



**FCC PART 15B, CLASS B**  
**TEST REPORT**

For

**Grandstream Networks, Inc.**

126 Brookline Ave., 3rd Floor Boston, MA 02215, USA

**FCC ID: YZZ-GXW4248**

<b>Report Type:</b> Class II Permissive Change		<b>Product Type:</b> Analog IP Gateway	
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<b>Report Number:</b>	RSZ201112007-00A1		
<b>Report Date:</b>	2020-12-07		
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## GENERAL INFORMATION

### Product Description for Equipment under Test (EUT)

Product	Analog IP Gateway
Tested Model	GXW4248
Voltage Range	DC 24V from adapter
Highest operating frequency	400 MHz
Date of Test	2020-11-21 to 2020-11-23
Sample serial number	RSZ201112007-EMA1-S1 (Assigned by BAACL, Shenzhen)
Received date	2020-11-12
Sample/EUT Status	Good condition
Adapter information	Model: FSP150-AAAN3 Input: AC 100-240V, 50-60Hz, 2.0A Output: DC 24V, 6.25A

### 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.

This is a CIIPC application of the device, the difference between the original device and current one described as following:

(1) Changing the adapter.

Based on the change made to the device, all the test items were performed.

### 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 expanded 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 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, Guangdong, 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

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### 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.

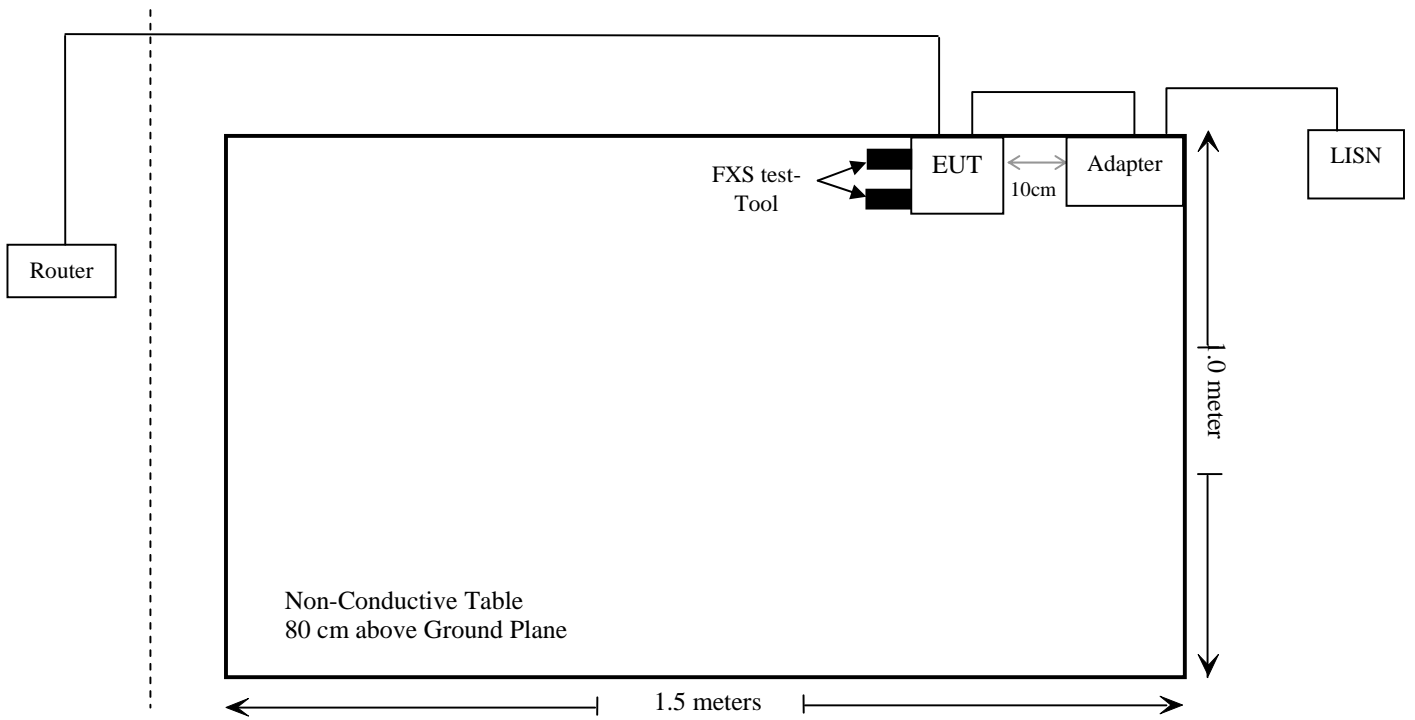
### Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
ASKPCB	FXS test tool*2	E239218	E239218
Sagem	Router	F@ST 1704N	3c81d839027c

### External I/O Cable

Cable Description	Length (m)	From/Port	To
Unshielded detachable AC cable	1.0	Adapter	LISN
Unshielded un-detachable DC cable	1.78	Adapter	EUT
Unshielded detachable RJ45 cable	10.0	EUT	Router

### Block Diagram of Test Setup



## **SUMMARY OF TEST RESULTS**

<b>FCC Rules</b>	<b>Description of Test</b>	<b>Results</b>
§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
<b>AC Line Conducted Emission Test</b>					
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	2019/11/29	2020/11/28
Unknown	CE Cable	CE Cable	UF A210B-1-0720-504504	2019/11/29	2020/11/28
Rohde & Schwarz	CE Test software	EMC 32	V8.53.0	NCR	NCR
<b>Radiated Emission Test</b>					
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	A040904-1	2017/12/22	2020/12/21
Unknown	Cable	Chamber Cable 4	EC-007	2019/11/29	2020/11/28
Unknow	Cable 2	RF Cable 2	F-03-EM197	2019/11/29	2020/11/28
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	2019/11/29	2020/11/28
Sunol Sciences	Horn Antenna	DRH-118	A052604	2017/12/22	2020/12/21
Yijia	Temperature & Humidity Meter	TA218B	E0938	2020/10/14	2021/10/13
Insulated Wire Inc.	RF Cable	SPS-2503-3150	02222010	2019/11/29	2020/11/28
Unknown	RF Cable	W1101-EQ1 OUT	F-19-EM005	2019/11/29	2020/11/28
Unknown	Signal Cable	RG-214	2	2019/11/29	2020/11/28
Agilent	Signal Generator	N5183A	MY51040755	2019/12/04	2020/12/04

\* **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).

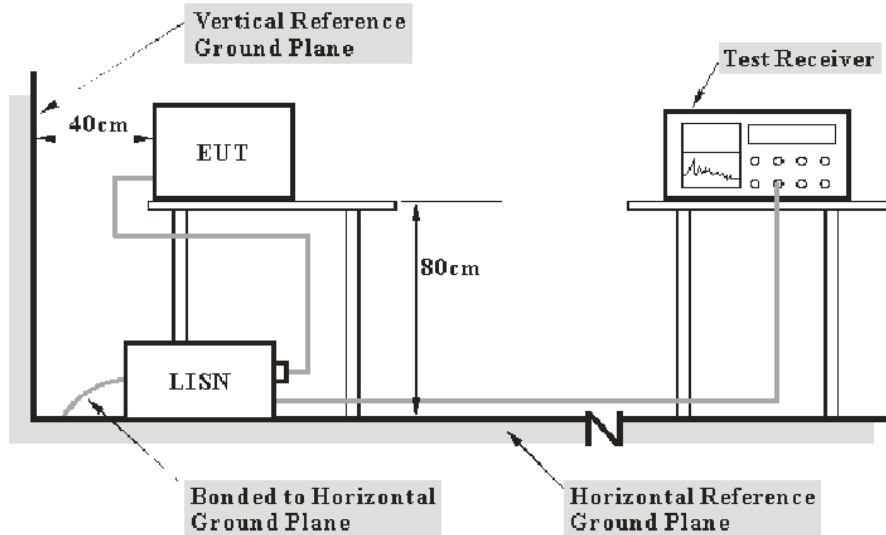


## FCC §15.107 – AC LINE CONDUCTED EMISSIONS

### 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 Class B.

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 EUT adapter 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

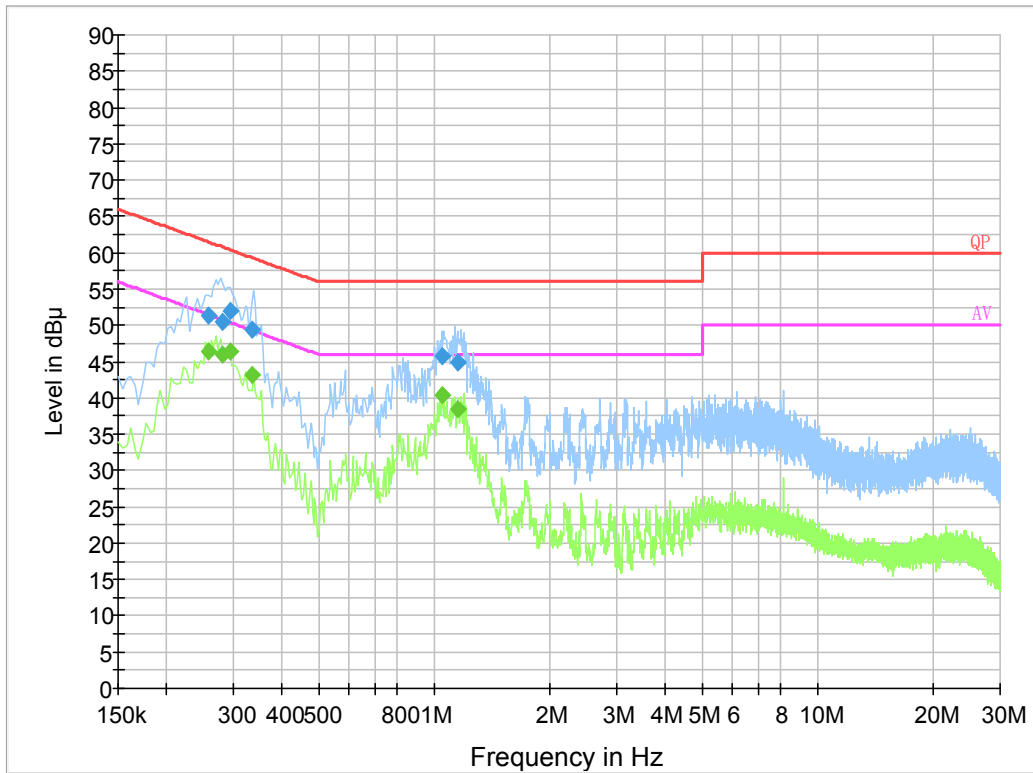
### Environmental Conditions

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	65 %
<b>ATM Pressure:</b>	101.0 kPa

*The testing was performed by Haiguo Li on 2020-11-23.*

*EUT Operation Mode: Full load*

AC 120V/60 Hz, Line



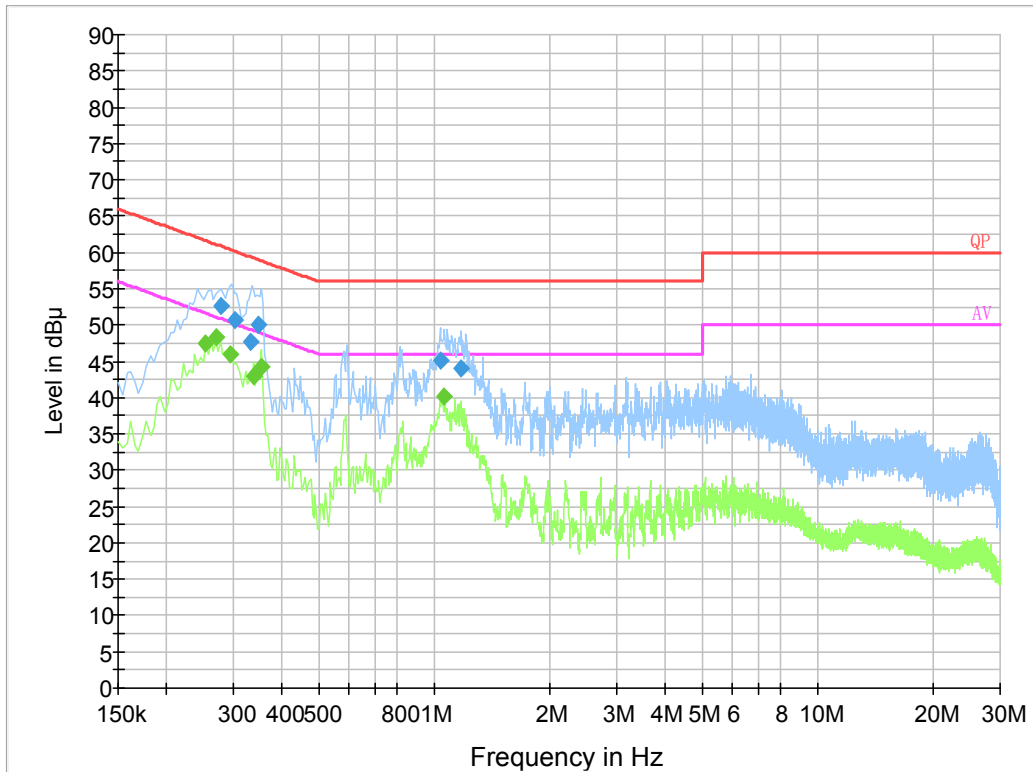
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.258500	51.4	9.000	L1	19.8	10.1	61.5
0.281500	50.4	9.000	L1	19.7	10.4	60.8
0.293500	52.1	9.000	L1	19.7	8.3	60.4
0.336930	49.3	9.000	L1	19.8	10.0	59.3
1.050250	45.7	9.000	L1	19.9	10.3	56.0
1.155070	45.0	9.000	L1	19.8	11.0	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.258500	46.4	9.000	L1	19.8	5.1	51.5
0.281500	46.0	9.000	L1	19.7	4.8	50.8
0.293500	46.5	9.000	L1	19.7	3.9	50.4
0.336930	43.1	9.000	L1	19.8	6.2	49.3
1.050250	40.5	9.000	L1	19.9	5.5	46.0
1.155070	38.5	9.000	L1	19.8	7.5	46.0

**AC 120V/60 Hz, Neutral**



**Final Result 1**

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.277500	52.6	9.000	N	19.7	8.3	60.9
0.301500	50.8	9.000	N	19.7	9.4	60.2
0.332990	47.8	9.000	N	19.8	11.6	59.4
0.348690	50.0	9.000	N	19.9	9.0	59.0
1.038430	45.1	9.000	N	19.8	10.9	56.0
1.172330	44.0	9.000	N	19.8	12.0	56.0

**Final Result 2**

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.254000	47.4	9.000	N	19.8	4.2	51.6
0.270000	48.3	9.000	N	19.7	2.8	51.1
0.294000	46.0	9.000	N	19.7	4.4	50.4
0.338000	42.9	9.000	N	19.8	6.4	49.3
0.354000	44.2	9.000	N	19.9	4.7	48.9
1.066000	40.1	9.000	N	19.8	5.9	46.0

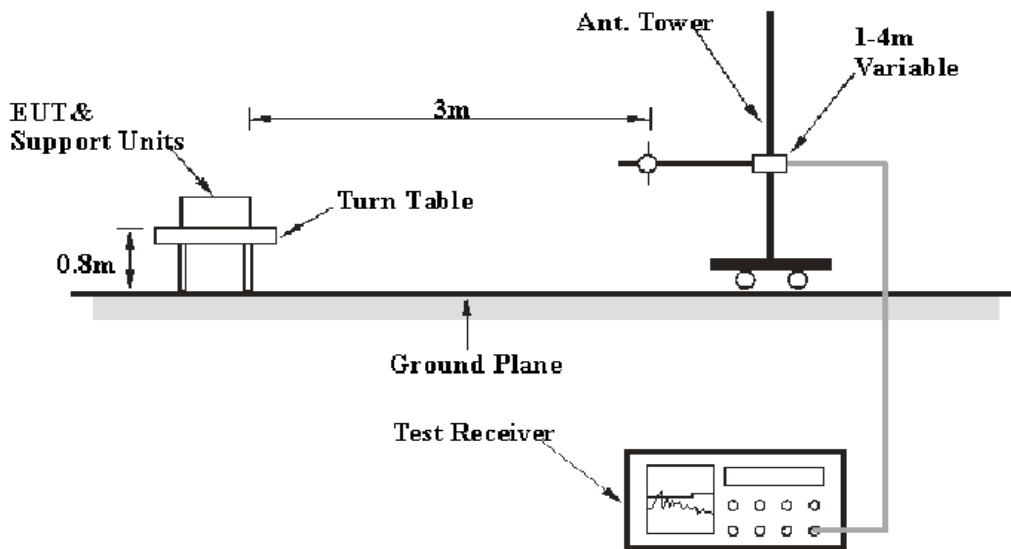
## FCC §15.109 - RADIATED SPURIOUS EMISSIONS

### Applicable Standard

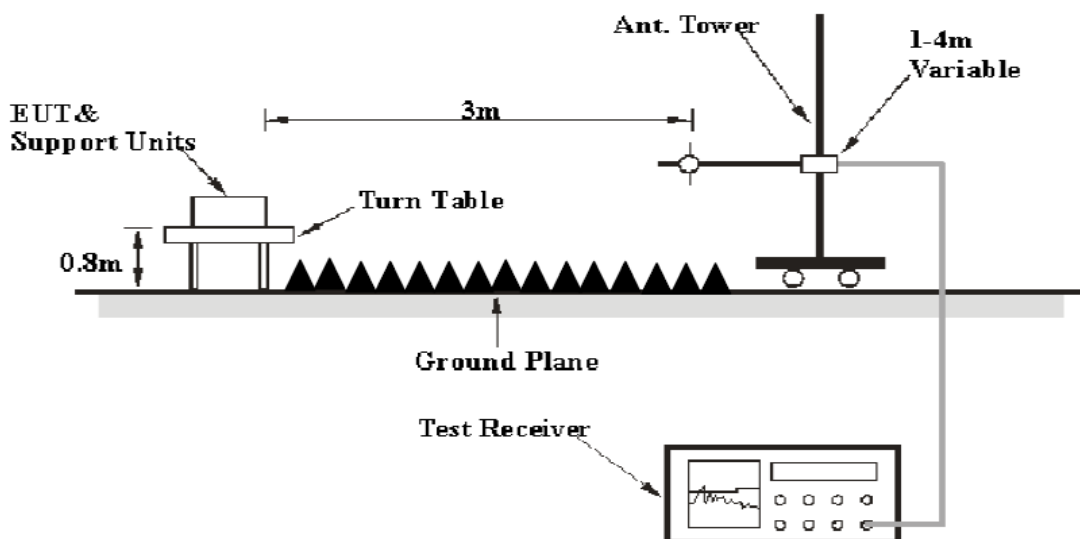
FCC §15.109

### 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 Class B 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

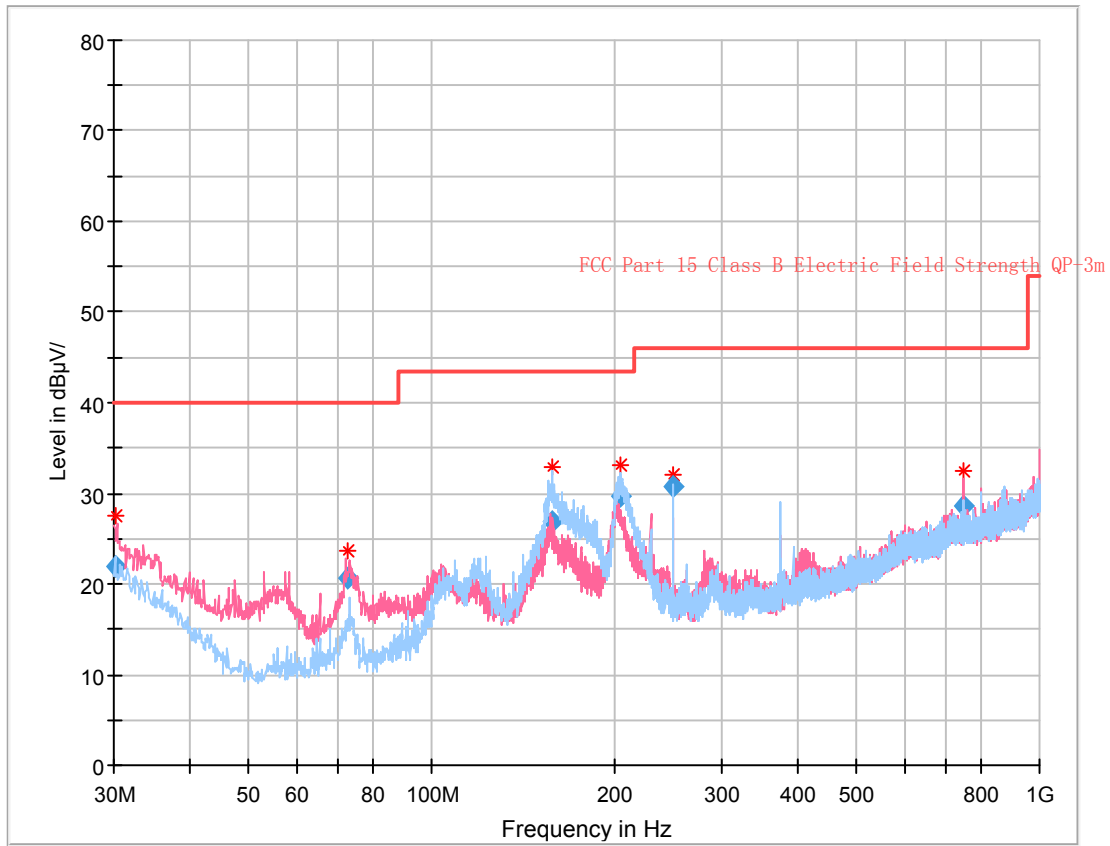
#### Environmental Conditions

<b>Temperature:</b>	27~31.7 °C
<b>Relative Humidity:</b>	54~55 %
<b>ATM Pressure:</b>	100.9~101.0 kPa

*The testing was performed by Charlie Cha on 2020-11-21.*

*EUT Operation Mode: Full load*

**30 MHz – 1 GHz:**



**Final Result**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
30.137228	21.94	40.00	18.06	111.0	V	219.0	-4.5
72.598500	20.70	40.00	19.30	180.0	V	127.0	-17.3
157.694625	26.80	43.50	16.70	199.0	H	266.0	-11.1
204.234000	29.75	43.50	13.75	192.0	H	253.0	-10.7
250.011375	30.79	46.00	15.21	104.0	H	80.0	-10.8
749.996125	28.67	46.00	17.33	109.0	V	0.0	-0.1

**1 GHz –2 GHz:**

Frequency (MHz)	Measurement		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dB $\mu$ V/m)	FCC Part 15B	
	Reading (dB $\mu$ V)	PK/QP/Ave.		Height (m)	Polar (H / V)			Limit (dB $\mu$ V/m)	Margin (dB)
1243.54	47.38	PK	110	1.7	H	-4.58	42.80	74	31.20
1243.54	29.35	Ave.	110	1.7	H	-4.58	24.77	54	29.23
1243.54	47.32	PK	183	1.6	V	-4.58	42.74	74	31.26
1243.54	29.28	Ave.	183	1.6	V	-4.58	24.70	54	29.30
1924.47	44.78	PK	148	1.1	H	-1.50	43.28	74	30.72
1924.47	29.28	Ave.	148	1.1	H	-1.50	27.78	54	26.22
1924.47	44.67	PK	82	1.3	V	-1.50	43.17	74	30.83
1924.47	29.21	Ave.	82	1.3	V	-1.50	27.71	54	26.29

**Note:**

- 1) Correction Factor=Antenna factor (RX) + cable loss – amplifier factor
- 2) Corrected Amplitude = Correction Factor + Reading
- 3) Margin = Limit - Corrected Amplitude

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