

FCC PART 15B

MEASUREMENT AND TEST REPORT

For

Hangzhou Ezviz Network Co., Ltd

Floor 7, Building 1, No. 700, Dongliu Road, Binjiang District, Hangzhou

FCC ID: 2ALZF-X3C-8E

Report Type: Original Report	Product Type: Wi-Fi Video Recorder
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Report Number: RKS170417001-00A	
Report Date: 2017-05-06 Kamp Chen	<i>Kamp Chen</i>
Reviewed By: EMC Leader	
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TABLE OF CONTENTS

GENERAL INFORMATION.....	3
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	3
OBJECTIVE	3
RELATED SUBMITTAL(S)/GRANT(S).....	3
TEST METHODOLOGY	3
TEST FACILITY	4
SYSTEM TEST CONFIGURATION.....	5
JUSTIFICATION	5
EUT EXERCISE SOFTWARE	5
SPECIAL ACCESSORIES.....	5
EQUIPMENT MODIFICATIONS	5
SUPPORT EQUIPMENT LIST AND DETAILS	5
EXTERNAL I/O CABLE.....	5
BLOCK DIAGRAM OF RADIATED TEST SETUP.....	6
SUMMARY OF TEST RESULTS	7
FCC §15.107 –CONDUCTED EMISSIONS	8
APPLICABLE STANDARD	8
MEASUREMENT UNCERTAINTY	8
EUT SETUP	8
EMI TEST RECEIVER SETUP.....	9
TEST PROCEDURE	9
TEST EQUIPMENT LIST AND DETAILS.....	9
CORRECTED FACTOR & MARGIN CALCULATION	9
TEST DATA	10
FCC §15.109 - RADIATED EMISSIONS	14
APPLICABLE STANDARD	14
MEASUREMENT UNCERTAINTY.....	14
EUT SETUP	14
EMI TEST RECEIVER SETUP.....	15
TEST PROCEDURE	15
TEST EQUIPMENT LIST AND DETAILS.....	16
CORRECTED AMPLITUDE & MARGIN CALCULATION	16
TEST DATA	16

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant	Hangzhou Ezviz Network Co., Ltd
Model	CS-X3C-8E
Product	Wi-Fi Video Recorder
Rate Voltage	DC 12V From Adapter
Operating Frequency	5.875GHz
Dimension	64 mm (L) × 256mm (W) × 241 mm (H)

Adapter Information:

Model: MSA-C2000IC12.0-24P-US/ MSA-C2000IC12.0-24P-JP/ MSA-C2000IC12.0-24P-MX

Input: AC 100-240V, 50/60 Hz, 0.7A MAX

Output: DC 12V, 2A

Note: The product's series model number: CS-X3C-8E/1T, CS-X3C-8E/2T. The difference between them was explained in the attached declaration letter.

** All measurement and test data in this report was gathered from production sample serial number: 20170417003 (Assigned by BACL, Kunshan). The EUT supplied by the applicant was received on 2017-04-17.*

Objective

This report is prepared on behalf of Hangzhou Ezviz Network 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 15.247 DTS and FCC Part 15.407 NII submission with FCC ID: 2ALZF-X3C-8E.

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 A 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 Mode: WAN port Link 100Mbps and LAN port Link 100Mbps

EUT Exercise Software

Notebook 1 exeutive “winthrax.exe” through the Flash to R/W.

Notebook 1 exeutive “MyHWin”present “H” pattern on the monitor.

Notebook 1 exeutive “ping.exe” through EUT to Notebook 2.

Notebook 3 exeutive “ping.exe” through EUT to Notebook 2.

Special Accessories

No special accessory was used.

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

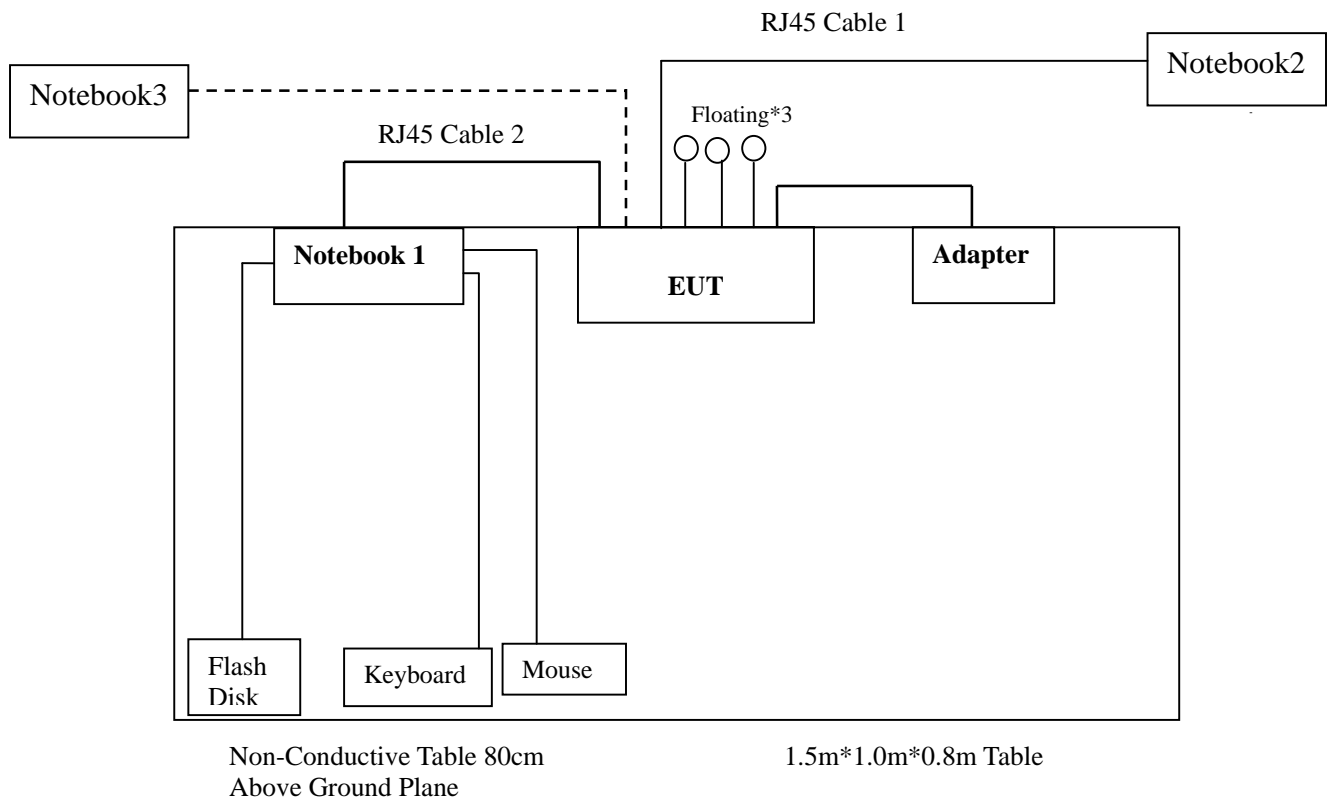
Manufacturer	Description	Model	Serial Number
DELL	Notebook 3	015K3N	00190-098-766-241
DELL	Notebook 2	0T7570	00045-644-426-785
DELL	Notebook 1	E6410	3094742521
Lenovo	USB flash disk	T180	0A1266865200521
Logitech	Keyboard	Y-U0009	1648MG010PW8
Logitech	Mouse	M-U0026	HS529HB

External I/O Cable

Cable Description	Length (m)	From/Port	To
RJ45 Cable 1	15	EUT	Notebook 2
RJ45 Cable 2	1.0	EUT	Notebook 1
USB flash disk USB Cable	1.0	Notebook 1	USB flash disk
Keyboard USB Cable	1.0	Notebook 1	Keyboard
Mouse USB Cable	1.0	Notebook 1	Mouse
Floating Cable*3	1.5	EUT	Floating Cable

Block Diagram of Radiated Test Setup

Test Mode: WAN port Link 100Mbps and LAN port Link 100Mbps



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

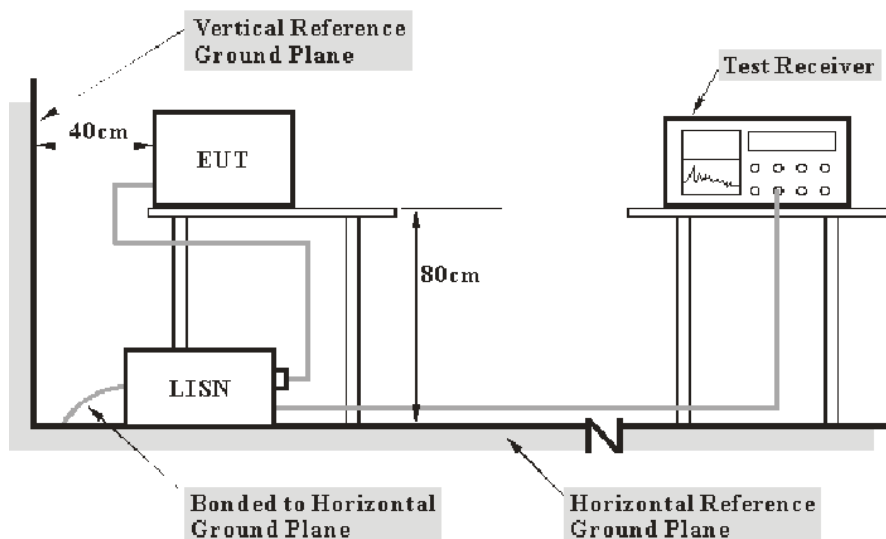
According to FCC§15.107

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 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:

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

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 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**

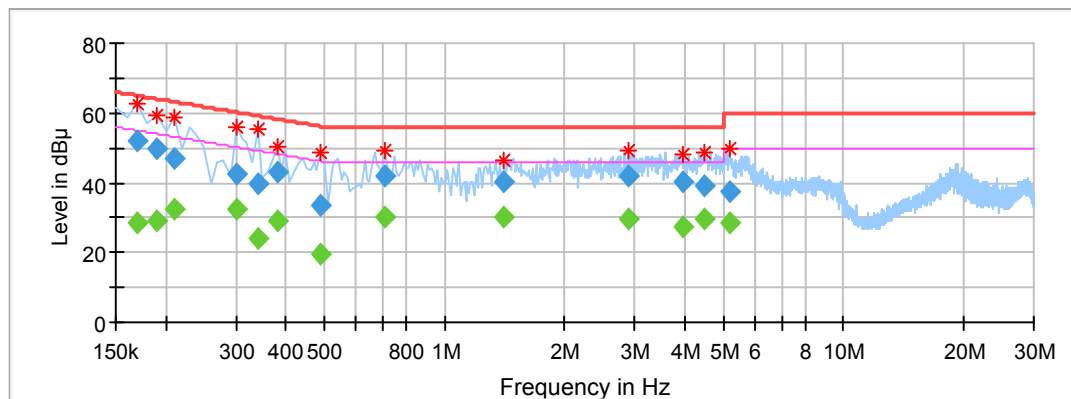
Temperature:	22°C
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Phil Zhu on 2017-04-26.

Test Mode: WAN port Link 100Mbps and LAN port Link 100Mbps

Line

Full Spectrum

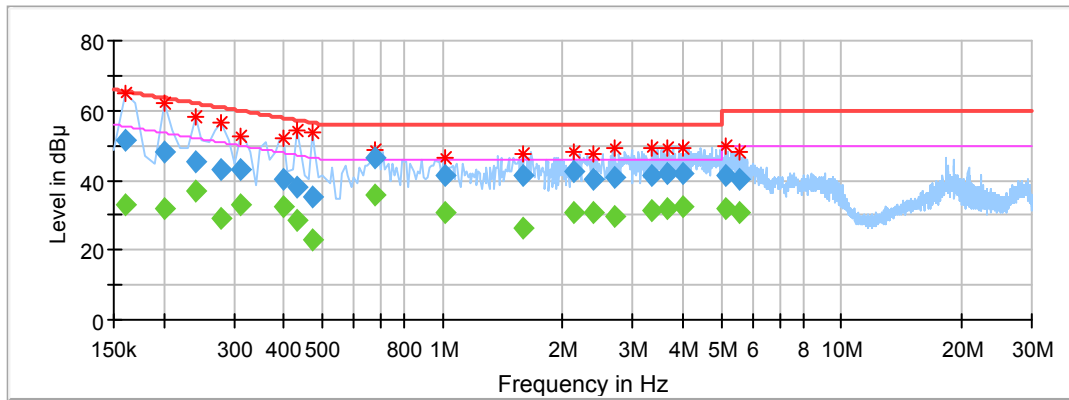


Frequency (MHz)	QuasiPeak (dB μ V)	Average (dB μ V)	Limit (dB μ V)	Margin (dB)	Line	Corr. (dB)
0.170000	---	28.57	54.96	26.39	L1	10.0
0.170000	51.79	---	64.96	13.17	L1	10.0
0.190000	---	29.03	54.04	25.01	L1	10.0
0.190000	49.80	---	64.04	14.24	L1	10.0
0.210000	---	32.24	53.21	20.97	L1	10.0
0.210000	47.17	---	63.21	16.04	L1	10.0
0.300000	---	32.27	50.24	17.97	L1	10.0
0.300000	42.45	---	60.24	17.79	L1	10.0
0.340000	---	24.04	49.20	25.16	L1	10.0
0.340000	39.74	---	59.20	19.46	L1	10.0
0.380000	---	29.17	48.28	19.11	L1	10.0
0.380000	43.15	---	58.28	15.13	L1	10.0
0.490000	---	19.62	46.17	26.55	L1	10.1
0.490000	33.41	---	56.17	22.76	L1	10.1

Frequency (MHz)	QuasiPeak (dB μ V)	Average (dB μ V)	Limit (dB μ V)	Margin (dB)	Line	Corr. (dB)
0.710000	---	30.16	46.00	15.84	L1	9.9
0.710000	42.10	---	56.00	13.90	L1	9.9
1.410000	---	30.13	46.00	15.87	L1	9.9
1.410000	40.01	---	56.00	15.99	L1	9.9
2.880000	---	29.64	46.00	16.36	L1	9.9
2.880000	41.91	---	56.00	14.09	L1	9.9
3.960000	---	27.20	46.00	18.80	L1	9.9
3.960000	40.06	---	56.00	15.94	L1	9.9
4.460000	---	29.50	46.00	16.50	L1	9.9
4.460000	39.17	---	56.00	16.83	L1	9.9
5.180000	---	28.32	50.00	21.68	L1	9.9
5.180000	37.58	---	60.00	22.42	L1	9.9

Neutral

Full Spectrum



Frequency (MHz)	QuasiPeak (dB μ V)	Average (dB μ V)	Limit (dB μ V)	Margin (dB)	Line	Corr. (dB)
0.160000	---	32.88	55.46	22.58	N	10.1
0.160000	51.24	---	65.46	14.22	N	10.1
0.200000	---	31.68	53.61	21.93	N	10.1
0.200000	48.06	---	63.61	15.55	N	10.1
0.240000	---	36.73	52.10	15.37	N	10.1
0.240000	45.25	---	62.10	16.85	N	10.1
0.280000	---	28.98	50.82	21.84	N	10.1
0.280000	43.25	---	60.82	17.57	N	10.1
0.310000	---	33.22	49.97	16.75	N	10.1
0.310000	42.80	---	59.97	17.17	N	10.1
0.400000	---	32.67	47.85	15.18	N	10.1
0.400000	40.50	---	57.85	17.35	N	10.1
0.430000	---	28.52	47.25	18.73	N	10.1
0.430000	38.20	---	57.25	19.05	N	10.1
0.470000	---	22.93	46.51	23.58	N	10.1
0.470000	35.37	---	56.51	21.14	N	10.1
0.680000	---	35.61	46.00	10.39	N	10.0
0.680000	46.57	---	56.00	9.43	N	10.0
1.010000	---	30.49	46.00	15.51	N	9.9
1.010000	41.52	---	56.00	14.48	N	9.9
1.590000	---	26.23	46.00	19.77	N	9.9
1.590000	41.41	---	56.00	14.59	N	9.9

Frequency (MHz)	QuasiPeak (dB μ V)	Average (dB μ V)	Limit (dB μ V)	Margin (dB)	Line	Corr. (dB)
2.130000	---	30.79	46.00	15.21	N	9.9
2.130000	42.50	---	56.00	13.50	N	9.9
2.400000	---	30.94	46.00	15.06	N	9.9
2.400000	40.32	---	56.00	15.68		9.9
2.690000	---	29.40	46.00	16.60	N	9.9
2.690000	41.11	---	56.00	14.89	N	9.9
3.350000	---	31.44	46.00	14.56	N	9.9
3.350000	41.46	---	56.00	14.54	N	9.9
3.680000	---	31.92	46.00	14.08	N	9.9
3.680000	41.87	---	56.00	14.13	N	9.9
4.010000	---	32.66	46.00	13.34	N	9.9
4.010000	41.82	---	56.00	14.18	N	9.9
5.110000	---	31.73	50.00	18.27	N	9.9
5.110000	41.61	---	60.00	18.39	N	9.9
5.540000	---	31.03	50.00	18.97	N	9.9
5.540000	40.13	---	60.00	19.87	N	9.9

FCC §15.109 - RADIATED EMISSIONS

Applicable Standard

FCC §15.109

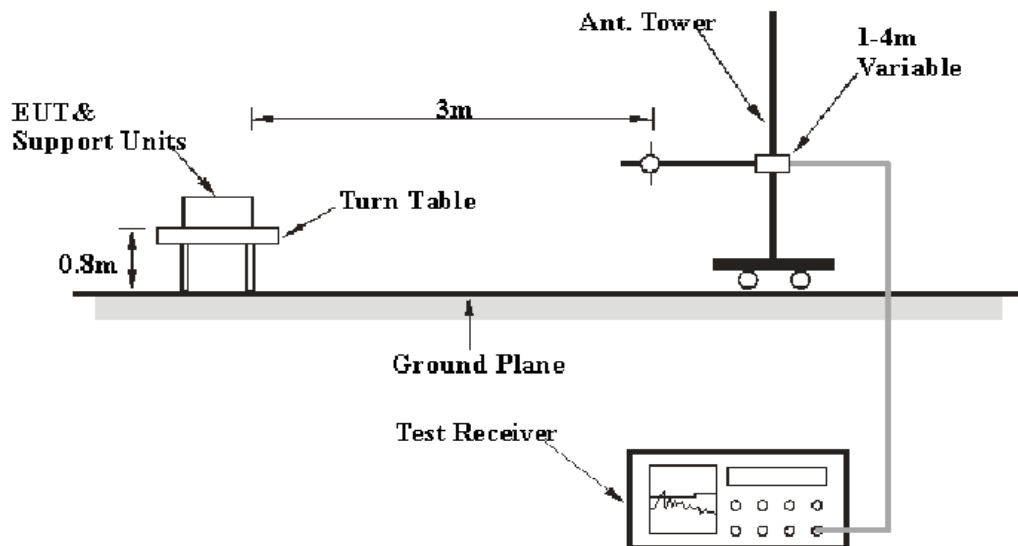
Measurement Uncertainty

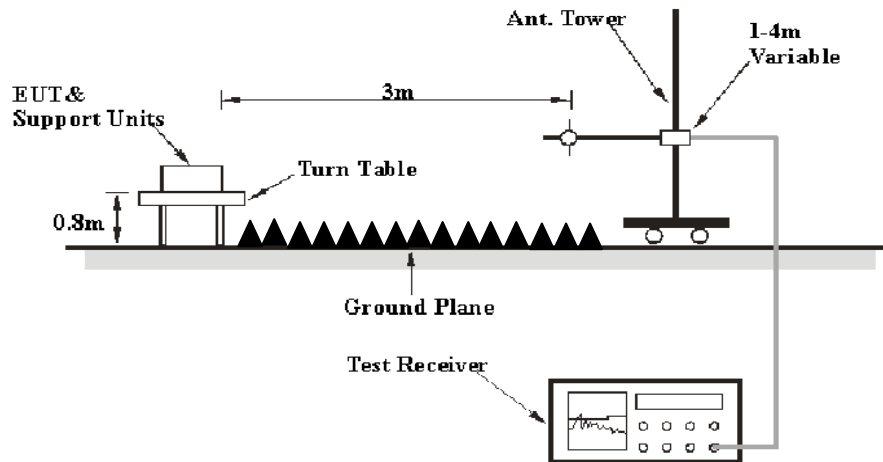
All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency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

Item		Measurement Uncertainty	$U_{\text{cisp}}r$
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
	18GHz up	4.88dB	NA

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 29 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	/	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, 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	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
ETS-LINDGREN	Horn Antenna	3116	00084159	2016-10-18	2019-10-18
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:

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

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:

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

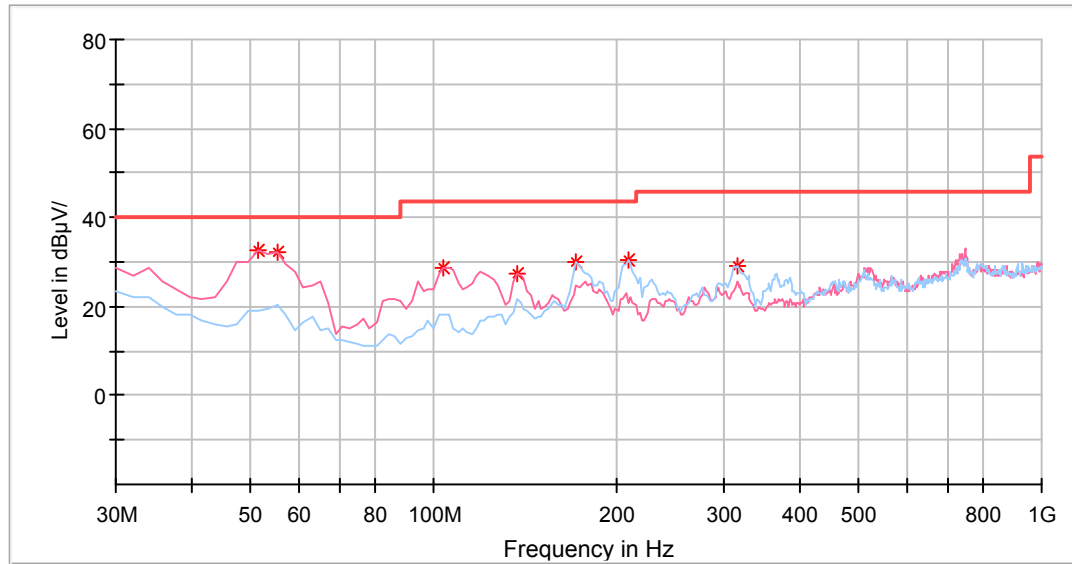
Test Data**Environmental Conditions**

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

The testing was performed by Phil Zhu on 2017-05-02.

Test Mode: WAN port Link 100Mbps and LAN port Link 100Mbps

30MHz ~ 1GHz:



Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
51.382766	32.42	40.00	7.58	100.0	V	34.0	-10.7
55.270541	32.05	40.00	7.95	100.0	V	38.0	-11.0
103.867735	28.84	43.50	14.66	100.0	V	296.0	-10.3
136.913828	27.48	43.50	16.02	100.0	V	66.0	-6.1
171.903808	30.00	43.50	13.50	200.0	H	196.0	-5.8
208.837675	30.56	43.50	12.94	100.0	H	178.0	-5.9
315.751503	29.18	46.00	16.82	100.0	H	118.0	-3.4

Above 1 GHz:

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)
1466.953908	---	22.53	54.00	31.47	100.0	H	166.0	-9.3
1466.953908	41.47	---	74.00	32.53	100.0	H	166.0	-9.3
1798.376753	42.22	---	74.00	31.78	100.0	V	289.0	-7.5
1798.376753	---	23.43	54.00	30.57	100.0	V	289.0	-7.5
1875.290581	39.44	---	74.00	34.56	100.0	V	289.0	-7.3
1875.290581	---	23.55	54.00	30.45	100.0	V	289.0	-7.3
2472.204409	---	23.12	54.00	30.88	100.0	V	291.0	-5.6
2472.204409	36.75	---	74.00	37.25	100.0	V	291.0	-5.6
2892.204409	41.75	---	74.00	32.25	100.0	V	137.0	-3.2
2892.204409	---	27.60	54.00	26.40	100.0	V	137.0	-3.2
4266.513026	45.86	---	74.00	28.14	100.0	V	128.0	0.5
4266.513026	---	37.16	54.00	16.84	100.0	V	128.0	0.5

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