



FCC PART 15B, CLASS B TEST REPORT

For

Crestron Electronics Inc.

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

FCC ID: EROAM-3100

Report Type: Original Report	Product Type: Wireless Presentation System
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Report Number:	RSZ210118001-EM-00
Report Date:	2021-03-25
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	Wireless Presentation System
Tested Model	M202018001
SKU	AM-3100-WF(For US), AM-3100-WF-I(For World)
Voltage Range	DC 24V from adapter or DC 48V from POE
Highest operating frequency	1.8GHz
Date of Test	2021-03-10 to 2021-03-16
Sample number	RSZ210118001-EM-S1(Assigned by BACL, Shenzhen)
Received date	2021-01-18
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		$\pm 1.95\text{dB}$
Radiated Emissions	Below 1GHz	$\pm 4.75\text{dB}$
	Above 1GHz	$\pm 4.88\text{dB}$

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.

Special Accessories

No special accessory.

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

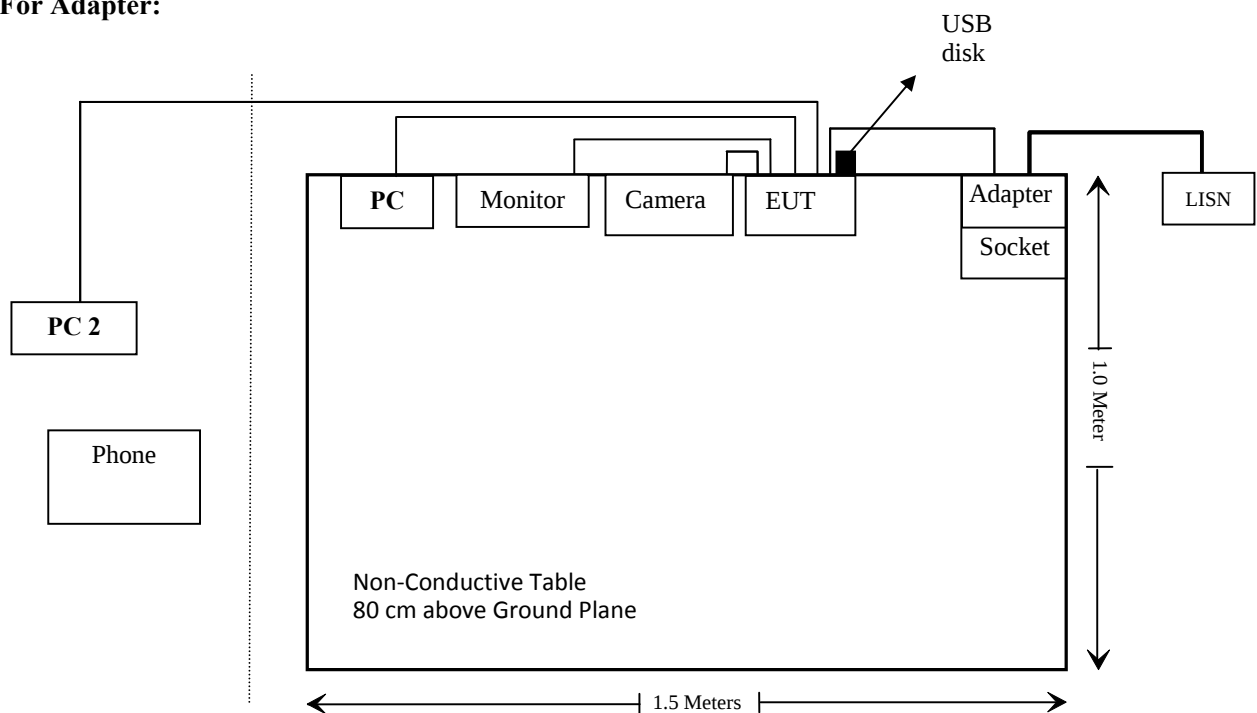
Manufacturer	Description	Model	Serial Number
Grandstream	Camera	GUV3105	2134674613
Gospower	POE	G0720-480-050	65496873
Redmi	PC 1	RedmiBook14	2123548
DELL	PC 2	Latitude E5430	590NLV1
SAMSUNG	Monitor	S24E390HL	ZZFRH4ZN303357K
HUAWEI	Phone	Mate 30 pro 5G	31646
Kingston	USB disk	DTSE9H/16G	65467636

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 HDMI Cable	1.0	EUT	Monitor
Un-Shielded Detachable USB Cable	2.0	EUT	PC 1
Un-Shielded Un-Detachable USB Cable	1.2	EUT	Camera
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

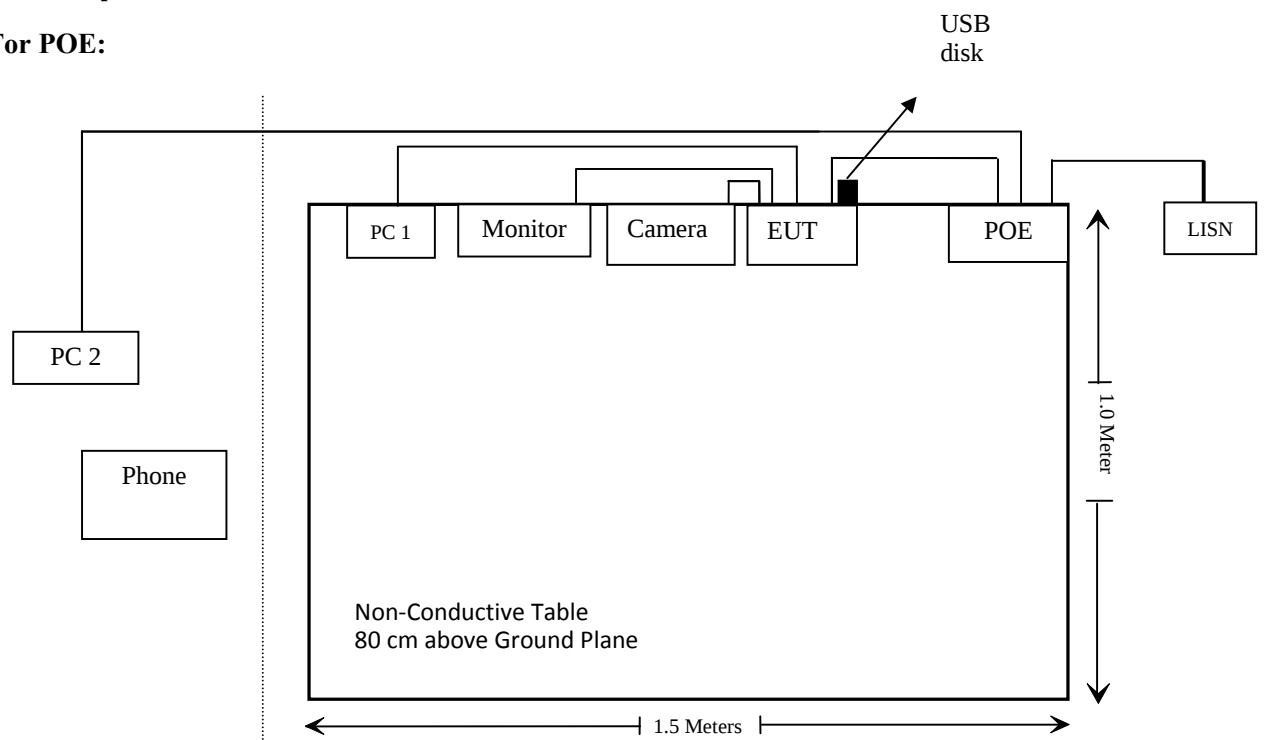
Block Diagram of Test Setup

For Conducted Emission:

For Adapter:

Test Set up Connect:

For 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 Limiter	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
Schwarzbeck	ISN Cat 6	NTFM 8158	cat 5-8158-0011	2020/08/04	2021/08/03
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 1	F-03-EM236	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
Quinstar	Amplifier	QLW-18405536-J0	15964001002	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
Unknown	Signal Cable	RG-214	2	2020/11/29	2021/11/28
SNSD	Band Reject filter	BSF5150-5850MN-0899-004	5G filter	2020/04/20	2021/04/20
Ducommun Technologies	Horn antenna	ARH-4223-02	1007726-02 1304	2020/12/06	2023/12/05
Ducommun Technologies	Horn antenna	ARH-2823-02	1007726-02 1302	2020/12/06	2023/12/05

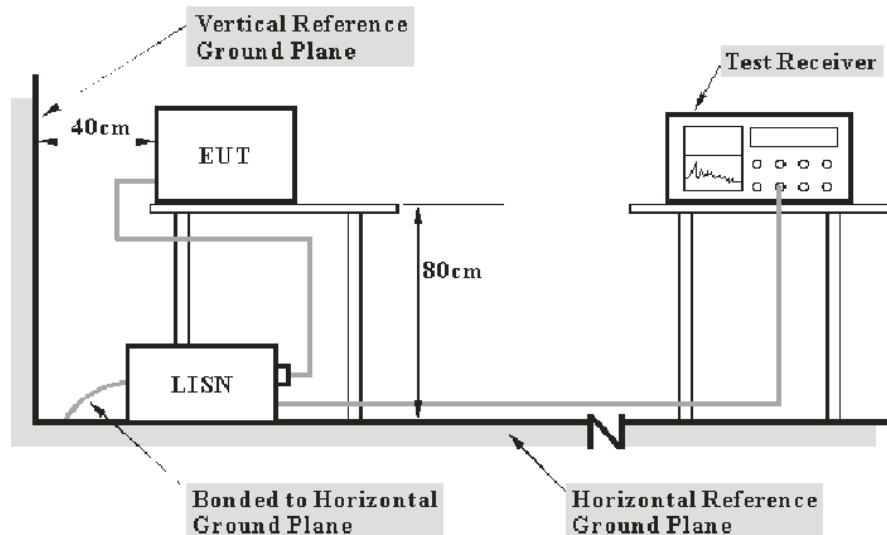
* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

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 connected 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:

$$\text{Correction Factor} = \text{LISN VDF} + \text{Cable Loss} + \text{Transient Limiter Attenuation}$$

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

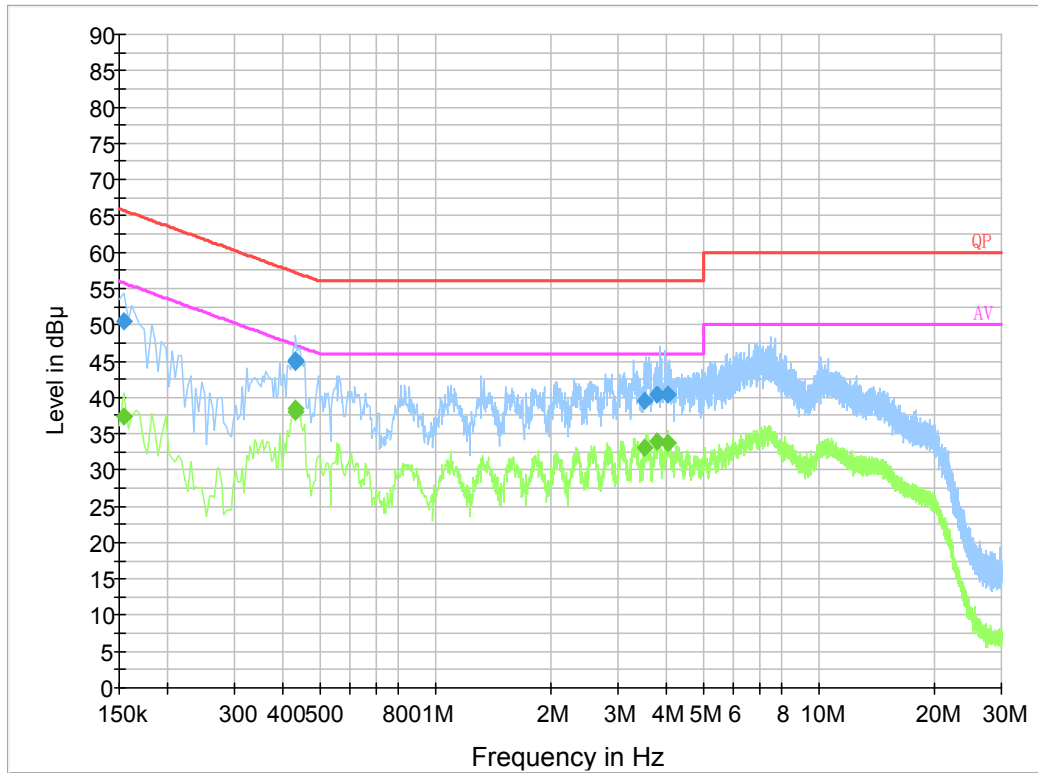
Temperature:	25 °C
Relative Humidity:	65 %
ATM Pressure:	101.0 kPa

The testing was performed by Haiguo Li on 2021-03-12.

EUT Operation Mode: Full load

For Adapter:

AC 120V/60 Hz, Line

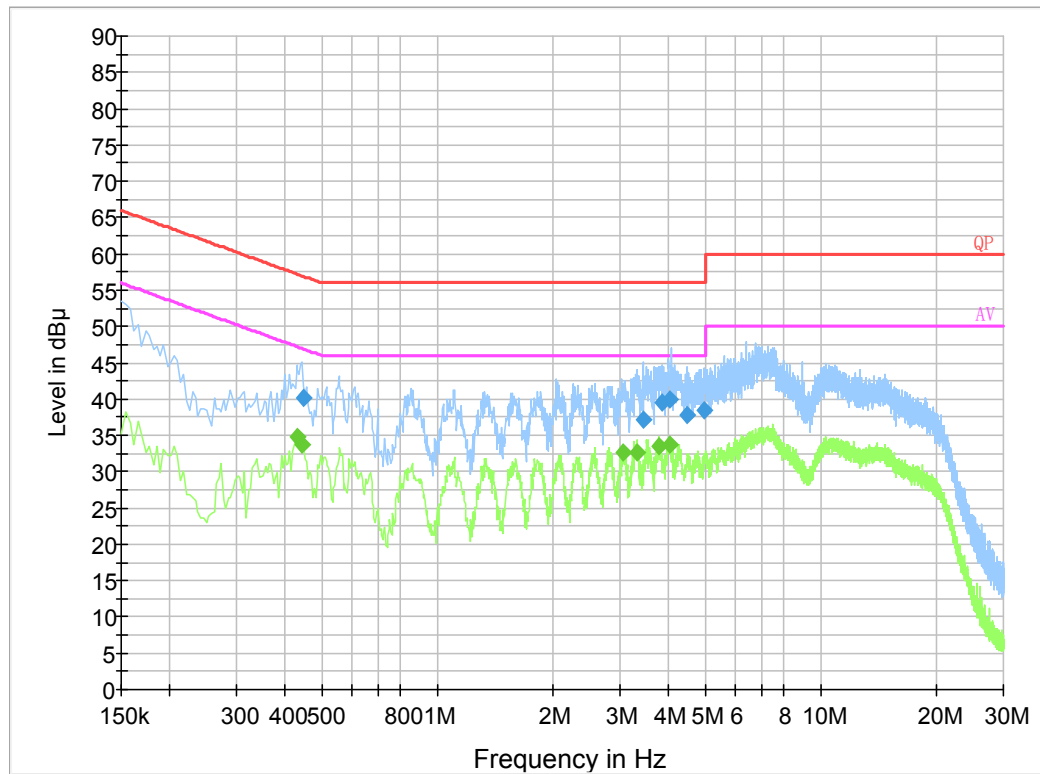


Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.154000	50.5	9.000	L1	19.8	15.3	65.8
0.431490	45.0	9.000	L1	19.8	12.2	57.2
0.431610	45.0	9.000	L1	19.8	12.2	57.2
3.524690	39.6	9.000	L1	19.9	16.4	56.0
3.800190	40.4	9.000	L1	19.9	15.6	56.0
4.032830	40.3	9.000	L1	19.9	15.7	56.0

Final Result 2

Frequency (MHz)	Average (dB μ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.154000	37.3	9.000	L1	19.8	18.5	55.8
0.431490	38.4	9.000	L1	19.8	8.8	47.2
0.431610	38.1	9.000	L1	19.8	9.1	47.2
3.524690	33.1	9.000	L1	19.9	12.9	46.0
3.800190	33.9	9.000	L1	19.9	12.1	46.0
4.032830	33.8	9.000	L1	19.9	12.2	46.0

AC 120V/60 Hz, Neutral**Final Result 1**

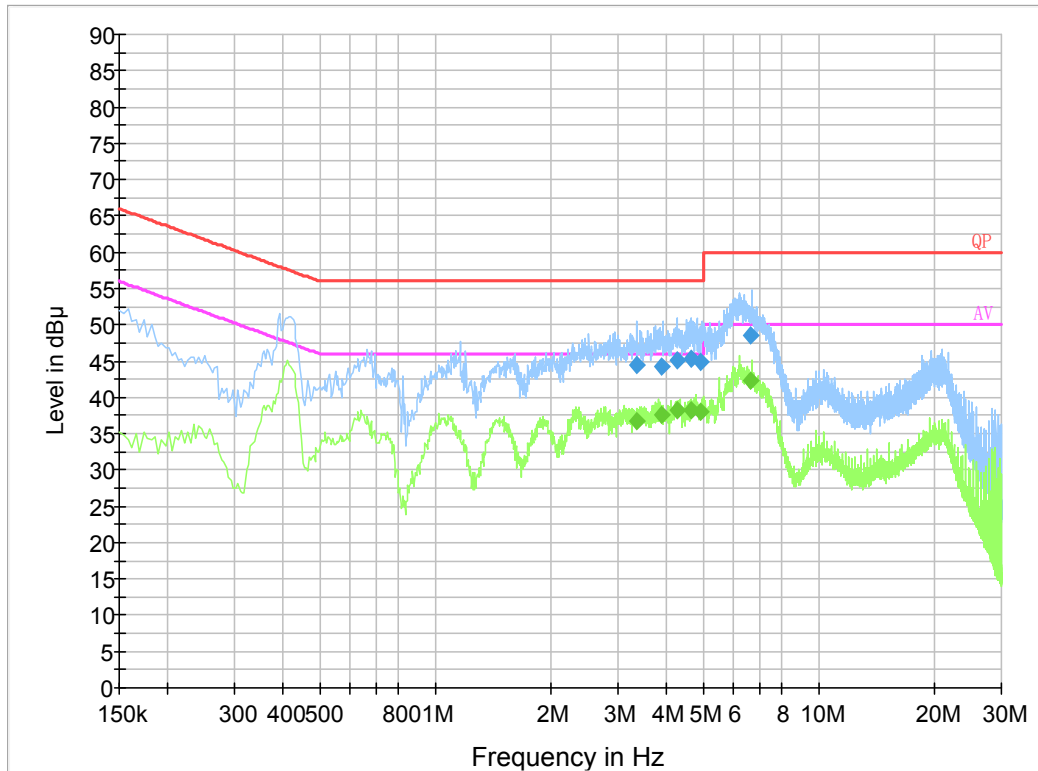
Frequency (MHz)	QuasiPeak (dB μ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.447310	40.2	9.000	N	19.8	16.7	56.9
3.458430	37.2	9.000	N	19.9	18.8	56.0
3.847950	39.4	9.000	N	19.9	16.6	56.0
4.032890	40.0	9.000	N	19.9	16.0	56.0
4.478410	37.9	9.000	N	19.9	18.1	56.0
4.975690	38.5	9.000	N	19.9	17.5	56.0

Final Result 2

Frequency (MHz)	Average (dB μ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.430000	34.9	9.000	N	19.8	12.4	47.3
0.446000	33.7	9.000	N	19.8	13.2	46.9
3.062000	32.7	9.000	N	19.9	13.3	46.0
3.322000	32.7	9.000	N	19.9	13.3	46.0
3.790000	33.4	9.000	N	19.9	12.6	46.0
4.034000	33.8	9.000	N	19.9	12.2	46.0

For POE:

AC 120V/60 Hz, Line

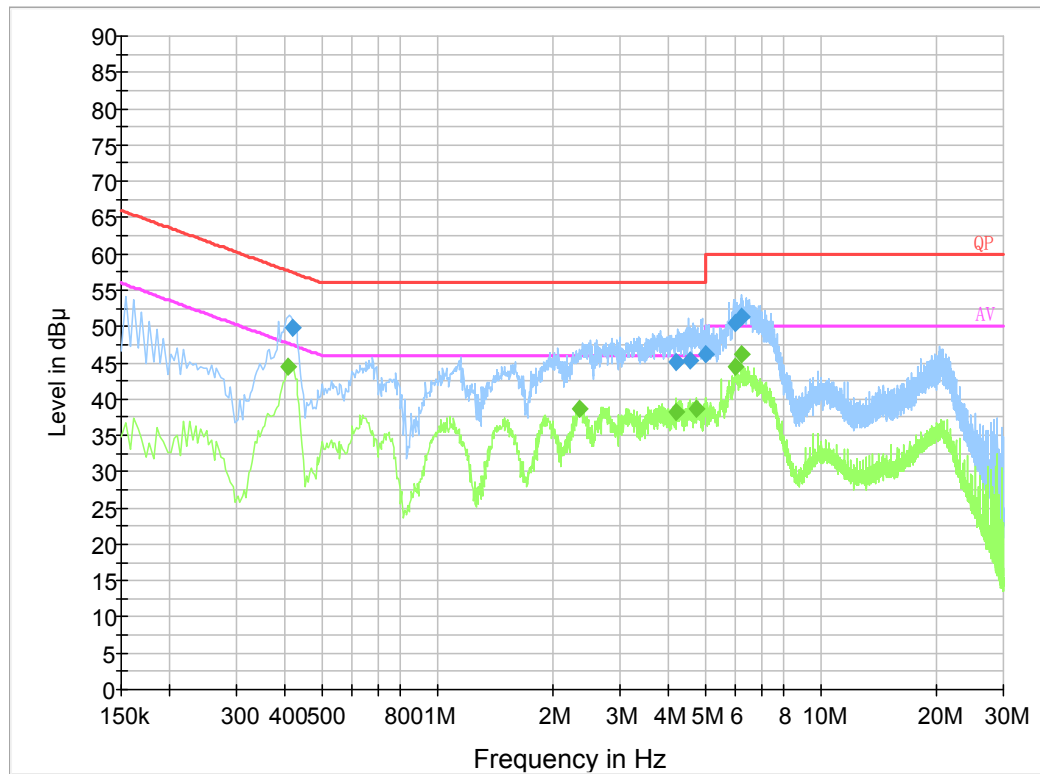


Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
3.363630	44.5	9.000	L1	19.9	11.5	56.0
3.886870	44.3	9.000	L1	19.9	11.7	56.0
4.269830	45.2	9.000	L1	19.9	10.8	56.0
4.660190	45.3	9.000	L1	19.9	10.7	56.0
4.947270	44.8	9.000	L1	19.9	11.2	56.0
6.617290	48.5	9.000	L1	19.9	11.5	60.0

Final Result 2

Frequency (MHz)	Average (dB μ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
3.363630	36.8	9.000	L1	19.9	9.2	46.0
3.886870	37.7	9.000	L1	19.9	8.3	46.0
4.269830	38.3	9.000	L1	19.9	7.7	46.0
4.660190	38.3	9.000	L1	19.9	7.7	46.0
4.947270	38.0	9.000	L1	19.9	8.0	46.0
6.617290	42.3	9.000	L1	19.9	7.7	50.0

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)
0.419790	49.9	9.000	N	19.8	7.6	57.5
4.214190	45.2	9.000	N	19.9	10.8	56.0
4.554170	45.3	9.000	N	19.9	10.7	56.0
5.039450	46.1	9.000	N	19.9	13.9	60.0
5.997290	50.4	9.000	N	19.9	9.6	60.0
6.236370	51.4	9.000	N	19.9	8.6	60.0

Final Result 2

Frequency (MHz)	Average (dB μ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.410000	44.5	9.000	N	19.8	3.1	47.6
2.358000	38.6	9.000	N	19.8	7.4	46.0
4.218000	38.3	9.000	N	19.9	7.7	46.0
4.762000	38.8	9.000	N	19.9	7.2	46.0
5.998000	44.5	9.000	N	19.9	5.5	50.0
6.238000	46.2	9.000	N	19.9	3.8	50.0

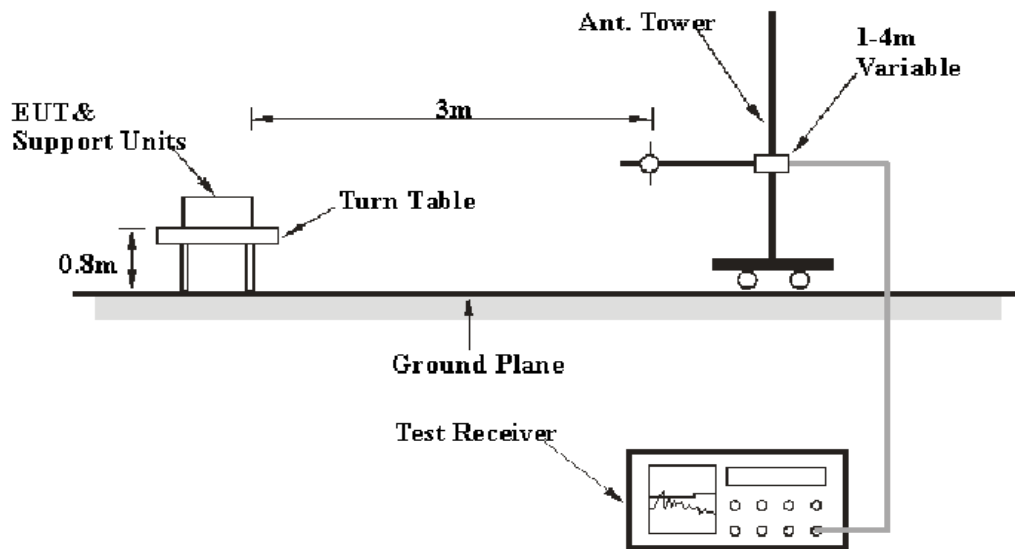
FCC §15.109 - RADIATED SPURIOUS EMISSIONS

Applicable Standard

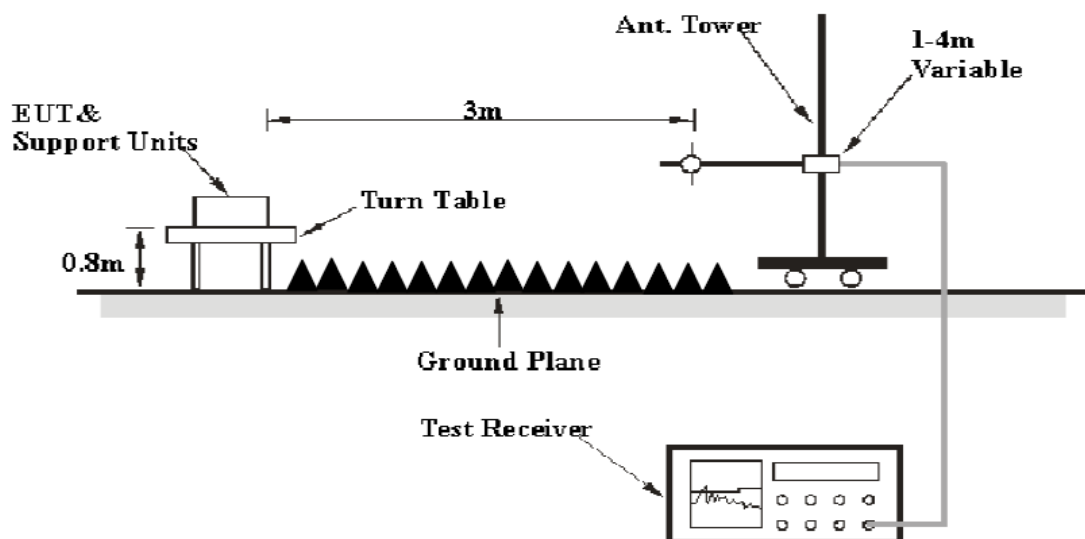
FCC §15.109

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:

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

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

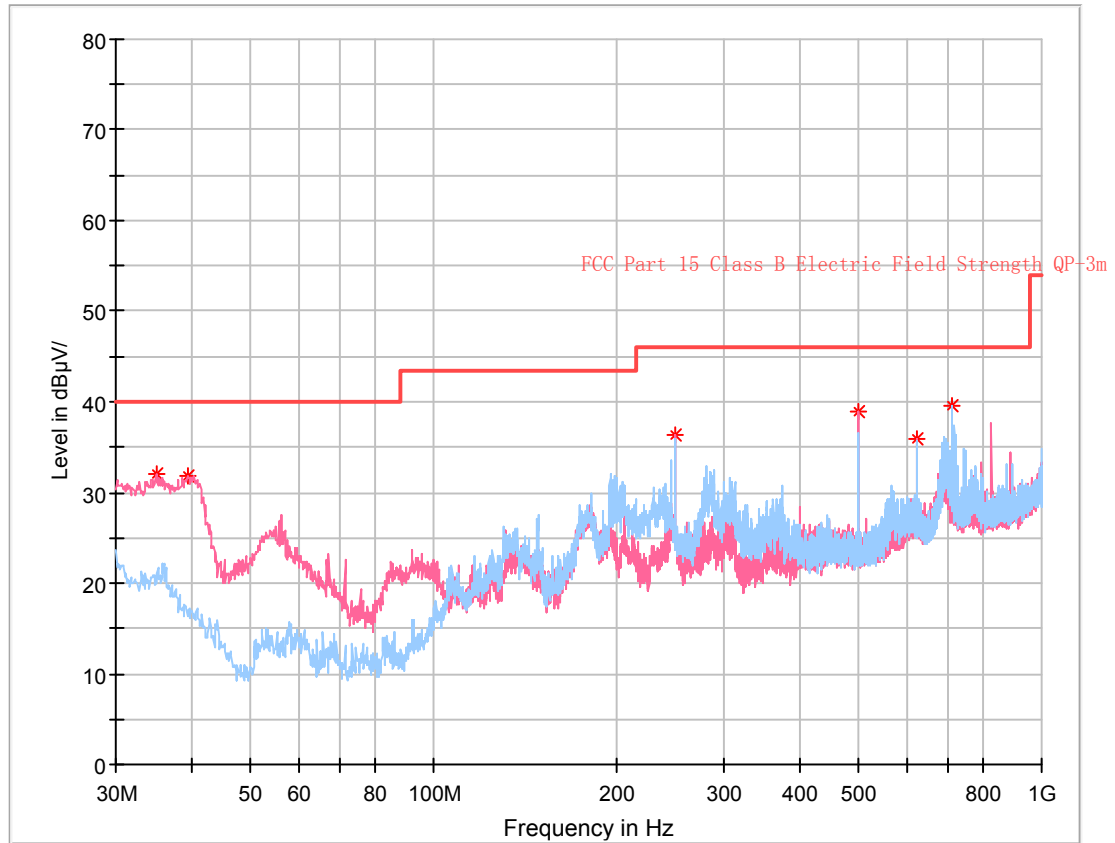
Temperature:	23.0~25.3 °C
Relative Humidity:	49.0~55.0 %
ATM Pressure:	100.9~101.1 kPa

The testing was performed by Harris He and Kilroy Deng on 2021-03-10 for below 1GHz and Alan He on 2021-03-16 for above 1GHz.

EUT Operation Mode: Full load

For Adapter:

30 MHz – 1 GHz:



Critical_Freqs

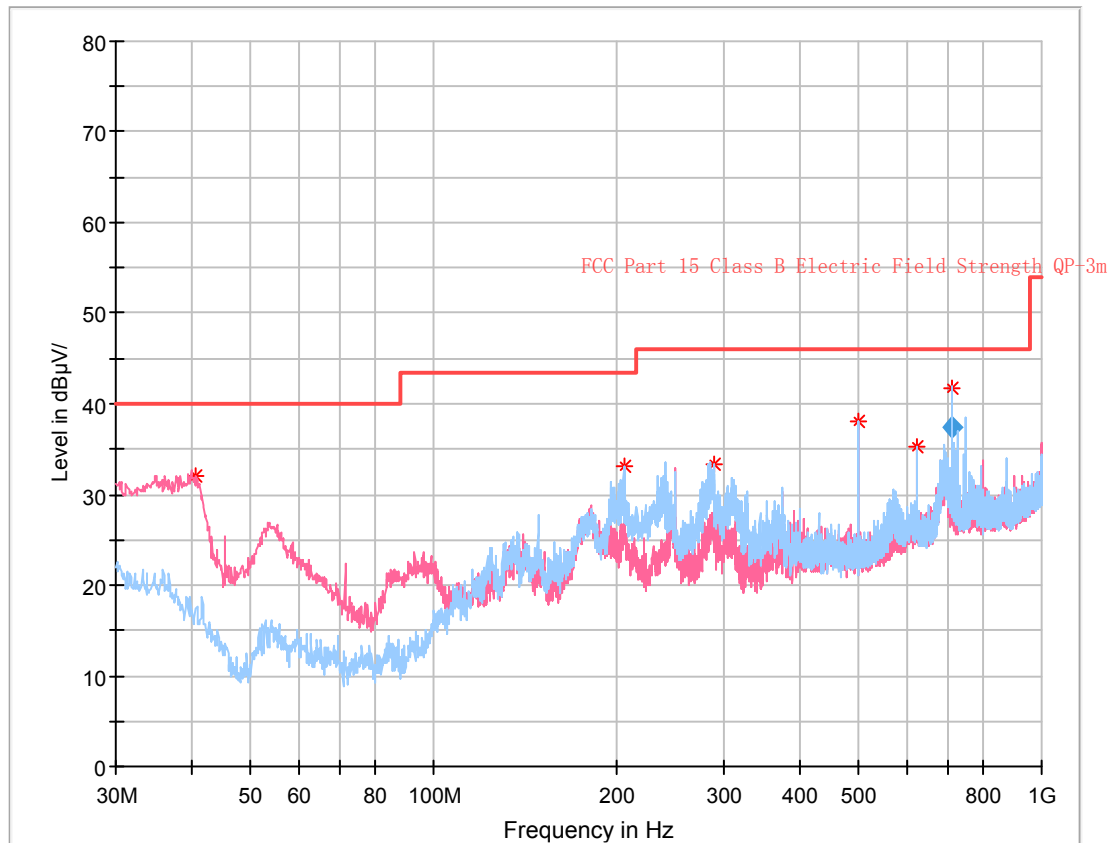
Frequency (MHz)	MaxPeak (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
34.971250	32.09	40.00	7.91	100.0	V	129.0	-7.3
39.336250	31.86	40.00	8.14	100.0	V	47.0	-10.0
249.947500	36.30	46.00	9.70	200.0	V	23.0	-11.8
499.965000	38.92	46.00	7.08	200.0	V	23.0	-5.1
624.973750	35.94	46.00	10.06	200.0	V	161.0	-2.7
713.728750	39.58	46.00	6.42	100.0	H	188.0	-1.2

1-30 GHz:

Frequency (MHz)	Measurement		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dB μ V/m)	FCC Part 15B	
	Reading (dB μ V)	PK/QP/Ave.		Height (m)	Polar (H / V)			Limit (dB μ V/m)	Margin (dB)
1036.51	49.62	PK	141	1.5	H	-6.08	43.54	74	30.46
1036.51	40.05	Ave.	141	1.5	H	-6.08	33.97	54	20.03
1036.51	56.32	PK	347	1.1	V	-6.08	50.24	74	23.76
1036.51	48.35	Ave.	347	1.1	V	-6.08	42.27	54	11.73
1484.30	49.82	PK	12	1.5	H	-2.71	47.11	74	26.89
1484.30	42.39	Ave.	12	1.5	H	-2.71	39.68	54	14.32
1484.30	48.76	PK	81	2.5	V	-2.71	46.05	74	27.95
1484.30	41.53	Ave.	81	2.5	V	-2.71	38.82	54	15.18

For 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)
713.661000	37.46	46.00	8.54	122.0	H	253.0	-1.2

Critical Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
40.670000	32.14	40.00	7.86	100.0	V	56.0	-10.9
205.327500	33.18	43.50	10.32	100.0	H	217.0	-11.1
290.081250	33.44	46.00	12.56	100.0	H	226.0	-10.3
499.965000	38.11	46.00	7.89	200.0	V	23.0	-5.1
624.973750	35.21	46.00	10.79	300.0	H	237.0	-2.7
713.661000	41.68	46.00	4.32	121.0	H	253.0	-1.2

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