

FCC PART 15B TEST REPORT

For

Communication Networks LLC

3 Corporate Drive, Danbury, Connecticut, United States

FCC ID: 2ANZ6NW10

Report Type: CIIPC Report	Product Type: Wireless AP
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Report Number: RKSA180104001-00C	
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant	Communication Networks LLC
Model	NW10IC
Product	Wireless AP
Rate Voltage	DC 48-56V from adapter
Dimension	45 mm(L)*15 mm(W)*35 mm(H)

Adapter Information:

Model: PSE801G

Input: AC100-240V 50/60Hz

Output: DC48-56V

* All measurement and test data in this report was gathered from production sample serial number: 20180104001. (Assigned by BACL, Kunshan). The EUT supplied by the applicant was received on 2018-01-04.

Objective

This report is prepared on behalf of Communication Networks LLC 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 digital device.

This is a CIIPC report base on the original report RKS170721003-00C with FCC ID: 2ANZ6NW10 which was granted on 2017-12-01, the difference between the original device and the current one is as follows:

Add the POE module to the EUT.

Related Submittal(s)/Grant(s)

FCC Part 15.407 NII and Part 90 TNB submission with FCC ID: 2ANZ6NW10.

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.

Bay Area Compliance Laboratories Corp. (Kunshan) Lab is accredited to ISO/IEC 17025 by A2LA (Lab code: 4323.01) and the FCC designation No. CN1185 under the FCC KDB 974614 D01. 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.: 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 mode: RJ45 Data Transmission

EUT Exercise Software

Notebook executive “My Win” present “H” pattern on the monitor.
Data transfer with server.

Special Accessories

No special accessory was used.

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

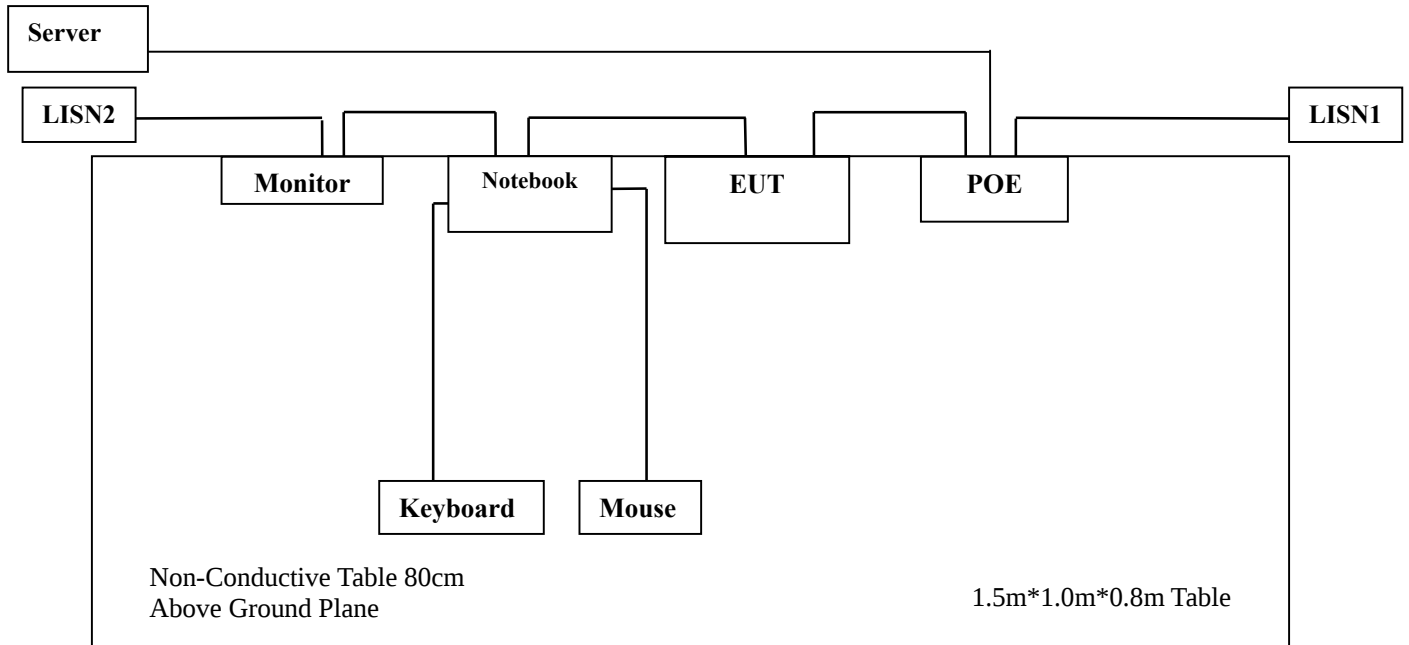
Manufacturer	Description	Model	Serial Number
DELL	Notebook	E6410	3094742521
Logitech	Keyboard	Y-U0009	1648MG010PW8
Logitech	Mouse	M-U0026	HS529HB
View Sonic	Monitor	VLCD523895-3W	/
Lenovo	Flash	T180	0A1266865200521

External I/O Cable

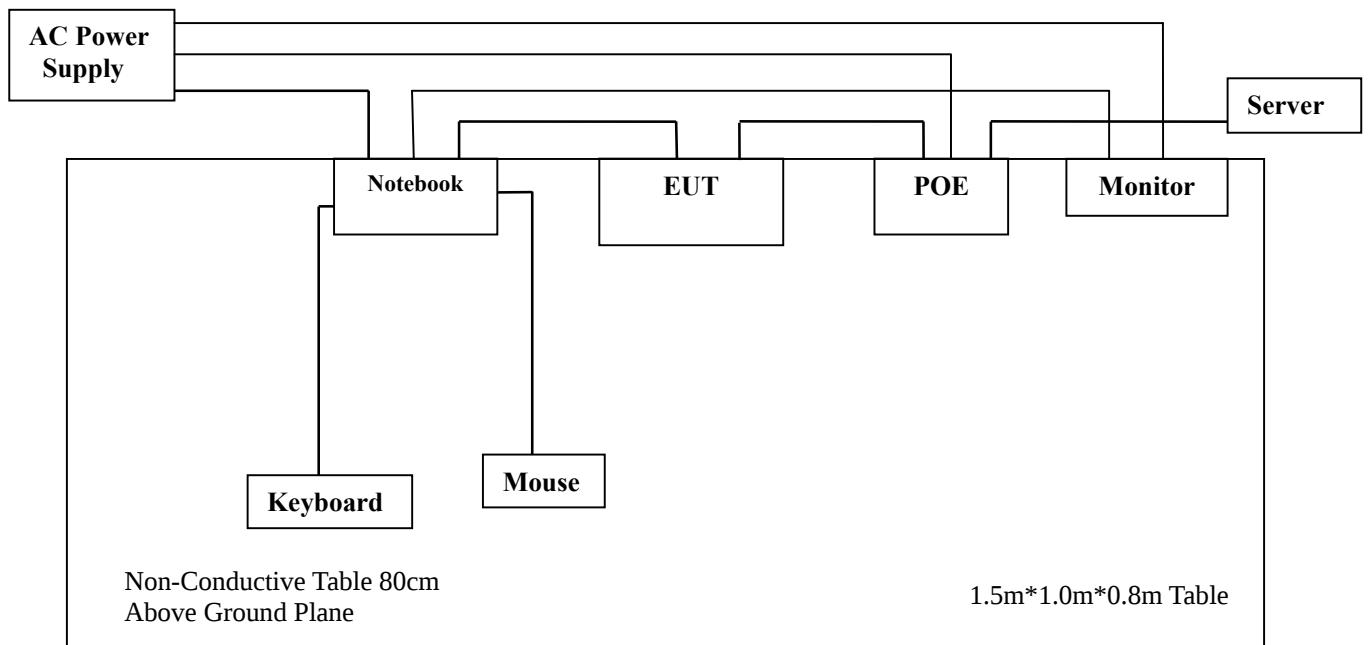
Cable Description	Length (m)	From/Port	To	Shielding
RJ45 Cable	1.0	EUT	POE	Non Shielding
VGA Cable	1.0	Notebook	Monitor	Non Shielding
RJ45 Cable	0.5	POE	Server	Non Shielding
RJ45 Cable	0.8	Notebook	EUT	Non Shielding
Keyboard USB Cable	1.5	Notebook	Keyboard	Non Shielding
Mouse USB Cable	1.5	Notebook	Mouse	Non Shielding
Power Cable	1.5	Monitor	LISN2	Non Shielding
Power Cable	1.5	POE	LISN1	Non Shielding

Block Diagram of Conducted Emissions and Radiated Emissions Test Setup

Conducted Emissions of test Setup



Radiated Emissions of test Setup



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

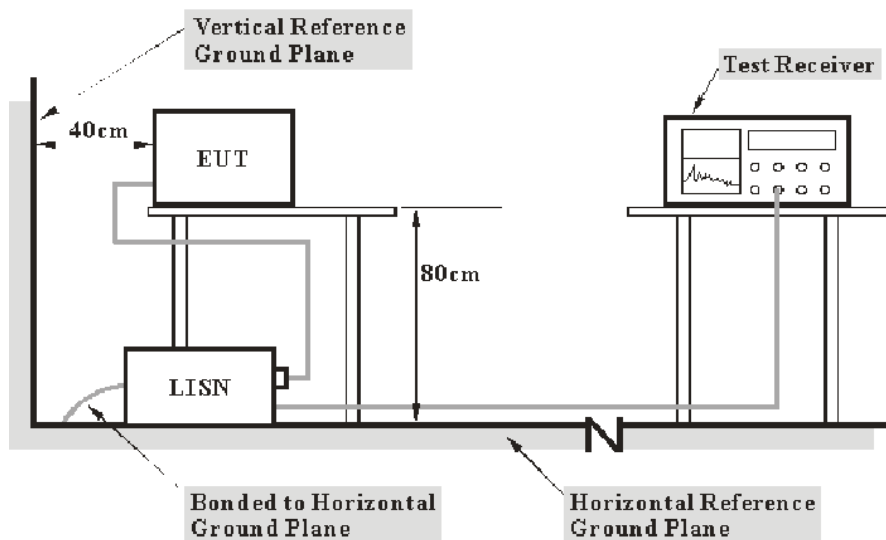
According to FCC§15.107

Measurement Uncertainty

Input quantities to be considered for conducted disturbance measurements may be 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	3.19 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 POE 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	2017-11-12	2018-11-11
Rohde & Schwarz	LISN	ESH3-Z5	862770/011	2017-11-12	2018-11-11
ROHDE&SCHWARZ	LISN	ENV216	3560655016	2017-11-12	2018-11-11
Rohde & Schwarz	CE Test software	EMC 32	100357	--	--
MICRO-COAX	Coaxial Cable	Cable-6	006	2017-09-08	2018-09-07

* **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:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{VDF} + \text{Cable Loss} + \text{Transient Limiter Attenuation}$$

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:

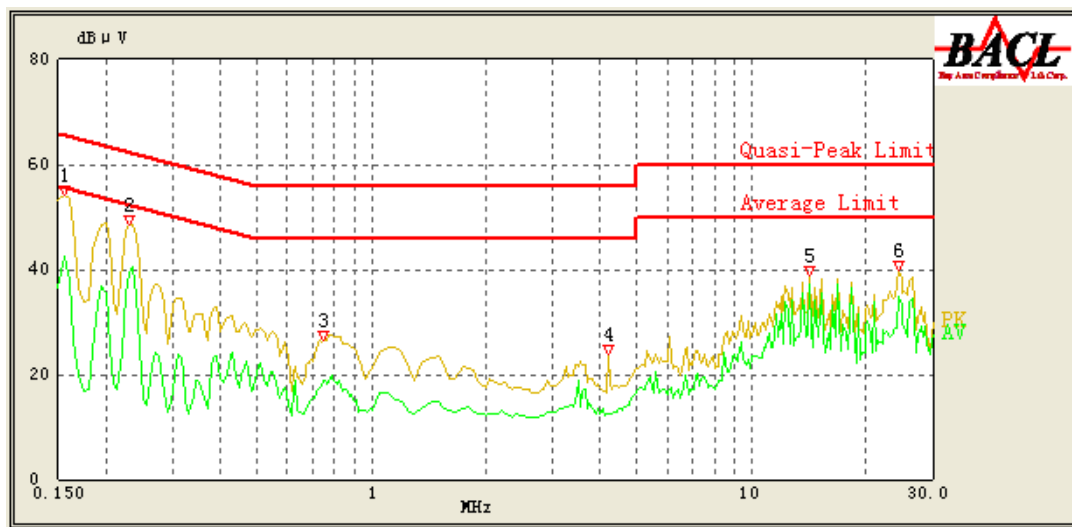
$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Data**Environmental Conditions**

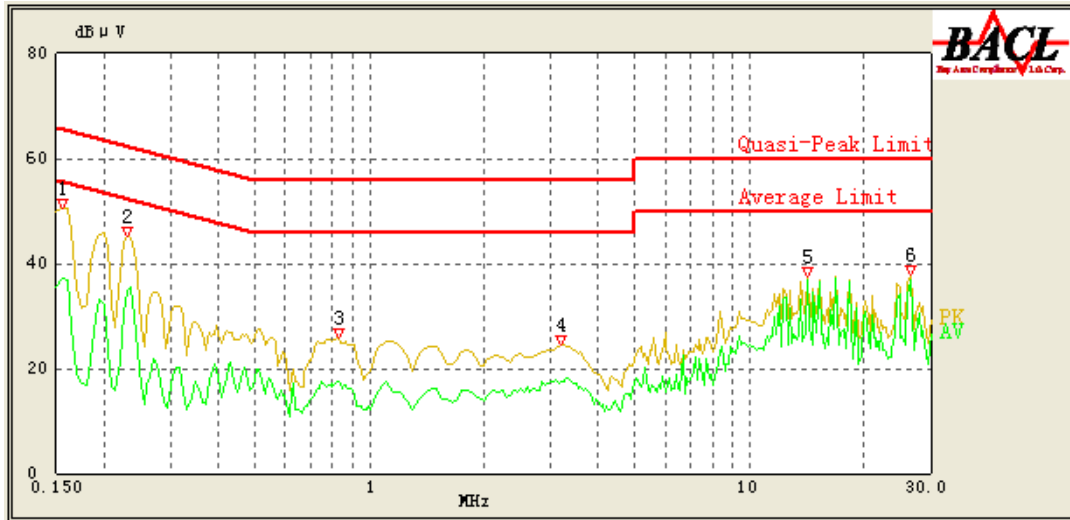
Temperature:	22°C
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Annie Xuan on 2018-01-17.

Test mode: RJ45 Data Transmission

Line

No.	Frequency (MHz)	Reading (dBμV)	Correction (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/AV/QP)
1	0.155	54.02	16.06	65.86	11.84	QP
2	0.155	42.44	16.06	55.86	13.42	AV
3	0.230	48.65	16.02	63.71	15.06	QP
4	0.230	39.11	16.02	53.71	14.60	AV
5	0.750	26.45	15.94	56.00	29.55	QP
6	0.750	18.86	15.94	46.00	27.14	AV
7	4.200	23.70	15.85	56.00	32.30	QP
8	4.200	12.61	15.85	46.00	33.39	AV
9	14.150	38.70	16.18	60.00	21.30	QP
10	14.150	37.02	16.18	50.00	12.98	AV
11	24.350	39.84	16.46	60.00	20.16	QP
12	24.350	34.97	16.46	50.00	15.03	AV

Neutral

No.	Frequency (MHz)	Reading (dBμV)	Correction (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/AV/QP)
1	0.155	50.64	16.06	65.86	15.22	QP
2	0.155	37.33	16.06	55.86	18.53	AV
3	0.230	45.27	16.06	63.71	18.44	QP
4	0.230	34.91	16.06	53.71	18.80	AV
5	0.830	25.85	15.97	56.00	30.15	QP
6	0.835	17.19	15.97	46.00	28.81	AV
7	3.200	24.52	15.89	56.00	31.48	QP
8	3.200	17.35	15.89	46.00	28.65	AV
9	14.150	37.42	16.01	60.00	22.58	QP
10	14.150	36.98	16.01	50.00	13.02	AV
11	26.550	37.93	16.27	60.00	22.07	QP
12	26.550	36.86	16.27	50.00	13.14	AV

FCC §15.109 - RADIATED EMISSIONS

Applicable Standard

FCC §15.109

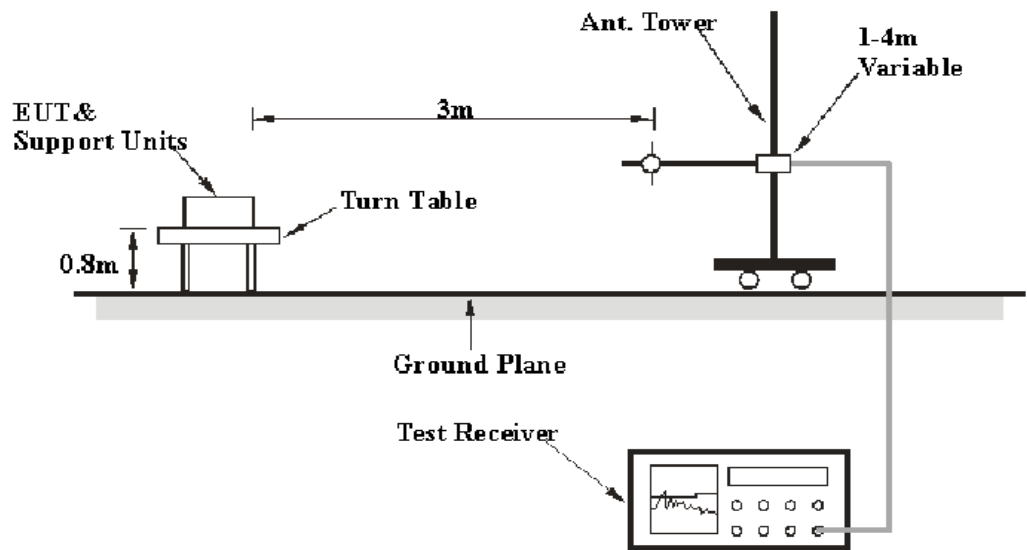
Measurement Uncertainty

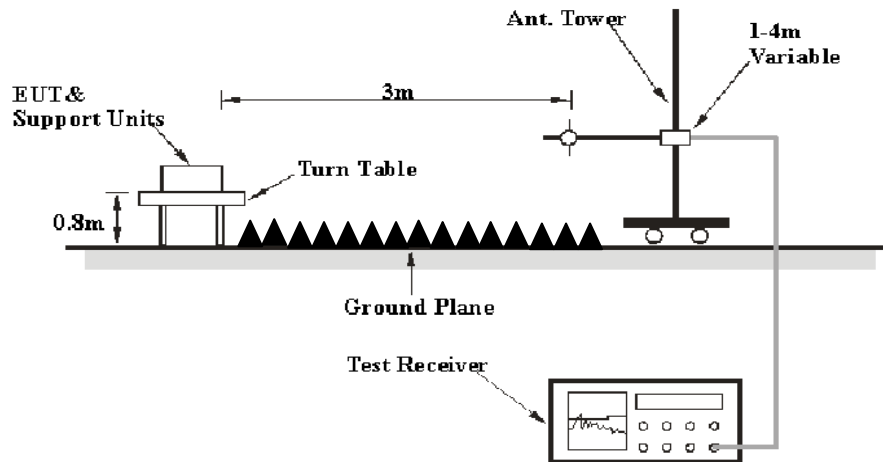
All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency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

Item		Measurement Uncertainty	U_{cispr}
Radiated Emission	30MHz~1GHz	6.11dB	6.3 dB
	1GHz~6GHz	4.45dB	5.2 dB
	6 GHz ~18 GHz	5.23dB	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 30 MHz to 18 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
30MHz – 1000 MHz	120 kHz	300 kHz	120kHz	QP
Above 1 GHz	1MHz	3 MHz	/	Peak
	1MHz	1 Hz	/	Peak

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, Peak and average detection mode above 1 GHz.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sonoma Instrument	Amplifier	310N	171205	2017-08-14	2018-08-13
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2017-11-12	2018-11-11
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
ETS-LINDGREN	Horn Antenna	3116	00084159	2016-10-18	2019-10-18
Rohde & Schwarz	EMI Test Receiver	ESU40	100207	2017-08-27	2018-08-26
Heatsink Required	Amplifier	QLW-18405536-J0	15964001009	2017-05-21	2018-05-20
MICRO-COAX	Coaxial Cable	Cable-8	008	2017-08-15	2018-08-14
MICRO-COAX	Coaxial Cable	Cable-9	009	2017-08-15	2018-08-14
MICRO-COAX	Coaxial Cable	Cable-10	010	2017-08-15	2018-08-14
MICRO-COAX	Coaxial Cable	Cable-4	004	2017-12-12	2018-12-11
MICRO-COAX	Coaxial Cable	Cable-5	005	2017-12-12	2018-12-11

* **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:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

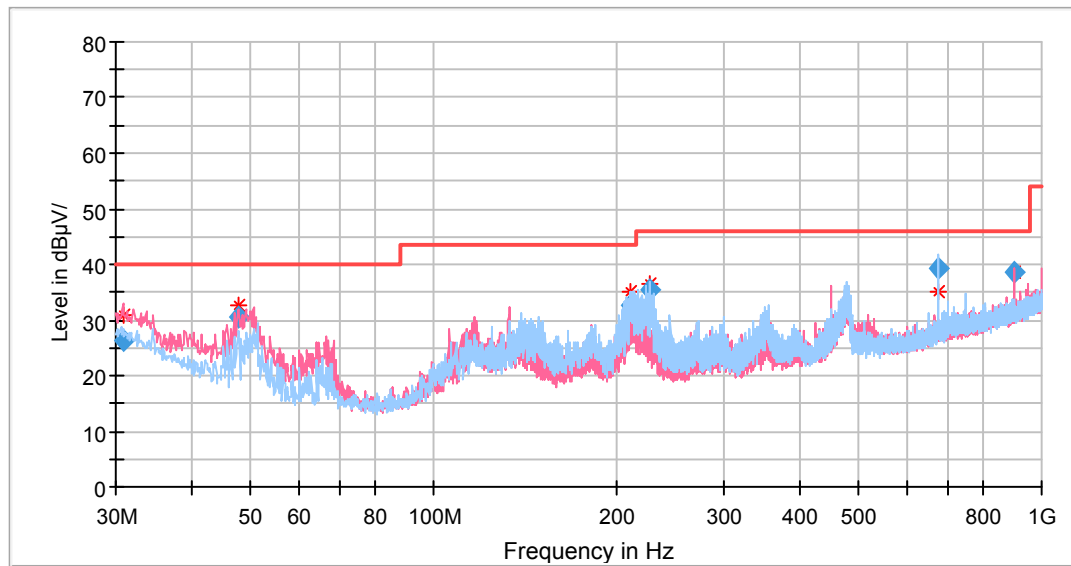
$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Data**Environmental Conditions**

Temperature:	27 °C
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Annie Xuan on 2018-01-15.

Test mode: RJ45 Data Transmission

30MHz ~ 1GHz:

Frequency (MHz)	Quasi Peak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
30.915755	26.17	40.00	13.83	101.0	V	282.0	-5.0
47.802050	30.43	40.00	9.57	101.0	V	42.0	-16.5
210.011370	32.74	43.50	10.76	199.0	H	223.0	-12.7
226.877990	35.59	46.00	10.41	101.0	H	31.0	-12.7
675.000500	39.17	46.00	6.83	101.0	H	163.0	-3.6
899.995290	38.45	46.00	7.55	101.0	V	158.0	0.2

Above 1 GHz:

Frequency (MHz)	Max Peak (dB μ V/m)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1447.484970	31.39	---	74.00	42.61	100.0	H	265.0	-9.4
1447.484970	---	17.79	54.00	36.21	100.0	H	265.0	-9.4
2569.108217	34.56	---	74.00	39.44	100.0	V	287.0	-5.1
2569.108217	---	21.26	54.00	32.74	100.0	V	287.0	-5.1
4237.124249	38.53	---	74.00	35.47	100.0	V	170.0	0.5
4237.124249	---	24.13	54.00	29.87	100.0	V	170.0	0.5
6823.476954	---	32.19	54.00	21.81	100.0	V	333.0	7.6
6823.476954	45.58	---	74.00	28.42	100.0	V	333.0	7.6
10397.845691	48.29	---	74.00	25.71	100.0	H	128.0	15.8
10397.845691	---	34.81	54.00	19.19	100.0	H	128.0	15.8
17627.945892	---	38.14	54.00	15.86	100.0	H	202.0	21.4
17627.945892	51.55	---	74.00	22.45	100.0	H	202.0	21.4

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