FCC PART 15B

MEASUREMENT AND TEST REPORT

For

Changsha SunSky Electronic Design & Development Co., Ltd.

Room1024, Building A, Biaozhi Business Center No. 198 Xiang Fu Road, Changsha, China

FCC ID: WSVSUNVOTEBASECX

Report Type:	Product Type:
Original Report	Voting Base Station

Test Engineer:	Phil Zhu
Report Number:	RKS160712001-00E
Report Date:	2017-05-11
Reviewed By:	Kamp Chen EMC Leader
Prepared By:	Bay Area Compliance Laboratories Corp. (Kunshan) No.248 Chenghu Road, Kunshan,Jiangsu province, China Tel: +86-0512-86175000 Fax: +86-0512-88934268 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant	Changsha SunSky Electronic Design & Development Co., Ltd.
Model	C4000T (FCC ID: WSVSUNVOTEBASECX)
Product	Voting Base Station
Dimension	137mm×125mm×25mm
Operation Highest frequency	2466MHz
Power input	DC 5.0V (by USB), DC 15V (by adapter), rated power :0.5W,rated current:0.1A

Adapter information:
Model: GM-150150
Input: AC100V-240V 50/60Hz
Output: DC15V(1.5A)

**All measurement and test data in this report was gathered from production sample serial number: 20160627001 (Assigned by BACL, Kunshan). The EUT was received on 2016-06-27.*

Objective

This report is prepared on behalf of Changsha SunSky Electronic Design & Development Co., Ltd. in accordance with Part 2-Subpart J, and Part 15-Subparts A and B of the Federal Communication Commission's rules.

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

Related Submittal(s)/Grant(s)

FCC Part 15.249 DXX submission with FCC ID: WSVSUNVOTEBASECX and FCC ID: WSVSUNVOTEKEYM5S.

Test Methodology

All measurements contained in this report were 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 was performed at Bay Area Compliance Laboratories Corp. (Kunshan). 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. (Kunshan) to collect test data is located on the No.248 Chenghu Road, Kunshan,Jiangsu province, China.

Test site at Bay Area Compliance Laboratories Corp. (Kunshan) 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 November 06, 2014. 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.: 815570. 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 was configured for testing in a typical fashion (as normally used by a typical user).

Test Mode1: Transmitting Data.
Test Mode2: Adapter mode.

EUT Exercise Software

Notebook exeutive “ARSTT” transmitting data from EUT to AE.

Special Accessories

No special accessory was used.

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

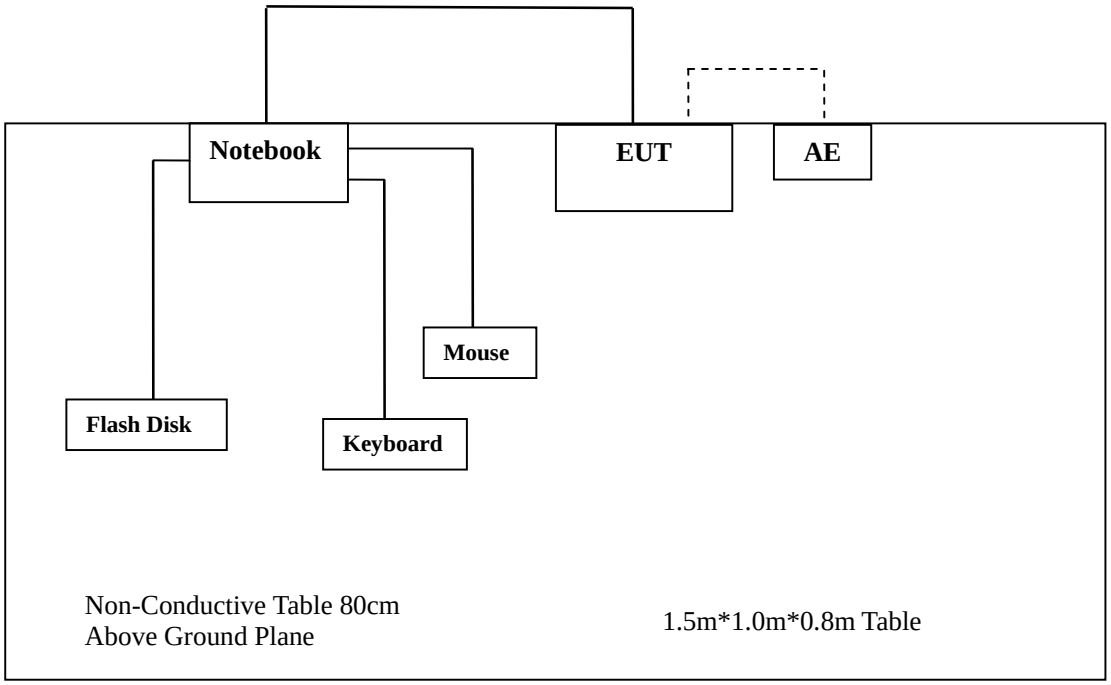
Manufacturer	Description	Model	Serial Number
Logitech	Keyboard	Y-U0009	1648MG010SV8
Logitech	Mouse	M-U0026	HS529HB
Lenovo	USB flash disk	T180	0A1266865200521
DELL	Notebook	E6410	3094742521
/	Sonvote	M52PLUS	221702013148

External I/O Cable

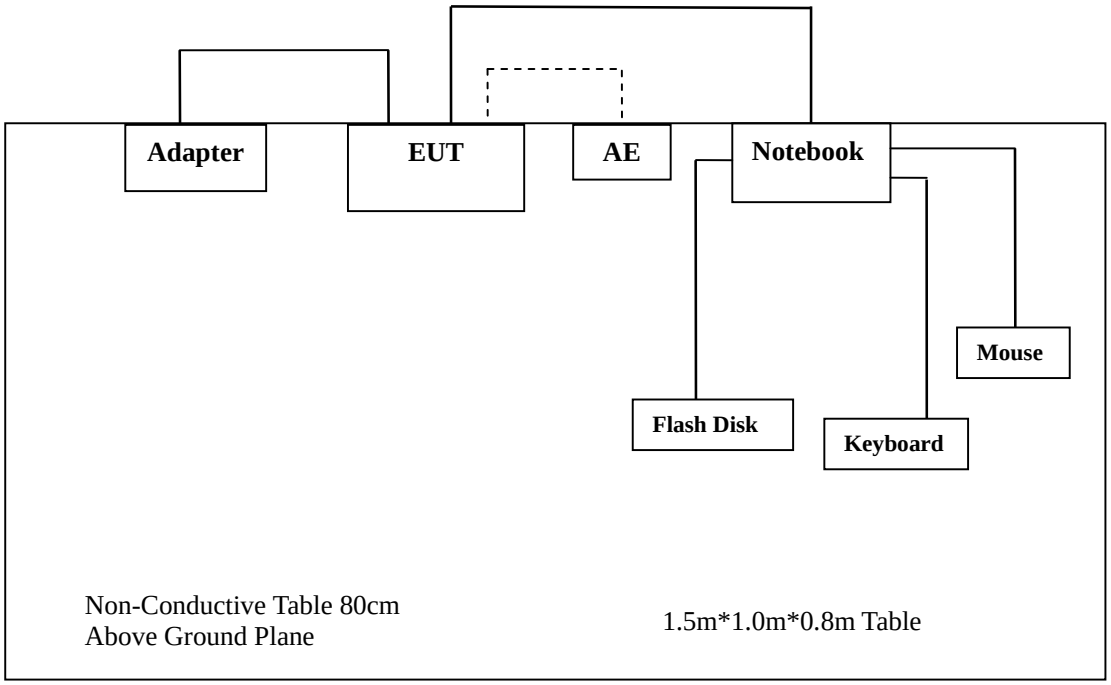
Cable Description	Length (m)	From/Port	To
Keyboard USB Cable	1.0	Notebook	Keyboard
Mouse USB Cable	1.0	Notebook	Mouse
USB flash disk USB Cable	1.0	Notebook	USB flash disk
Type B to Type A	1.5	EUT	Notebook

Block Diagram of Radiated Test Setup

Test mode 1： -



Test mode 2： -



SUMMARY OF TEST RESULTS

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

FCC §15.107 –CONDUCTED EMISSIONS

Applicable Standard

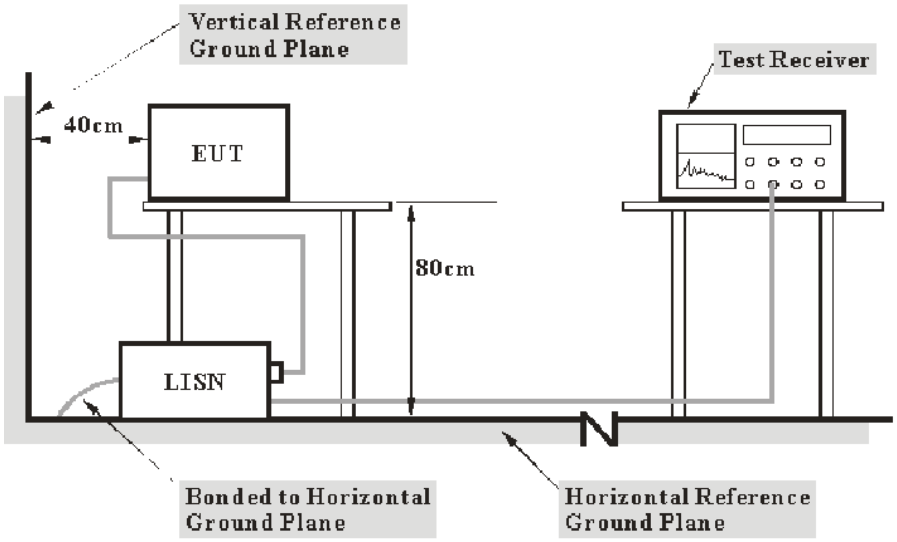
According to FCC§15.107

Measurement Uncertainty

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

Item		Measurement Uncertainty	U_{cispr}
AMN	150kHz~30MHz	3.26 dB	3.4 dB

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 C63.4-2014. The related limit was specified in FCC Part 15.107 Class B.

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

During the conducted emission test, the EUT was connected to the outlet of the LISN.

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

All final 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	ESCI	100195	2016-11-25	2017-11-25
Rohde & Schwarz	LISN	ESH3-Z5	862770/011	2016-10-10	2017-10-09
ROHDE&SCHWARZ	LISN	ENV216	3560655016	2016-11-25	2017-11-24
Rohde & Schwarz	CE Test software	EMC 32	100357	--	--
MICRO-COAX	Coaxial Cable	Cable-6	006	2016-09-08	2017-09-07

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) 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 Transient Limiter Attenuation. The basic equation is as follows:

Corrected Amplitude = Meter Reading + Antenna Factor + 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 7 dB below the limit. The equation for margin calculation is as follows:

Margin = Limit – Corrected Amplitude

Test Data

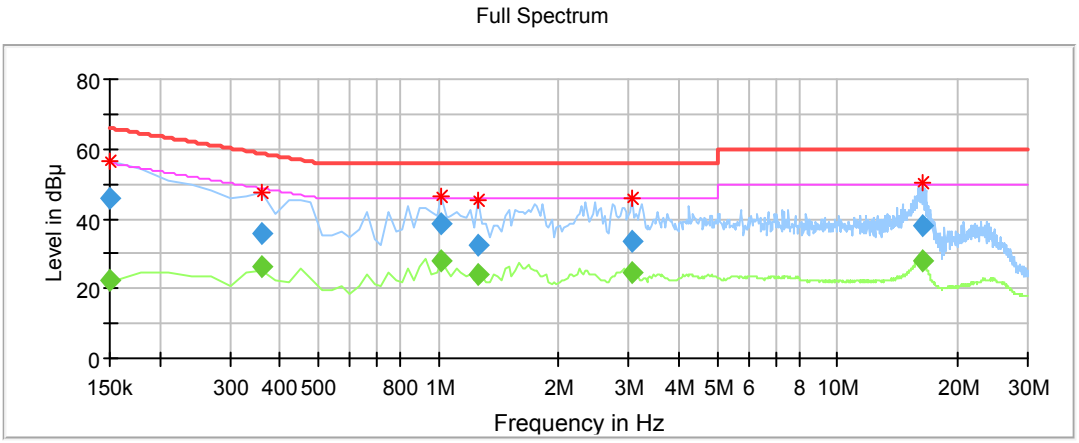
Environmental Conditions

Temperature:	22℃
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Phil Zhu on 2017-04-27.

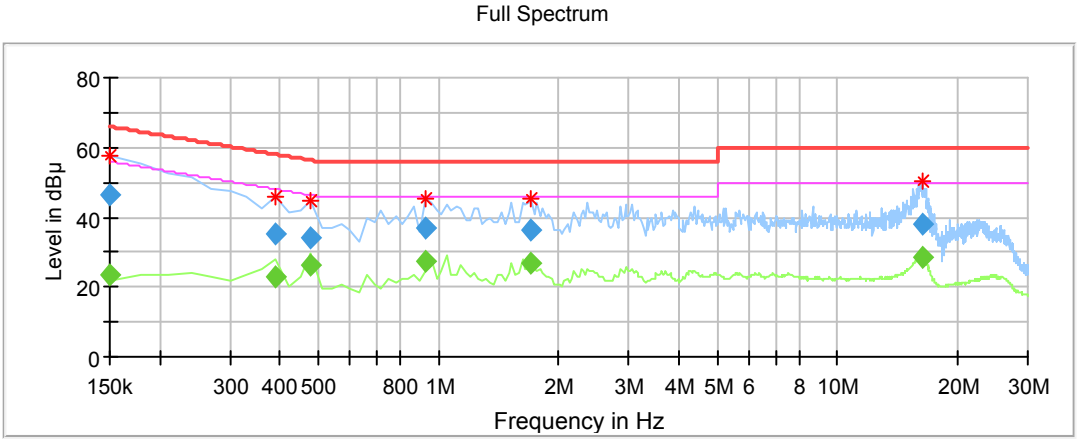
Test Model 1

Line



Frequency (MHz)	QuasiPeak (dB µ V)	Average (dB µ V)	Limit (dB µ V)	Margin (dB)	Line	Corr. (dB)
0.150000	---	22.37	56.00	33.63	L1	9.8
0.150000	45.67	---	66.00	20.33	L1	9.8
0.360000	---	26.17	48.73	22.56	L1	9.3
0.360000	36.01	---	58.73	22.72	L1	9.3
1.020000	---	28.17	46.00	17.83	L1	10.1
1.020000	38.37	---	56.00	17.63	L1	10.1
1.260000	---	23.87	46.00	22.13	L1	10.1
1.260000	32.35	---	56.00	23.65	L1	10.1
3.060000	---	24.77	46.00	21.23	L1	10.0
3.060000	33.77	---	56.00	22.23	L1	10.0
16.380000	---	28.17	50.00	21.83	L1	9.0
16.380000	38.21	---	60.00	21.79	L1	9.0

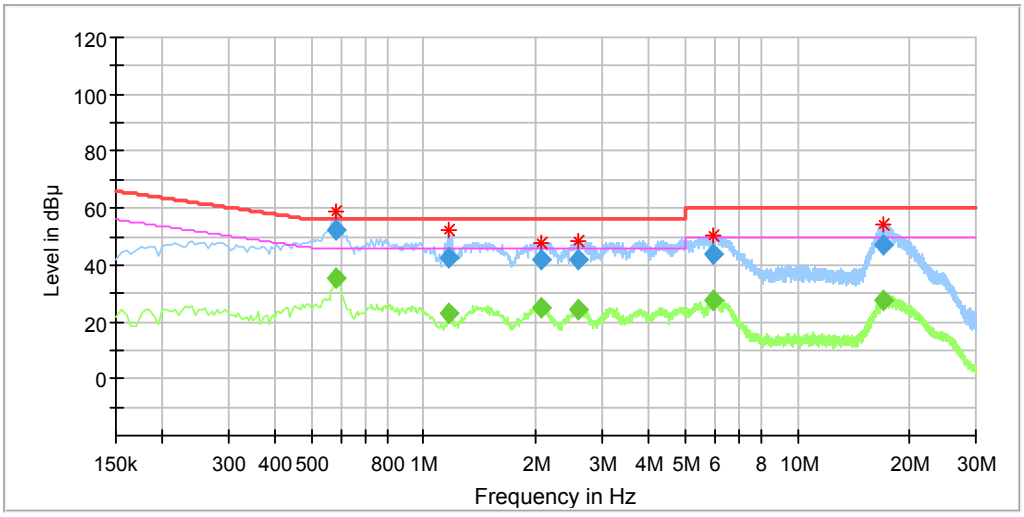
Neutral



Frequency (MHz)	QuasiPeak (dB µ V)	Average (dB µ V)	Limit (dB µ V)	Margin (dB)	Line	Corr. (dB)
0.150000	---	23.36	56.00	32.64	N	9.9
0.150000	46.67	---	66.00	19.33	N	9.9
0.390000	---	22.85	48.06	25.21	N	9.3
0.390000	35.05	---	58.06	23.01	N	9.3
0.480000	---	26.11	46.34	20.23	N	9.5
0.480000	34.36	---	56.34	21.98	N	9.5
0.930000	---	27.64	46.00	18.36	N	10.0
0.930000	37.06	---	56.00	18.94	N	10.0
1.710000	---	26.81	46.00	19.19	N	10.0
1.710000	36.25	---	56.00	19.75	N	10.0
16.320000	---	28.64	50.00	21.36	N	9.0
16.320000	38.07	---	60.00	21.93	N	9.0

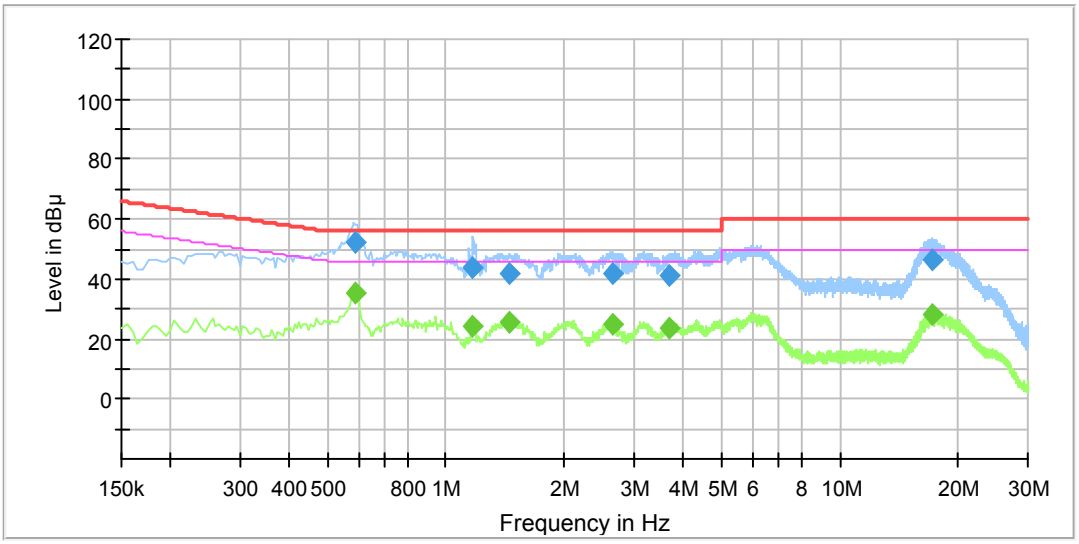
Test Model 2

Line



Frequency (MHz)	QuasiPeak (dB µ V)	Average (dB µ V)	Limit (dB µ V)	Margin (dB)	Line	Corr. (dB)
0.592000	---	35.24	46.00	10.76	L1	10.3
0.592000	51.96	---	56.00	4.04	L1	10.3
1.173000	---	22.36	46.00	23.64	L1	10.3
1.173000	43.38	---	56.00	12.62	L1	10.3
2.038000	---	26.62	46.00	19.38	L1	10.4
2.038000	42.37	---	56.00	13.63	L1	10.4
2.546000	---	26.91	46.00	19.09	L1	10.4
2.546000	42.31	---	56.00	13.69	L1	10.4
5.988000	---	26.52	50.00	23.48	L1	10.5
5.988000	43.33	---	60.00	16.67	L1	10.5
16.930000	---	27.65	50.00	22.35	L1	10.5
16.930000	46.33	---	60.00	13.67	L1	10.5

Neutral



Frequency (MHz)	QuasiPeak (dB µ V)	Average (dB µ V)	Limit (dB µ V)	Margin (dB)	Line	Corr. (dB)
0.592000	---	35.36	46.00	10.64	N	10.3
0.592000	52.62	---	56.00	3.38	N	10.3
1.173000	---	24.11	46.00	21.89	N	10.3
1.173000	43.39	---	56.00	12.61	N	10.3
1.436000	---	25.29	46.00	20.71	N	10.3
1.436000	41.95	---	56.00	14.05	N	10.3
2.628000	---	24.03	46.00	21.97	N	10.5
2.628000	41.92	---	56.00	14.08	N	10.5
3.673000	---	23.92	46.00	22.08	N	10.5
3.673000	41.38	---	56.00	14.62	N	10.5
17.090260	---	28.37	50.00	21.63	N	10.5
17.090260	46.19	---	60.00	13.81	N	10.5

FCC §15.109 - RADIATED EMISSIONS

Applicable Standard

FCC §15.109

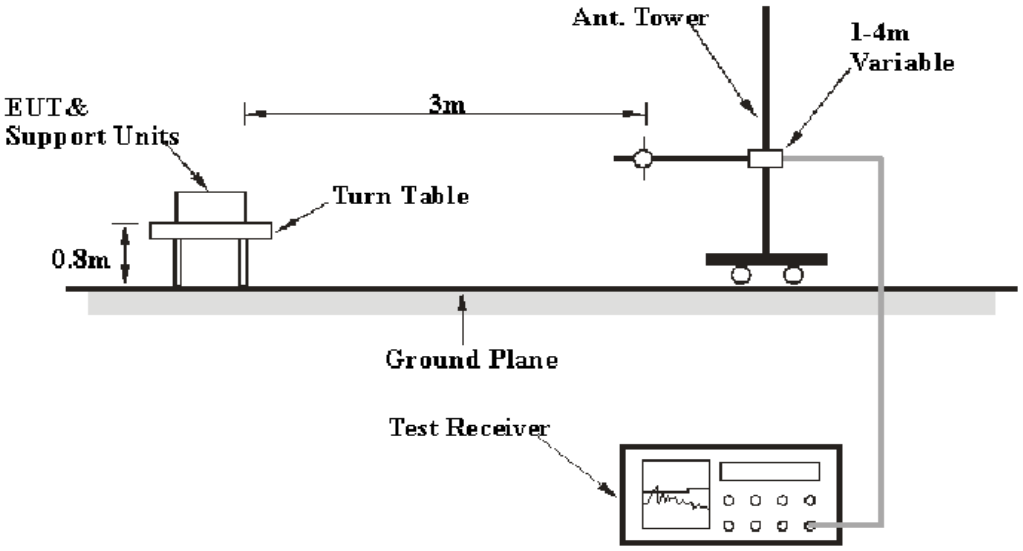
Measurement Uncertainty

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.

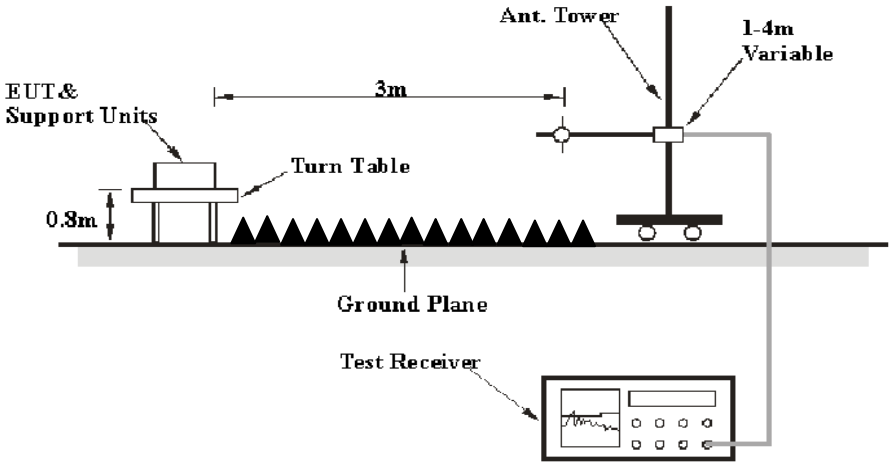
Item		Measurement Uncertainty	U_{cispr}
Radiated Emission	30MHz~1GHz	5.91dB	6.3 dB
	1GHz~6GHz	4.68dB	5.2 dB
	6 GHz ~18 GHz	4.92dB	5.5 dB

EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.4-2014. The specification used was the FCC Part 15.109 Class B limits.

EMI Test Receiver Setup

The system was investigated from 30MHz to13GHz.

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	120 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	1 Hz	/	AV.

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 detector mode from 30MHz to 1GHz.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sonoma Instrunent	Amplifier	330	171377	2016-12-12	2017-12-11
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2016-11-25	2017-11-24
Sunol Sciences	Broadband Antenna	JB3	A090314-2	2016-01-09	2019-01-08
Champrotek	Chamber	Chamber A	T-KSEMC049	-	-
R&S	Auto test Software	EMC32	100361	-	-
ETS	Horn Antenna	3115	6229	2016-01-11	2019-01-10
Rohde & Schwarz	Signal Analyzer	FSIQ26	100048	2016-11-25	2017-11-25
Narda	Pre-amplifier	AFS42-00101800	2001270	2016-12-12	2017-12-11
haojintech	Coaxial Cable	Cable-1	001	2016-12-12	2017-12-11
haojintech	Coaxial Cable	Cable-2	002	2016-12-12	2017-12-11
haojintech	Coaxial Cable	Cable-3	003	2016-12-12	2017-12-11
MICRO-COAX	Coaxial Cable	Cable-4	004	2016-12-12	2017-12-11
MICRO-COAX	Coaxial Cable	Cable-5	005	2016-12-12	2017-12-11

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) 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 Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Corrected Amplitude = Meter Reading + Antenna Factor + 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 7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

Margin = Limit – Corrected Amplitude

Test Data

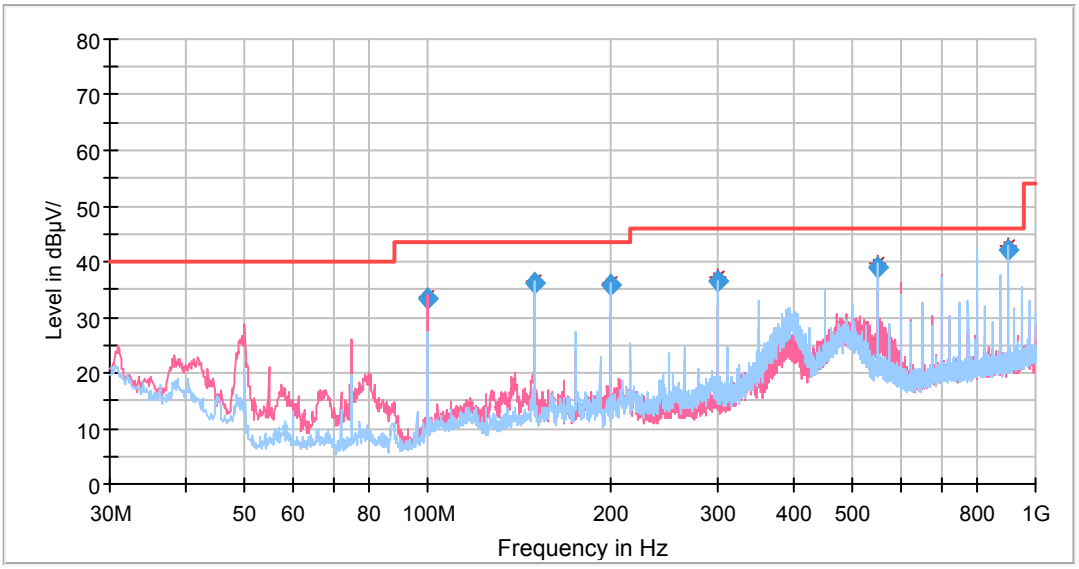
Environmental Conditions

Temperature:	27 ℃
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Phil Zhu on 2017-04-27.

Test Model 1

30MHz ~ 1GHz:



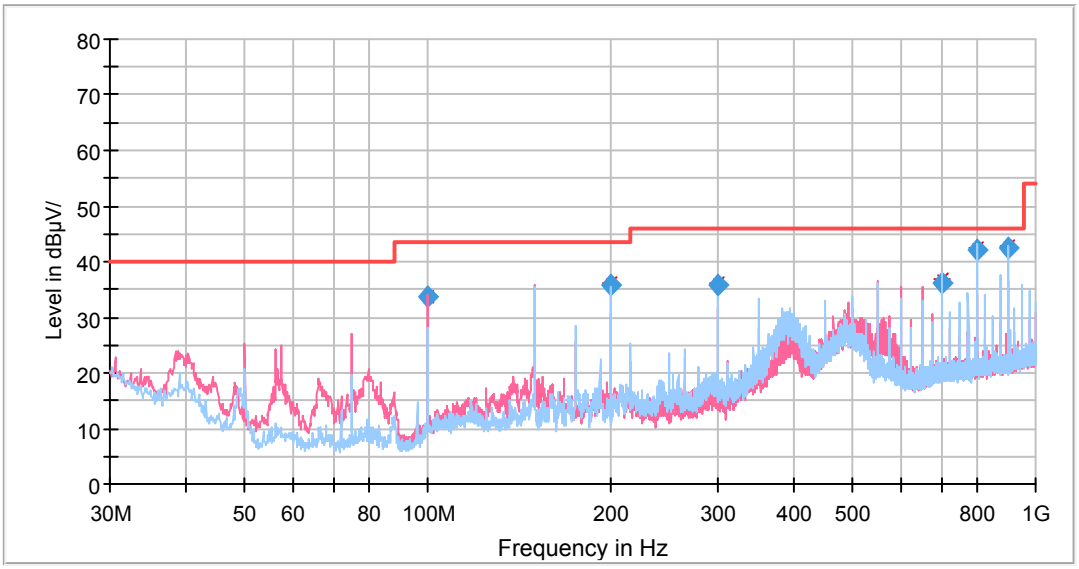
Frequency (MHz)	QuasiPeak (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
100.009250	33.23	43.50	10.27	101.0	V	260.0	-13.6
150.007200	36.00	43.50	7.50	199.0	H	224.0	-12.2
200.006900	35.88	43.50	7.62	101.0	H	217.0	-12.4
300.004850	36.59	46.00	9.41	101.0	H	266.0	-10.4
550.034950	39.04	46.00	6.96	199.0	H	231.0	-5.2
900.047400	42.20	46.00	3.80	101.0	H	190.0	-0.9

Above 1GHz:

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB /m)
1797.525050	54.86	---	74.00	19.14	149.0	V	234.0	-7.6
1797.525050	---	25.43	54.00	28.57	149.0	V	234.0	-7.6
2008.306613	42.30	---	74.00	31.70	149.0	V	157.0	-6.8
2008.306613	---	24.01	54.00	29.99	149.0	V	157.0	-6.8
2201.452906	41.04	---	74.00	32.96	149.0	V	16.0	-6.5
2201.452906	---	22.08	54.00	31.92	149.0	V	16.0	-6.5
3986.282565	45.09	---	74.00	28.91	149.0	V	359.0	0.4
3986.282565	---	30.40	54.00	23.60	149.0	V	359.0	0.4
5063.456914	---	31.89	54.00	22.11	149.0	V	194.0	2.5
5063.456914	45.77	---	74.00	28.23	149.0	V	194.0	2.5
6988.246493	---	35.89	54.00	18.11	149.0	H	324.0	8.2
6988.246493	49.45	---	74.00	24.55	149.0	H	324.0	8.2

Test Model 2

30MHz ~ 1GHz：



Frequency (MHz)	QuasiPeak (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
100.014950	33.56	43.50	9.94	101.0	V	273.0	-13.6
200.009600	35.64	43.50	7.86	101.0	H	211.0	-12.4
300.006950	35.78	46.00	10.22	101.0	H	259.0	-10.4
700.041600	35.97	46.00	10.03	101.0	H	218.0	-2.5
800.044100	42.04	46.00	3.96	101.0	H	191.0	-1.6
900.039600	42.31	46.00	3.69	101.0	H	191.0	-0.9

Above 1GHz:

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB /m)
1400.743487	45.32	---	74.00	28.68	149.0	V	343.0	-9.8
1400.743487	---	25.63	54.00	30.37	149.0	V	343.0	-9.8
1795.490982	54.88	---	74.00	19.12	149.0	V	183.0	-7.6
1795.490982	---	25.27	54.00	28.73	149.0	V	183.0	-7.6
1990.338677	40.39	---	74.00	33.61	149.0	V	156.0	-6.9
1990.338677	---	23.68	54.00	30.32	149.0	V	156.0	-6.9
3988.677355	48.67	---	74.00	25.33	149.0	V	32.0	0.4
3988.677355	---	33.77	54.00	20.33	149.0	V	32.0	0.4
4870.773547	47.62	---	74.00	26.38	149.0	H	163.0	2.4
4870.773547	---	35.15	54.00	18.85	149.0	H	163.0	2.4
6655.639278	51.59	---	74.00	22.41	149.0	H	95.0	7.0
6655.639278	---	35.91	54.00	18.09	149.0	H	95.0	7.0

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