

## FCC PART 15B CLASS B


# MEASUREMENT AND TEST REPORT

For

## Chengdu Vantron Technology, Ltd.

No.5 GaoPeng Road, Hi-Tech Zone, Chengdu, SiChuan, P.R. China 610045

**FCC ID: 2AAGETAB185-SKLU**

<b>Report Type:</b> Original Report	<b>Equipment Name:</b> Embedded Computer
<b>Report Number:</b>	<u>RSC180208001-0B</u>
<b>Report Date:</b>	<u>2018-05-23</u>
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## GENERAL INFORMATION

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

The **Chengdu Vantron Technology, Ltd.**, model number: **VT-TAB185-SKLU** (FCC ID: **2AAGETAB185-SKLU**) or the "EUT" as referred to in this report was the **Embedded Computer**. The highest operating frequency is 5850MHz.

### Mechanical Description of EUT

The EUT was measured approximately: 471.86 mm (L) x 283.86 mm (W) x 18.01 mm (H). The EUT has two power input ports, details see EUT external picture.

Rated input voltage: DC 15.2V rechargeable Li-ion battery or DC19V from adapter.

#### Switching Power Adapter Information

Manufacturer: FSP Group Inc.

Model: FSP065-REBN2

Input: AC 100-240V; 50/60Hz

Output: DC 19V, 3.42A

*\*All measurement and test data in this report was gathered from final production sample, serial number: 180208001/01 (assigned by the BACL, Chengdu). It may have deviation from any other sample. The EUT supplied by the applicant was received on 2018-02-02, and EUT conformed to test requirement.*

### Objective

The report was prepared on behalf of **Chengdu Vantron Technology, Ltd.** in accordance with Part 2, Subpart J, and Part 15, Subparts A and B of the Federal Communication Commissions rules.

The objective of the manufacturer is to demonstrate compliance with FCC Part 15 Class B limits.

### Related Submittal(s)/Grant(s)

FCC Part 15.247 DTS submissions with FCC ID: 2AAGETAB185-SKLU

FCC Part 15.247 DSS submissions with FCC ID: 2AAGETAB185-SKLU

FCC Part 15.407 NII submissions with FCC ID: 2AAGETAB185-SKLU

### Measurement Uncertainty

Item		Uncertainty	
AC power line conducted emission		2.71 dB	
Radiated Emission(Field Strength)	30MHz-200MHz	H	4.57 dB
		V	4.81 dB
	200MHz-1GHz	H	5.69 dB
		V	6.07 dB
	1GHz-6GHz		5.49 dB
	6GHz-18GHz		5.57 dB
	18GHz-40GHz		5.48 dB

### Test Methodology

All measurements contained in this report are 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 is performed at BACL. The radiated testing is performed at an antenna-to-EUT distance of 3 Meters.

### Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Chengdu) to collect test data is located No.5040, Huilongwan Plaza, No. 1, Shawan Road, Jinniu District, Chengdu, Sichuan, China.

Bay Area Compliance Laboratories Corp. (Chengdu) lab is accredited to ISO/IEC 17025 by A2LA (Lab code: 4324.01) and the FCC designation No. CN1186 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.

## **SYSTEM TEST CONFIGURATION**

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### **Justification**

The system is configured for testing in a typical fashion (as a normally used by a typical user).

### **EUT Exercise Software**

Windows Media Player

### **Special Accessories**

No special accessories were supplied by BAACL.

### **Equipment Modifications**

No modification was made to the EUT.

### **Support Equipment List and Details**

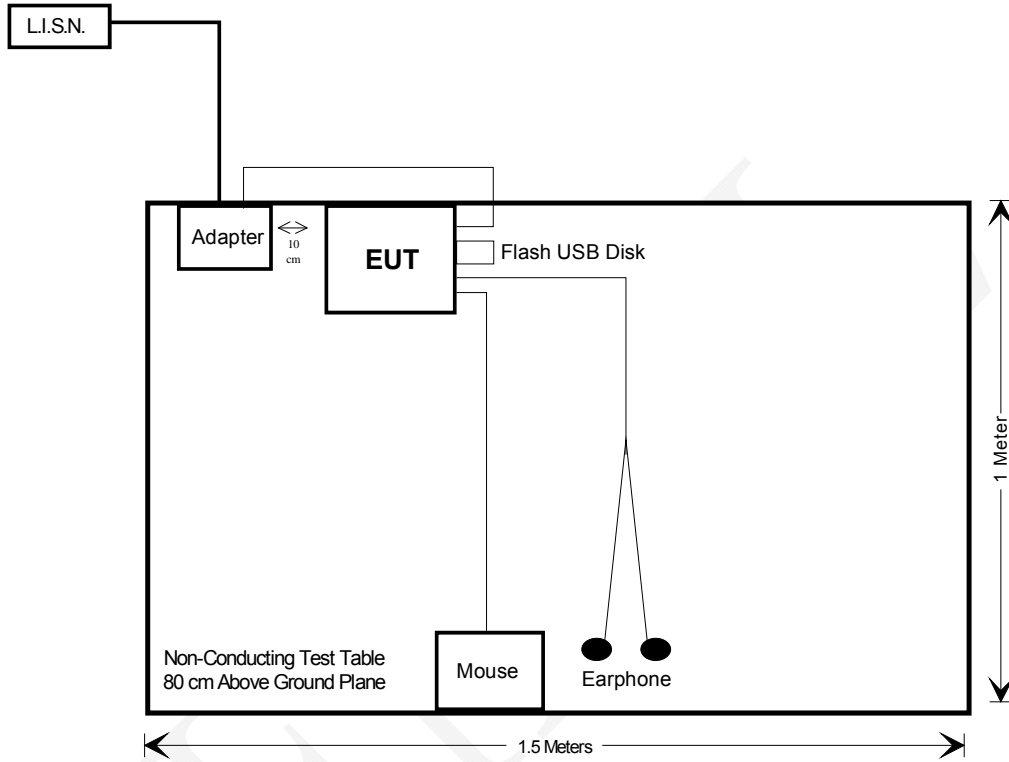
<b>Manufacturer</b>	<b>Description</b>	<b>Model</b>	<b>Serial Number</b>
Kingston	Flash USB Disk	DTSE9	7869951
HUAWEI	Earphone	P9	None
Logitech	Mouse	M-U0004	810-U01808

### **External I/O Cable**

<b>Cable Description</b>	<b>Length (m)</b>	<b>From</b>	<b>To</b>
Unshielded Power Cable	1.2	Adapter	EUT
Unshielded Earphone Cable	1.0	EUT	Earphone
Unshielded USB Cable	1.8	EUT	Mouse

## Block Diagram of Test Setup

Conducted Emissions



## **SUMMARY OF TEST RESULTS**

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<b>Standard</b>	<b>Description</b>	<b>Result</b>
FCC §15.107	Conducted Emission	Compliance
FCC §15.109	Radiated Emission	Compliance

FINAL

## TEST EQUIPMENTS LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted Emission					
Rohde & Schwarz	EMI Test Receiver	ESCS 30	836858/0016	2017-12-02	2018-12-01
Rohde & Schwarz	L.I.S.N.	ENV216	100018	2017-05-20	2018-05-19
Rohde & Schwarz	RF Limiter	ESH3Z2	DE14781	2017-11-10	2018-11-09
Unknown	Conducted Cable	L-E003	000003	2017-11-10	2018-11-09
Rohde & Schwarz	EMC32	EMC32	V 8.52.0	N/A	N/A
Radiated Emission					
EMCT	Semi-Anechoic Chamber	966	N/A	2017-05-18	2020-05-17
Sonoma	Pre-Amplifier	310N	186684	2017-08-18	2018-08-17
Rohde & Schwarz	EMI Test Receiver	ESIB 40	100215	2017-09-12	2018-09-11
Rohde & Schwarz	EMI Test Receiver	ESCI	100028	2017-05-20	2018-05-19
A.H. Systems, Inc	Amplifier	PAM-0118P	467	2017-08-10	2018-08-09
EM Electronics	RF Pre-Amplifier	EM18G40	060725	2018-03-28	2019-03-27
SUNOL SCIENCES	Broadband Antenna	JB3	A121808	2017-05-19	2020-05-18
ETS	Horn Antenna	3115	003-6076	2017-05-19	2020-05-18
A.H. Systems, Inc	Horn Antenna	SAS-574	510	2017-05-19	2020-05-18
INMET	Attenuator	18N-6dB	64671	2017-11-10	2018-11-09
Unknown	RF Cable (below 1GHz)	L-E005	000005	2017-11-10	2018-11-09
Unknown	RF Cable (below 1GHz)	T-E128	000128	2017-11-10	2018-11-09
Unknown	RF Cable (below 1GHz)	T-E129	000129	2017-11-10	2018-11-09
Unknown	RF Cable (above 1GHz)	T-E069	000069	2017-11-10	2018-11-09
Micro-coax	RF Cable (above 1GHz)	T-E209	MFR 64639 2310	2018-03-14	2019-03-13
Rohde & Schwarz	EMC32	EMC32	V 8.52.0	N/A	N/A

\* **Statement of Traceability:** BA CL (Chengdu) attested that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).



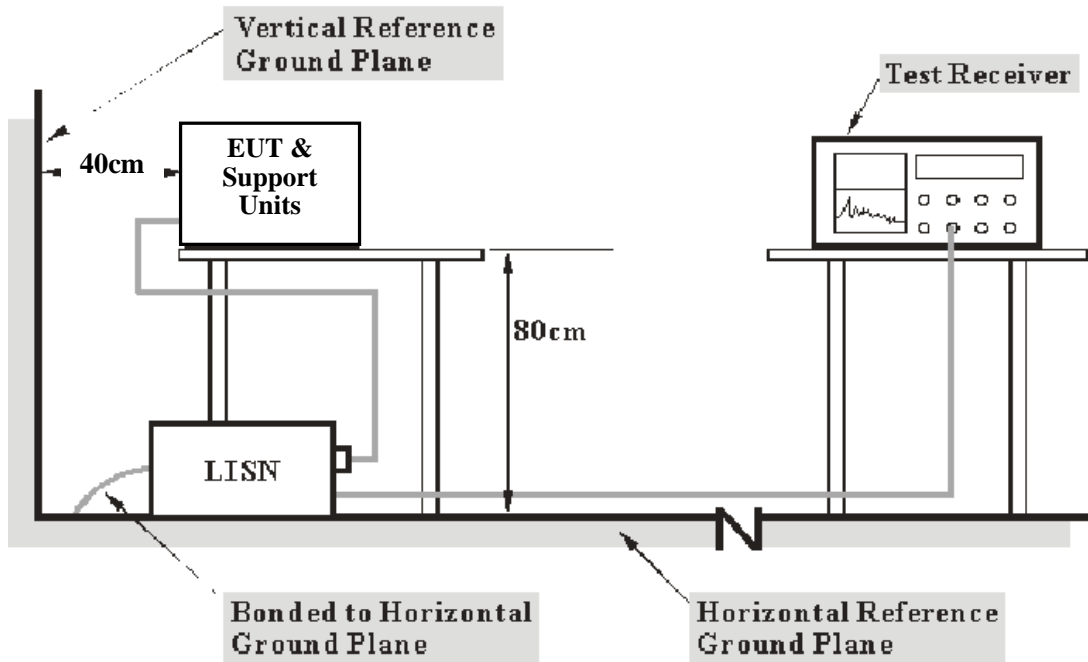
## FCC §15.107 CONDUCTED EMISSION TEST

### Applicable Standard

FCC §15.107

### EUT Setup

The setup of EUT was in accordance with ANSI C63.4-2014 measurement procedure. The specification used was the FCC Part 15B CLASS B limits.



- 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 power cables and excess cables shall be folded at the cable center into a bundle no longer than 40 cm.

The spacing between the peripherals unit & EUT was 10 cm.

The adapter was connected to AC120V/60Hz power source.

### 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

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT is compliant with all installation combination.

All data are recorded in the Quasi-peak and Average detection mode. Quasi-peak readings are distinguished with a "QP". Average readings are distinguished with an "AV".

The EUT is in the normal operating mode during the final qualification test to represent the worst cases results.

### Corrected Amplitude & Margin Calculation

The basic equation is as follows:

$$V_C = V_R + A_C + VDF$$
$$C_f = A_C + VDF$$

Herein,  
 $V_C$  (cord. Reading): corrected voltage amplitude  
 $V_R$ : reading voltage amplitude  
 $A_C$ : attenuation caused by cable loss  
 $VDF$ : voltage division factor of AMN  
 $C_f$ : Correction Factor

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

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

### Summary of Test Results

According to the data in the following, the EUT complied with the FCC Part 15B Class B limit.

## Test Data

### Test Environment Conditions

Temperature:	23 °C
Relative Humidity:	46 %
ATM Pressure:	95.9 kPa

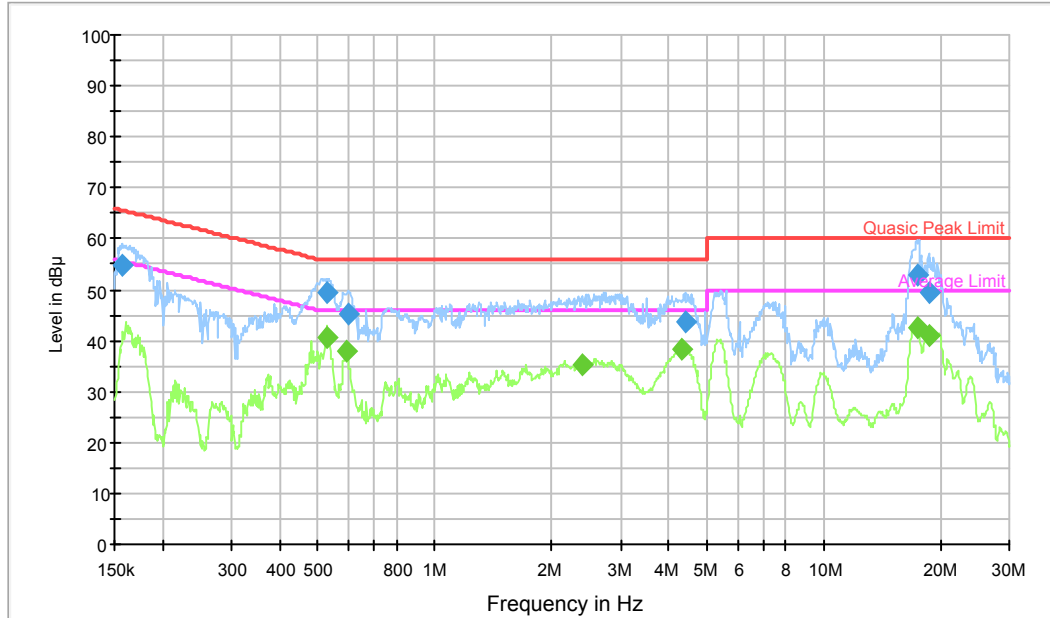
*The testing was performed by Lorin Bian on 2018-03-28.*

*Test mode: Play video & audio file*

FINAL

**DC Input 1**

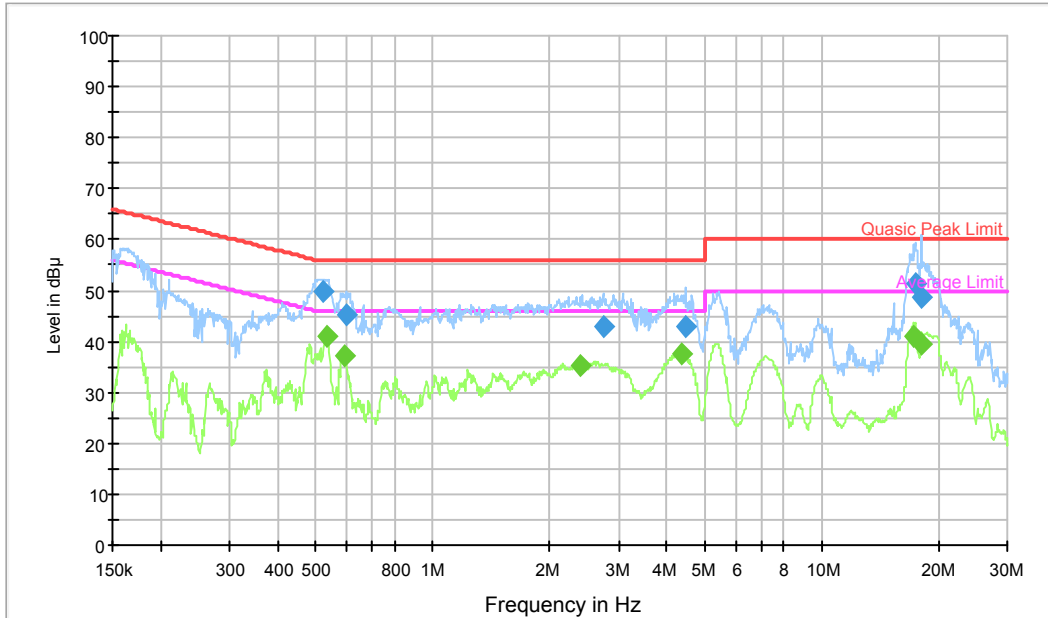
**AC120 V, 60 Hz, Line:**



Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corrected Factor (dB)	Margin (dB)	Limit (dBμV)
0.157361	54.8	200.0	9.000	L1	19.6	10.8	65.6
0.527486	49.4	200.0	9.000	L1	19.8	6.6	56.0
0.596975	45.3	200.0	9.000	L1	19.8	10.7	56.0
4.393520	43.7	200.0	9.000	L1	20.0	12.3	56.0
17.346417	52.8	200.0	9.000	L1	20.1	7.2	60.0
18.638743	49.3	200.0	9.000	L1	20.1	10.7	60.0

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corrected Factor (dB)	Margin (dB)	Limit (dBμV)
0.527486	40.4	200.0	9.000	L1	19.8	5.6	46.0
0.592228	38.0	200.0	9.000	L1	19.8	8.0	46.0
2.404484	35.2	200.0	9.000	L1	19.8	10.8	46.0
4.289536	38.2	200.0	9.000	L1	19.9	7.8	46.0
17.346417	42.5	200.0	9.000	L1	20.1	7.5	50.0
18.638743	41.1	200.0	9.000	L1	20.1	8.9	50.0

**AC120 V, 60 Hz, Neutral:**

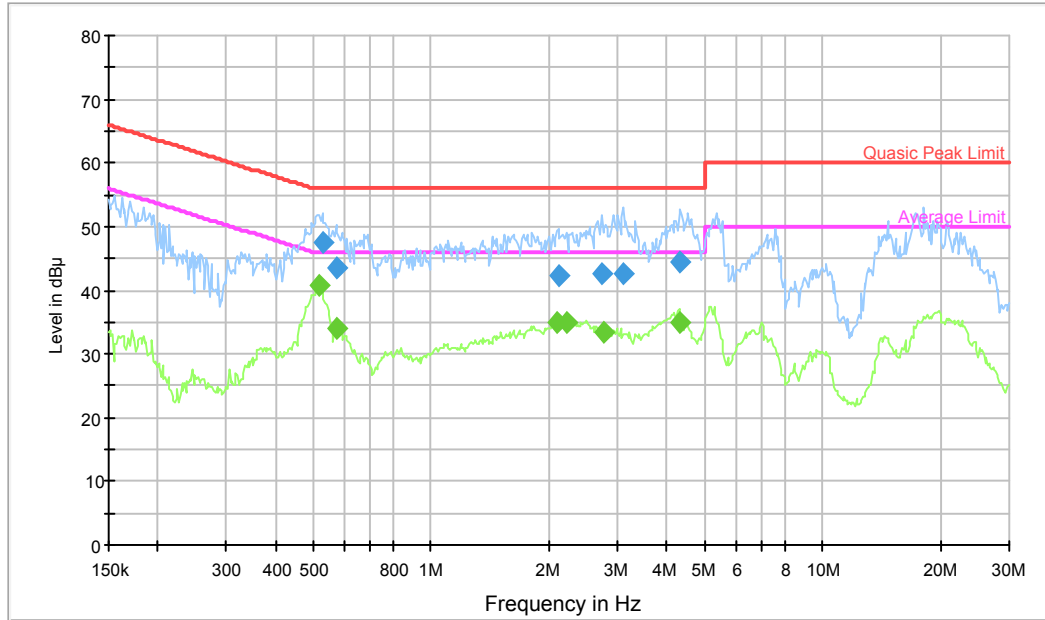


Frequency (MHz)	QuasiPeak (dB $\mu$ V)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corrected Factor (dB)	Margin (dB)	Limit (dB $\mu$ V)
0.519130	49.8	200.0	9.000	N	19.5	6.2	56.0
0.596975	45.2	200.0	9.000	N	19.5	10.8	56.0
2.743055	42.8	200.0	9.000	N	19.6	13.2	56.0
4.464239	42.7	200.0	9.000	N	19.7	13.3	56.0
17.346417	51.5	200.0	9.000	N	19.9	8.5	60.0
18.052898	48.6	200.0	9.000	N	19.9	11.4	60.0

Frequency (MHz)	Average (dB $\mu$ V)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corrected Factor (dB)	Margin (dB)	Limit (dB $\mu$ V)
0.533841	41.2	200.0	9.000	N	19.5	4.8	46.0
0.592228	37.0	200.0	9.000	N	19.5	9.0	46.0
2.404484	35.3	200.0	9.000	N	19.6	10.7	46.0
4.341217	37.6	200.0	9.000	N	19.7	8.4	46.0
17.208474	41.2	200.0	9.000	N	19.9	8.8	50.0
18.052898	39.6	200.0	9.000	N	19.9	10.4	50.0

**DC Input 2**

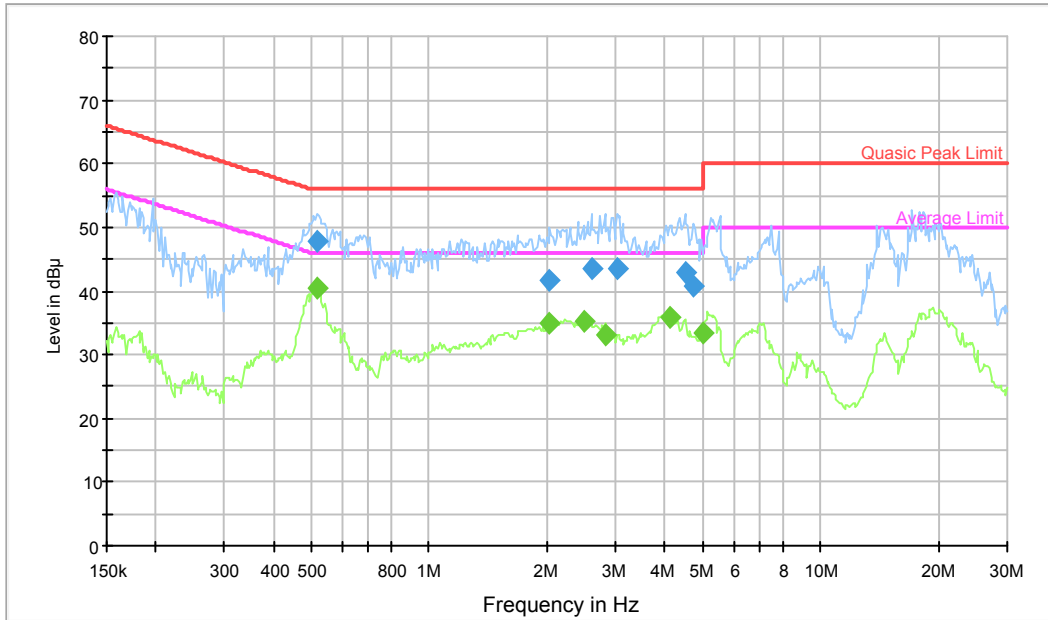
**AC120 V, 60 Hz, Line:**



Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corrected Factor (dB)	Margin (dB)	Limit (dBμV)
0.528270	47.6	200.0	9.000	L1	19.7	8.4	56.0
0.572086	43.5	200.0	9.000	L1	19.7	12.5	56.0
2.113432	42.4	200.0	9.000	L1	19.7	13.6	56.0
2.727252	42.7	200.0	9.000	L1	19.7	13.3	56.0
3.098088	42.6	200.0	9.000	L1	19.7	13.4	56.0
4.329484	44.5	200.0	9.000	L1	19.8	11.5	56.0

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corrected Factor (dB)	Margin (dB)	Limit (dBμV)
0.515791	40.6	200.0	9.000	L1	19.7	5.4	46.0
0.576662	34.1	200.0	9.000	L1	19.7	11.9	46.0
2.096658	34.9	200.0	9.000	L1	19.7	11.1	46.0
2.216927	34.9	200.0	9.000	L1	19.7	11.1	46.0
2.771062	33.3	200.0	9.000	L1	19.7	12.7	46.0
4.295123	34.9	200.0	9.000	L1	19.8	11.1	46.0

**AC120 V, 60 Hz, Neutral:**



Frequency (MHz)	QuasiPeak (dB $\mu$ V)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corrected Factor (dB)	Margin (dB)	Limit (dB $\mu$ V)
0.515791	47.8	200.0	9.000	N	19.8	8.2	56.0
2.030886	41.7	200.0	9.000	N	19.8	14.3	56.0
2.599932	43.5	200.0	9.000	N	19.8	12.5	56.0
3.024908	43.4	200.0	9.000	N	19.9	12.6	56.0
4.505456	43.0	200.0	9.000	N	19.9	13.0	56.0
4.726090	40.9	200.0	9.000	N	19.9	15.1	56.0

Frequency (MHz)	Average (dB $\mu$ V)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corrected Factor (dB)	Margin (dB)	Limit (dB $\mu$ V)
0.515791	40.4	200.0	9.000	N	19.8	5.6	46.0
2.030886	35.0	200.0	9.000	N	19.8	11.0	46.0
2.478557	35.1	200.0	9.000	N	19.8	10.9	46.0
2.815577	33.0	200.0	9.000	N	19.9	13.0	46.0
4.127365	35.7	200.0	9.000	N	19.9	10.3	46.0
4.997188	33.5	200.0	9.000	N	19.9	12.5	46.0

**Note:**

- 1) Corrected Amplitude = Reading + Correction Factor
- 2) Correction Factor = LISN VDF (Voltage Division Factor) + Cable Loss + Transient Limiter
- 3) Margin = Limit – Corrected Amplitude

## FCC §15.109 RADIATED EMISSION TEST

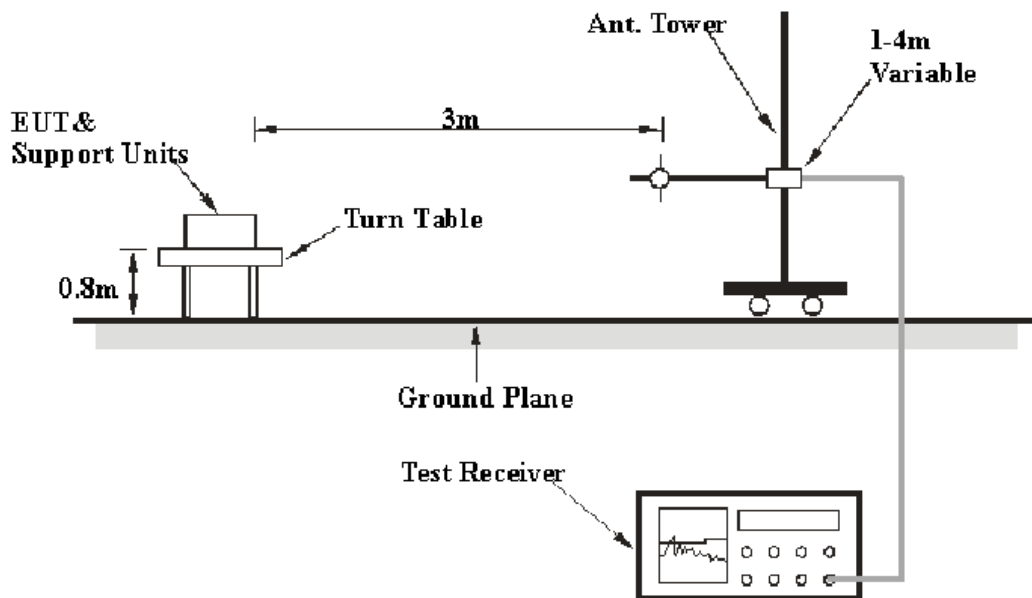
### Applicable Standard

FCC §15.109

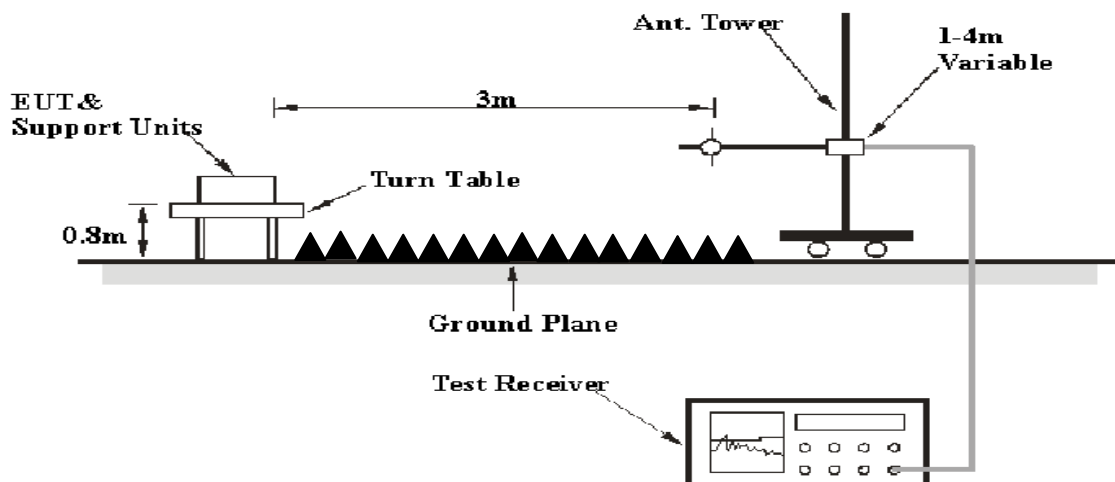
### EUT Setup

The radiated emission tests were performed in the 3 meter Semi Anechoic Chamber, using the setup in accordance with the ANSI C63.4-2014. The specification used was the FCC Part 15B Class B limits.

Below 1GHz:



Above 1GHz:





The excess cables shall be folded at the cable center into a bundle no longer than 40 cm.

The spacing between the peripherals unit & EUT was 10 cm.

The adapter was connected to AC 120V/60Hz power source.

### EMI Test Receiver Setup

Per FCC 15.33 requirement, the frequency range is investigated from 30MHz to 30GHz.

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

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1 MHz	3 MHz	1 MHz	PK
	1 MHz	3 MHz	1 MHz	AV

### Test Procedure

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT is compliant with all installation combinations.

All data were recorded in the quasi-peak detection mode from 30 MHz to 1 GHz. Peak and average detection mode above 1 GHz.

The EUT was in the normal operating mode during the final qualification test to represent the worst case results.

### Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corrected Amplitude = Indicated Reading + Antenna Factor + Cable Factor - 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 7dB below the limit. The equation for margin calculation is as follows:

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

### Summary of Test Results

According to the data in the following, the EUT complied with the FCC Part 15B Class B limit.

## Test Data

### Test Environment Conditions

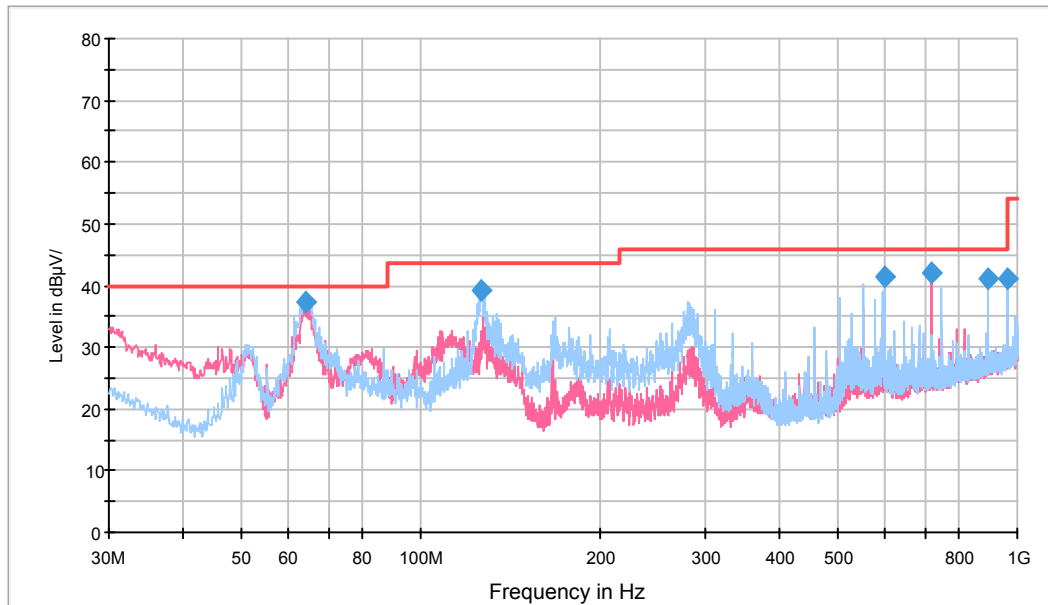
Temperature:	24 °C
Relative Humidity:	48 %
ATM Pressure:	95.3 kPa

The testing was performed by Lorin Bian on 2018-04-02.

Test mode: Play video&audio file

### DC Input 1

Below 1GHz:

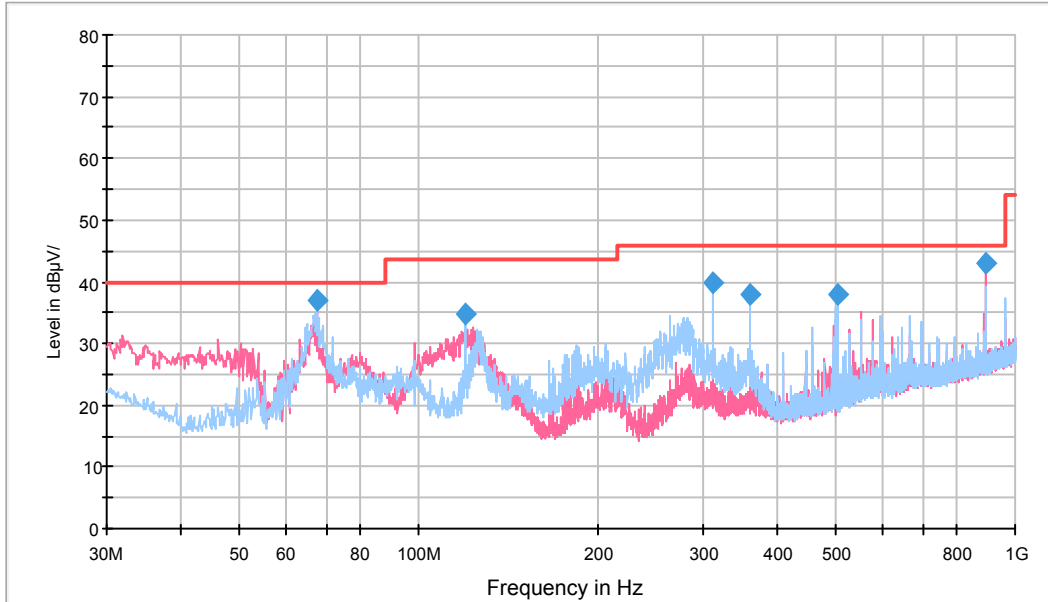


Frequency (MHz)	QuasicPeak (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corrected Factor (dB/m)	Margin (dB)	Limit (dBµV/m)
64.313750	37.2	150.0	H	328.0	-17.1	*2.8	40.0
126.030000	39.3	100.0	H	105.0	-11.2	*4.2	43.5
599.996250	41.3	100.0	H	79.0	-4.3	*4.7	46.0
717.366250	42.1	100.0	V	171.0	-2.9	*3.9	46.0
890.996250	41.0	150.0	H	359.0	-0.2	*5.0	46.0
959.987500	41.2	150.0	H	99.0	1.4	*4.8	46.0

\* Within Measurement Uncertainty.

**DC Input 2**

Below 1GHz:

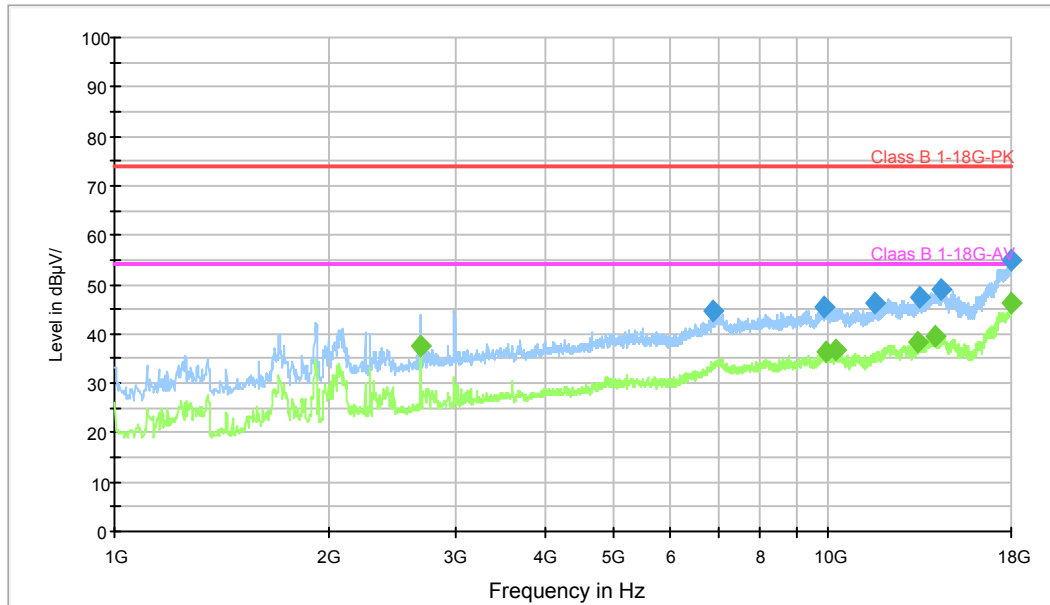


Frequency (MHz)	QuasicPeak (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corrected Factor (dB/m)	Margin (dB)	Limit (dBµV/m)
67.587500	37.0	200.0	H	327.0	-16.8	*3.0	40.0
119.967500	34.8	200.0	H	297.0	-12.1	8.7	43.5
311.906250	39.8	100.0	H	58.0	-10.4	6.2	46.0
360.042500	37.8	100.0	H	352.0	-9.6	8.2	46.0
503.966250	37.9	200.0	H	312.0	-6.8	8.1	46.0
890.996250	43.0	100.0	V	8.0	-0.2	*3.0	46.0

\* Within Measurement Uncertainty.

Above 1GHz:

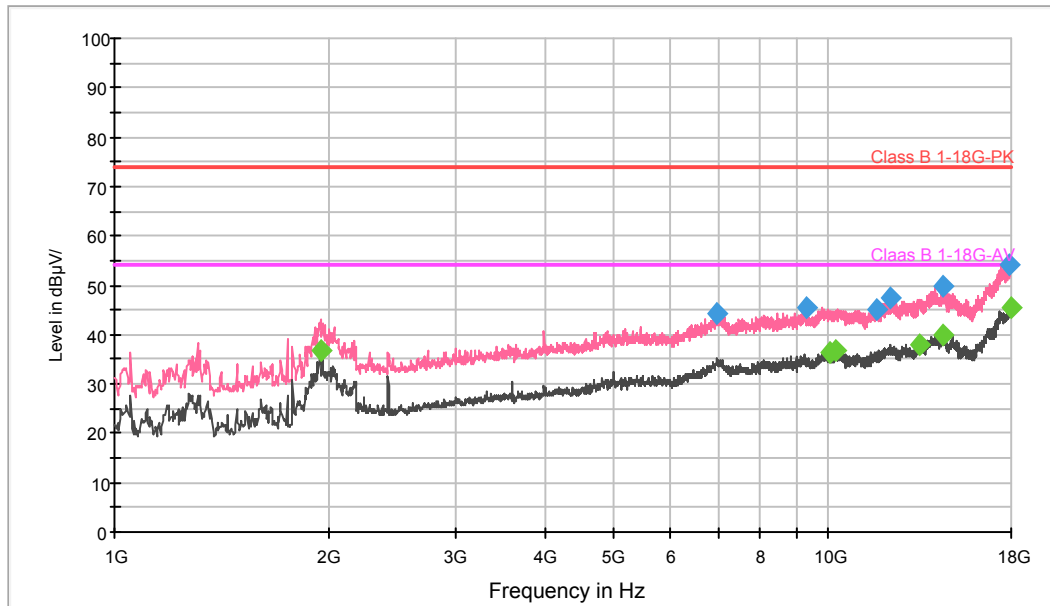
Horizontal



Frequency (MHz)	MaxPeak- (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corrected Factor (dB/m)	Margin (dB)	Limit (dBµV/m)
6868.400000	44.8	100.0	H	194.0	-0.8	29.2	74.0
9867.200000	45.6	150.0	H	0.0	1.8	28.4	74.0
11611.400000	46.3	100.0	H	149.0	3.4	27.7	74.0
13382.800000	47.3	150.0	H	77.0	6.7	26.7	74.0
14338.200000	49.0	150.0	H	5.0	8.6	25.0	74.0
17996.600000	54.8	100.0	H	249.0	15.4	19.2	74.0

Frequency (MHz)	Average (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corrected Factor (dB/m)	Margin (dB)	Limit (dBµV/m)
2679.600000	37.4	150.0	H	50.0	-10.7	16.6	54.0
9897.800000	36.2	150.0	H	148.0	2.0	17.8	54.0
10224.200000	36.8	100.0	H	257.0	2.2	17.2	54.0
13325.000000	38.5	100.0	H	266.0	6.6	15.5	54.0
14073.000000	39.5	100.0	H	212.0	8.6	14.5	54.0
17962.600000	46.2	100.0	H	345.0	15.4	7.8	54.0

**Vertical**



Frequency (MHz)	MaxPeak (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corrected Factor (dB/m)	Margin (dB)	Limit (dBµV/m)
6963.600000	44.4	150.0	V	11.0	-0.3	29.6	74.0
9282.400000	45.6	100.0	V	105.0	0.6	28.4	74.0
11648.800000	45.1	100.0	V	176.0	3.6	28.9	74.0
12206.400000	47.5	100.0	V	220.0	5.6	26.5	74.0
14467.400000	49.8	100.0	V	114.0	8.6	24.2	74.0
17915.000000	54.3	100.0	V	194.0	15.3	19.7	74.0

Frequency (MHz)	Average (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corrected Factor (dB/m)	Margin (dB)	Limit (dBµV/m)
1941.800000	36.7	150.0	V	74.0	-13.2	17.3	54.0
10006.600000	36.2	150.0	V	0.0	2.3	17.8	54.0
10217.400000	36.7	100.0	V	0.0	2.3	17.3	54.0
13379.400000	38.1	100.0	V	159.0	6.7	15.9	54.0
14433.400000	39.9	150.0	V	38.0	8.6	14.1	54.0
17986.400000	45.6	100.0	V	132.0	15.4	8.4	54.0

Note: No emissions were detected above 18GHz.

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