FCC PART 15B

MEASUREMENT AND TEST REPORT

For

CommSky Technologies Corporation

4677 Old Ironsides Drive, Suite 400, Santa Clara, California, United States

FCC ID: 2AJUSCST-AP4600

Report Type:	**Product Type:**
Original Report	Indoor WLAN Access Point

Test Engineer:	Phil Zhu
Report Number:	RKS160612006-00D
Report Date:	2016-08-30
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The CommSky Technologies Corporation's product, model number: AP4600 (FCC ID: 2AJUSCST-AP4600) or the "EUT" in this report was a Indoor WLAN Access Point, which was measured approximately: 233.4mm (L) x216.5mm (W)) x60mm (H), rated input voltage: DC 48 V From Adapter..

Adapter information:
Manufacturer: FSP GROUP INC.
AC INPUT: 100-240V, 0.7A,50-60Hz
DC OUTPUT: 48V, 0.52A MAX

Manufacture information:
CommSky Technologies Corporation /4677 Old Ironsides Drive, Suite 400, Santa Clara, California, United States

**All measurement and test data in this report was gathered from production sample serial number: 20160603001 (Assigned by BACL, Kunshan). The EUT was received on 2016-06-03.*

Objective

This report is prepared on behalf of CommSky Technologies Corporation 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 submission with FCC ID: 2AJUSCST-AP4600.

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 Chenghu Road, Kunshan Development Zone No.248, Kunshan, Jiangsu, 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).

EUT Exercise Software

No exercise software was used.

Special Accessories

No special accessory was used.

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

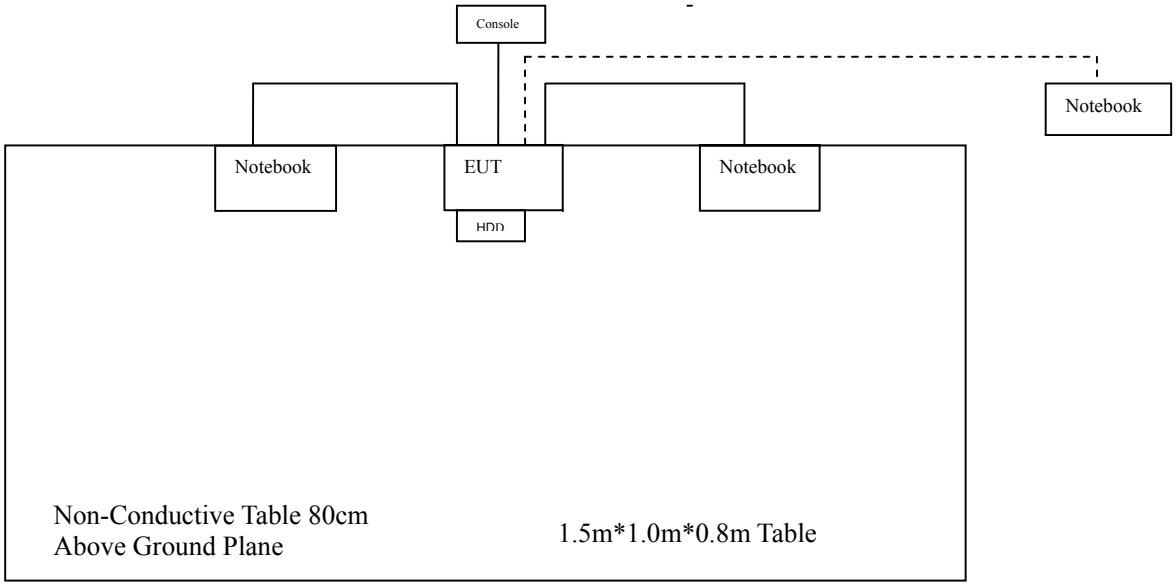
Manufacturer	Description	Model	Serial Number
DELL	Notebook	GX620	D65874152

External I/O Cable

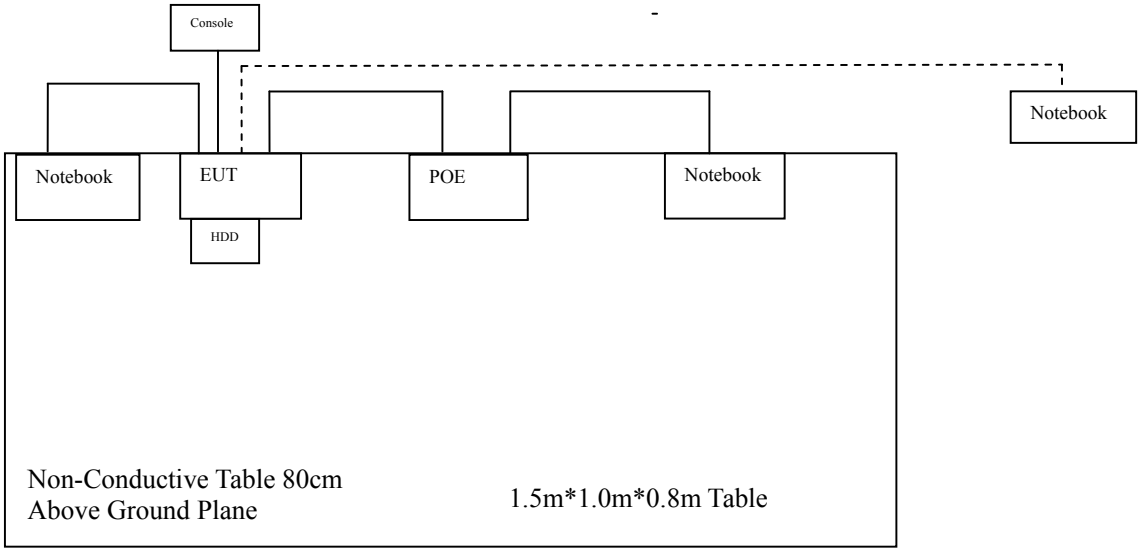
Cable Description	Length (m)	From/Port	To
USB Cable	0.9	Notebook	EUT
AC Line	Un-shielding	1.0	LISN
DC Line	Un-shielding	0.8	Adapter

Block Diagram of Test Setup

Test Model: Adapter mode



Test Model: POE mode



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

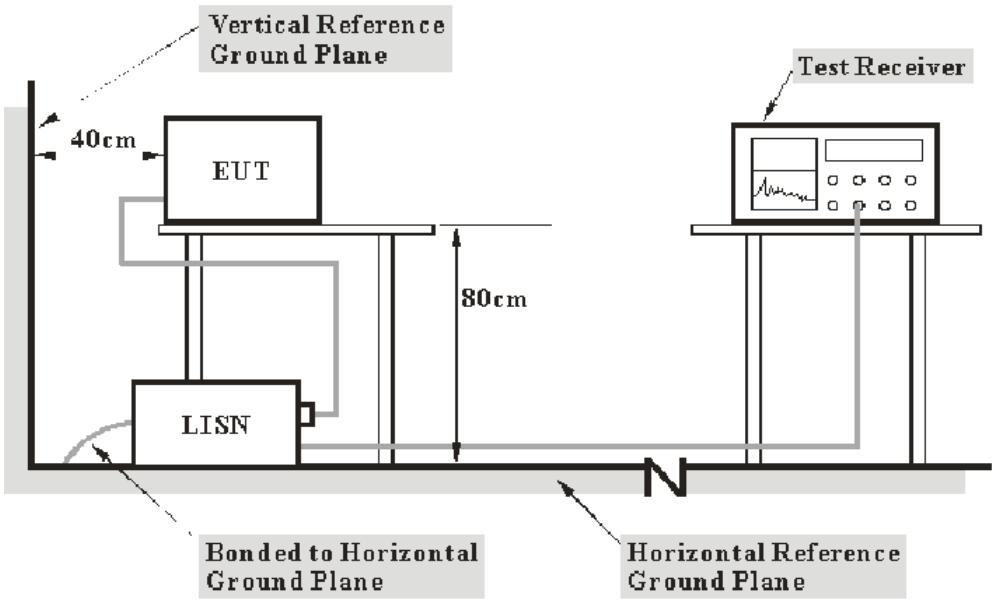
Measurement Uncertainty

Input quantities to be considered for conducted disturbance measurements maybe receiver reading, attenuation of the connection between LISN and receiver, LISN voltage division factor, LISN 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. (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.

The EUT 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

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	934115/007	2015-11-11	2016-11-10
Rohde & Schwarz	LISN	ESH3-Z5	862770/011	2015-11-12	2016-11-11
Rohde & Schwarz	LISN	ESH3-Z5	892239/018	2016-06-23	2017-06-22
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2015-09-16	2016-09-15
Rohde & Schwarz	CE Test software	EMC 32	V 09.10.0	--	--
MICRO-COAX	Coaxial line	UFB-293B-1-0 480-50X50	97F0173	2015-10-01	2016-10-01

*** 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:

6.91 dB μ V at **0.345000 MHz** in the **Line** conducted 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

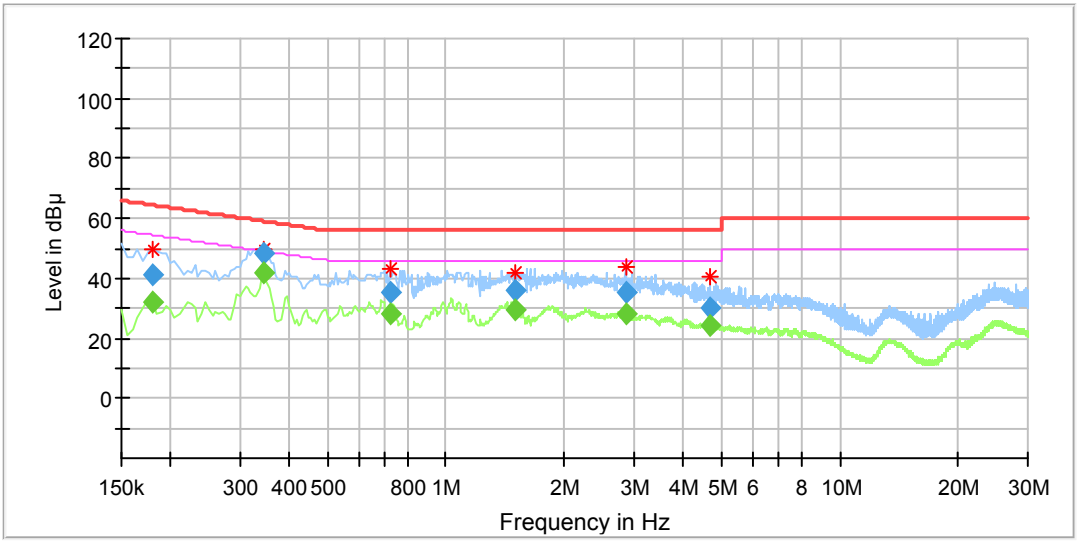
Environmental Conditions

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

The testing was performed by Phil Zhu on 2016-08-19.

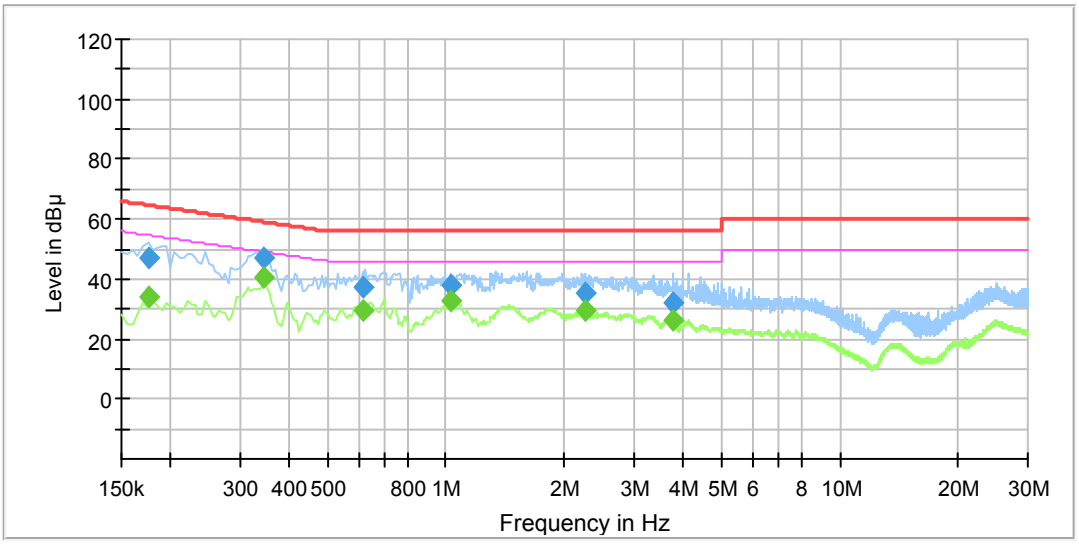
Test Model: Adapter mode

AC 120V/60 Hz, Line



Frequency (MHz)	Corrected Amplitude		Limit (dB µ V)	Margin (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB dB µ V)
	QuasiPeak (dB µ V)	Average (dB µ V)					
0.180000	---	32.36	54.49	22.13	9.000	L1	11.0
0.180000	41.34	---	64.49	23.15	9.000	L1	11.0
0.345000	---	42.17	49.08	6.91	9.000	L1	11.0
0.345000	48.22	---	59.08	10.86	9.000	L1	11.0
0.720000	---	28.08	46.00	17.92	9.000	L1	11.1
0.720000	35.57	---	56.00	20.43	9.000	L1	11.1
1.500000	---	29.49	46.00	16.51	9.000	L1	11.1
1.500000	36.24	---	56.00	19.76	9.000	L1	11.1
2.855000	---	27.93	46.00	18.07	9.000	L1	11.2
2.855000	35.08	---	56.00	20.92	9.000	L1	11.2
4.670000	---	24.29	46.00	21.71	9.000	L1	11.3
4.670000	29.90	---	56.00	26.10	9.000	L1	11.3

AC 120V/60 Hz, Neutral



Frequency (MHz)	Corrected Amplitude		Limit (dB µ V)	Margin (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)
	QuasiPeak (dB µ V)	Average (dB µ V)					
0.175000	---	33.79	54.72	20.93	9.000	N	11.0
0.175000	46.75	---	64.72	17.97	9.000	N	11.0
0.345000	---	40.43	49.08	8.65	9.000	N	11.0
0.345000	47.29	---	59.08	11.79	9.000	N	11.0
0.615000	---	29.77	46.00	16.23	9.000	N	11.1
0.615000	36.98	---	56.00	19.02	9.000	N	11.1
1.025000	---	32.73	46.00	13.27	9.000	N	11.1
1.025000	37.83	---	56.00	18.17	9.000	N	11.1
2.250000	---	29.60	46.00	16.40	9.000	N	11.3
2.250000	35.30	---	56.00	20.70	9.000	N	11.3
3.755000	---	26.39	46.00	19.61	9.000	N	11.3
3.755000	32.36	---	56.00	23.64	9.000	N	11.3

Note:

1) Corrected Amplitude = Reading + Correction Factor
2) Margin = Limit – Corrected Amplitude

FCC §15.109 - RADIATED SPURIOUS EMISSIONS

Applicable Standard

FCC §15.109

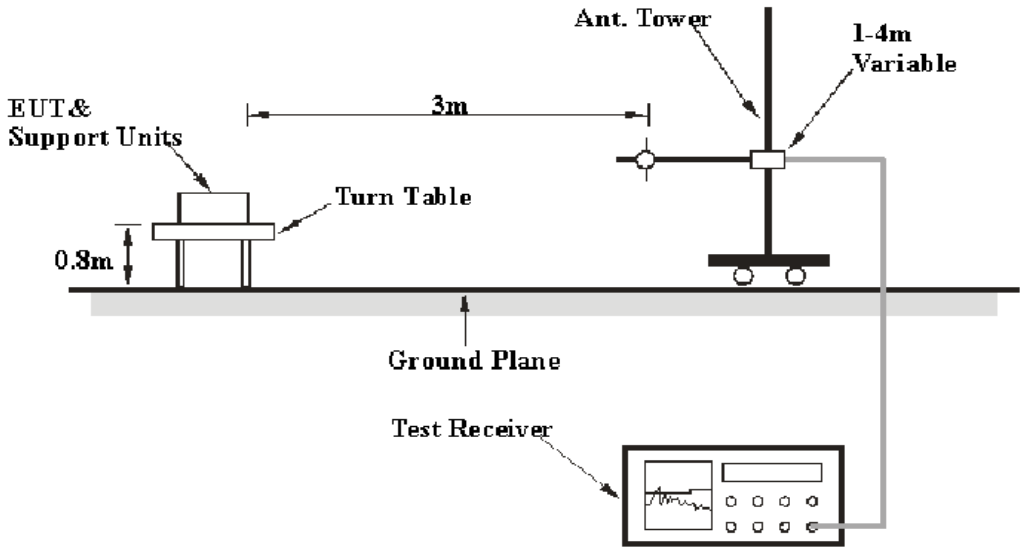
Measurement Uncertainty

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, 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



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 9 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
1GHz-9GHz	1MHz	3MHz	-	PK
1GHz-9GHz	1MHz	10Hz	-	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	2015-09-16	2016-09-15
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2016-05-20	2017-05-19
Sunol Sciences	Broadband Antenna	JB3	A090314-2	2015-11-07	2016-11-06
ETS	Horn Antenna	3115	6229	2015-11-07	2016-11-06
Rohde & Schwarz	Signal Analyzer	FSIQ26	100048	2015-11-04	2016-11-03
Mini	Pre-amplifier	ZVA-183-S+	857001418	2015-09-16	2016-09-15
R&S	Auto test Software	EMC32	V 09.10.0	-	-
BACL	RF cable	KS-LAB-012	KS-LAB-012	2015-12-16	2016-12-15
BACL	RF cable	KS-LAB-010	KS-LAB-010	2015-12-16	2016-12-15

*** 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:

4.05 dB μ V/m at **599.996250 MHz** in the **Vertical** polarization mode(*Test Model: Adapter*)
6.85 dB μ V/m at **599.996250 MHz** in the **Vertical** polarization mode(*Test Model: POE*)

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

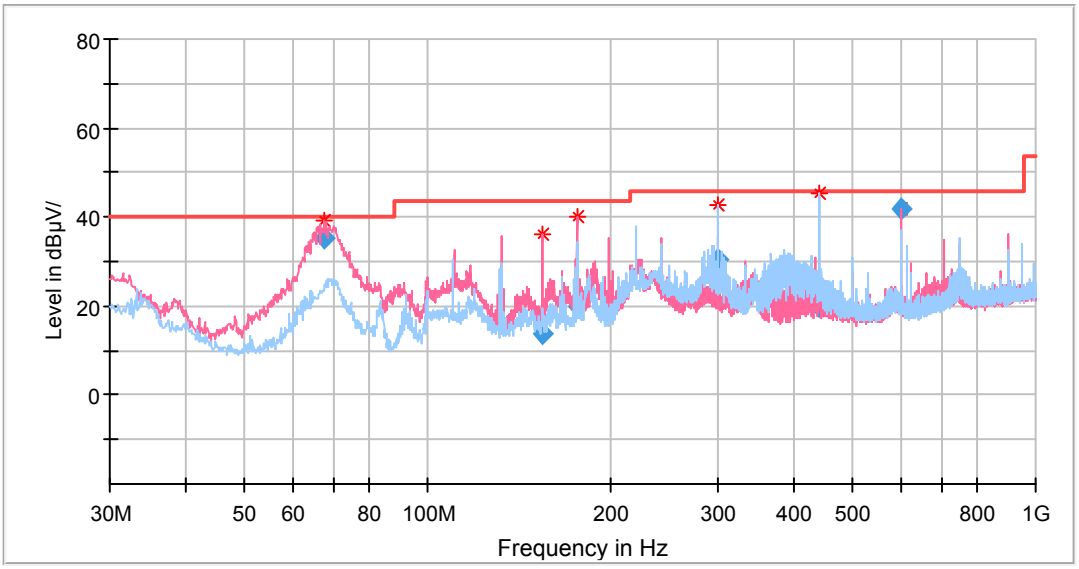
Temperature:	27 ℃
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Phil Zhu on 2016-08-23.

Test Model: Adapter mode

1)30MHz ~ 1GHz

AC 120V/60 Hz



Frequency (MHz)	Corrected Amplitude (dB µ V)	Detector	Limit (dB µ V/m)	Margin (dB µ V/m)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB µ V/m)
67.587500	35.44	QuasiPeak	40.00	4.56	120.000	101.0	V	169.0	-17.1
154.160000	13.69	QuasiPeak	43.50	29.81	120.000	101.0	V	347.0	-12.3
175.863750	20.05	QuasiPeak	43.50	23.45	120.000	101.0	V	89.0	-12.1
300.023750	30.54	QuasiPeak	46.00	15.46	120.000	101.0	H	233.0	-10.4
440.916250	20.12	QuasiPeak	46.00	25.88	120.000	101.0	H	139.0	-7.3
599.996250	41.95	QuasiPeak	46.00	4.05	120.000	101.0	V	193.0	-5.2

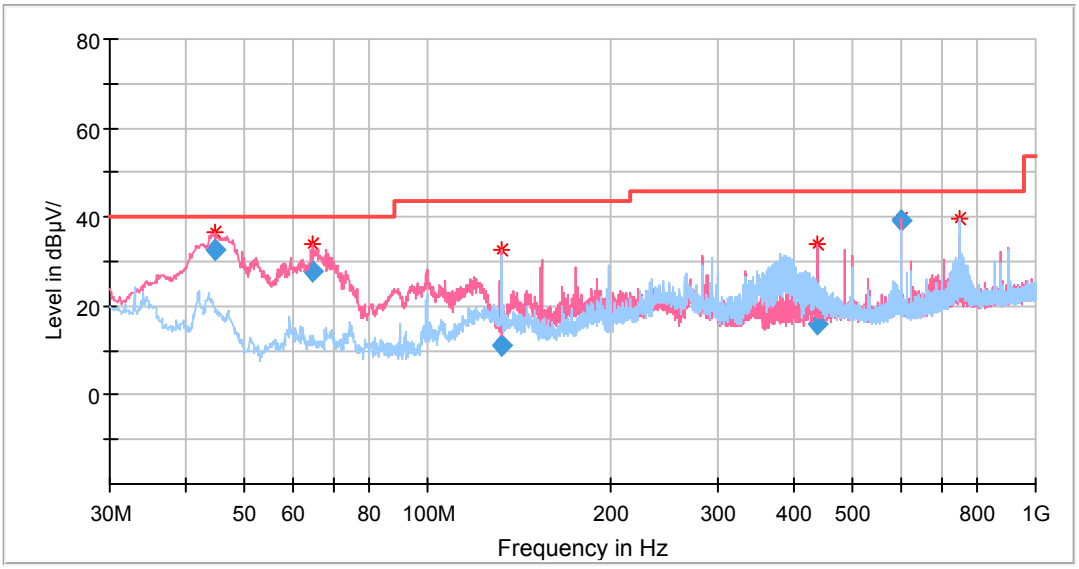
1) Above 1GHz

Frequency (MHz)	MaxPeak (dB μ V)	Average (dBV/m)	Limit (dB μ V/m)	Margin (dB μ V/m)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB μ V/m)
2810.851703	---	25.19	54.00	28.81	1000.000	149.0	V	14.0	6.1
2810.851703	39.23	---	74.00	34.77	1000.000	149.0	V	14.0	6.1
3944.659319	41.62	---	74.00	32.38	1000.000	149.0	V	293.0	9.8
3944.659319	---	27.74	54.00	26.26	1000.000	149.0	V	293.0	9.8
5373.997996	45.89	---	74.00	28.11	1000.000	149.0	V	62.0	14.7
5373.997996	---	32.10	54.00	21.90	1000.000	149.0	V	62.0	14.7
5864.539078	61.05	---	74.00	12.95	1000.000	149.0	H	209.0	15.2
5864.539078	---	34.78	54.00	19.22	1000.000	149.0	H	209.0	15.2
6624.038076	53.16	---	74.00	20.84	1000.000	149.0	V	105.0	17.7
6624.038076	---	38.57	54.00	15.43	1000.000	149.0	V	105.0	17.7
7523.456914	---	38.01	54.00	15.99	1000.000	149.0	V	209.0	20.6
7523.456914	52.37	---	74.00	21.63	1000.000	149.0	V	209.0	20.6

Test Model: POE mode

1) 30 MHz - 1 GHz

AC 120V/60 Hz



Frequency (MHz)	Corrected Amplitude (dB µ V)	Detector	Limit (dB µ V/m)	Margin (dB µ V/m)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB µ V/m)
44.550000	32.62	QuasiPeak	40.00	7.38	120.000	199.0	V	304.0	-13.2
64.798750	28.01	QuasiPeak	40.00	11.99	120.000	101.0	V	169.0	-17.0
132.456250	11.11	QuasiPeak	43.50	32.39	120.000	101.0	V	126.0	-13.1
438.976250	15.93	QuasiPeak	46.00	30.07	120.000	101.0	V	42.0	-7.3
599.996250	39.15	QuasiPeak	46.00	6.85	120.000	101.0	V	136.0	-5.2
750.103750	24.29	QuasiPeak	46.00	21.71	120.000	101.0	H	181.0	-2.1

2) Above 1 GHz

Frequency (MHz)	MaxPeak (dB µ V)	Average (dBV/m)	Limit (dB µ V/m)	Margin (dB µ V/m)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB µ V/m)
2728.486974	---	23.80	54.00	30.20	1000.000	149.0	V	358.0	5.8
2728.486974	37.65	---	74.00	36.35	1000.000	149.0	V	358.0	5.8
3906.322645	---	28.17	54.00	25.83	1000.000	149.0	H	204.0	9.6
3906.322645	41.88	---	74.00	32.12	1000.000	149.0	H	204.0	9.6
5498.607214	---	32.33	54.00	21.67	1000.000	149.0	H	291.0	15.0
5498.607214	46.63	---	74.00	27.37	1000.000	149.0	H	291.0	15.0
5826.583167	---	34.25	54.00	19.75	1000.000	149.0	H	189.0	15.2
5826.583167	61.20	---	74.00	12.80	1000.000	149.0	H	189.0	15.2
6678.847695	---	38.34	54.00	15.66	1000.000	149.0	V	135.0	17.9
6678.847695	52.28	---	74.00	21.72	1000.000	149.0	V	135.0	17.9
7509.108216	---	37.96	54.00	16.04	1000.000	149.0	V	39.0	20.6
7509.108216	51.54	---	74.00	22.46	1000.000	149.0	V	39.0	20.6

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