Road, JinNiu District, ChengDu, China

Test site at BACL 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 July 31, 2009. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 560332. 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

Justification

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

EUT Exercise Software

N/A.

Special Accessories

No special accessories were supplied by BACL.

Equipment Modifications

No modification to the EUT was made by BACL to make sure the EUT comply with applicable limits.

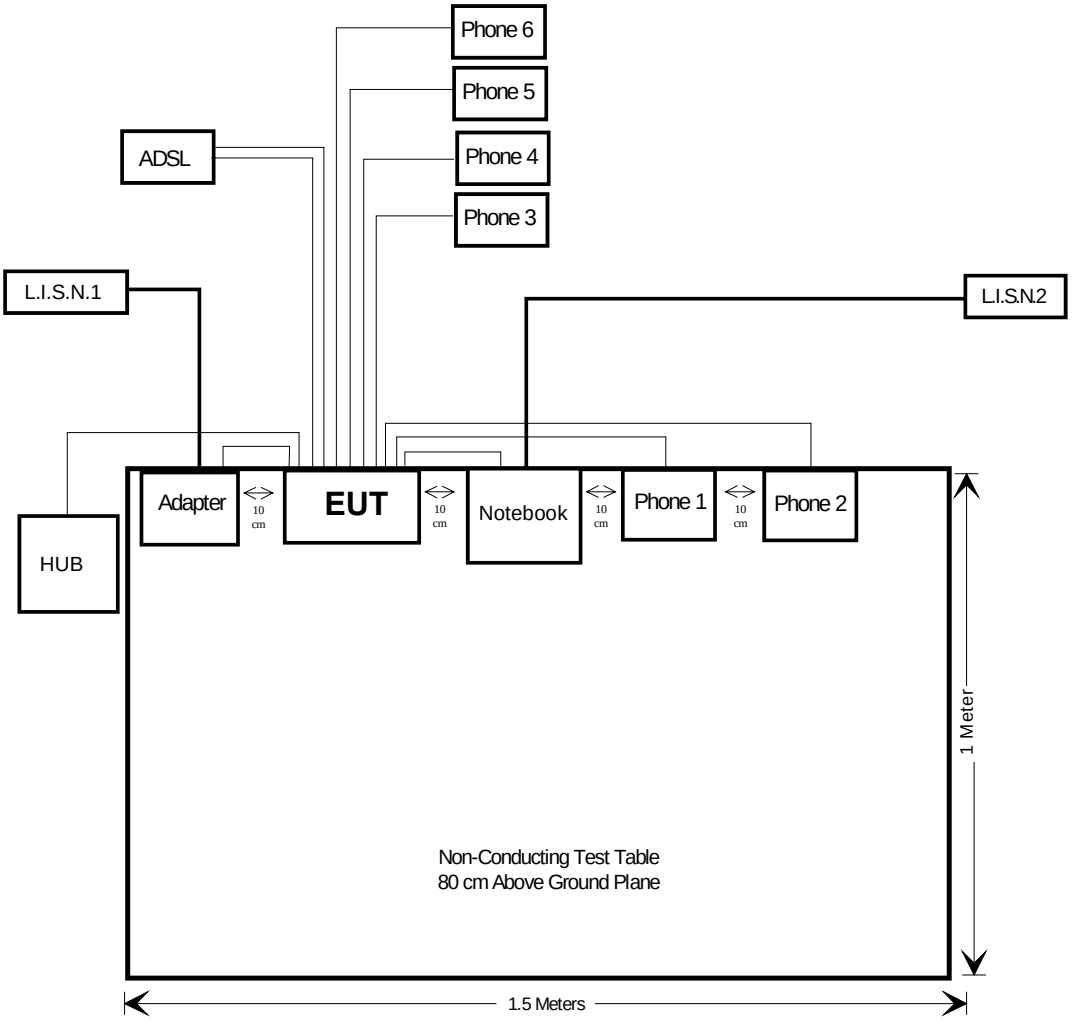
Local Support Equipment List and Details

Manufacturer	Description	Model Number	Serial Number
TP-LINK	ADSL	TP-86207	1147103014730
DL	HUB	810005PM	20000083PD00030
ADATA	USB Disk	None	None
Sachikoo	Phone x 2	HA6688T	None
DELL	Notebook	E6410	7480059229
JIAZHIXUAN	Phone x 2	HCD6868TSO	0067585
BLD	Phone x 2	HA6688P/T	990086

External I/O Cable

Cable Description	Length (m)	From / Port	To
Unshielded RJ11 Cable x2	3	EUT/RJ11	ADSL
Unshielded RJ11 Cable	1.2	EUT/RJ11	Phone 1
Unshielded RJ11 Cable	1.2	EUT/RJ11	Phone 2
Unshielded RJ11 Cable	3	EUT/RJ11	Phone 3
Unshielded RJ45 Cable	1.5	EUT/RJ45	Notebook
Unshielded RJ45 Cable	3	EUT/RJ45	HUB
Unshielded RJ11 Cable	3	EUT/RJ11	Phone 4
Unshielded RJ11 Cable	3	EUT/RJ11	Phone 5
Unshielded RJ11 Cable	3	EUT/RJ11	Phone 6

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

Standard	Description	Result
FCC §15.107	Conducted Emission	Compliance
FCC §15.109	Radiated Emission	Compliance

FCC §15.107 CONDUCTED EMISSION TEST

Applicable Standard

FCC §15.107

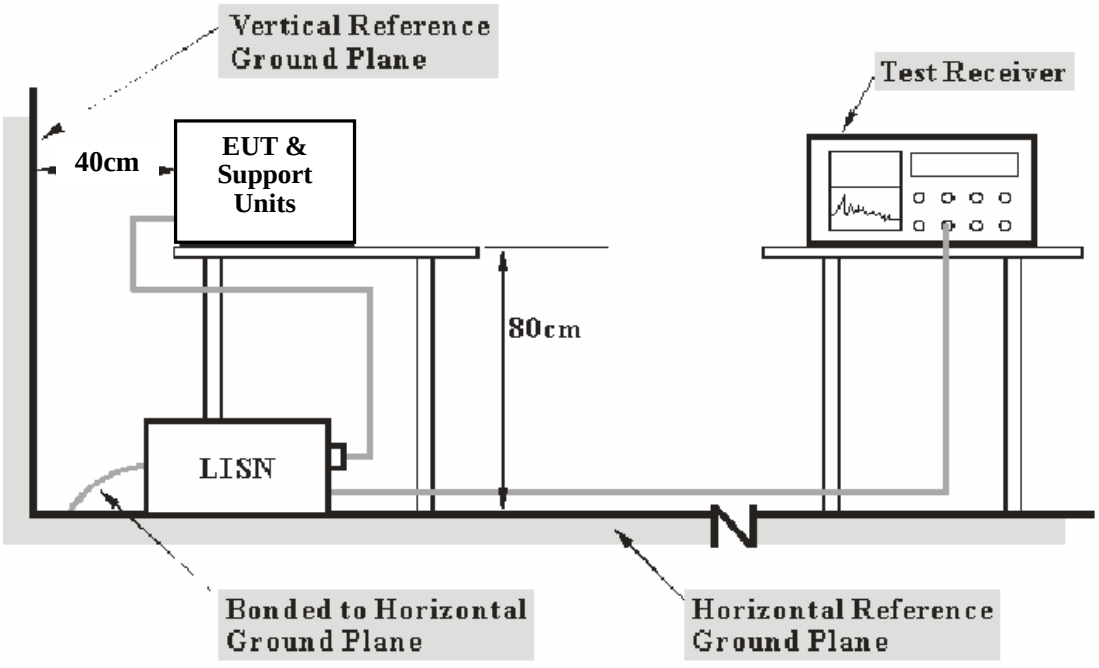
Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMI. The factors contributing to uncertainties are EMI Test Receiver, cable loss, and L.I.S.N.

Based on CISPR 16-4-2, the Treatment of Uncertainty in EMI Measurements, the best estimate of the uncertainty of any conducted emissions measurement at Bay Area Compliance Laboratories Corp. (Chengdu) is ±3.17 dB.

EUT Setup

The setup of EUT was in accordance with ANSI C63.4-2014 measurement procedure. The specification used was the FCC Part 15 Class B limits.



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 power cables and excess cables shall be folded at the cable center into a bundle no longer than 40 cm.

The spacing between the peripherals unit & EUT was 10 cm.

DC 12V power source was provided to EUT through AC adapter.

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 to ensure EUT is compliant with all installation combination.

All data are recorded in the Quasi-peak and Average detection mode. Quasi-peak readings are distinguished with a "**QP**". Average readings are distinguished with an "**AV**".

The EUT is in the normal operating mode during the final qualification test to represent the worst cases results.

Test Equipment List and Details

Manufacturer	Description	Model Number	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS 30	836858/0016	2015-12-02	2016-12-01
Rohde & Schwarz	L.I.S.N.	ENV216	3560.6550.06	2015-12-02	2016-12-01
BACL	CVP	CVP	150602	2015-07-17	2016-07-16
N/A	Conducted Cable	NO.1	N/A	2015-11-10	2016-11-09

*** Statement of Traceability:** BACL (Chengdu) attested that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Summary of Test Results

According to the data in the following, the EUT complied with the FCC Part 15B Conducted margin for a Class B device, with the *worst* margin reading of:

5.4 dB at **0.450130 MHz** in the **Line** Phase

Conducted Emission Test Data and Plots

Test Environment Conditions

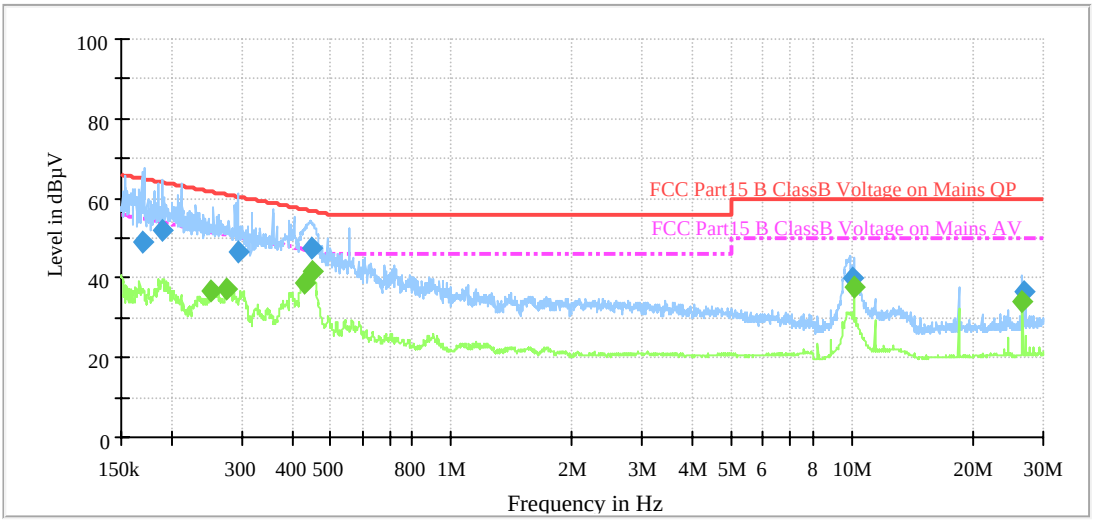
Temperature:	18 °C
Relative Humidity:	70 %
ATM Pressure:	101.0 kPa

The testing was performed by Kevin Hu on 2016-03-16.

Test Mode: Talking Mode

0.15 MHz – 30 MHz

Line

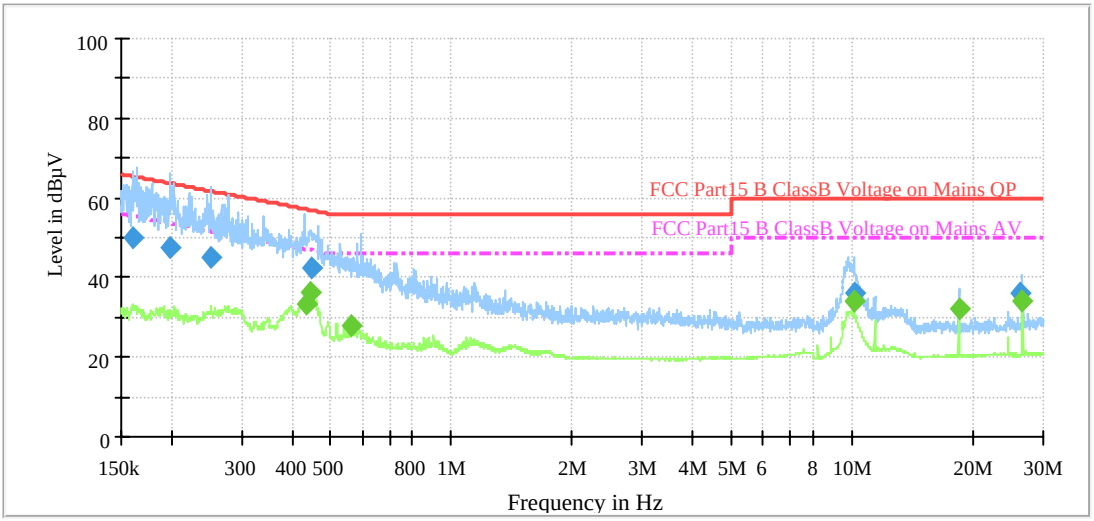


Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.169781	48.9	9.000	L1	18.8	16.1	65.0
0.189882	51.8	9.000	L1	18.9	12.2	64.0
0.292355	46.6	9.000	L1	19.5	13.9	60.5
0.450130	48.1	9.000	L1	19.9	8.8	56.9
10.121585	39.2	9.000	L1	20.2	20.8	60.0
26.621085	37.9	9.000	L1	20.7	22.1	60.0

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.250666	37.0	9.000	L1	19.2	14.7	51.7
0.275897	37.4	9.000	L1	19.4	13.5	50.9
0.430773	38.7	9.000	L1	19.9	8.5	47.2
0.450130	41.5	9.000	L1	19.9	**5.4**	46.9
10.121585	37.5	9.000	L1	20.2	12.5	50.0
26.621085	35.0	9.000	L1	20.7	15.0	50.0

0.15 MHz – 30 MHz

Neutral



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.160865	50.2	9.000	N	18.8	15.2	65.4
0.198414	47.4	9.000	N	18.8	16.3	63.7
0.251168	44.9	9.000	N	19.2	16.8	61.7
0.446547	41.4	9.000	N	19.9	15.5	56.9
10.121585	35.8	9.000	N	20.2	24.2	60.0
26.621085	37.2	9.000	N	20.6	22.8	60.0

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.432498	33.4	9.000	N	19.9	13.8	47.2
0.446547	36.3	9.000	N	19.9	10.6	46.9
0.565274	28.1	9.000	N	19.9	17.9	46.0
10.121585	33.9	9.000	N	20.2	16.1	50.0
18.431683	32.1	9.000	N	20.6	17.9	50.0
26.621085	36.2	9.000	N	20.6	13.8	50.0

FCC §15.109 RADIATED EMISSION TEST

Applicable Standard

FCC §15.109

Measurement Uncertainty

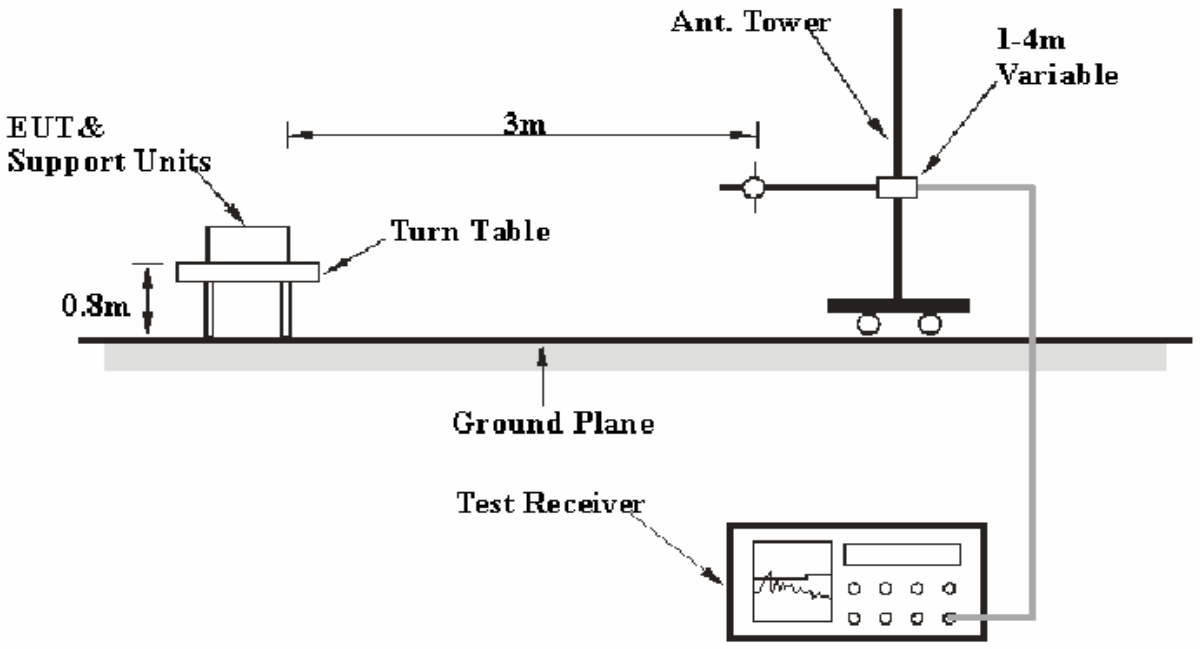
All measurements involve certain levels of uncertainties, especially in the field of EMI. The factors contributing to uncertainties are EMI Test Receiver, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor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

Based on CISPR 16-4-2, the Treatment of Uncertainty in EMI Measurements, the best estimate of the uncertainty of a radiation emissions measurement at BACL is 30M~200MHz: ±4.7 dB ; 200M~1GHz: ±6.0 dB ; 1G-6GHz: ±5.13dB.

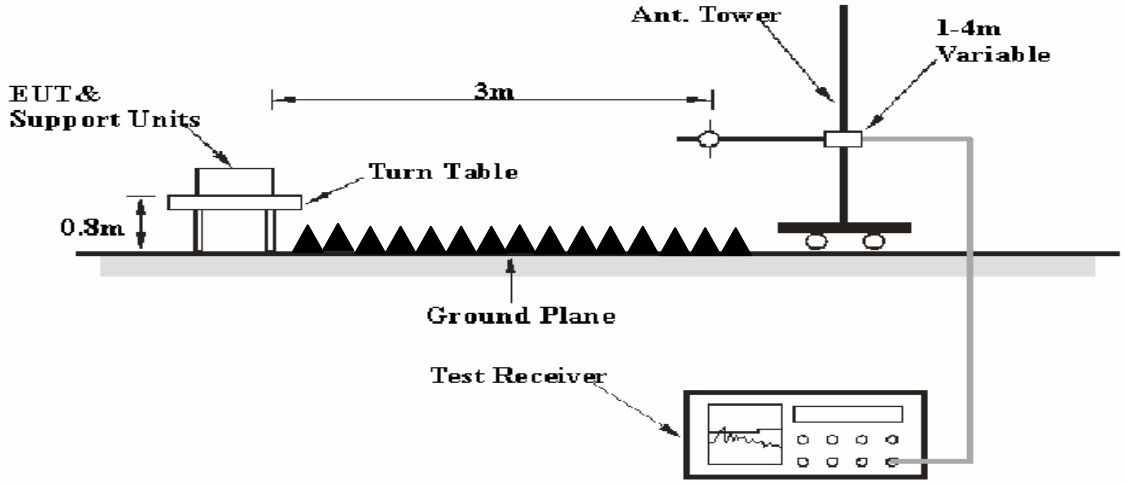
EUT Setup

The radiated emission tests were performed in the 3 meter Semi Anechoic Chamber, using the setup in accordance with the ANSI C63.4-2014. The specification used was the FCC Part 15 Class B limits.

Below 1GHz:



Above 1GHz:



The excess cables shall be folded at the cable center into a bundle no longer than 40 cm.

The spacing between the peripherals unit & EUT was 10 cm.

DC 12V power source was provided to EUT through AC adapter.

EMI Test Receiver Setup

According to FCC Rules, the highest frequency in the device is 1 GHz, so the frequency range to be tested from 30 MHz to 5 GHz.

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

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

Test Procedure

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

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

The EUT was in the normal operating mode during the final qualification test to represent the worst case results.

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:

Corr. Ampl. = Indicated Reading + Antenna Factor + Cable Factor - 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 7 dBμV/m below the maximum limit for FCC Part 15 Class B. The equation for margin calculation is as follows:

Margin = FCC Part 15 Class B Limit – Corr. Ampl.

Test Equipment List and Details

Manufacturer	Description	Model Number	Serial Number	Calibration Date	Calibration Due Date
Agilent	Amplifier	8447D	2944A10442	2015-12-02	2016-12-01
Rohde & Schwarz	EMI Test Receiver	ESCI	100028	2015-12-02	2016-12-01
Sunol Sciences	Broadband Antenna	JB3	A101808	2013-04-10	2016-04-09
Rohde & Schwarz	Spectrum Analyzer	FSL18	100180	2013-12-02	2016-12-01
EM TEST	Horn Antenna	3115	003-6076	2013-04-09	2016-04-08
Mini-circuits	Amplifier	ZVA-183-S+	771001215	2013-04-09	2016-04-08
EMCT	Semi-Anechoic Chamber	966	N/A	2015-04-24	2018-04-23
N/A	RF Cable (below 1GHz)	NO.1	N/A	2015-11-10	2016-11-09
N/A	RF Cable (below 1GHz)	NO.3	N/A	2015-11-10	2016-11-09
N/A	RF Cable (above 1GHz)	NO.2	N/A	2015-11-10	2016-11-09

*** Statement of Traceability:** BACL (Chengdu) attested that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Software

Description	Manufacturer	Version
EMC32	R&S	V 8.54.0

Summary of Test Results

According to the data in the following, the EUT complied with the FCC Part 15 Class B standards, and had the worst margin of:

2.8 dB at **884.748000 MHz** in the **Horizontal** polarization

Radiated Emission Test

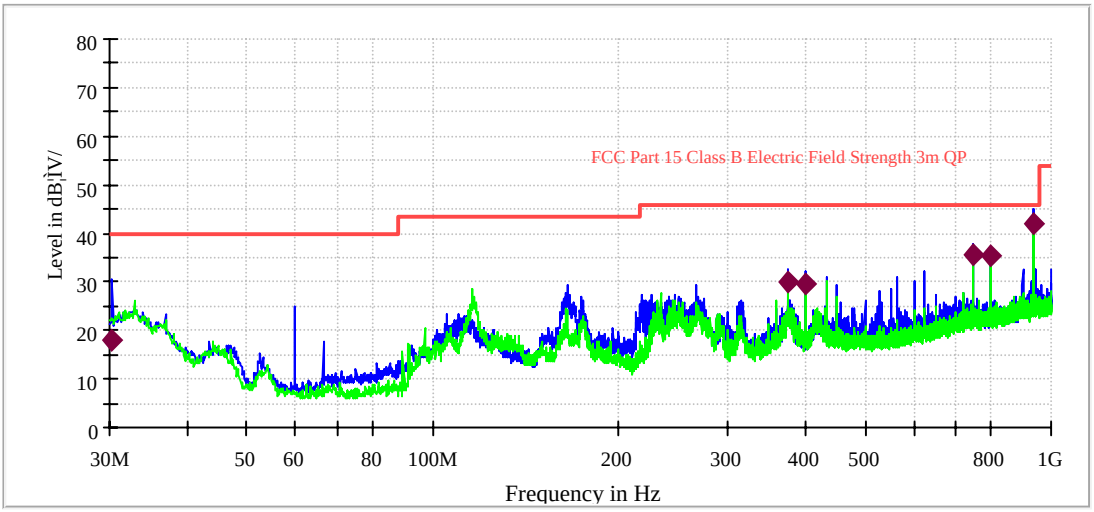
Test Environment Conditions

Temperature:	19 °C
Relative Humidity:	62 %
ATM Pressure:	101.0 kPa

The testing was performed by Kevin Hu on 2016-03-16.

Test Mode: Talking Mode

Below 1 GHz:



Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dBuV/m)	Margin (dB)	Limit (dBµV/m)
30.708550	32.0	120.000	100.0	V	108.0	-6.0	8.0	40.0
32.940750	23.8	120.000	125.0	V	98.0	-7.4	16.2	40.0
44.216250	23.4	120.000	100.0	V	145.0	-16.2	16.6	40.0
47.118550	30.6	120.000	100.0	V	246.0	-17.9	9.4	40.0
49.820700	21.4	120.000	100.0	V	255.0	-19.2	18.6	40.0
884.748000	43.2	120.000	100.0	H	230.0	-3.2	***2.8**	46.0

***** *Within Measurement Uncertainty*

Above 1 GHz:

Frequency	Result	Polarity	Detector	Corrected factor	Limit	Antenna Height	Turntable Position	Margin
(MHz)	(dBµV/m)	V/H	PK/Ave.	(dBuV/m)	(dBµV/m)	(cm)	(deg)	(dB)
1405.000	51.75	V	PK	0.36	74	100	156	22.25
1405.000	31.08	V	AV	0.36	54	100	156	22.92
2590.000	52.19	V	PK	0.95	74	110	183	21.81
2590.000	31.42	V	AV	0.95	54	110	183	22.58
4835.000	52.11	H	PK	8.58	74	100	215	21.89
4835.000	30.87	H	AV	8.58	54	100	215	23.13

Test Result: Compliance

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