


TEST REPORT



Applicant	Flashbay Electronics
Address	Blgd b & C Xi Feng Cheng IND Zone, No.2 FuYuan Road He Ping, Village, FuYong Town, ShenZhen, China

Manufacturer or Supplier	Flashbay Electronics	
Address	Blgd b & C Xi Feng Cheng IND Zone, No.2 FuYuan Road He Ping, Village, FuYong Town, ShenZhen, China	
Product	Power Bank	
Brand Name	N/A	
Model	Bridge(BG)	
Additional Model & Model Difference	Boost (BS), see items 2.1	
Date of tests	Apr. 12, 2018 ~ May 23, 2018	

The submitted sample of the above equipment has been tested for according to the requirements of the following standards:

AS/NZS CISPR 32:2015

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

Tested by Breeze Jiang Project Engineer/ EMC Department	Approved by Madison Luo Supervisor / EMC Department
	 Date: May 25, 2018

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**BUREAU
VERITAS**

Test Report No.: C180412N028

RELEASE CONTROL RECORD

Issue No.	Description	Date Issued
C180412N028	Original release	May 25, 2018



1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

Emission			
Standard	Test Item	Result	Remarks
AS/NZS CISPR 32: 2015, Class B	Conducted test	PASS	Minimum passing margin is -17.65dB at 4.01775MHz
	Radiated emission 30-1000 MHz	PASS	Minimum passing margin is -3.14dB at 222.060MHz

1.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

The listed uncertainties are the worst case uncertainty for the entire range of measurement. Please note that the uncertainty values are provided for informational purposes only and are not used in determining the PASS/FAIL results.

MEASUREMENT	FREQUENCY	UNCERTAINTY
Mains Terminal Disturbance Voltage Test	0.15MHz ~ 30MHz	+/- 2.70 dB
Radiated Disturbance Test	30MHz ~ 1000MHz	+/- 4.03dB



2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Power Bank
TEST MODEL	Bridge(BG)
ADDITIONAL MODEL	Boost (BS)
POWER SUPPLY	DC 3.7V from Li-ion Battery(3.7V 1.85WH, 500mAh *2) or DC 5V from USB Host Unit, Output: DC 5V 1A(Micro USB, Lightning, Type C)
CABLE SUPPLIED	USB Line: unshielded non-detachable 0.05m
OPERATION FREQUENCY	Below 108MHz

NOTE:

1. For the test results, the EUT had been tested with all conditions. But only the worst case was showed in test report.
2. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
3. Please refer to the EUT photo document (Reference No.: 180412N028) for detailed product photo.
4. Additional model Boost (BS) is identical with the test model Bridge(BG) except the shell and model number for marketing purpose



2.2 DESCRIPTION OF TEST MODES

The EUT was tested under the following modes. And the final worst mode was marked in boldface and recorded in this report.

◆ FOR COUDUCTED TEST:

Test Mode	Test Voltage
Charging	DC 5V from Adapter Input AC230V 50Hz
Charging + Micro USB Discharging(5V 1A)	
Charging + Type C USB Discharging(5V 1A)	
Charging + Lightning USB Discharging(5V 1A)	

◆ FOR RADIATED TEST:

Test Mode	Test Voltage
Charging	DC 5V from Adapter Input AC230V 50Hz
Charging + Micro USB Discharging(5V 1A)	
Charging + Type C USB Discharging(5V 1A)	
Charging + Lightning USB Discharging(5V 1A)	
Micro USB Discharging(5V 1A)	DC 3.7V from Battery
Type C USB Discharging(5V 1A)	
Lightning USB Discharging(5V 1A)	

2.3 TEST PROGRAM USED AND OPERATION DESCRIPTIONS

- a. Turned on the power of all equipment.
- b. EUT was operated according to the type description in manufacturer’s specifications or the User's Manual.

2.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

According to the specifications of the manufacturers, the EUT must comply with the requirements of the following standards:

AS/NZS CISPR 32:2015

All applicable tests have been performed and recorded as per the above standards.



2.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an dependent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Adapter	N/A	5V 1.5A	N/A	N/A
2	Mobile Phone	APPLE	ML7F2CH/A	C6KQKXLAGRY8	N/A

NO.	DESCRIPTION OF THE ABOVE SUPPORT UNITS
1, 2	N/A



3 CONDUCTED EMISSION FROM THE AC MAINS POWER PORT

3.1 LIMITS

Frequency (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

Notes: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases linearly with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

3.2 TEST INSTRUMENT

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR7	101494	Apr. 05,18	Apr. 04,19
Artificial Mains Network	Rohde&Schwarz	ENV216	101173	Mar. 03,18	Mar. 02,19
Artificial Mains Network	Rohde&Schwarz	ESH3-Z5	100317	Apr. 05,18	Apr. 04,19
Voltage probe	SCHWARZBECK	TK 9421	TK 9421-176	Jan. 17,18	Jan. 16,19
Test software	ADT	ADT_Cond _V7.3.7	N/A	N/A	N/A

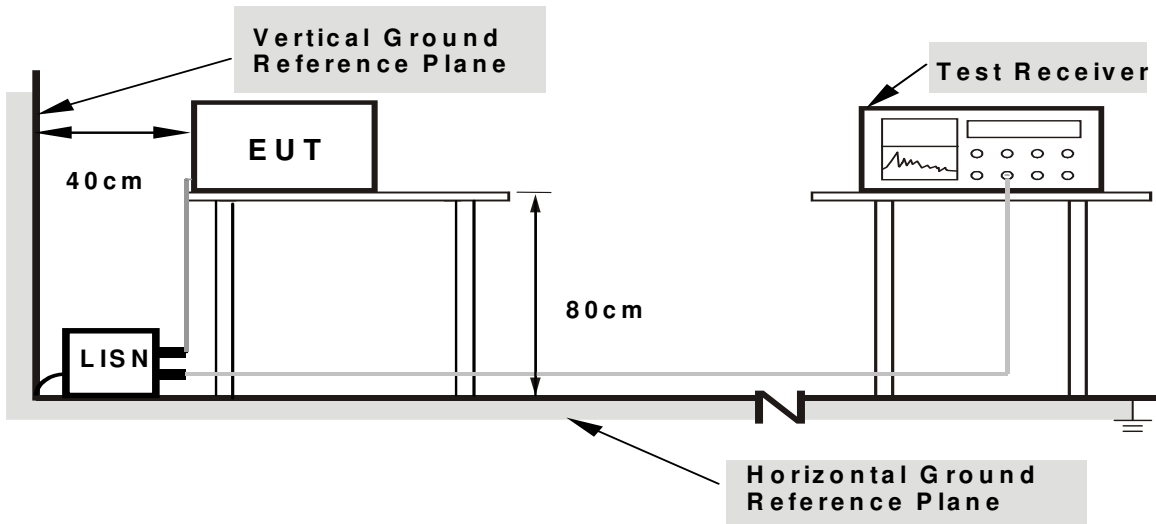
NOTE: 1. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
2. The test was performed at Shielded Room 553.

3.3 TEST ARRANGEMENT

- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The test results of conducted emissions at mains ports are recorded of six worst margins for quasi-peak (mandatory) [and average (if necessary)] values against the limits at frequencies of interest unless the margin is 20 dB or greater.

Note: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

3.4 TEST SETUP



- Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80cm from EUT and at least 80cm from other units and other metal planes support units.

3.5 SUPPLEMENTARY INFORMATION

N/A

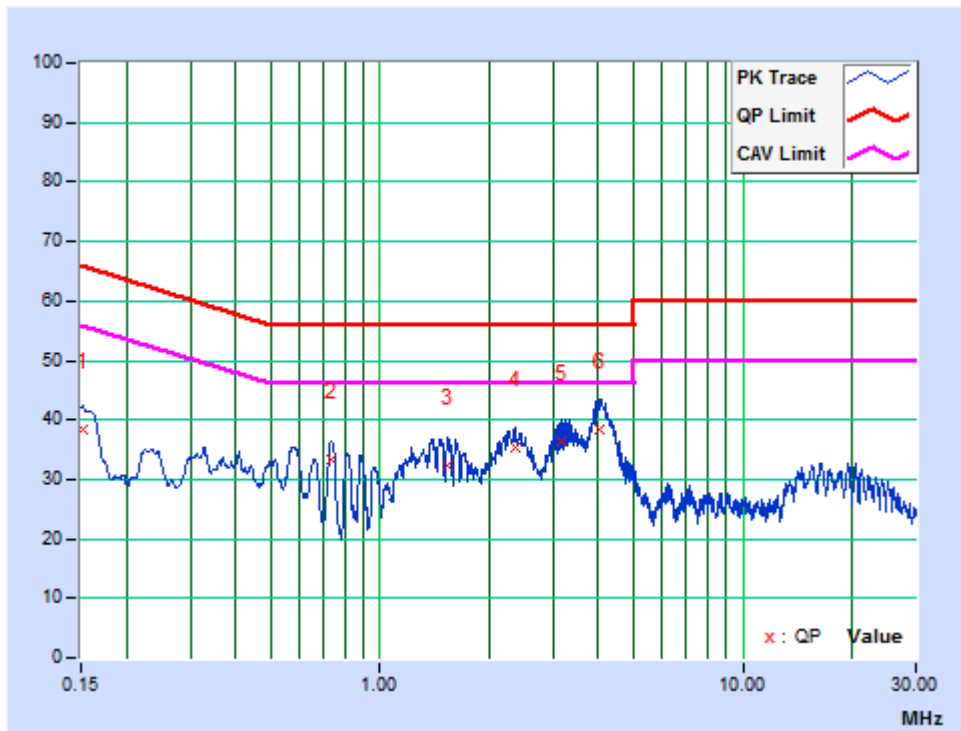


3.6 TEST RESULTS

TEST MODE	See section 2.2	6DB BANDWIDTH	9 kHz
TEST VOLTAGE	See section 2.2	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	25.0deg.C, 56.0% RH	TESTED BY	Dragon

No.	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15225	10.22	28.30	18.63	38.52	28.85	65.88	55.88	-27.36	-27.03
2	0.73061	10.22	23.26	14.07	33.48	24.29	56.00	46.00	-22.52	-21.71
3	1.53833	10.22	22.13	10.56	32.35	20.78	56.00	46.00	-23.65	-25.22
4	2.35725	10.22	25.29	11.39	35.51	21.61	56.00	46.00	-20.49	-24.39
5	3.16725	10.22	26.23	10.67	36.45	20.89	56.00	46.00	-19.55	-25.11
6	4.01775	10.22	28.13	13.24	38.35	23.46	56.00	46.00	-17.65	-22.54

REMARKS: The emission levels of other frequencies were very low against the limit.

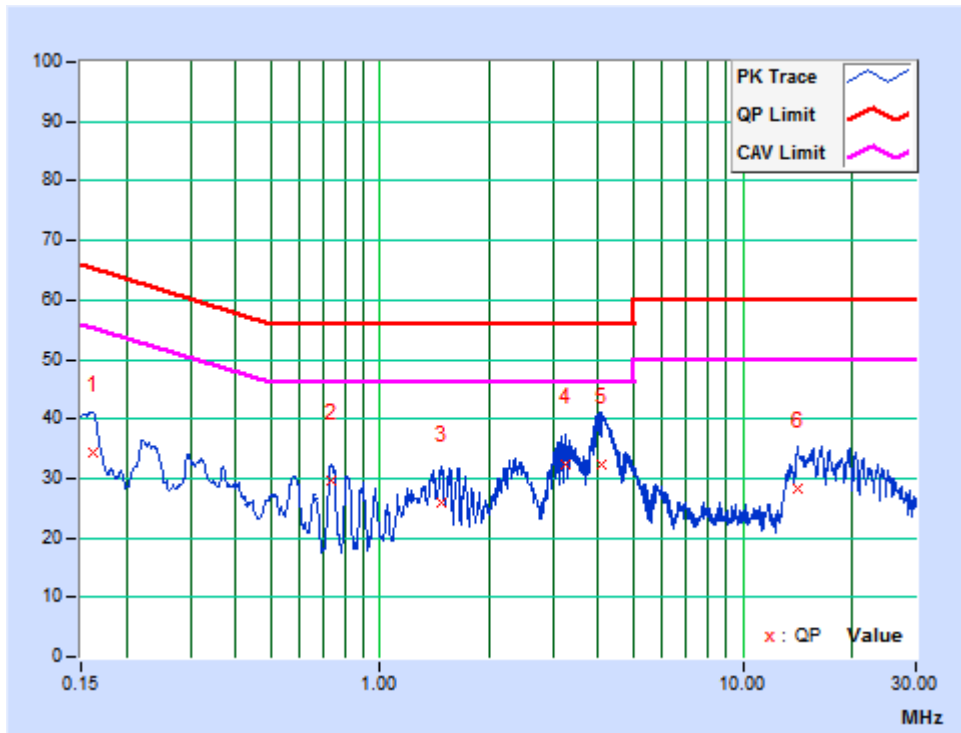




TEST MODE	See section 2.2	6DB BANDWIDTH	9 kHz
TEST VOLTAGE	See section 2.2	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	25.0deg.C, 56.0% RH	TESTED BY	Dragon

No.	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16125	10.01	24.47	7.74	34.48	17.75	65.40	55.40	-30.92	-37.65
2	0.73254	10.02	19.53	12.11	29.55	22.13	56.00	46.00	-26.45	-23.87
3	1.47470	10.01	15.75	4.24	25.76	14.25	56.00	46.00	-30.24	-31.75
4	3.24825	10.03	22.43	7.20	32.46	17.23	56.00	46.00	-23.54	-28.77
5	4.06725	10.02	22.26	8.51	32.28	18.53	56.00	46.00	-23.72	-27.47
6	14.18775	10.13	18.00	11.06	28.13	21.19	60.00	50.00	-31.87	-28.81

REMARKS: The emission levels of other frequencies were very low against the limit.





4 RADIATED EMISSION MEASUREMENT

4.1 LIMITS OF RADIATED EMISSION MEASUREMENT

FOR FREQUENCY BELOW 1000 MHz

FREQUENCY (MHz)	Class A (at 10m)	Class B (at 10m)
	Quasi-Peak dBuV/m	Quasi-Peak dBuV/m
30 – 230	40	30
230 – 1000	47	37

FREQUENCY (MHz)	Class A (at 3m)	Class B (at 3m)
	Quasi-Peak dBuV/m	Quasi-Peak dBuV/m
30 – 230	50	40
230 – 1000	57	47

For FM receivers

Distance (m)	Source	Frequency Range (MHz)	Limits dB (uV/m)	
			Quasi-peak	
10	Local oscillator	≤1000	Fundamental	50
		30 to 300	Harmonics	42
		300 to 1000	Harmonics	46
	Other	30 to 230		30
		230 to 1000		37
3	Local oscillator	≤1000	Fundamental	60
		30 to 300	Harmonics	52
		300 to 1000	Harmonics	56
	Other	30 to 230		40
		230 to 1000		47



FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	Up to 5 times of the highest frequency or 6 GHz, whichever is less

FOR FREQUENCY ABOVE 1000 MHz

FREQUENCY (GHz)	Class A (dBuV/m) (at 3m)		Class B (dBuV/m) (at 3m)	
	PEAK	AVERAGE	PEAK	AVERAGE
1 to 3	76	56	70	50
3 to 6	80	60	74	54

- NOTE:**
1. The lower limit shall apply at the transition frequencies.
 2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
 3. All emanation from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

**4.2 TEST INSTRUMENTS****FREQUENCY RANGE BELOW 1GHz**

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESU26	100005	Jun. 05,17	Jun. 04,18
EMI Test Receiver	Rohde&Schwarz	ESR7	101564	Jan. 18,18	Jan. 17,19
Trilog-Broadband Antenna	SCHWARZBECK	VULB 9168	9168-555	Nov. 10, 17	Nov. 09, 18
Trilog-Broadband Antenna	SCHWARZBECK	VULB 9168	9168-554	Dec. 10, 17	Dec. 09, 18
Preamplifier	EMCI	EMC1135	980378	Mar. 19,18	Mar. 18,19
Preamplifier	EMCI	EMC1135	980423	Mar. 19,18	Mar. 18,19
10m Semi-anechoic Chamber	CHANGLING	21.4m*12.1m*8.8m	NSEMC006	Feb. 10,18	Feb. 09,19
Test Software	ADT	ADT_Radiated_V8.7.07	N/A	N/A	N/A

- NOTES:** 1. The test was performed in 10m Chamber.
2. The calibration interval of the above test instruments is months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

FREQUENCY RANGE ABOVE 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Horn Antenna	ETS-Lindgren	3117	00085519	Dec. 10, 17	Dec. 09, 18
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170242	Mar. 15,18	Mar. 14,19
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV40	101003	Apr. 21,18	Apr. 20,19
Broadband Preamplifier (1~18GHz)	SCHWARZBECK	BBV9718	266	Apr. 18,18	Apr. 18,19
Pre-Amplifier (18GHz-40GHz)	EMCI	EMC 184045	980102	Nov. 08,17	Nov. 07,18
Test Software	ADT	ADT_Radiated_V8.7.07	N/A	N/A	N/A

- NOTES:** 1. The test was performed in 10m Chamber.
2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.



4.3 TEST PROCEDURE

<Frequency Range below 1GHz>

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from 1 meter to 4 meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1GHz.

NOTE:

1. The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
3. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) (if the raw value not contains the amplifier);
4. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Amplifier Gain(dB) (if the raw value contains the amplifier).
5. Margin value = Emission level – Limit value.



<Frequency Range above 1GHz>

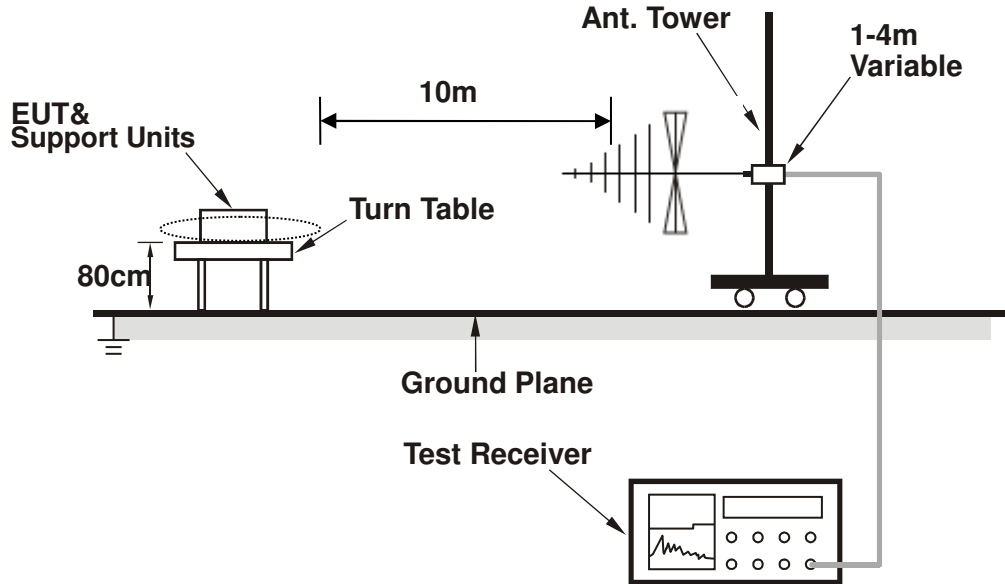
- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna can be varied from one meter-to four meters, the height of adjustment depends on the EUT height and the antenna 3dB beamwidth both, to detect the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test receiver/spectrum was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.

NOTE:

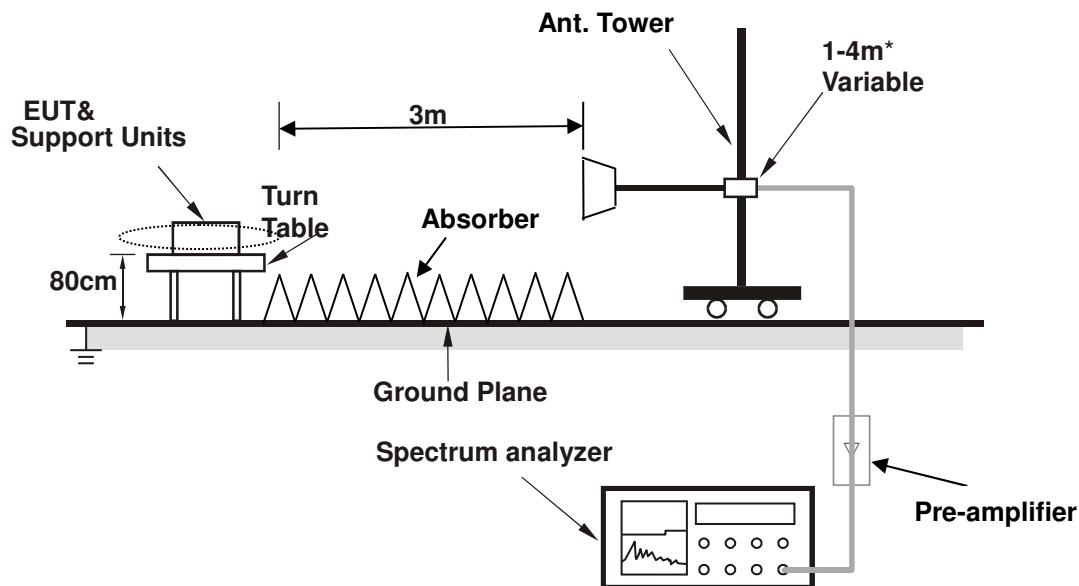
1. The resolution bandwidth is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz for Average detection (AV) at frequency above 1GHz.
2. For measurement of frequency above 1000 MHz, the EUT was set 3 meters away from the receiver antenna.
3. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
4. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) (if the raw value not contains the amplifier);
5. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Amplifier Gain(dB) (if the raw value contains the amplifier).
6. Margin value = Emission level – Limit value.

4.4 TEST SETUP

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



* : depends on the EUT height and the antenna 3dB beamwidth both, refer to section 7.3 of CISPR 16-2-3

4.5 SUPPLEMENTARY INFORMATION

The more stringent measurement method of paragraph 8.3.2 in ANSI C63.4:2014 was applied for the test.



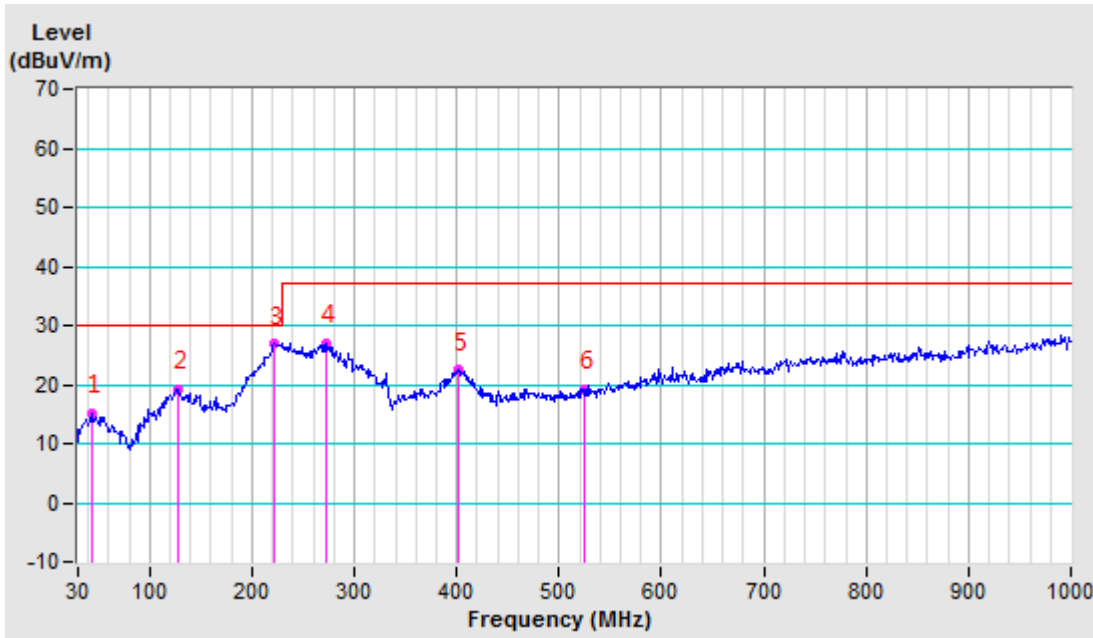
4.6 TEST RESULTS (BELOW 1GHz)

TEST MODE	See section 2.2		
FREQUENCY RANGE	30-1000 MHz	DETECTOR FUNCTION & BANDWIDTH	Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	21deg. C, 54% RH	TESTED BY: Xin Peng	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 10 M

No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	42.974	-17.48	32.64	15.16	30.00	-14.84	400	5
2	128.698	-18.53	37.68	19.15	30.00	-10.85	400	43
3	222.060	-18.55	45.41	26.86	30.00	-3.14	400	241
4	272.258	-16.70	43.59	26.89	37.00	-10.11	400	34
5	401.995	-13.05	35.47	22.42	37.00	-14.58	400	43
6	524.821	-10.73	29.98	19.25	37.00	-17.75	200	292

- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
 2. Negative sign (-) in the margin column signify levels below the limit.
 3. Frequency range scanned: 30MHz to 1000MHz.
 4. Only emissions significantly above equipment noise floor are reported.



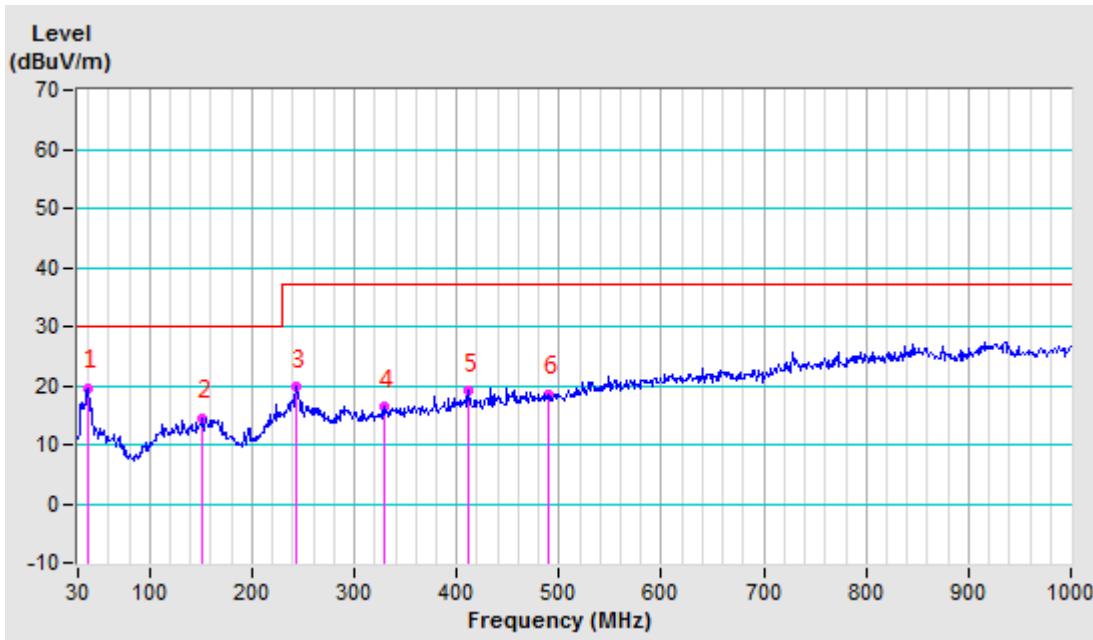


TEST MODE	See section 2.2		
FREQUENCY RANGE	30-1000 MHz	DETECTOR FUNCTION & BANDWIDTH	Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	21deg. C, 54% RH	TESTED BY: Xin Peng	

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 10 M

No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	39.458	-17.79	37.22	19.43	30.00	-10.57	100	103
2	152.099	-15.97	30.45	14.48	30.00	-15.52	100	3
3	243.400	-16.47	36.19	19.72	37.00	-17.28	300	243
4	328.396	-13.64	29.99	16.35	37.00	-20.65	300	256
5	412.180	-12.00	30.99	18.99	37.00	-18.01	300	210
6	490.386	-10.42	29.05	18.63	37.00	-18.37	300	230

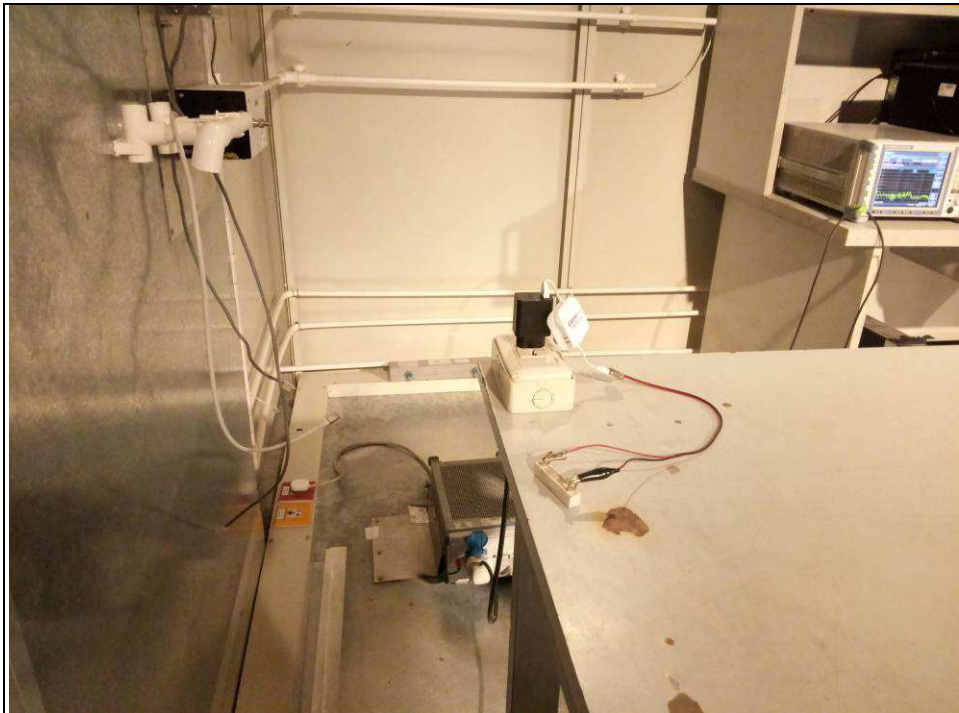
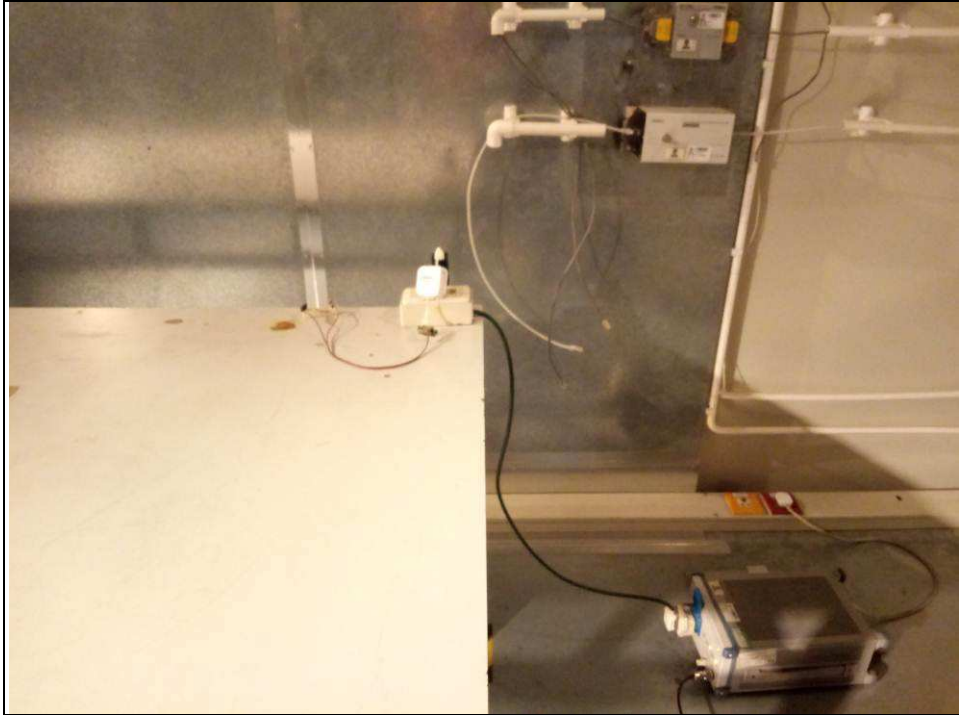
- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
 2. Negative sign (-) in the margin column signify levels below the limit.
 3. Frequency range scanned: 30MHz to 1000MHz.
 4. Only emissions significantly above equipment noise floor are reported.



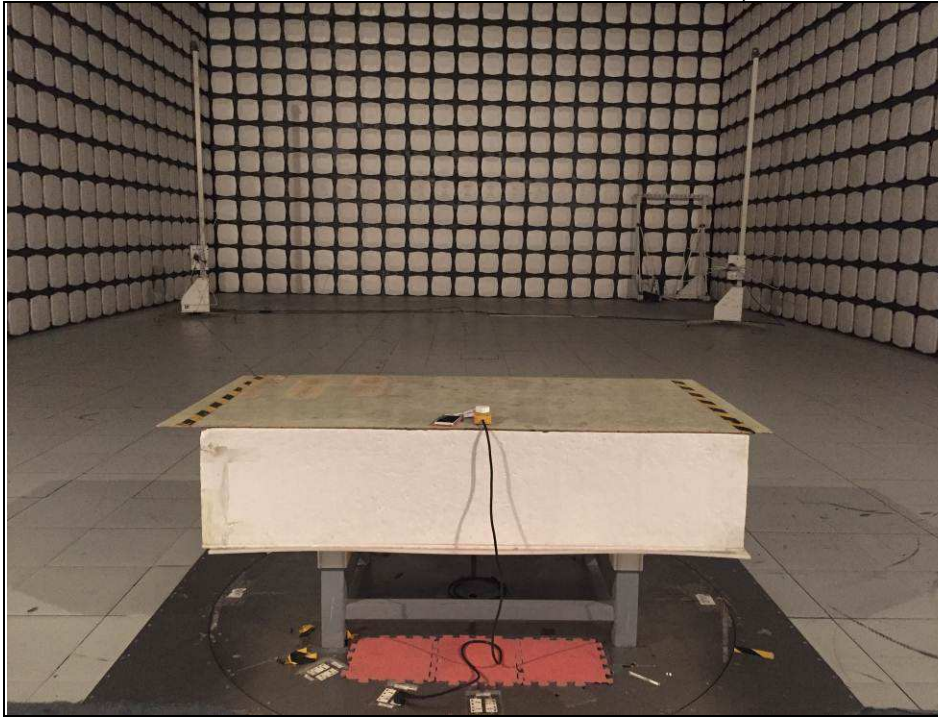


5 PHOTOGRAPHS OF THE TEST CONFIGURATION

CONDUCTED EMISSION TEST



RADIATED EMISSION TEST <30MHz-1GHz>





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Test Report No.: C180412N028

6 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications were made to the EUT by the lab during the test.

END