FCC PART 15B, CLASS B

MEASUREMENT AND TEST REPORT

For

Crestron Electronics Inc

15 Volvo Drive, Rockleigh, New Jersey, 07647, USA

FCC ID: EROAM-3200

Report Type:	**Product Type:**
Original Report	Wireless Presentation System

Test Engineer:	Haiguo Li Andy Yu Alan He
Report Number:	SZ1210222-04663E-EM-00F
Report Date:	2021-04-13
Reviewed By:	Joson Xiao EMC Engineer
Prepared By:	Bay Area Compliance Laboratories Corp. (Shenzhen) 5F(B-West) , 6F, 7F, the 3rd Phase of Wan Li Industrial Building D, Shihua Rd, FuTian Free Trade Zone, Shenzhen, China Tel: +86-755-33320018 Fax: +86-755-33320008 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	Wireless Presentation System
Tested Model	M202011001
SKU	AM-3200-WF/AM-3200-WF-I
Voltage Range	DC 24V from adapter or DC 48V from POE
Highest operating frequency	5GHz
Date of Test	2021-03-11 to 2021-03-30
Sample number	SZ1210222-04663E-EM-S1(Assigned by BACL, Shenzhen)
Received date	2021-02-22
Sample/EUT Status	Good condition
Applicant	Crestron Electronics Inc
Applicant Address	15 Volvo Drive, Rockleigh, New Jersey, 07647, USA
Manufacturer	Crestron Electronics Inc
Manufacturer Address	15 Volvo Drive, Rockleigh, New Jersey, 07647, USA

Objective

This test report is in accordance with Part 2-Subpart J, Part 15-Subparts A, B of the Federal Communication Commissions rules.

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

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 emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

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 test at Bay Area Compliance Laboratories Corp. (Shenzhen) is shown as below. And the uncertainty will be taken into consideration for the test data recorded in the report

Parameter		uncertainty
Conducted Emissions		±1.95dB
Radiated Emissions	Below 1GHz	±4.75dB
	Above 1GHz	±4.88dB

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 5F(B-West) , 6F, 7F, the 3rd Phase of Wan Li Industrial Building D, Shihua Rd, FuTian Free Trade Zone, Shenzhen, China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 342867, the FCC Designation No.: CN1221.

The test site has been registered with ISED Canada under ISED Canada Registration Number 3062B.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in a manufacturer testing fashion.

EUT Exercise Software

No exercise software was used.

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

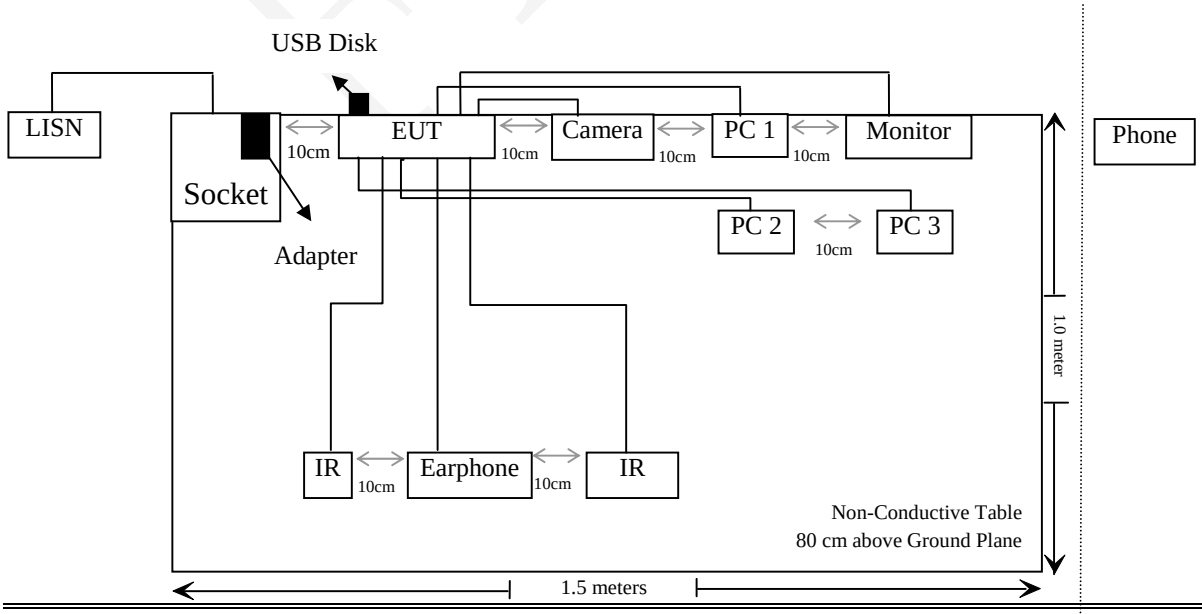
Manufacturer	Description	Model	Serial Number
Grandstream	Camera	GUV3105	GUV3105
Gospower	POE	G0720-480-050	G0720-480-050
CRESTRON	Adapter	NBS30D240125D5	NBS30D240125D5
Redmi	PC 1	RedmiBook14	RedmiBook14
DELL	PC 2	Latitude E5430	590NLV1
DELL	PC 3	Inspiron 15-3543	30064495430
SAMSUNG	Monitor	S24E390HL	ZZFRH4ZN303357K
HUAWEI	Phone	Mate 30 pro 5G	Mate 30 pro 5G
Kingston	USB disk	DTSE9H/16G	DTSE9H/16G
Unknown	IR	Unknown	Unknown
Unknown	Earphone	Unknown	Unknown

External I/O Cable

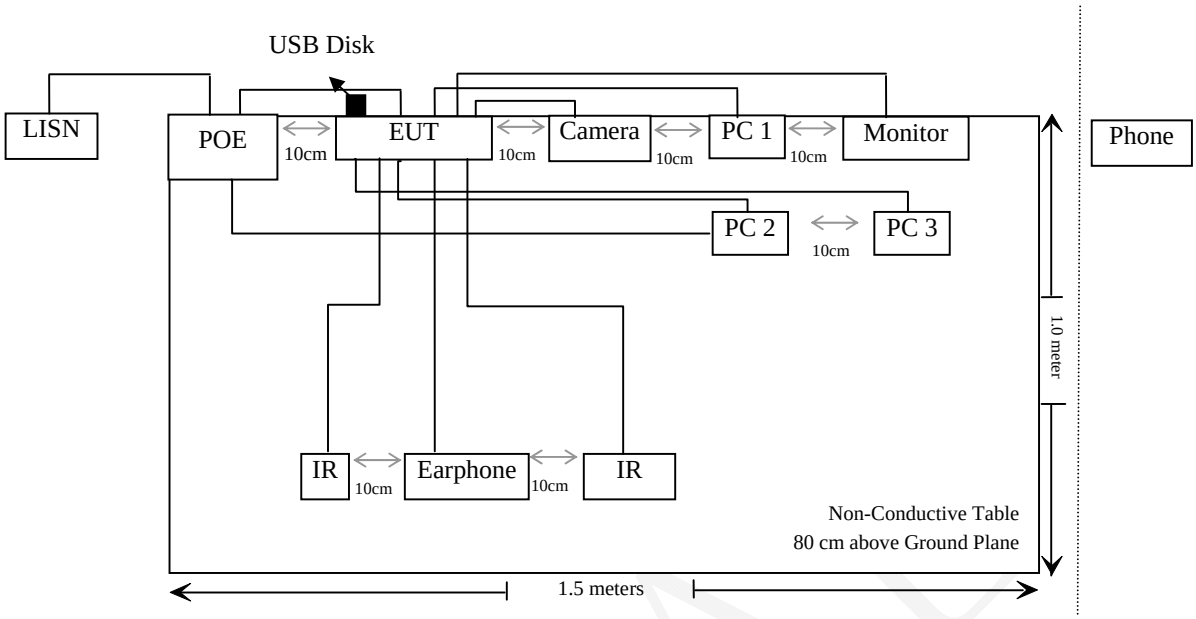
Cable Description	Length (m)	From/Port	To
Un-Shielded Un-Detachable AC Cable	1.0	LISN	Socket
Un-Shielded Un-Detachable DC Cable	1.2	EUT	Adapter
Un-Shielded Detachable RJ45 Cable	8.0	EUT	PC 2
Un-Shielded Detachable RJ45 Cable	8.0	EUT	PC 3
Un-Shielded Detachable HDMI Cable	1.0	EUT	Monitor
Un-Shielded Detachable USB Cable	2.0	EUT	PC 1
Un-Shielded Detachable HDMI Cable	1.0	EUT	PC 1
Un-Shielded Un-Detachable USB Cable	1.2	EUT	Camera
Un-Shielded Detachable IR Cable	2.98	EUT	IR
Un-Shielded Detachable Earphone Cable	1.2	EUT	Earphone
Un-Shielded Detachable RJ45 Cable	1.0	EUT	ISN
Un-Shielded Detachable RJ45 Cable	8.0	ISN	PC 2
Un-Shielded Detachable AC Cable	1.0	POE	LISN
Un-Shielded Detachable RJ45 Cable	1.0	EUT	POE
Un-Shielded Detachable RJ45 Cable	8.0	POE	PC 2

Block Diagram of Test Setup

Test Mode: Powered by adapter



Test Mode: Powered by POE



SUMMARY OF TEST RESULTS

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

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
AC Line Conducted Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2020/08/04	2021/08/03
Rohde & Schwarz	LISN	ENV216	101613	2020/08/04	2021/08/03
Rohde & Schwarz	Transient Limitor	ESH3Z2	DE25985	2020/11/29	2021/11/28
Unknown	CE Cable	CE Cable	UF A210B-1-0720-504504	2020/11/29	2021/11/28
Rohde & Schwarz	CE Test software	EMC 32	V8.53.0	NCR	NCR
Radiated Emission Test					
R&S	EMI Test Receiver	ESR3	102455	2020/08/04	2021/08/03
Sonoma instrument	Pre-amplifier	310 N	186238	2020/08/04	2021/08/03
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2020/12/22	2023/12/21
Unknown	Cable 2	RF Cable 2	F-03-EM197	2020/11/29	2021/11/28
Unknown	Cable	Chamber Cable 4	EC-007	2020/11/29	2021/11/28
Rohde & Schwarz	Auto test software	EMC 32	V9.10	NCR	NCR
Rohde & Schwarz	Spectrum Analyzer	FSV40-N	102259	2020/08/04	2021/08/03
COM-POWER	Pre-amplifier	PA-122	181919	2020/11/29	2021/11/28
Sunol Sciences	Horn Antenna	3115	9107-3694	2021/01/15	2024/01/14
Insulted Wire Inc.	RF Cable	SPS-2503-3150	02222010	2020/11/29	2021/11/28
Unknown	RF Cable	W1101-EQ1 OUT	F-19-EM005	2020/11/29	2021/11/28

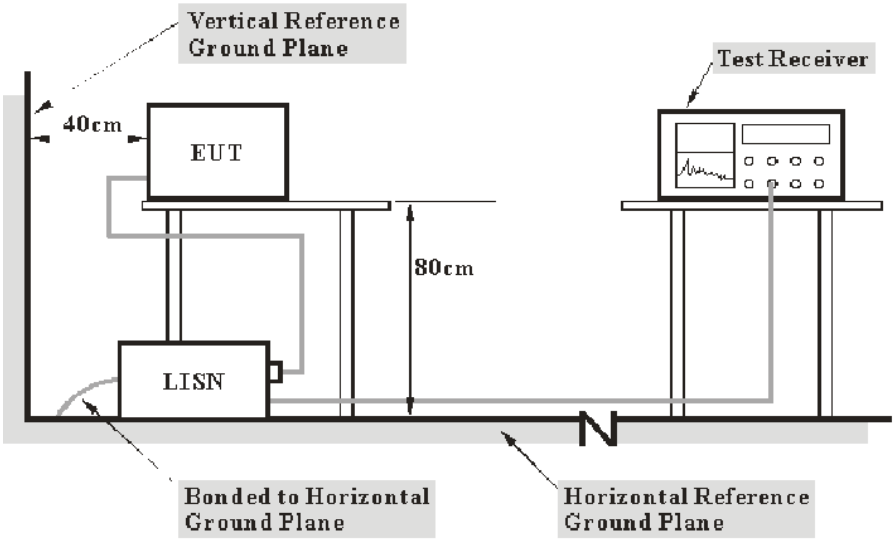
*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC §15.107 – AC LINE CONDUCTED EMISSIONS

Applicable Standard

According to FCC §15.107

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 per ANSI C63.4-2014. The related limit was specified in FCC Part 15.107.

The spacing between the peripherals was 10 cm.

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 device was connected to the first LISN and the other relevant equipments were conncected to the second LISN.

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

All data was recorded in the Quasi-peak and average detection mode.

Corrected Factor & Margin Calculation

The Corrected factor is calculated by adding LISN/ISN 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 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

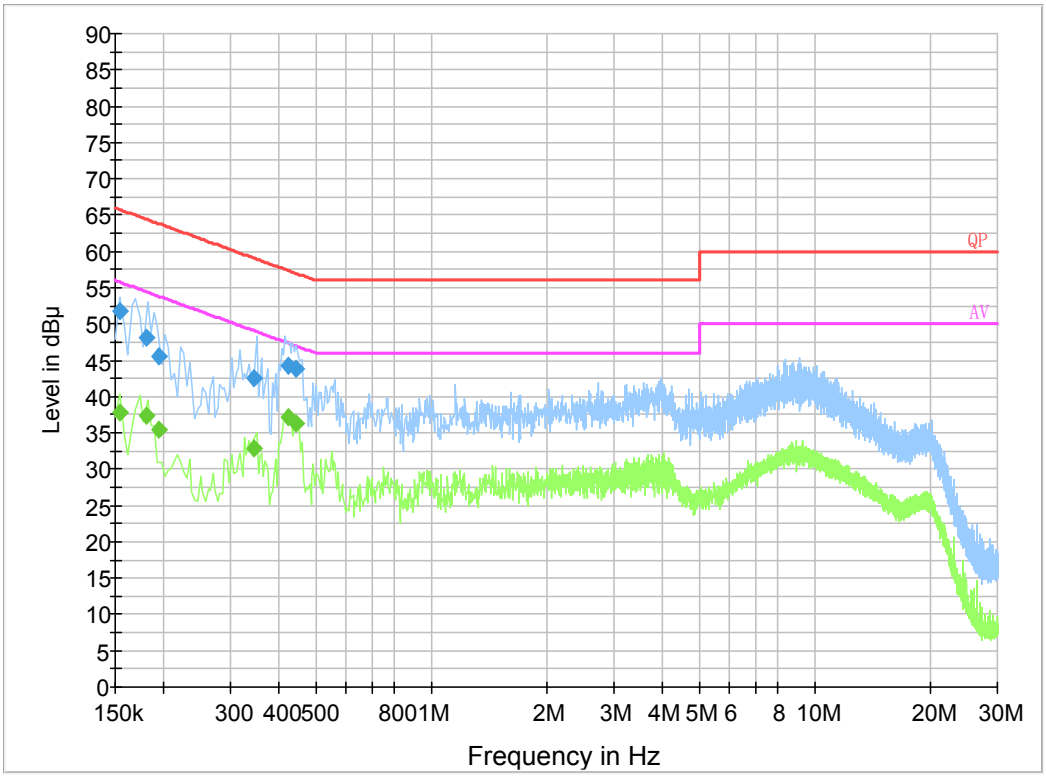
Temperature:	25 ℃
Relative Humidity:	65 %
ATM Pressure:	101.0 kPa

The testing was performed by Haiguo Li on 2021-03-15.

EUT Operation Mode: Full Load

Powered by adapter

AC 120V/60 Hz, Line



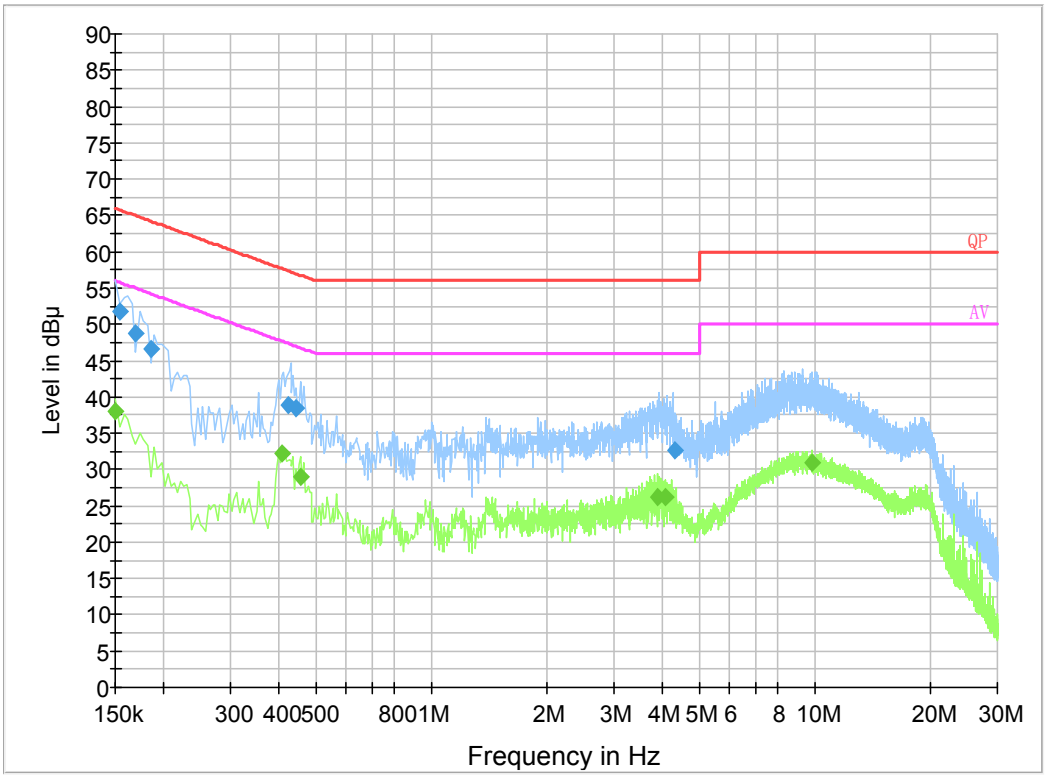
Final Result 1

Frequency (MHz)	QuasiPeak (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.154000	51.8	9.000	L1	19.8	14.0	65.8
0.181500	48.1	9.000	L1	19.9	16.3	64.4
0.194500	45.6	9.000	L1	19.8	18.2	63.8
0.344750	42.5	9.000	L1	19.9	16.6	59.1
0.424270	44.2	9.000	L1	19.9	13.2	57.4
0.444570	43.9	9.000	L1	19.8	13.1	57.0

Final Result 2

Frequency (MHz)	Average (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.154000	37.9	9.000	L1	19.8	17.9	55.8
0.181500	37.4	9.000	L1	19.9	17.0	54.4
0.194500	35.5	9.000	L1	19.8	18.3	53.8
0.344750	32.9	9.000	L1	19.9	16.2	49.1
0.424270	37.1	9.000	L1	19.9	10.3	47.4
0.444570	36.3	9.000	L1	19.8	10.7	47.0

AC 120V/60 Hz, Neutral



Final Result 1

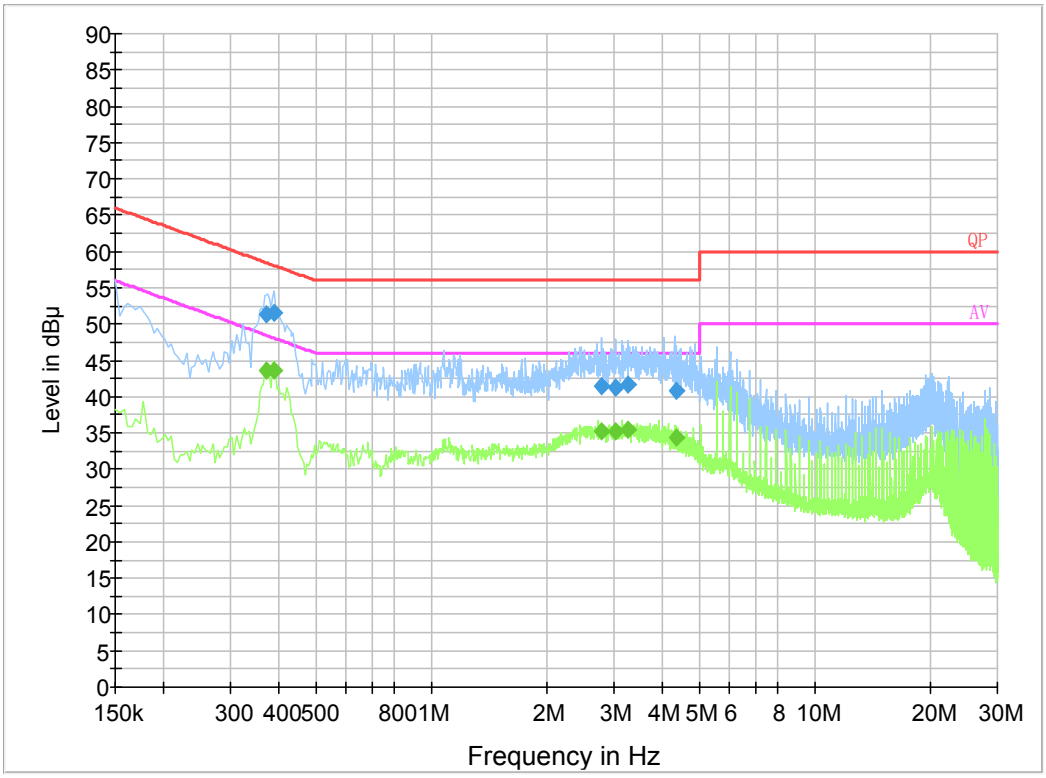
Frequency (MHz)	QuasiPeak (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.154500	51.8	9.000	N	19.8	14.0	65.8
0.169500	48.8	9.000	N	19.8	16.2	65.0
0.185500	46.6	9.000	N	19.8	17.6	64.2
0.423550	38.9	9.000	N	19.8	18.5	57.4
0.443430	38.5	9.000	N	19.8	18.5	57.0
4.306070	32.7	9.000	N	19.9	23.3	56.0

Final Result 2

Frequency (MHz)	Average (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.150000	38.1	9.000	N	19.8	17.9	56.0
0.410000	32.3	9.000	N	19.8	15.3	47.6
0.458000	29.1	9.000	N	19.8	17.6	46.7
3.898000	26.2	9.000	N	19.9	19.8	46.0
4.078000	26.1	9.000	N	19.9	19.9	46.0
9.850000	31.0	9.000	N	20.0	19.0	50.0

Powered by POE

AC 120V/60 Hz, Line



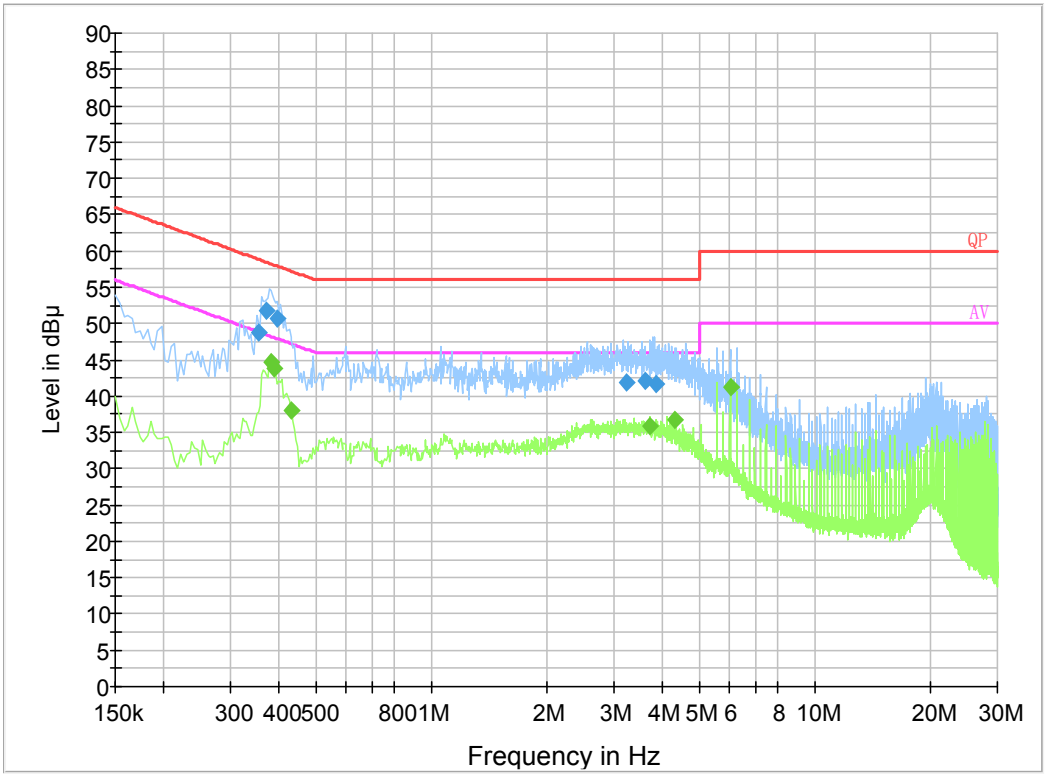
Final Result 1

Frequency (MHz)	QuasiPeak (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.372390	51.4	9.000	L1	19.9	7.0	58.4
0.388150	51.5	9.000	L1	19.9	6.6	58.1
2.788150	41.4	9.000	L1	19.9	14.6	56.0
3.020610	41.3	9.000	L1	19.9	14.7	56.0
3.272890	41.7	9.000	L1	19.9	14.3	56.0
4.353470	40.8	9.000	L1	19.9	15.2	56.0

Final Result 2

Frequency (MHz)	Average (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.372390	43.7	9.000	L1	19.9	4.7	48.4
0.388150	43.6	9.000	L1	19.9	4.5	48.1
2.788150	35.3	9.000	L1	19.9	10.7	46.0
3.020610	35.3	9.000	L1	19.9	10.7	46.0
3.272890	35.5	9.000	L1	19.9	10.5	46.0
4.353470	34.3	9.000	L1	19.9	11.7	46.0

AC 120V/60 Hz, Neutral



Final Result 1

Frequency (MHz)	QuasiPeak (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.355250	48.9	9.000	N	19.9	10.0	58.8
0.372330	51.7	9.000	N	19.8	6.7	58.4
0.396030	50.7	9.000	N	19.8	7.2	57.9
3.218270	42.0	9.000	N	19.9	14.0	56.0
3.600630	42.0	9.000	N	19.9	14.0	56.0
3.868790	41.7	9.000	N	19.9	14.3	56.0

Final Result 2

Frequency (MHz)	Average (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.382000	44.7	9.000	N	19.8	3.5	48.2
0.390000	43.9	9.000	N	19.8	4.2	48.1
0.434000	38.0	9.000	N	19.8	9.2	47.2
3.714000	35.8	9.000	N	19.9	10.2	46.0
4.338000	36.6	9.000	N	19.9	9.4	46.0
6.026000	41.2	9.000	N	19.9	8.8	50.0

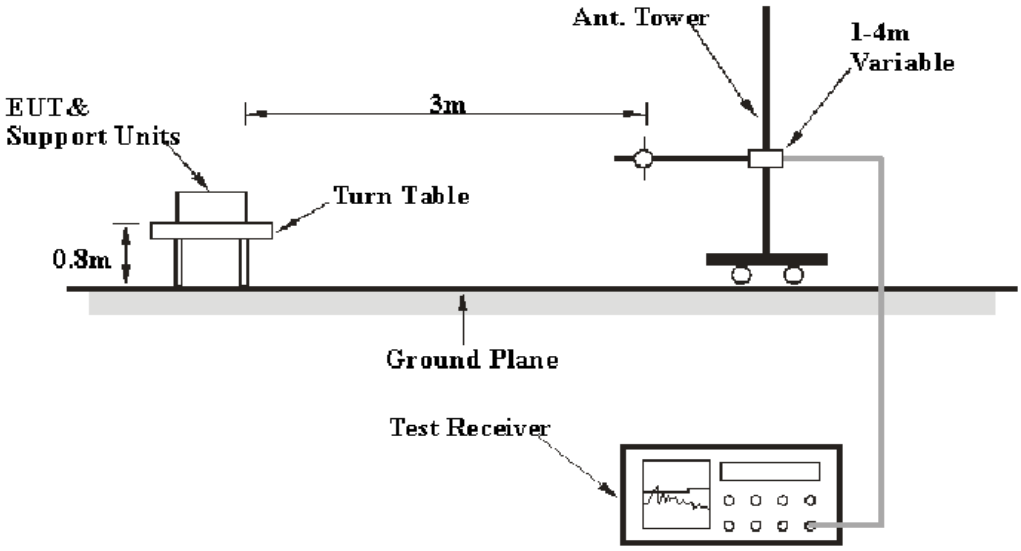
FCC §15.109 - RADIATED SPURIOUS EMISSIONS

Applicable Standard

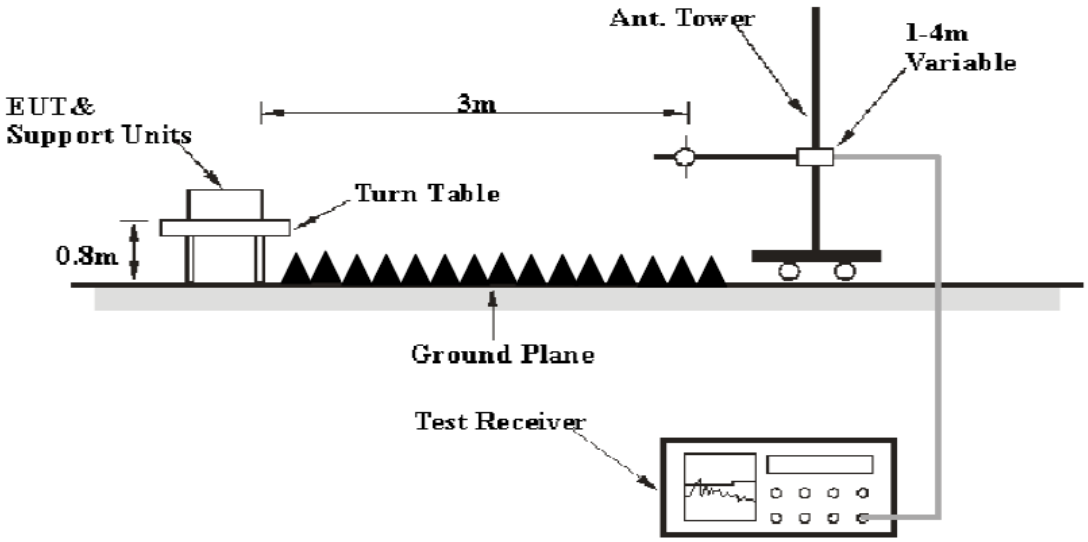
FCC §15.109

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 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

EMI Test Receiver Setup

During the radiated emission test, the EMI test receiver was set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Measurement
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	Ave.

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 and PK and average detector modes for frequencies above 1 GHz.

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

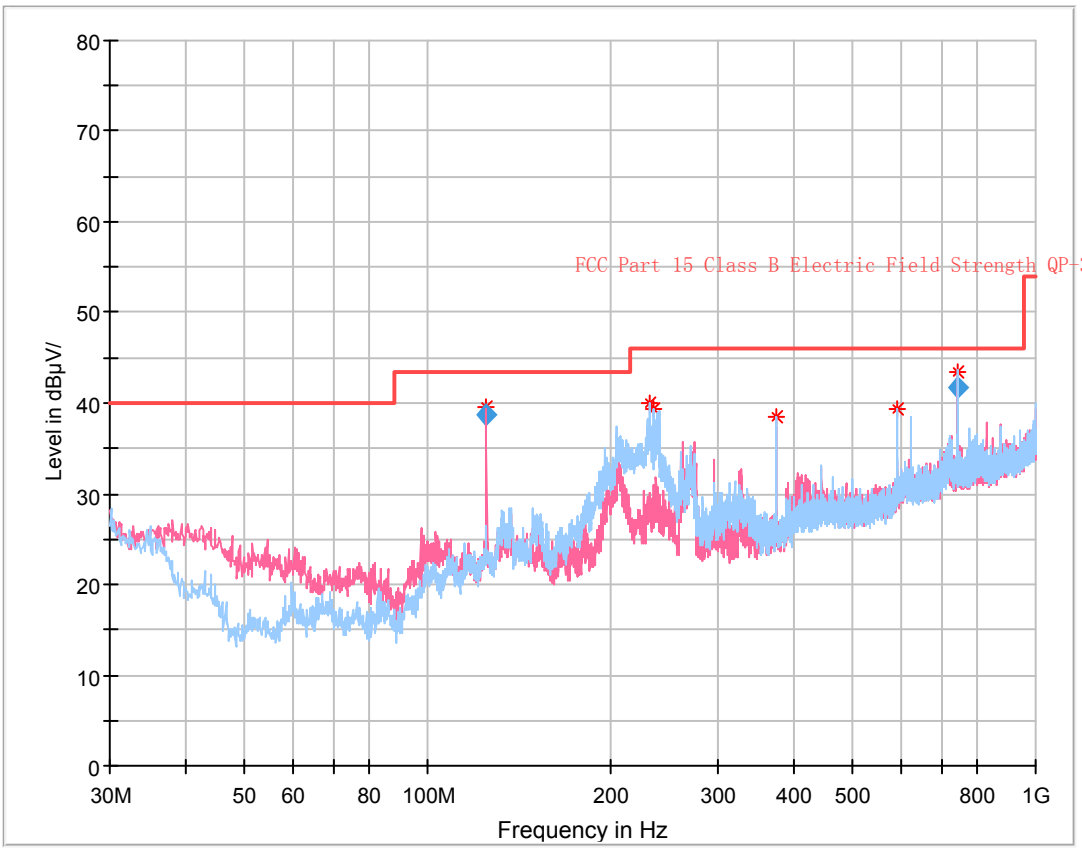
Temperature:	23~25.3 ℃
Relative Humidity:	49~55 %
ATM Pressure:	100.9~101.1 kPa

The testing was performed by Kilroy Deng on 2021-03-11 for below 1GHz and Alan He on 2021-03-30 for above 1GHz.

EUT Operation Mode: Full Load

Powered by adapter

30 MHz – 1 GHz:



Final_Result

Frequency (MHz)	QuasiPeak (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
125.012250	38.62	43.50	4.88	103.0	V	291.0	-4.3
741.721250	41.69	47.00	5.31	293.0	H	223.0	5.3

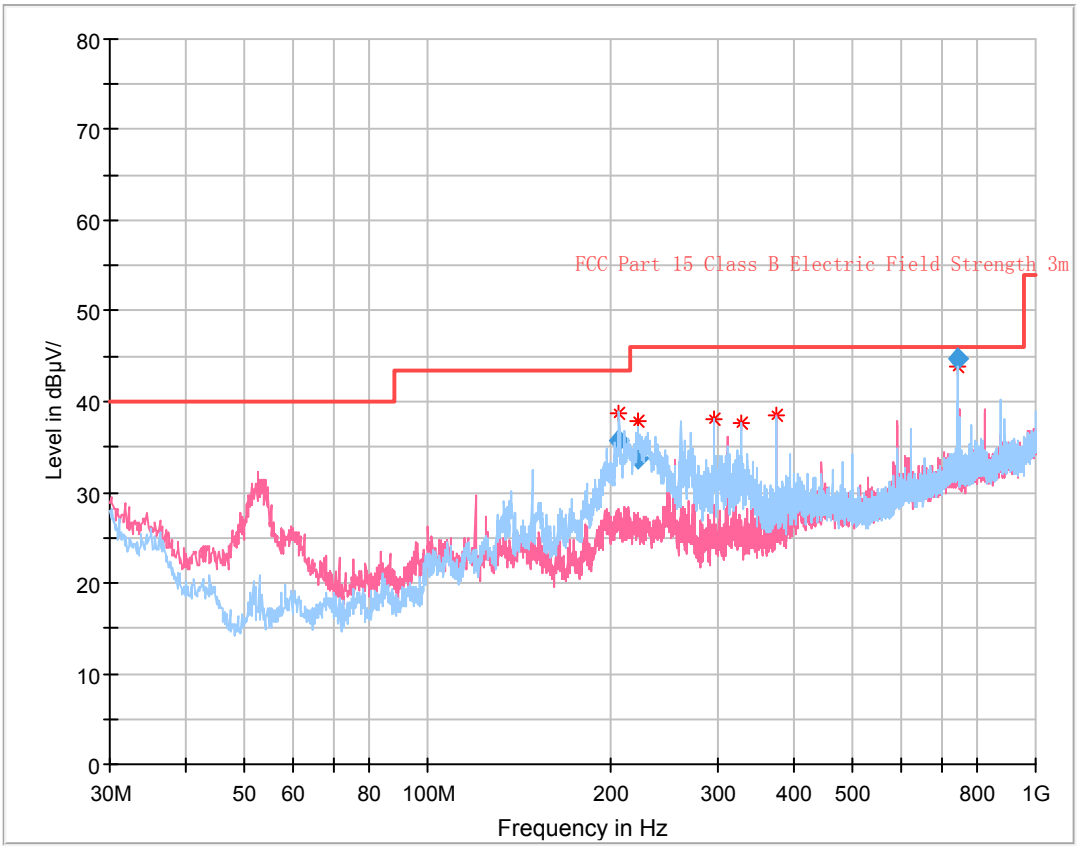
Frequency (MHz)	MaxPeak (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
231.638750	39.92	47.00	7.08	200.0	H	233.0	-5.6
235.882500	39.37	47.00	7.63	100.0	H	205.0	-5.6
374.956250	38.55	47.00	8.45	100.0	H	323.0	-2.1
594.055000	39.31	47.00	7.69	100.0	H	60.0	2.8

1-30 GHz:

Frequency (MHz)	Measurement		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part 15B	
	Reading (dBµV)	PK/QP/Ave.		Height (m)	Polar (H / V)			Limit (dBµV/m)	Margin (dB)
1011.51	53.52	PK	214	1.4	H	-6.18	47.34	74	26.66
1011.51	36.11	Ave.	214	1.4	H	-6.18	29.93	54	24.07
1011.51	55.36	PK	193	2.5	V	-6.18	49.18	74	24.82
1011.51	40.14	Ave.	193	2.5	V	-6.18	33.96	54	20.04
2235.69	53.85	PK	79	1.1	H	-0.56	53.29	74	20.71
2235.69	37.81	Ave.	79	1.1	H	-0.56	37.25	54	16.75
2235.69	56.65	PK	117	1.2	V	-0.56	56.09	74	17.91
2235.69	37.54	Ave.	117	1.2	V	-0.56	36.98	54	17.02

Powered by POE

30 MHz – 1 GHz:



Final_Result

Frequency (MHz)	QuasiPeak (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
206.480375	35.79	43.50	7.71	109.0	H	173.0	-5.1
221.895375	33.85	46.00	12.15	123.0	H	172.0	-5.4
741.756000	44.83	47.00	2.17	281.0	H	227.0	5.3

Frequency (MHz)	MaxPeak (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
296.628750	38.10	47.00	8.90	105.0	H	248.0	-4.1
328.032500	37.73	47.00	9.27	105.0	H	188.0	-3.3
374.956250	38.41	47.00	8.59	205.0	V	147.0	-2.1

1-30GHz:

Frequency (MHz)	Measurement		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part 15B	
	Reading (dBµV)	PK/QP/Ave.		Height (m)	Polar (H / V)			Limit (dBµV/m)	Margin (dB)
1036.58	53.54	PK	300	2.1	H	-6.08	47.46	74	26.54
1036.58	36.98	Ave.	300	2.1	H	-6.08	30.90	54	23.10
1036.58	55.51	PK	170	2.0	V	-6.08	49.43	74	24.57
1036.58	40.74	Ave.	170	2.0	V	-6.08	34.66	54	19.34
2225.14	53.56	PK	69	2.2	H	-0.56	53.00	74	21.00
2225.14	37.96	Ave.	69	2.2	H	-0.56	37.40	54	16.60
2225.14	56.32	PK	100	1.6	V	-0.56	55.76	74	18.24
2225.14	37.99	Ave.	100	1.6	V	-0.56	37.43	54	16.57

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