FCC PART 15B

MEASUREMENT AND TEST REPORT

For

Jiangsu SEUIC Technology Co.,Ltd

No23, Wenzhu Road, Yuhuatai District Nanjing, Jiangsu, China

FCC ID: 2AC68-CRUISE1

Report Type:	Product Type:
Original Report	Portable Data Collection Terminal

Test Engineer:	Phil Zhu
Report Number:	RKS160913001-00A
Report Date:	2016-09-28
Reviewed By:	Jesse huang EMC Manager
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)

Manufacturer	Jiangsu SEUIC Technology Co.,Ltd.
Model	CRUISE 1
Series Model	CRUISE 1-HC
Product	Portable Data Collection Terminal
Dimension	152mm(H)×75.9mm(W)×12.8mm(T)
Operation frequency	5825MHz
Power input	DC 3.8V From rechargeable battery or DC 5V Adapter

Adapter Information:

Model: SW-3530
Input: AC 100-240V, 50/60 Hz, 0.7A
Output: DC 5.0V, 2.5A

Model: FJ-SW1260502000UB
Input: AC 100-240V, 50/60 Hz, 0.4A
Output: DC 5.0V, 2000mA

*Note: * The difference between tested model and series model was explained in the declaration letter.*

**All measurement and test data in this report was gathered from production sample serial number: 20160909001 (Assigned by BACL, Kunshan). The EUT was received on 2016-09-09.*

Objective

This report is prepared on behalf of Jiangsu SEUIC Technology 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 determine the compliance of EUT with FCC Part 15, Class B.

Related Submittal(s)/Grant(s)

FCC Part 15.247 DTS and FCC Part 15.407 NII , FCC Part 22H , FCC Part 24E , FCC Part 27 PCE and FCC Part 15.225 DXX, Part 15.247 DSS, submission with FCC ID: 2AC68-CRUISE1.

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.

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 (FCC §15.27)

Justification

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

Test mode1: Data download mode

EUT Exercise Software

NA

Special Accessories

No special accessory was used.

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

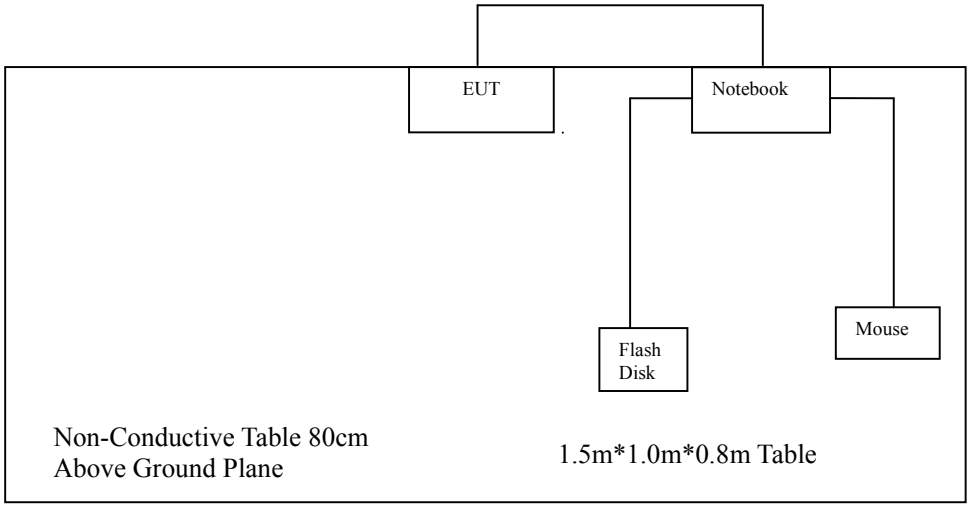
Manufacturer	Description	Model	Serial Number
DELL	Laptop	PP11L	QDS-BRCM1017
Disk	Flash Disk	NA	NA
DELL	Mouse	MO-1008BU	M0914

External I/O Cable

Cable Description	Length (m)	From/Port	To
USB Cable	1.0	Notebook	U Flash Disk
USB Cable	1.0	Notebook	Mouse
RJ 45	1.8	EUT	Notebook

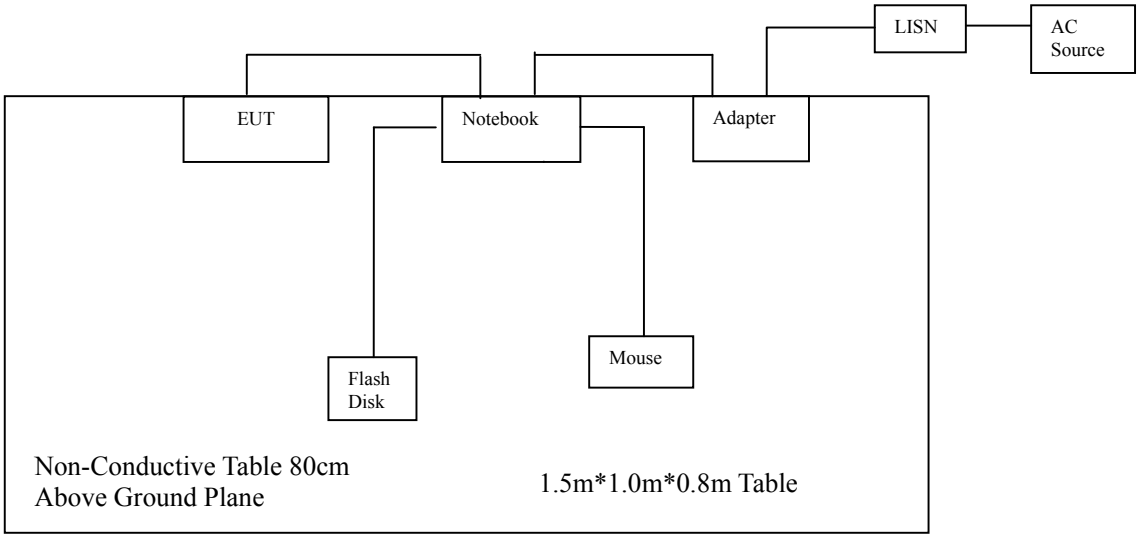
Block Diagram of Radiated Test Setup

Test Model1 -



Block Diagram of Conduction Test Setup

Test Model1 -



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

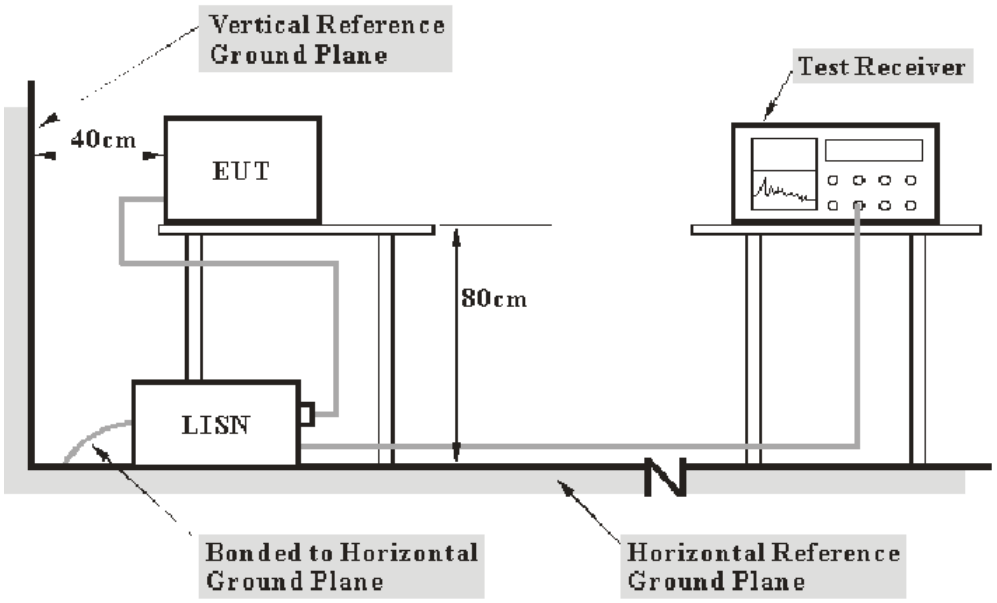
Measurement Uncertainty

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.

Based on CISPR 16-4-2:2011+A1-2014, the expended combined standard uncertainty of conducted disturbance test at Bay Area Compliance Laboratories Corp. (Kunshan) is shown as below. And the uncertainty will not be taken into consideration for the test data recorded in the report.

Port	Expanded 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 C63.4-2014. 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	ESCS30	834115/007	2015-11-12	2016-11-11
Rohde & Schwarz	LISN	ESH3-Z5	862770/011	2016-10-10	2017-10-10
HP	Current probe	11967A	636	2016-07-04	2017-07-03
FCC	ISN	FCC-TLISN-T8-02	20376	2016-07-04	2017-07-03
Haojintech	Coaxial Cable	HMR400UF	NN11600	2016-9-8	2017-9-8
Rohde & Schwarz	CE Test software	EMC32	V 09.10.0	/	/

*** 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:

Correction Factor = LISN VDF + Cable Loss + Transient 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, the EUT complied with the FCC Part 15.107 Class B, the worst margin reading as below:

9.24 dB at **0.158000 MHz** in the **Line** conducted mode(*Test mode 1*)

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level complies 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

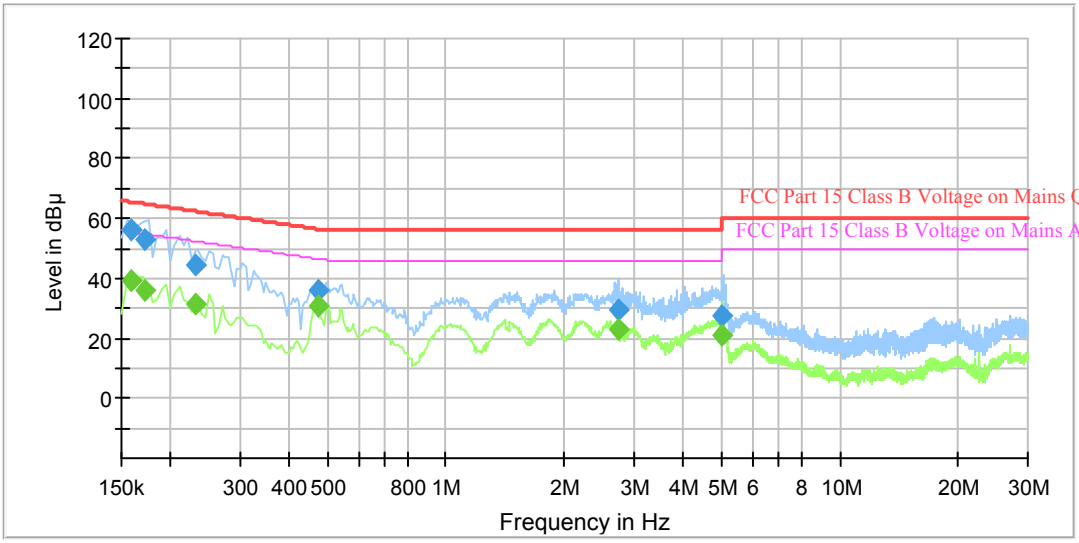
Environmental Conditions

Temperature:	25℃
Relative Humidity:	51 %
ATM Pressure:	101.0 kPa

The testing was performed by Phil Zhu on 2016-09-21.

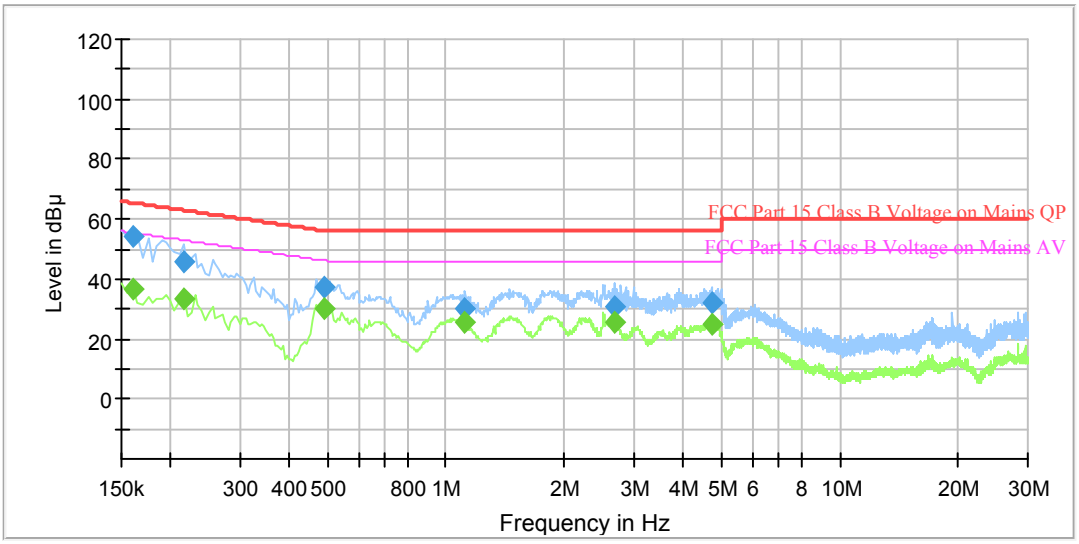
Test Model 1

Line



Frequency (MHz)	Corrected Amplitude		Limit (dB µ V)	Margin (dB)	Line	Corr. (dB)
	QuasiPeak (dB µ V)	Average (dB µ V)				
0.158000	---	39.29	55.57	16.28	L1	11.0
0.158000	56.33	---	65.57	9.24	L1	11.0
0.172500	---	35.86	54.84	18.98	L1	11.0
0.172500	53.16	---	64.84	11.68	L1	11.0
0.232500	---	31.63	52.36	20.73	L1	11.0
0.232500	44.71	---	62.36	17.65	L1	11.0
0.472500	---	30.98	46.47	15.49	L1	11.0
0.472500	36.06	---	56.47	20.41	L1	11.0
2.736500	---	23.28	46.00	22.72	L1	11.2
2.736500	29.42	---	56.00	26.58	L1	11.2
5.022500	---	20.87	50.00	29.13	L1	11.3
5.022500	27.76	---	60.00	32.24	L1	11.3

Neutral



Frequency (MHz)	Corrected Amplitude		Limit (dB µ V)	Margin (dB µ V)	Line	Corr. (dB)
	QuasiPeak (dB µ V)	Average (dB µ V)				
0.160000	---	36.41	55.46	19.05	N	11.0
0.160000	54.13	---	65.46	11.33	N	11.0
0.215000	---	33.57	53.01	19.44	N	11.0
0.215000	45.99	---	63.01	17.02	N	11.0
0.490000	---	30.39	46.17	15.78	N	11.0
0.490000	37.09	---	56.17	19.08	N	11.0
1.120000	---	25.57	46.00	20.43	N	11.1
1.120000	30.44	---	56.00	25.56	N	11.1
2.670000	---	25.56	46.00	20.44	N	11.3
2.670000	30.73	---	56.00	25.27	N	11.3
4.710000	---	24.74	46.00	21.26	N	11.4
4.710000	32.19	---	56.00	23.81	N	11.4

FCC §15.109 - RADIATED EMISSIONS

Applicable Standard

FCC §15.109

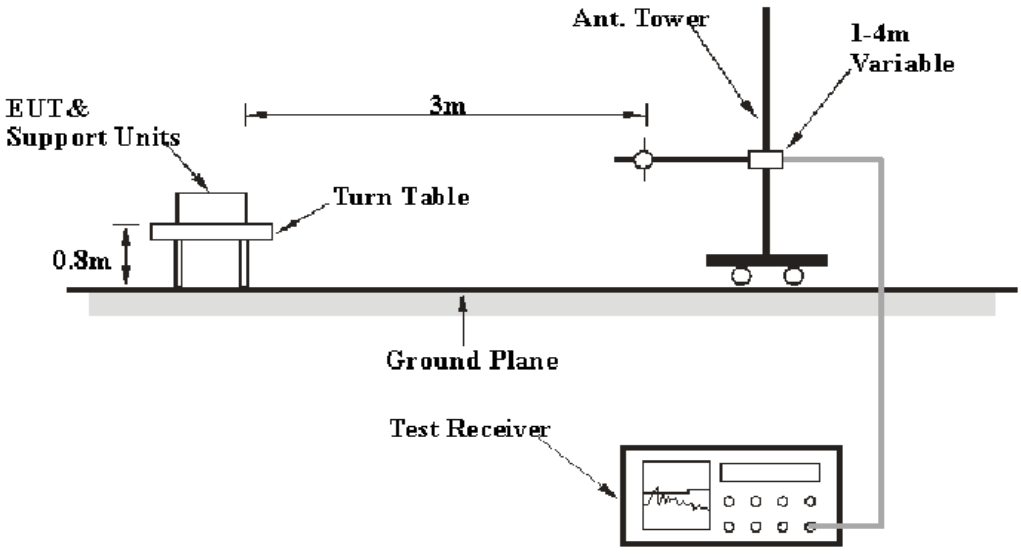
Measurement Uncertainty

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.

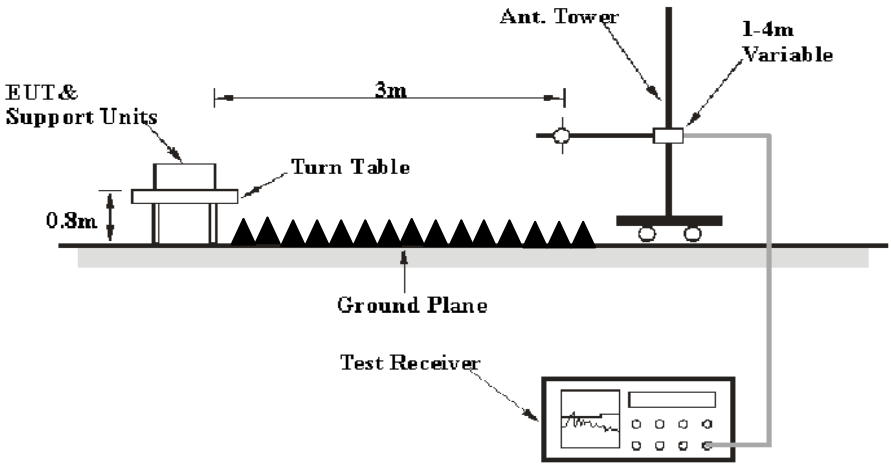
Based on CISPR 16-4-2:2011+A1-2014, the expended combined standard uncertainty of radiation emissions at Bay Area Compliance Laboratories Corp. (Kunshan) is shown in below table. And the uncertainty will not be taken into consideration for the test data recorded in the report

Frequency	Polarity	Measurement uncertainty
30 MHz~200 MHz	Horizontal	4.62 dB (k=2, 95% level of confidence)
	Vertical	4.54 dB (k=2, 95% level of confidence)
200 MHz~1 GHz	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



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 30 MHz to 30GHz.

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 1GHz	1MHz	3MHz	-	PK
	1MHz	1Hz	-	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 30 MHz to 1 GHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sonoma Instrunent	Amplifier	330	171377	2016-10-21	2017-10-21
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2015-11-12	2016-11-11
Sunol Sciences	Broadband Antenna	JB3	A090314-2	2016-01-09	2019-01-08
ETS	Horn Antenna	3115	6229	2016-01-11	2019-01-10
Rohde & Schwarz	Signal Analyzer	FSIQ26	100048	2015-11-12	2016-11-11
Narda	Pre-amplifier	AFS42-00101800	2001270	2016-09-08	2017-09-08
R&S	Auto test Software	EMC32	V 09.10.0	/	/
Haojintech	Coaxial Cable	HMR400UF	NN11600	2016-09-08	2017-09-08
Haojintech	Coaxial Cable	SR	SS11800	2016-09-08	2017-09-08
ETS-LINDGREN	Horn Antenna	3116	00084159	2015-10-18	2018-10-18

*** 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 Results Summary

According to the data in the following table, the EUT complied with the FCC §15.109 Class B, with the worst margin reading of:

18.06 dB at **151.525000 MHz** in the **Horizontal** polarization mode

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level complies 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

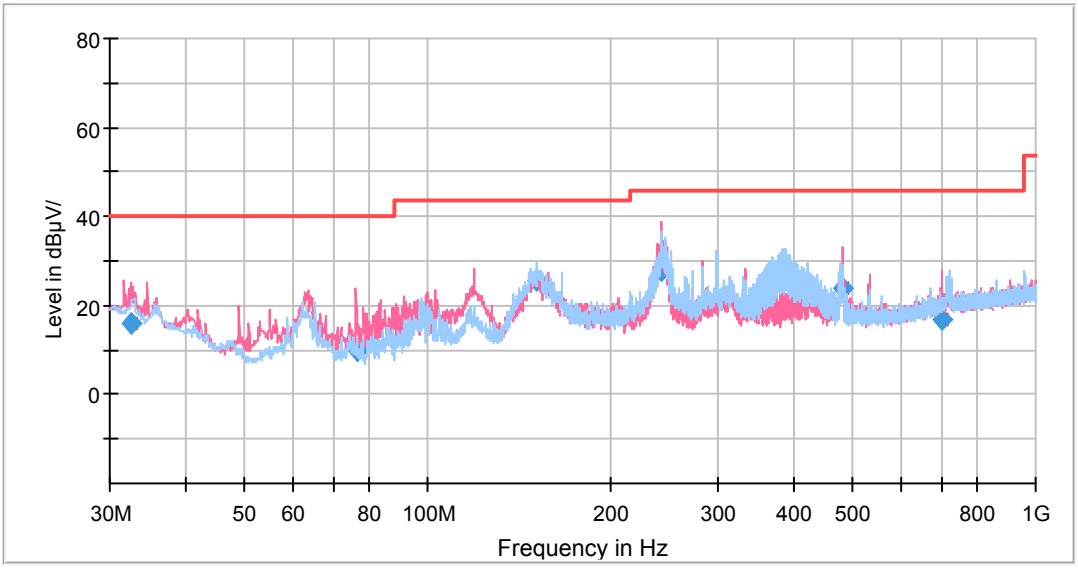
Environmental Conditions

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

The testing was performed by Phil Zhu on 2016-09-23.

Test Model 1

1)30MHz ~ 1GHz



Frequency (MHz)	Corrected Amplitude (dB µ V/m)	Detector	Limit (dB µ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
32.457500	16.17	QuasiPeak	40.00	23.83	199.0	V	83.0	-6.5
76.517500	9.88	QuasiPeak	40.00	30.12	101.0	V	226.0	-17.1
151.525000	25.44	QuasiPeak	43.50	18.06	199.0	H	221.0	-12.3
241.986250	27.63	QuasiPeak	46.00	18.37	101.0	V	274.0	-12.1
479.998750	23.92	QuasiPeak	46.00	22.08	199.0	V	210.0	-6.2
701.605000	16.66	QuasiPeak	46.00	29.34	101.0	V	18.0	-2.5

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)
1060.120240	28.63	---	70.00	45.37	101.0	V	308.0	-10.8
1060.120240	---	14.22	54.00	39.78	101.0	V	308.0	-10.8
1591.182365	30.86	---	74.00	43.14	101.0	V	168.0	-7.1
1591.182365	---	16.23	54.00	37.77	101.0	V	168.0	-7.1
2432.865731	---	17.57	54.00	36.43	101.0	V	88.0	-3.3
2432.865731	40.33	---	74.00	33.67	101.0	V	88.0	-3.3
2883.767535	---	21.05	54.00	32.95	101.0	V	351.0	-0.6
2883.767535	34.93	---	74.00	39.07	101.0	V	351.0	-0.6
3454.909820	---	24.90	54.00	29.10	101.0	H	234.0	1.5
3454.909820	37.45	---	74.00	36.55	101.0	H	234.0	1.5
6000.000000	---	30.37	54.00	23.63	101.0	H	87.0	10.8
6000.000000	43.73	---	74.00	30.27	101.0	H	87.0	10.8

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