



FCC PART 15 CLASS B

MEASUREMENT AND TEST REPORT

For

Skspruce Technologies Inc.

1732 N, First Street, Suit 220, San Jose, CA

FCC ID: 2ACKD-SAC700
Model Number: SAC700

This Report Concerns: Original Report	Equipment Name: Smart Access Control
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Report Number: RSC141011003	
Report Date: 2014-11-21	
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The **Skspruce Technologies Inc.**'s product, model number: **SAC700** (FCC ID: **2ACKD-SAC700**) or the "EUT" as referred to in this report was the **Smart Access Control**, which has the metallic enclosure. The highest operating frequency was 800 MHz.

Mechanical Description of EUT

The EUT was measured approximately 440 mm L x 320 mm W x 45 mm H.

Rated input voltage: AC120V/60Hz.

** All measurement and test data in this report were gathered from final production sample, serial number: 8042014061900003 (Assigned by the Applicant), It may have deviation from other sample. The EUT supplied by the applicant was received on 2014-10-11, and the EUT was complied with test requirement.*

Objective

The following Class B report was prepared on behalf of **Skspruce Technologies 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 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 C63.4-2003, 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 C63.4-2003.

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

Software name: tfgen.exe

Special Accessories

No special accessories were supplied by BAACL.

Equipment Modifications

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

Equipment under Test (EUT) General Description

Applicant	Description	Model Number	Serial Number
Skspruce Technologies Inc.	Smart Access Control	SAC700	8042014061900003

Local Support Equipment List and Details

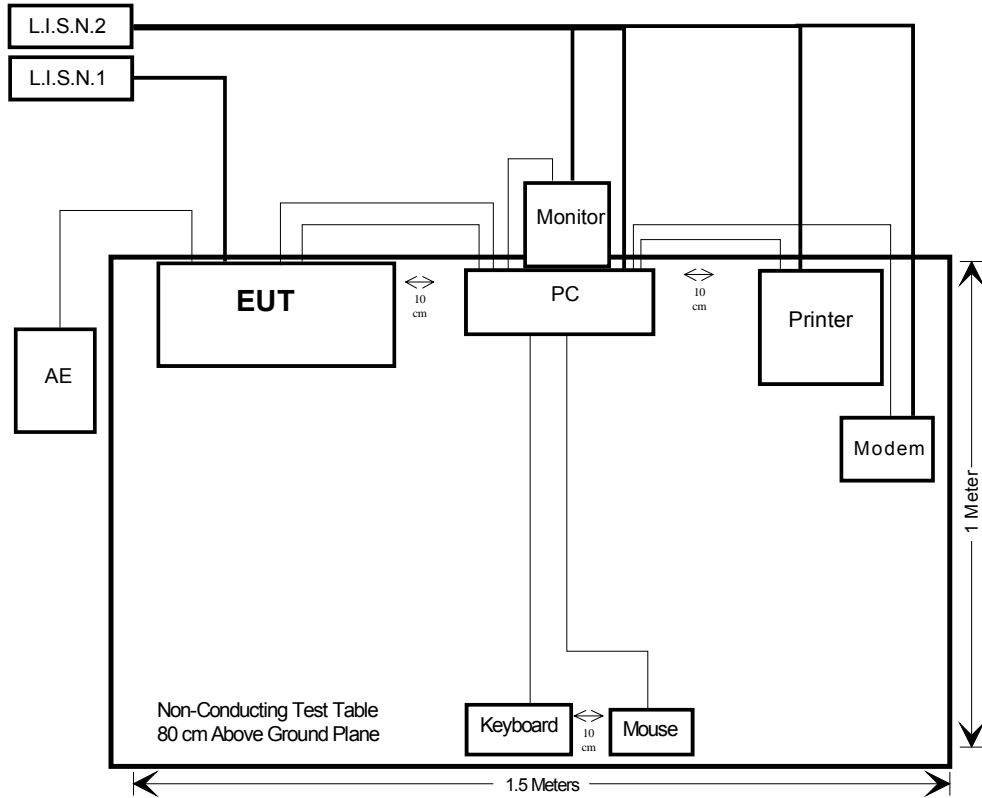
Manufacturer	Description	Model Number	Serial Number	Grants
IBM	PC	8176	99Y7315	DOC
ESPON	Printer	STYLUS PHOTO700	A2U0002196	DOC
DELL	Monitor	E157FPb	CN-OWH339-74261-894-3LOU	DOC
ANTEK	Modem	EGW-802	05083500	DOC
Genius	Keyboard	KM-110X	XBK133000993	DOC
Genius	Mouse	Netscroll 120	33C83137305720	DOC

External I/O Cable

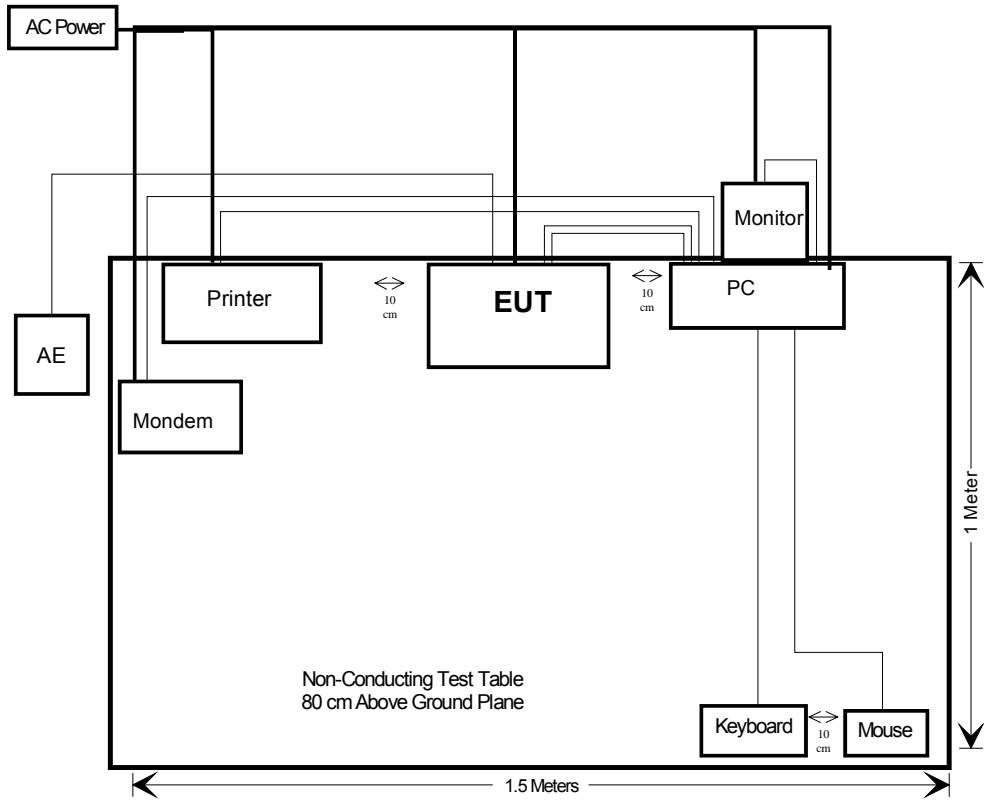
Cable Description	Length (m)	From	To
VGA Cable	1.5	PC/VGA Port	Monitor/VGA Port
USB Cable	1.5	PC / USB Port	Keyboard
USB Cable	1.5	PC/ USB Port	Mouse
RS232 Cable	1.5	PC/ RS232 Port	Modem/ RS232 Port
Parallel Cable	1.5	PC/ Parallel Port	Printer/ Parallel Port
RS232 Cable	3.75	PC	EUT
RJ45 Cable	1	PC/ RJ45 Port	Switch/ RJ45 Port

Block Diagram of Test Setup

Conducted emission:



Radiated emission:



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

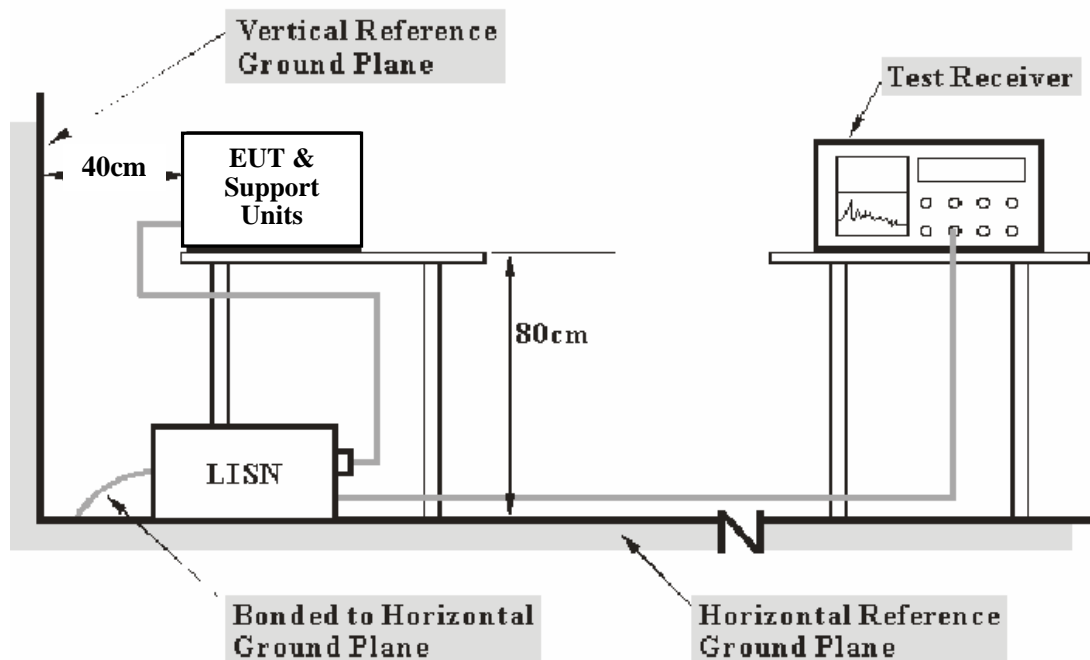
Measurement Uncertainty

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 C63.4-2003 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.

AC 120V/60Hz power source was provided to EUT.

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:

<u>Frequency Range</u>	<u>IF B/W</u>
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

Description	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due Date
EMI Test Receiver	Rohde & Schwarz	ESCS 30	836858/0016	2014-06-23	2015-06-22
L.I.S.N.	Rohde & Schwarz	ENV216	3560.6550.06	2014-06-23	2015-06-22
L.I.S.N.	Rohde & Schwarz	ENV216	3560.6550.12	2014-02-08	2015-02-07

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

Test Environment Conditions

Temperature:	21°C
Relative Humidity:	55%
ATM Pressure:	101.4 kPa

The testing was performed by Kevin Tao on 2014-10-20.

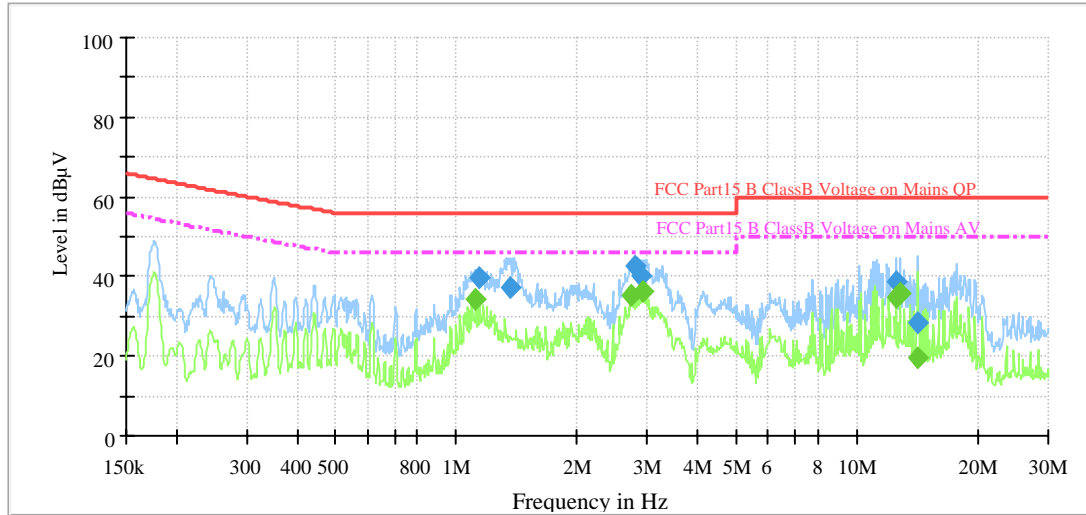
Summary of Test Results

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

9.8 dB at 2.913478 MHz in the L1 conductor mode

Conducted Emission Test Data and Plots

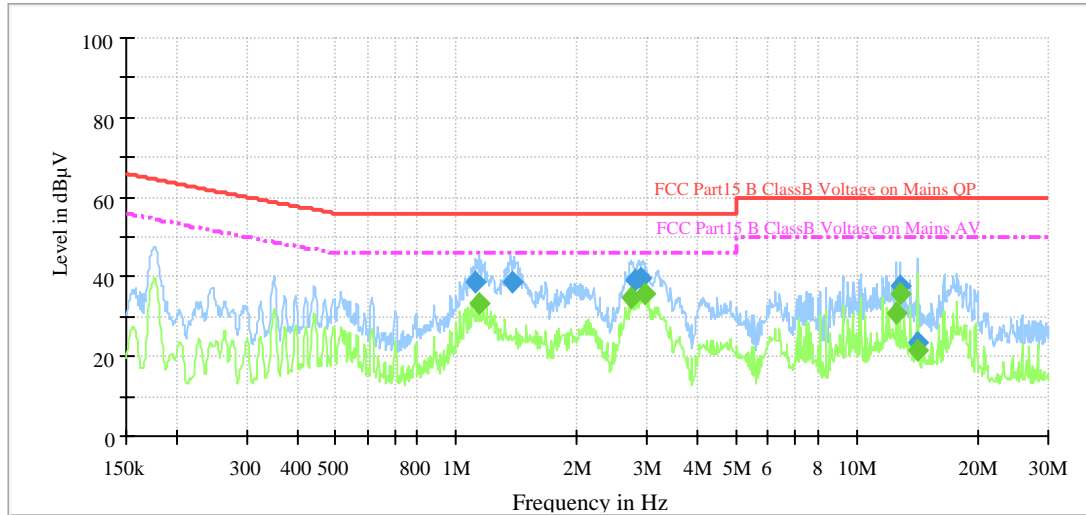
AC 120V/60Hz, L1



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
1.143727	39.5	9.000	Off	L1	10.2	16.5	56.0
1.361121	37.4	9.000	Off	L1	10.3	18.6	56.0
2.777124	42.6	9.000	Off	L1	10.4	13.4	56.0
2.877700	40.0	9.000	Off	L1	10.4	16.0	56.0
12.508723	38.8	9.000	Off	L1	10.4	21.2	60.0
14.162522	28.3	9.000	Off	L1	10.5	31.7	60.0

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
1.119432	34.3	9.000	Off	L1	10.2	11.7	46.0
2.719681	35.3	9.000	Off	L1	10.4	10.7	46.0
2.913478	36.2	9.000	Off	L1	10.4	9.8	46.0
12.508723	34.6	9.000	Off	L1	10.4	15.4	50.0
12.813046	35.8	9.000	Off	L1	10.4	14.2	50.0
14.162522	19.7	9.000	Off	L1	10.5	30.3	50.0

120 V/60 Hz, Neutral



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
1.116841	38.5	9.000	Off	N	10.2	17.5	56.0
1.372972	38.4	9.000	Off	N	10.3	17.6	56.0
2.777124	39.4	9.000	Off	N	10.4	16.6	56.0
2.889579	39.9	9.000	Off	N	10.4	16.1	56.0
12.813046	37.7	9.000	Off	N	10.4	22.3	60.0
14.106098	23.8	9.000	Off	N	10.4	36.2	60.0

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
1.144102	33.1	9.000	Off	N	10.2	12.9	46.0
2.719681	34.7	9.000	Off	N	10.3	11.3	46.0
2.936833	35.8	9.000	Off	N	10.4	10.2	46.0
12.508723	30.8	9.000	Off	N	10.4	19.2	50.0
12.813046	35.6	9.000	Off	N	10.4	14.4	50.0
14.162522	21.5	9.000	Off	N	10.4	28.5	50.0

FCC §15.109 RADIATED EMISSION TEST

Measurement Uncertainty

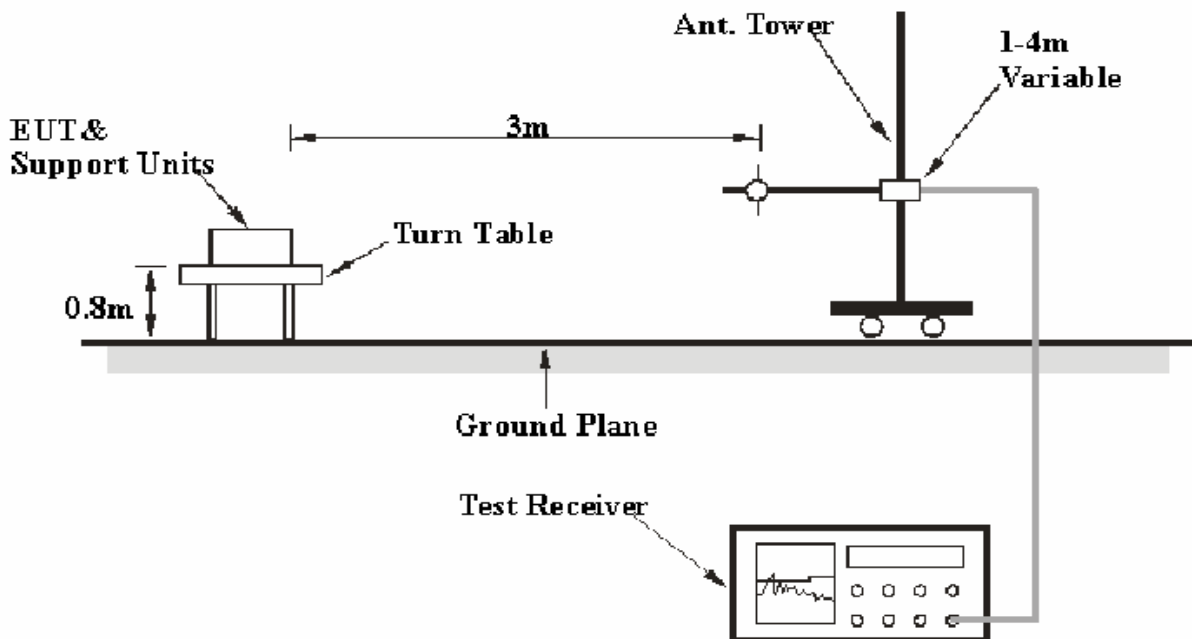
All measurements involve certain levels of uncertainties, especially in the field of EMI. The factors contributing to uncertainties are EMI Test Receiver, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor 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: ± 5.13 dB.

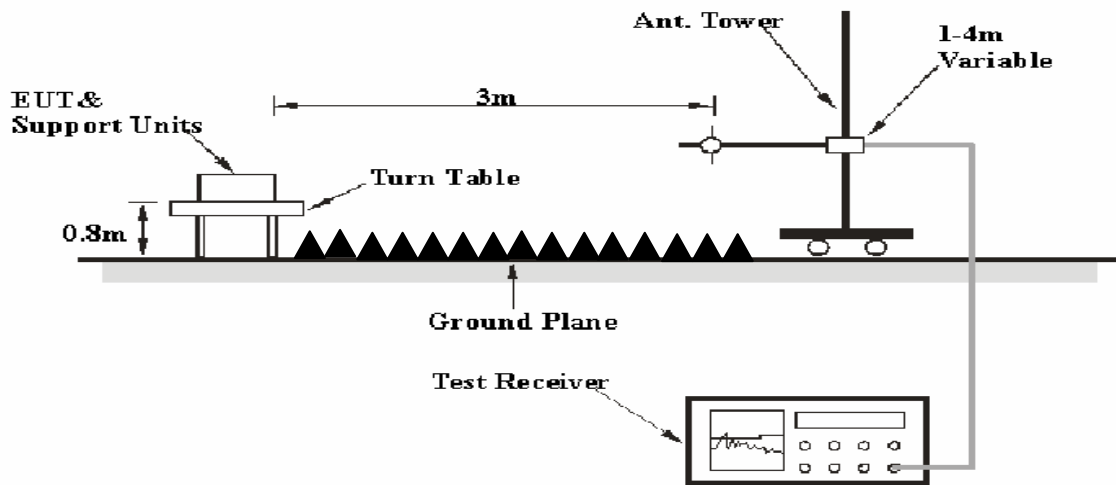
EUT Setup

The radiated emission tests were performed in the 3 meter Semi Anechoic Chamber, using the setup in accordance with the ANSI C63.4-2003. 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.

AC 120V/60Hz power source was provided to EUT.

EMI Test Receiver Setup

According to FCC Rules, the highest frequency in the device is 800 MHz, so the frequency range to be tested from 30 MHz to 5000 MHz.

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

<i>Frequency</i>	<i>RB/W</i>	<i>VB/W</i>	<i>IF B/W</i>	<i>Detector</i>
30 MHz-1 GHz	120 kHz	300 kHz	120 kHz	Quasi-peak
Above 1 GHz	1 MHz	3 MHz		Peak
	1 MHz	10 Hz		Average

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.

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:

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

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 7 dB μ V/m below the maximum limit for FCC Part 15 Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{FCC Part 15 Class B Limit} - \text{Corr. Ampl.}$$

Test Equipment List and Details

Description	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due Date
Amplifier	Agilent	8447D	2944A10442	2014-06-23	2015-06-22
EMI Test Receiver	Rohde & Schwarz	ESCI	100028	2014-06-23	2015-06-22
Broadband Antenna	Sunol Sciences	JB3	A101808	2013-04-10	2015-04-09
Semi-Anechoic Chamber	EMCT	966	N/A	2013-03-13	2016-03-12
Spectrum Analyzer	Rohde & Schwarz	FSL18	100180	2014-06-23	2015-06-22
Horn Antenna	EM TEST	3115	003-6076	2013-04-09	2015-04-08
Amplifier	HP	8449B	3008A00277	2014-06-23	2015-06-22

* **Statement of Traceability:** BAACL (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 8.52.0

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:

2.4 dB at 48.020000 MHz in the **Vertical** polarization for Normal Operating Mode, 30 MHz to 1000 MHz, 3 meters

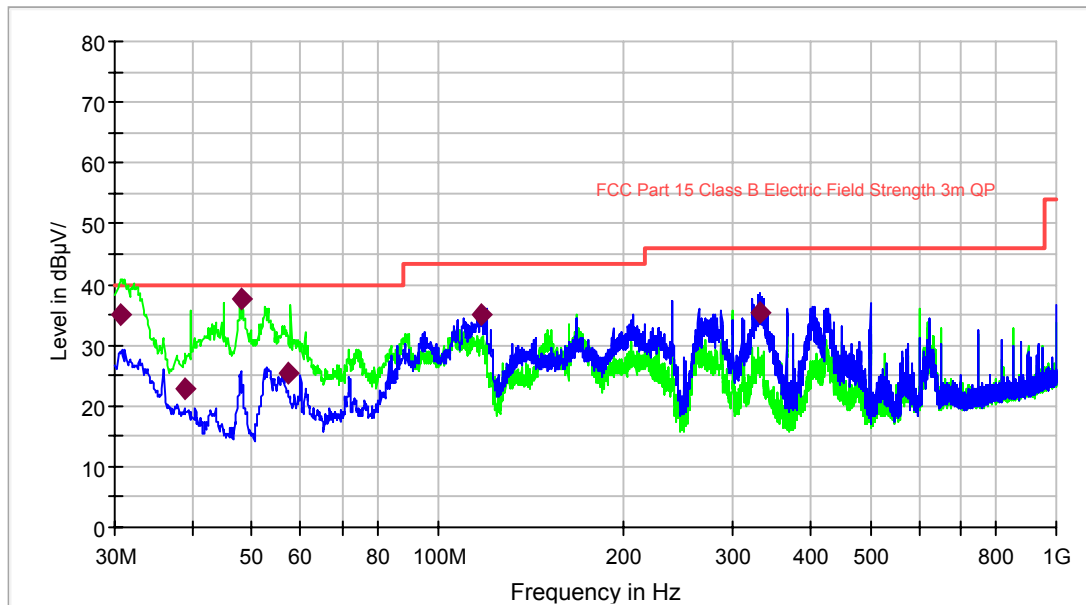
Radiated Emission Test Data

Test Environment Conditions

Temperature:	18 °C
Relative Humidity:	68 %
ATM Pressure:	102.1 kPa

The testing was performed by Kevin Tao on 2014-11-21

Electric Field Strength with AutoTest-RE

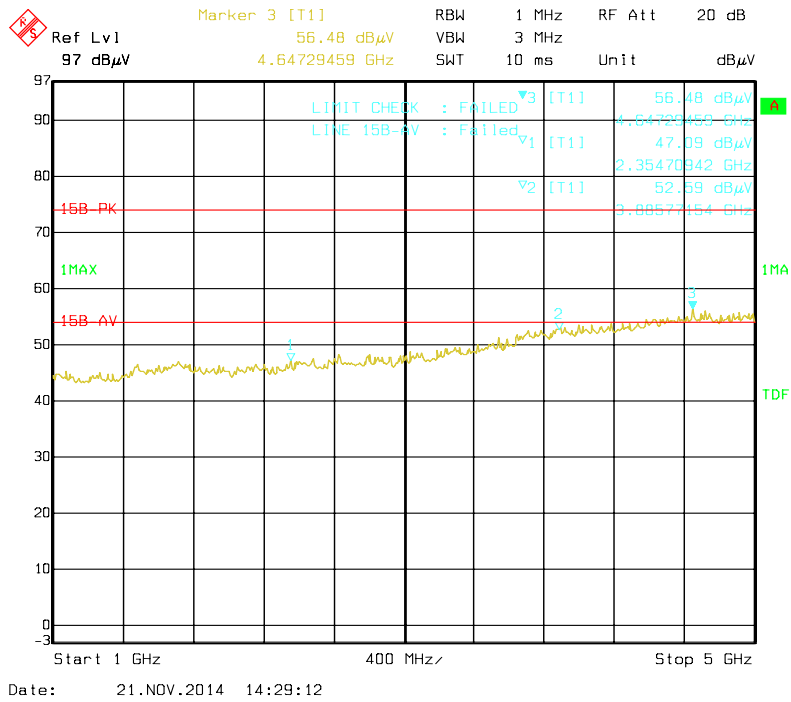


Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
30.702756	35.0	120.000	113.0	V	94.0	-5.2	5.0	40.0
39.002500	22.9	120.000	271.0	V	123.0	-11.5	17.1	40.0
48.020000	37.6	120.000	130.0	V	179.0	-17.6	*2.4	40.0
57.396500	25.5	120.000	298.0	V	15.0	-19.7	14.5	40.0
117.626000	35.1	120.000	250.0	H	268.0	-11.9	8.4	43.5
331.279250	35.5	120.000	122.0	H	35.0	-11.2	10.5	46.0

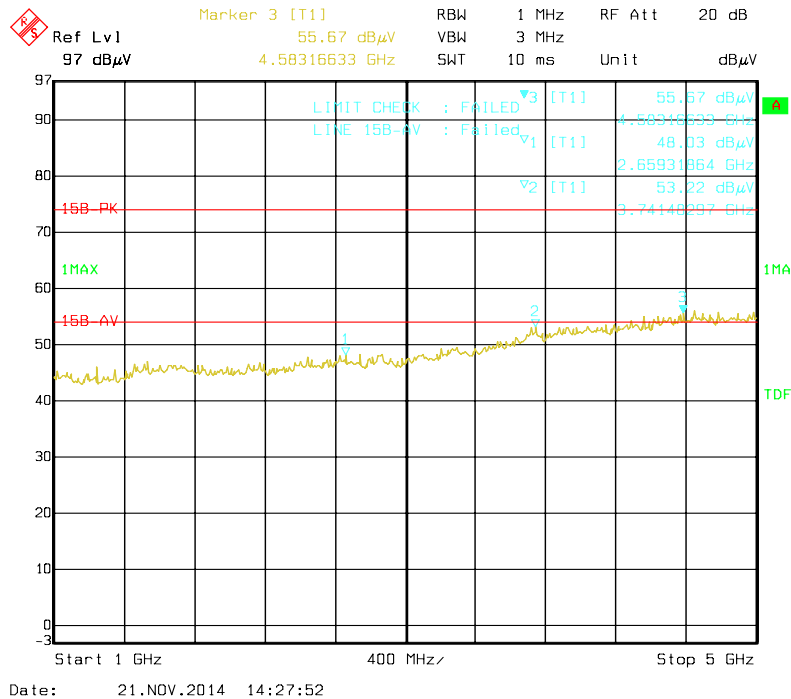
* Within Measurement Uncertainty

Above 1 GHz:

Horizontal



Vertical



Frequency	Polarity	Detector	Result	Limit	Margin
MHz	V/H	QP/pk/AV	(dB μ V/m)	(dB μ V/m)	(dB)
2354.709	H	PK	47.09	74	26.91
2354.709	H	AV	31.16	54	22.84
3885.771	H	PK	52.59	74	21.41
3885.771	H	AV	39.86	54	14.14
4647.294	H	PK	56.48	74	17.52
4647.294	H	AV	40.96	54	13.04
2659.318	V	PK	48.03	74	25.97
2659.318	V	AV	34.25	54	19.75
3741.482	V	PK	53.22	74	20.78
3741.482	V	AV	32.36	54	21.64
4583.166	V	PK	55.67	74	18.33
4583.166	V	AV	40.85	54	13.15

Test Result: Pass

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