

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

For

Group Sense Mobile-Tech Limited

Room 13-24, 2/F, Sino Industrial Plaza, 9 Kai Cheung Road, Kowloon Bay, Kowloon, Hong Kong

FCC ID: VRI-B231

Report Type: Original Report	Product Type: POS Terminal
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Group Sense Mobile-Tech Limited's* product, model number: *DT-10 (FCC ID: VRI-B231)* or the "EUT" in this report was a *POS Terminal*, which was measured approximately: 28.4 cm (L) × 19.3 cm (W) × 1.9 cm (H), rated with input voltage: DC 3.8 V battery or DC 5V from adapter. The highest operating frequency is 5825MHz.

Adapter Information:

Model: JK050300-S04US

Input: AC 100-240V, 50/60Hz, 0.5A

Output: DC 5V, 3000 mA

**All measurement and test data in this report was gathered from production sample serial number: 1700742 (Assigned by BACL, Shenzhen). The EUT supplied by the applicant was received on 2017-07-20.*

Objective

This test report is prepared on behalf of *Group Sense Mobile-Tech Limited* 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.

Related Submittal(s)/Grant(s)

FCC Part 15.247 DSS& DTS, Part 15.407 NII, Part 15.225 DXX and Part 22H&24E PCB submissions with FCC ID: VRI-B231.

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

Parameter	uncertainty
Conducted Emissions	±1.95dB
All emissions, radiated	±4.88dB

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.

Bay Area Compliance Laboratories Corp. (Shenzhen) has been accredited to ISO/IEC 17025 by CNAS(Lab code: L2408). And accredited to ISO/IEC 17025 by NVLAP(Lab code: 200707-0), the FCC Designation No. CN5001 under the KDB 974614 D01.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Bay Area Compliance Laboratories Corp. (Shenzhen) was 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 operation mode: Downloading & HDMI playing

EUT Exercise Software

“BurnIn test v5.3” exercise software was used.

Special Accessories

No special accessory.

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

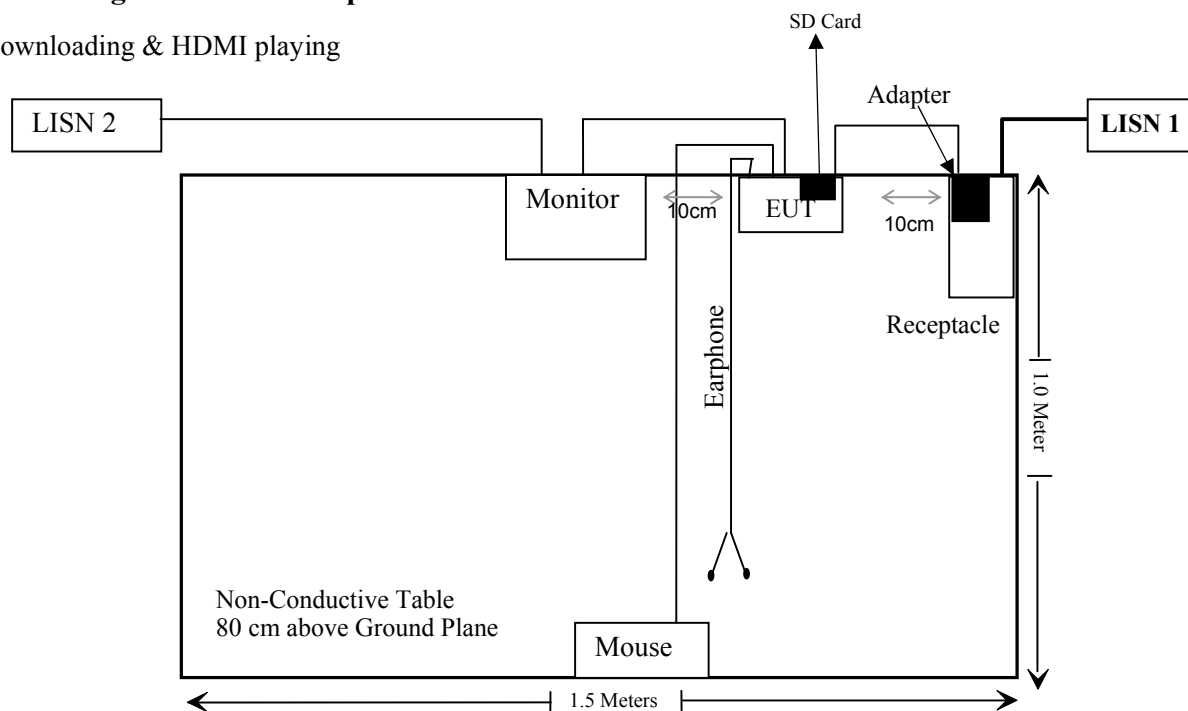
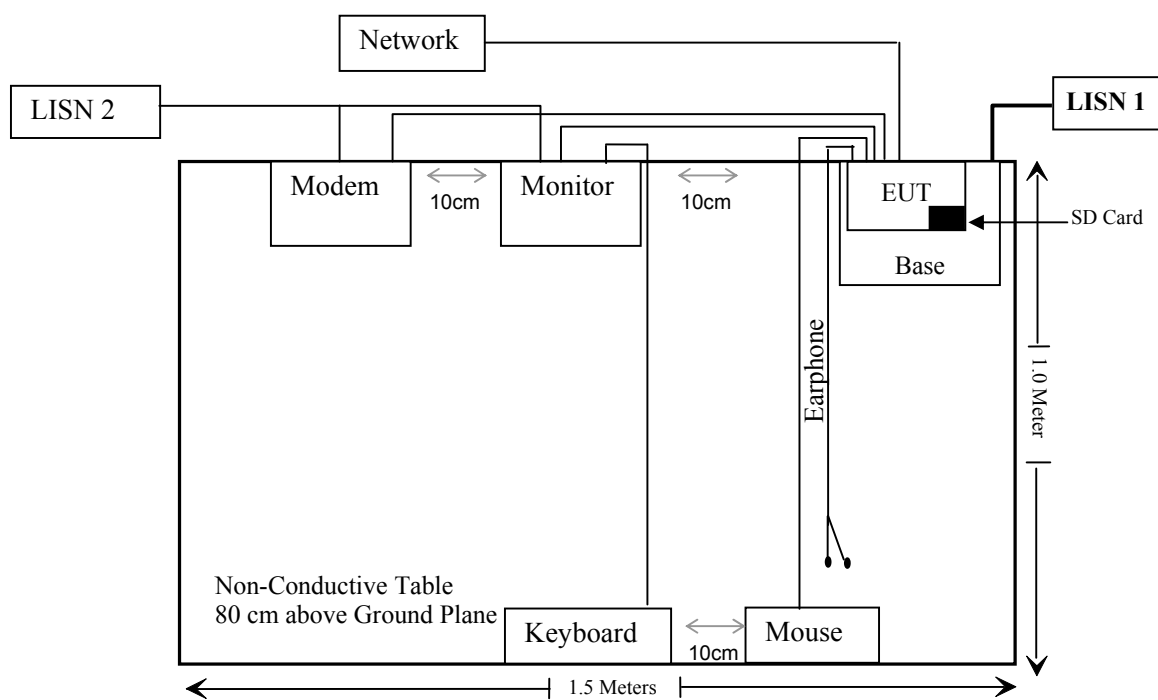
Manufacturer	Description	Model	Serial Number
SAST	Modem	AEM-2100	0293
DELL	Mouse	MOC5UO	G1900NKD
PHILIPS	Earphone	SBCHP250	N/A
DELL	LCD Monitor	E178WFPC	CN-OWY564-64180-7C4-2SQH

External I/O Cable

Cable Description	Length (m)	From Port	To
Un-Shielding Detachable USB Cable	1.0	EUT	Adapter
Un-Shielding Detachable Serial Cable	1.5	EUT	Modem
Un-shielding Un-detachable AC Cable	1.0	Modem	LISN 2
Un-shielded Un-detachable AC Cable	1.0	LISN 1	Receptacle
Un-shielded Un-detachable AC Cable	1.0	LISN 1	Base
Un-shielded Undetachable Audio Cable	1.0	EUT	Earphone
Un-Shielded Undetachable USB Cable	1.2	Mouse	EUT
Un-Shielding Detachable RJ45 Cable	3.0	EUT	Network
Shielding Detachable USB Cable	1.5	Monitor	Keyboard
Shielding Detachable HDMI Cable	1.0	EUT	Monitor
Un-shielded Un-detachable AC Cable	1.0	LISN 2	Monitor

Block Diagram of Test Setup

Downloading & HDMI playing

Downloading & HDMI playing
(with base):

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	ESCS30	100176	2016-10-19	2017-10-19
Rohde & Schwarz	LISN	ENV216	3560.6650.12-101613-Yb	2016-12-07	2017-12-07
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2017-02-14	2017-08-15
Rohde & Schwarz	CE Test software	EMC 32	V8.53.0	NCR	NCR
N/A	Conducted Emission Cable	N/A	UF A210B-1-0720-504504	2017-05-12	2017-11-12
Radiated Emission Test					
Sunol Sciences	Horn Antenna	DRH-118	A052604	2014-12-29	2017-12-28
Rohde & Schwarz	Signal Analyzer	FSIQ26	837405/023	2017-04-24	2018-04-24
Sunol Sciences	Bi-log Antenna	JB1	A040904-2	2014-12-17	2017-12-16
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2017-05-21	2018-05-21
HP	Amplifier	HP8447E	1937A01046	2017-05-21	2017-11-19
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2016-12-07	2017-12-07
Ducommun technologies	RF Cable	UFA210A-1-4724-30050U	MFR64369 223410-001	2017-05-21	2017-11-19
Ducommun technologies	RF Cable	104PEA	218124002	2017-05-21	2017-11-19
Ducommun technologies	RF Cable	RG-214	1	2017-05-21	2017-11-19
Ducommun technologies	RF Cable	RG-214	2	2017-05-22	2017-11-22
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-04	2014-12-29	2017-12-28
Ducommun technologies	Horn Antenna	ARH-2823-02	1007726-03	2014-12-29	2017-12-28
Ducommun technologies	Pre-amplifier	ALN-22093530-01	991373-01	2017-08-03	2018-08-03

* **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

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 Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.107,

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level is in compliance with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cisp\text{r}}$$

In BACL., $U_{(Lm)}$ is less than $U_{cisp\text{r}}$, if L_m is less than L_{lim} , it implies that the EUT complies with the limit.

Test Data

Environmental Conditions

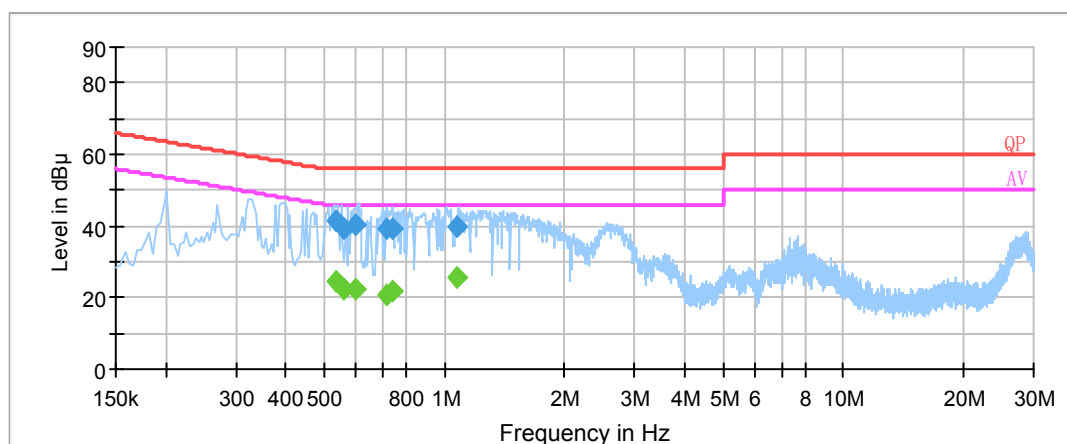
Temperature:	26 °C
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Haiguo Li on 2017-08-11.

EUT Operation Mode: Downloading& HDMI playing(with adaptor)

AC 120V/60 Hz, Line

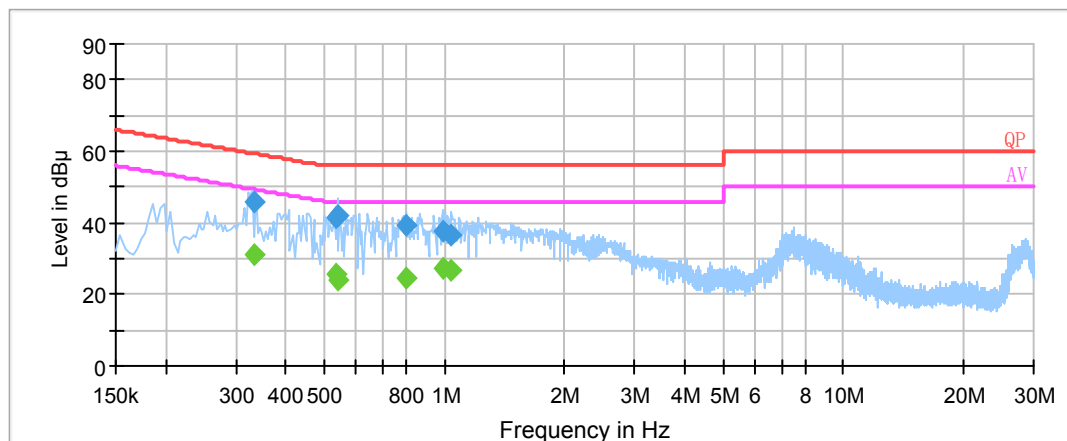
EMI Auto Test L



Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/Ave./QP)
0.534050	41.4	20.2	56.0	14.6	QP
0.558250	39.3	20.1	56.0	16.7	QP
0.600850	40.3	20.1	56.0	15.7	QP
0.715230	39.2	20.0	56.0	16.8	QP
0.738870	39.1	20.0	56.0	16.9	QP
1.077770	39.7	20.1	56.0	16.3	QP
0.534050	24.7	20.2	46.0	21.3	Ave.
0.558250	22.1	20.1	46.0	23.9	Ave.
0.600850	22.4	20.1	46.0	23.6	Ave.
0.715230	20.9	20.0	46.0	25.1	Ave.
0.738870	22.1	20.0	46.0	23.9	Ave.
1.077770	25.8	20.1	46.0	20.2	Ave.

AC 120V/60 Hz, Neutral

EMI Auto Test N

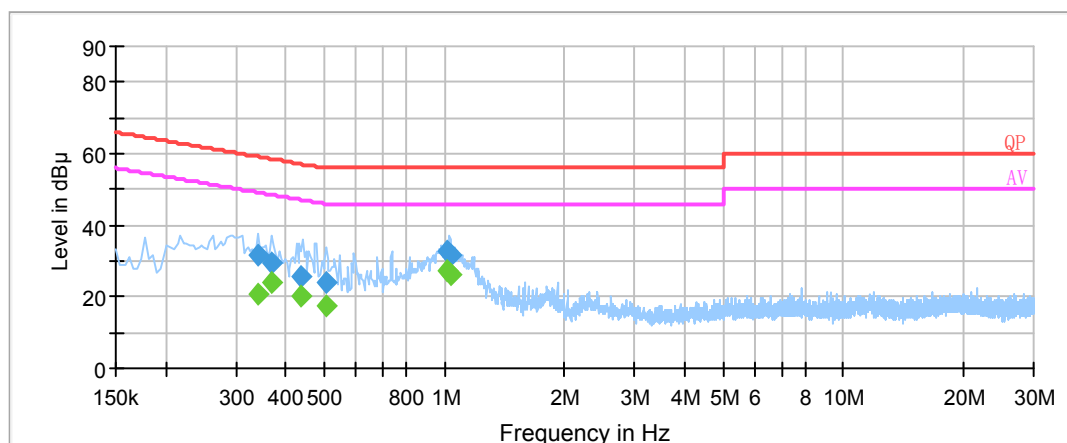


Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/Ave./QP)
0.332930	45.8	20.2	59.4	13.6	QP
0.534050	41.7	20.2	56.0	14.3	QP
0.541930	41.8	20.2	56.0	14.2	QP
0.801910	39.5	20.0	56.0	16.5	QP
0.995150	37.5	20.1	56.0	18.5	QP
1.038370	36.5	20.1	56.0	19.5	QP
0.332930	31.3	20.2	49.4	18.1	Ave.
0.534050	25.5	20.2	46.0	20.5	Ave.
0.541930	24.1	20.2	46.0	21.9	Ave.
0.801910	24.7	20.0	46.0	21.3	Ave.
0.995150	27.3	20.1	46.0	18.7	Ave.
1.038370	26.7	20.1	46.0	19.3	Ave.

EUT Operation Mode: Downloading&HDMI playing(with base)

AC 120V/60 Hz, Line

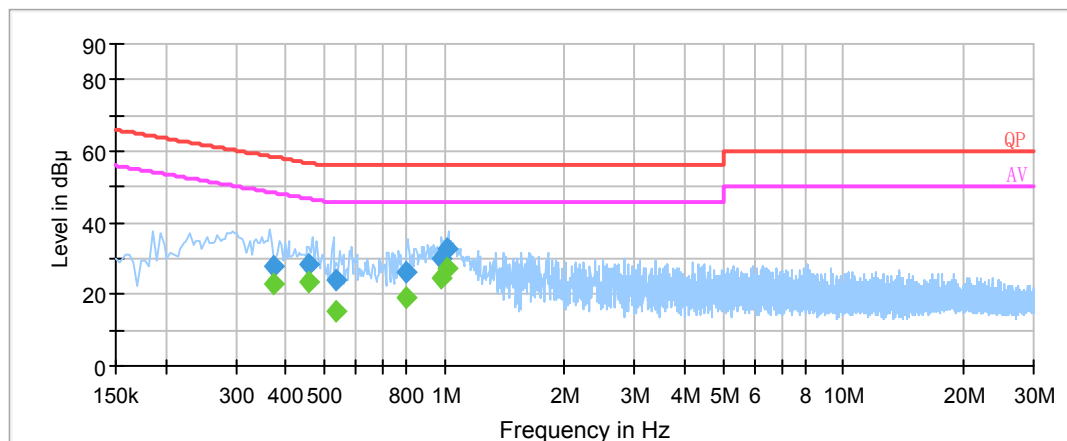
EMI Auto Test L



Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/Ave./QP)
0.340870	31.5	20.2	59.2	27.7	QP
0.368450	29.6	20.2	58.5	28.9	QP
0.435370	25.8	20.2	57.1	31.3	QP
0.506410	24.2	20.2	56.0	31.8	QP
1.018850	32.5	20.1	56.0	23.5	QP
1.034550	31.9	20.1	56.0	24.1	QP
0.340870	20.5	20.2	49.2	28.7	Ave.
0.368450	23.8	20.2	48.5	24.7	Ave.
0.435370	20.3	20.2	47.1	26.8	Ave.
0.506410	17.5	20.2	46.0	28.5	Ave.
1.018850	27.1	20.1	46.0	18.9	Ave.
1.034550	26.2	20.1	46.0	19.8	Ave.

AC 120V/60 Hz, Neutral

EMI Auto Test N



Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/Ave./QP)
0.371490	27.7	20.2	58.5	30.8	QP
0.459010	28.1	20.2	56.7	28.6	QP
0.533890	24.3	20.2	56.0	31.7	QP
0.805850	26.3	20.0	56.0	29.7	QP
0.983210	29.9	20.1	56.0	26.1	QP
1.018670	32.6	20.1	56.0	23.4	QP
0.371490	23.1	20.2	48.5	25.4	Ave.
0.459010	23.4	20.2	46.7	23.3	Ave.
0.533890	15.3	20.2	46.0	30.7	Ave.
0.805850	19.2	20.0	46.0	26.8	Ave.
0.983210	24.4	20.1	46.0	21.6	Ave.
1.018670	27.4	20.1	46.0	18.6	Ave.

Note:

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

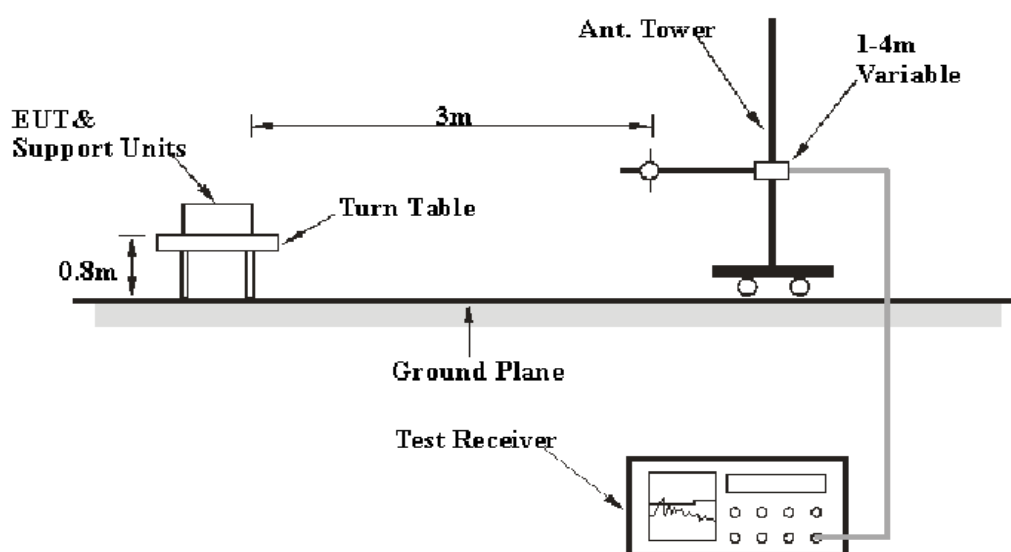
FCC §15.109 - RADIATED SPURIOUS EMISSIONS

Applicable Standard

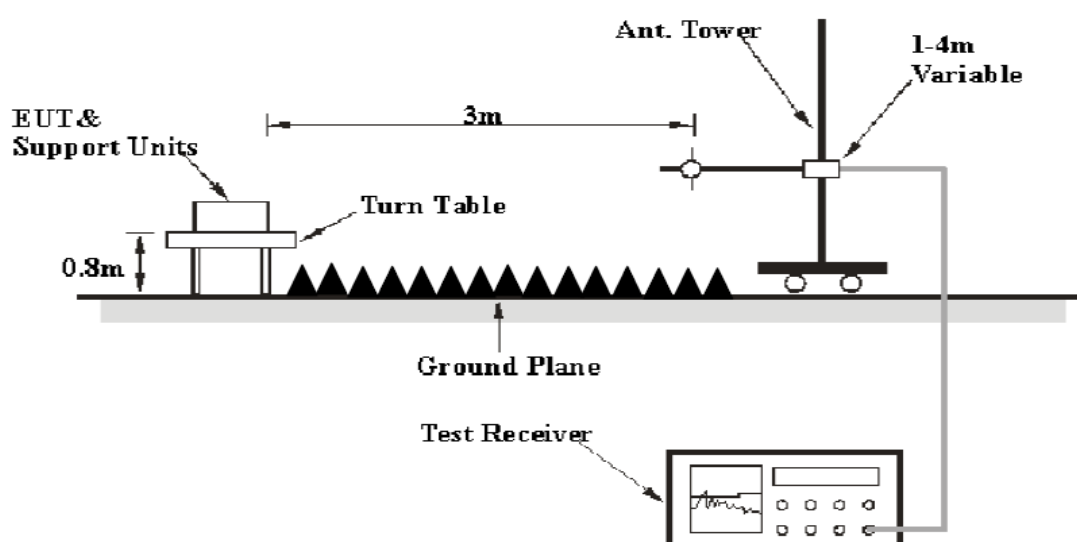
FCC §15.109

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

The system was investigated from 30 MHz to 30 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
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 Results Summary

According to the data in the following table, the EUT complied with the FCC §15.109 Class B,

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level is in compliance with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

In BACL, $U_{(Lm)}$ is less than U_{cispr} , if L_m is less than L_{lim} , it implies that the EUT complies with the limit.

Test Data**Environmental Conditions**

Temperature:	26 °C
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Haiguo Li on 2017-08-11.

EUT Operation Mode: Downloading&HDMI playing(with adaptor)

30MHz – 30 GHz:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBuV/m)	FCC Part 15B	
	Reading (dBuV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H / V)			Limit (dBuV/m)	Margin (dB)
41.37	42.26	QP	100	1.1	V	-7.10	35.16	40	4.84
42.75	45.04	QP	112	1.0	V	-8.20	36.84	40	3.16
54.63	44.7	QP	81	1.7	V	-11.40	33.30	40	6.70
60.96	45.65	QP	306	2.3	V	-11.90	33.75	40	6.25
102.43	44.06	QP	297	1.3	V	-8.90	35.16	43.5	8.34
121.07	42.85	QP	188	1.0	V	-5.90	36.95	43.5	6.55
1158.69	44.85	PK	324	1.9	V	-8.48	36.37	74	37.63
1158.69	28.75	Ave.	324	1.9	V	-8.48	20.27	54	33.73
1723.65	46.58	PK	50	1.6	V	-5.23	41.35	74	32.65
1723.65	31.22	Ave.	50	1.6	V	-5.23	25.99	54	28.01

EUT Operation Mode: Downloading&HDMI playing (with base):

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBuV/m)	FCC Part 15B	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H / V)			Limit (dBuV/m)	Margin (dB)
30.15	22.31	QP	357	2.6	H	0.20	22.51	40	17.49
36.25	22.32	QP	112	3.9	H	-3.80	18.52	40	21.48
537.67	22.04	QP	128	2.5	V	4.40	26.44	46	19.56
694.25	22.25	QP	98	2.0	V	6.40	28.65	46	17.35
811.01	22.02	QP	354	2.2	V	9.00	31.02	46	14.98
858.85	21.87	QP	31	2.7	H	9.20	31.07	46	14.93
1123.65	44.21	PK	85	2.1	V	-8.61	35.60	74	38.40
1123.65	28.12	Ave.	85	2.1	V	-8.61	19.51	54	34.49
2125.42	46.41	PK	345	1.4	V	-0.82	45.59	74	28.41
2125.42	30.32	Ave.	345	1.4	V	-0.82	29.50	54	24.50

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 *****