Test Lab
Cert 2951.01

TEST REPORT

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

Manufacturer or Supplier	Flashbay Electronics
Address	Blgd b & C Xi Feng Cheng IND Zone, No.2 FuYuan Road He Ping, Village, FuYong Town, ShenZhen
Product	FOTO Power Bank
Brand Name	N/A
Model	FT
Additional Model & Model Difference	N/A
Date of tests	Jul. 19, 2016 ~ Aug. 11, 2016

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

☒ **AS/NZS CISPR 22:2009 + A1:2010**

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

Tested by Ryan Lu Project Engineer / EMC Department	Approved by Madison Luo Supervisor / EMC Department
	Date: Aug. 11, 2016

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
C160719N014	Original release	Aug. 11, 2016

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

EMISSION			
Standard	**Test Type**	**Result**	**Remarks**
AS/NZS CISPR 22:2009 + A1:2010	Conducted Emission Test	PASS	Minimum passing margin is –14.87 dB at 0.18123 MHz
	Radiated Test (30MHz ~ 1GHz)	PASS	Minimum passing margin is –3.20 dB at 96.700MHz

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.

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	0.15MHz ~ 30MHz	+ /-2.70 dB
Radiated emissions	30MHz ~ 1000MHz	+/- 4.06 dB

2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT OF EUT	FOTO Power Bank
MODEL NO.	FT
ADDITIONAL MODEL	N/A
POWER SUPPLY	DC 5V from USB or DC 3.7V from Li-ion battery
DATA CABLE SUPPLIED	N/A
THE HIGHEST OPERATING FREQUENCY	Below 108MHz

NOTE:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2. For the test results, the EUT had been tested with all conditions. But only the worst case was showed in test report.
3. Please refer to the EUT photo document (Reference No.: 160719N014) for detailed product photo.

2.2 DESCRIPTION OF TEST MODES

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

◆ **For Conducted Emission Test**

Test Mode
Charging
Charging + Discharging

◆ **FOR RADIATED EMISSIONS TEST:**

Test Mode
Charging
Discharging
Charging + Discharging

2.3 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	Notebook	DELL	E6420	9H12FS1	N/A
2	Notebook	Lenovo	E430	MP-0DN27	N/A
3	Printer	HP	hp LaserJet 1300	CNSJF75989	N/A
4	Printer	Lenovo	LJ2200L	LP02857415 48001408	N/A
5	Mouse	HP	SC105	N/A	N/A

NO.	DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	AC Line: Unshielded, Detachable 1.0m, DC Line: Unshielded, Detachable 2.0m
2	AC Line: Unshielded, Detachable 1.5m, DC Line: Unshielded, Detachable 1.5m
3	AC Line: Unshielded, Detachable 1.8m, USB Line: Unshielded, Detachable 1.8m
4	AC Line: Unshielded, Detachable 1.5m, USB Line: Unshielded, Detachable 1.5m
5	USB Line: Unshielded, Detachable 1.5m

3 EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT (AS/NZS CISPR 22)

3.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

TEST STANDARD: AS/NZS CISPR 22

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

NOTE: (1) The lower limit shall apply at the transition frequencies.

(2) The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

(3) All emanations 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.

3.1.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR7	101588	Jan. 22,16	Jan. 21,17
Artificial Mains Network	Rohde&Schwarz	ENV216	101173	Mar. 04,16	Mar. 03,17
Artificial Mains Network	Rohde&Schwarz	ESH3-Z5	100317	Apr. 05,16	Apr. 04,17
Voltage probe	SCHWARZBECK	TK 9421	TK 9421-176	Jan. 08,16	Jan. 07,17
Test software	ADT	ADT_Cond_V 7.3.7	N/A	N/A	N/A

NOTE: 1. The test was performed at Shielded Room 553.

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.

3.1.3 TEST PROCEDURE

a. 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 artificial mains 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.

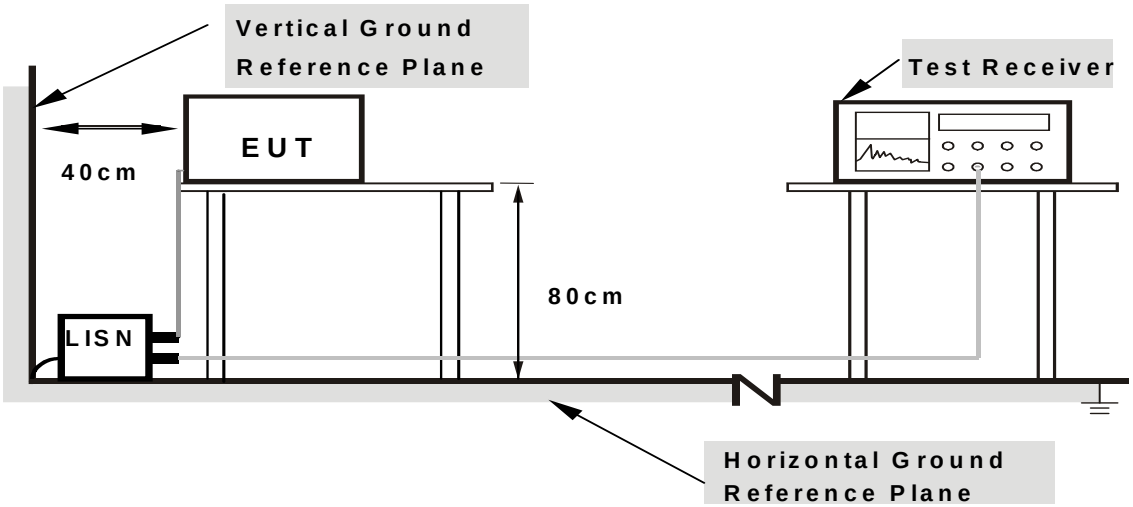
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit - 20dB) were not recorded.

3.1.4 DEVIATION FROM TEST STANDARD

No deviation.

3.1.5 TEST SETUP



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

3.1.6 EUT OPERATING CONDITIONS

a. Turned on the power of all equipment.

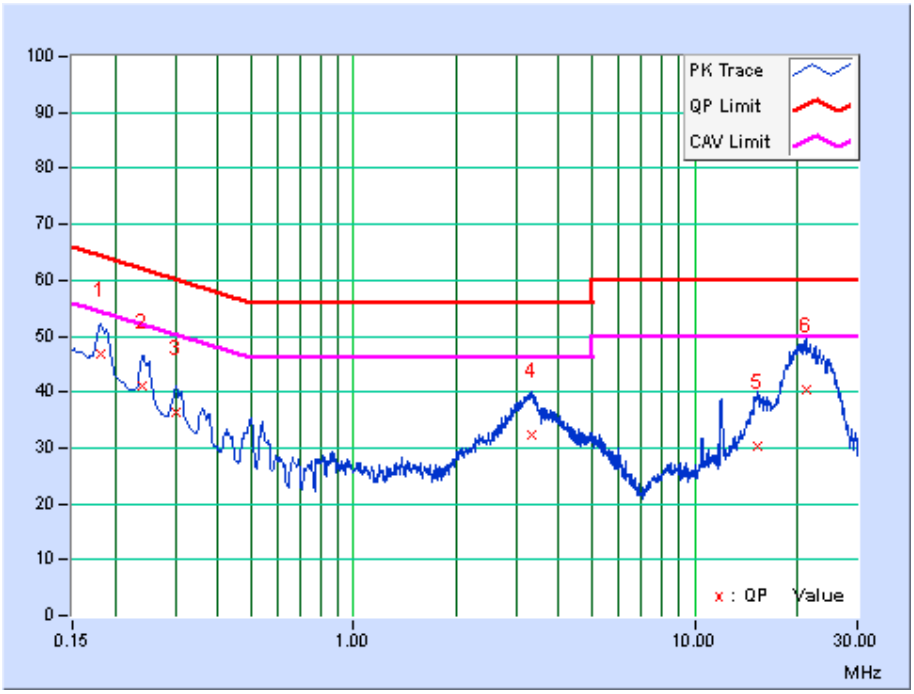
b. EUT was operated according to the type description in manufacturer's specifications or the User's Manual.

3.1.7 TEST RESULTS

TEST MODE	Charging + Discharging	**6DB BANDWIDTH**	9 kHz
TEST VOLTAGE	DC 5V from USB	**PHASE**	Line (L)
ENVIRONMENTAL CONDITIONS	25 deg. C, 61% RH	**TESTED BY**	Yang

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18123	10.04	36.62	20.97	46.66	31.01	64.43	54.43	-17.77	-23.42
2	0.24103	10.05	30.87	14.35	40.92	24.40	62.06	52.06	-21.14	-27.66
3	0.30168	10.07	26.23	11.67	36.30	21.74	60.20	50.20	-23.89	-28.45
4	3.33448	10.15	22.23	13.84	32.38	23.99	56.00	46.00	-23.62	-22.01
5	15.3465	10.20	20.24	11.02	30.44	21.22	60.00	50.00	-29.56	-28.78
6	21.16725	10.33	30.04	23.45	40.37	33.78	60.00	50.00	-19.63	-16.22

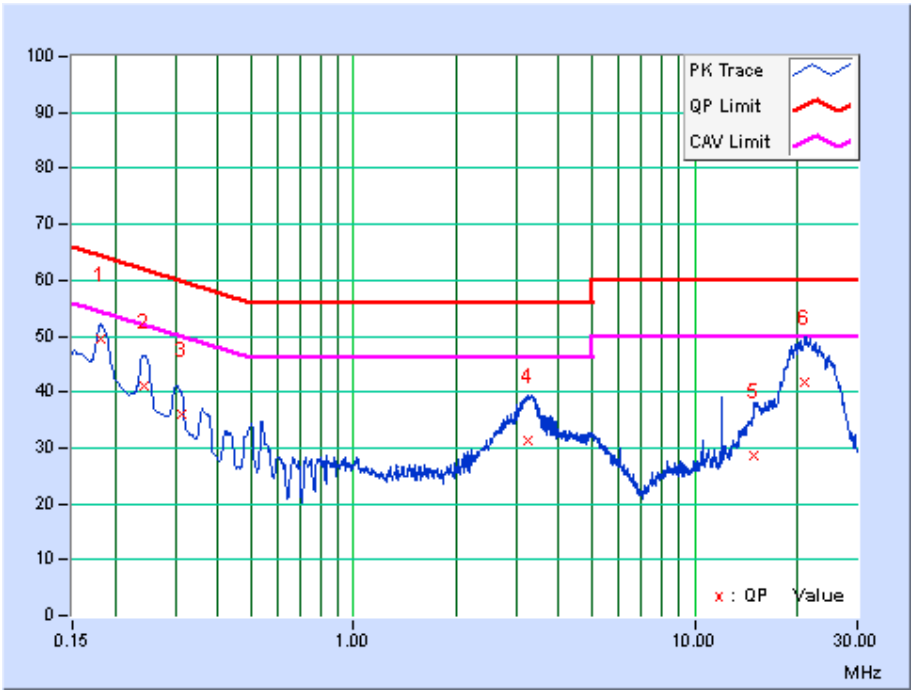
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value



TEST MODE	Charging + Discharging	**6DB BANDWIDTH**	9 kHz
TEST VOLTAGE	DC 5V from USB	**PHASE**	Neutral (N)
ENVIRONMENTAL CONDITIONS	25 deg. C, 61% RH	**TESTED BY**	Yang

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.18123**	**9.84**	**39.72**	**20.73**	**49.56**	**30.57**	**64.43**	**54.43**	**-14.87**	**-23.86**
2	0.24225	9.84	31.40	14.92	41.24	24.76	62.02	52.02	-20.78	-27.26
3	0.31425	9.84	26.06	9.48	35.90	19.32	59.86	49.86	-23.96	-30.54
4	3.25050	9.89	21.47	13.40	31.36	23.29	56.00	46.00	-24.64	-22.71
5	15.00450	10.19	18.50	10.36	28.69	20.55	60.00	50.00	-31.31	-29.45
6	21.09525	10.24	31.41	23.07	41.65	33.31	60.00	50.00	-18.35	-16.69

REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss.
6. Emission Level = Correction Factor + Reading Value



3.2 RADIATED EMISSION MEASUREMENT (AS/NZS CISPR 22)

3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

TEST STANDARD: AS/NZS CISPR 22

FOR FREQUENCY BELOW 1000 MHz

FREQUENCY (MHz)	Class B (at 10m) Quasi-Peak (dBuV/m)	Class B (at 3m) Quasi-Peak (dBuV/m)
30 – 230	30	40
230 – 1000	37	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.

3.2.2 TEST INSTRUMENTS

FREQUENCY RANGE BELOW 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESCI	100962	Mar. 04,16	Mar. 03,17
EMI Test Receiver	Rohde&Schwarz	ESCI	101418	Mar. 04,16	Mar. 03,17
Trilog-Broadband Antenna	SCHWARZBECK	VULB 9168	9168-555	Nov. 20, 15	Nov. 19, 16
Trilog-Broadband Antenna	SCHWARZBECK	VULB 9168	9168-554	Dec. 30, 15	Dec. 29, 16
Signal Amplifier	Agilent	8447D	2944A10488	Jun. 25,16	Jun. 24,17
Signal Amplifier	Agilent	8447D	2944A11174	Jun. 25,16	Jun. 24,17
10m Semi-anechoic Chamber	CHANGLING	21.4m*12.1m*8.8m	NSEMC006	Mar. 12,16	Mar. 11,18
Test Software	ADT	ADT_Radiated_V8.7.x	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 and 24 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. 30, 15	Dec. 29, 16
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170242	Mar. 12,16	Mar. 11,17
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV40	101003	Apr. 05,16	Apr. 04,17
Broadband Preamplifier	SCHWARZBECK	BBV9718	266	Mar. 22,16	Mar. 21,17
Pre-Amplifier (100MHz-26.5GHz)	EMCI	EMC 012645	980077	May 04,16	May 03,17
Pre-Amplifier (18GHz-40GHz)	EMCI	EMC 184045	980102	Nov. 11,15	Nov. 10,16
Test Software	ADT	ADT_Radiated_V8.7.x	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.

3.2.3 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 meters 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 one meter to four 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 for horizontal polarization, 2 meter to 4 meters for vertical polarization 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 1 GHz.

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 meters 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. The bore sight should be used during the test above 1GHz.

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 system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

NOTE:

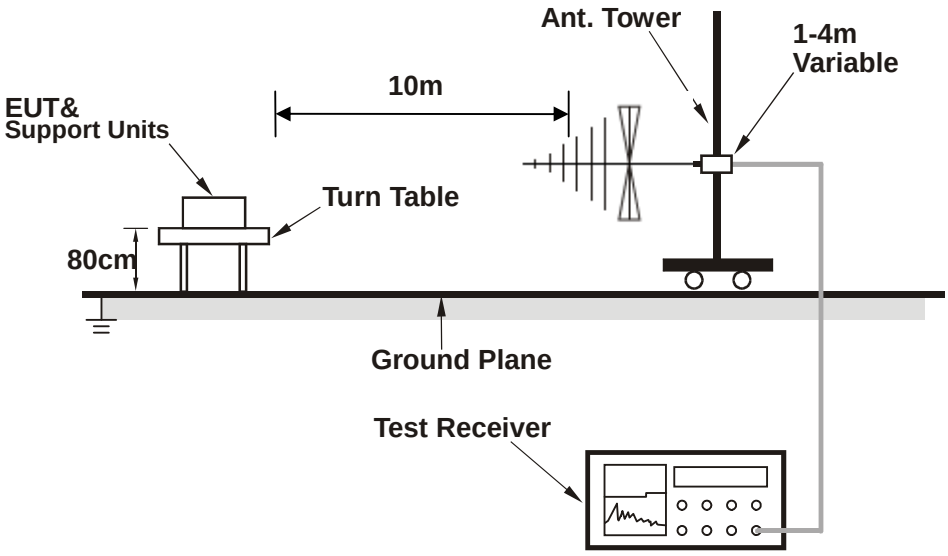
1. The resolution bandwidth is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz for Average detection (AV) at frequency above 1GHz.
2. For measurement of frequency above 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

3.2.4 DEVIATION FROM TEST STANDARD

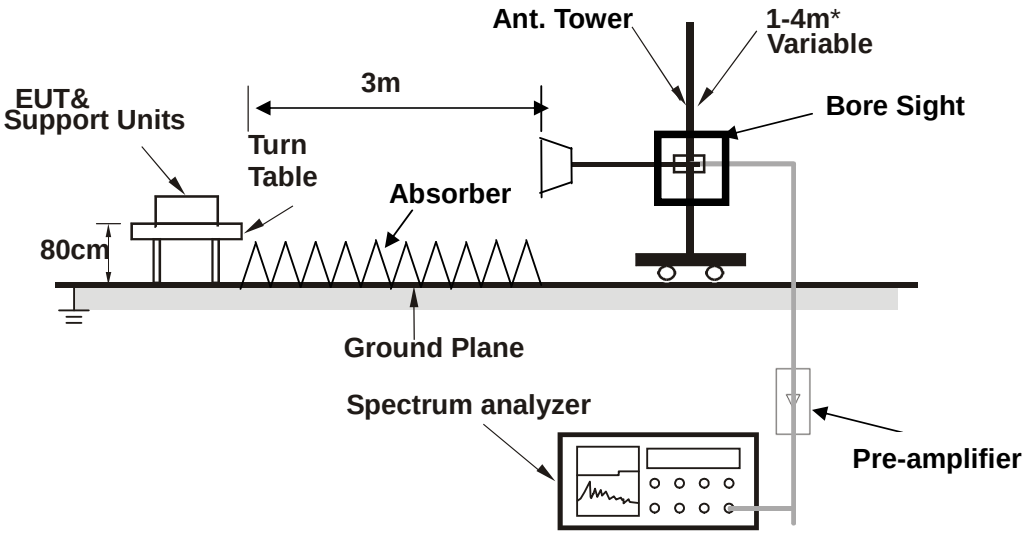
No deviation.

3.2.5 TEST SETUP

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



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

3.2.6 EUT OPERATING CONDITIONS

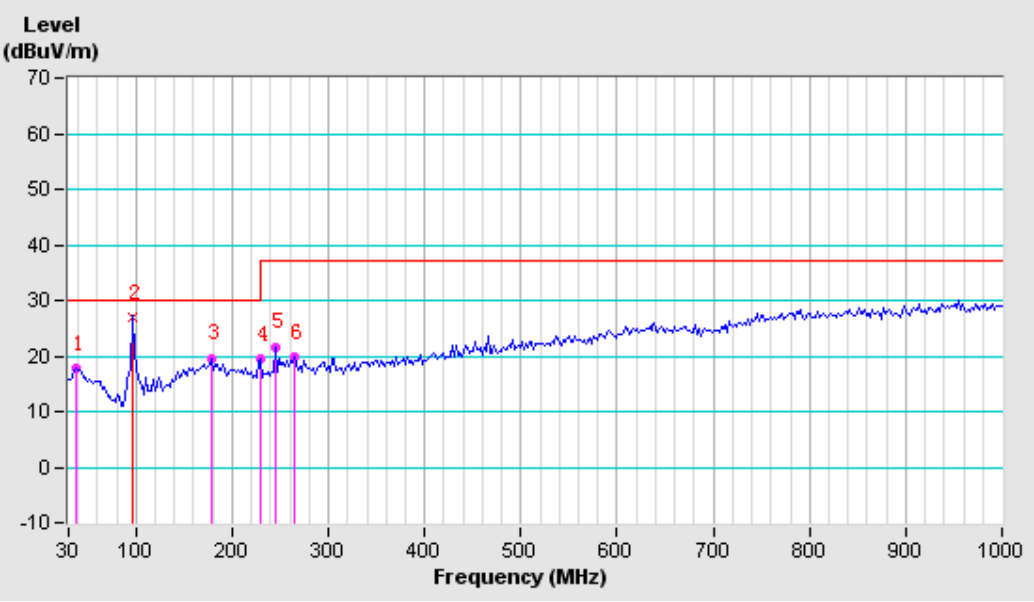
Same as section 3.1.6

3.2.7 TEST RESULTS

TEST MODE	Charging + Discharging	**FREQUENCY RANGE**	30-1000MHz
TEST VOLTAGE	DC 5V from USB	**DETECTOR FUNCTION & RESOLUTION BANDWIDTH**	Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	22deg. C, 51% RH	**TESTED BY**: Wang	

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	37.760	-9.37	27.00	17.63	30.00	-12.37	200	3
2	**96.700**	**-13.24**	**40.04**	**26.80**	**30.00**	**-3.20**	**400**	**50**
3	179.380	-10.26	29.84	19.58	30.00	-10.42	400	257
4	229.820	-10.12	29.45	19.33	30.00	-10.67	400	316
5	245.340	-8.55	30.03	21.48	37.00	-15.52	200	43
6	264.740	-8.46	28.18	19.72	37.00	-17.28	200	43

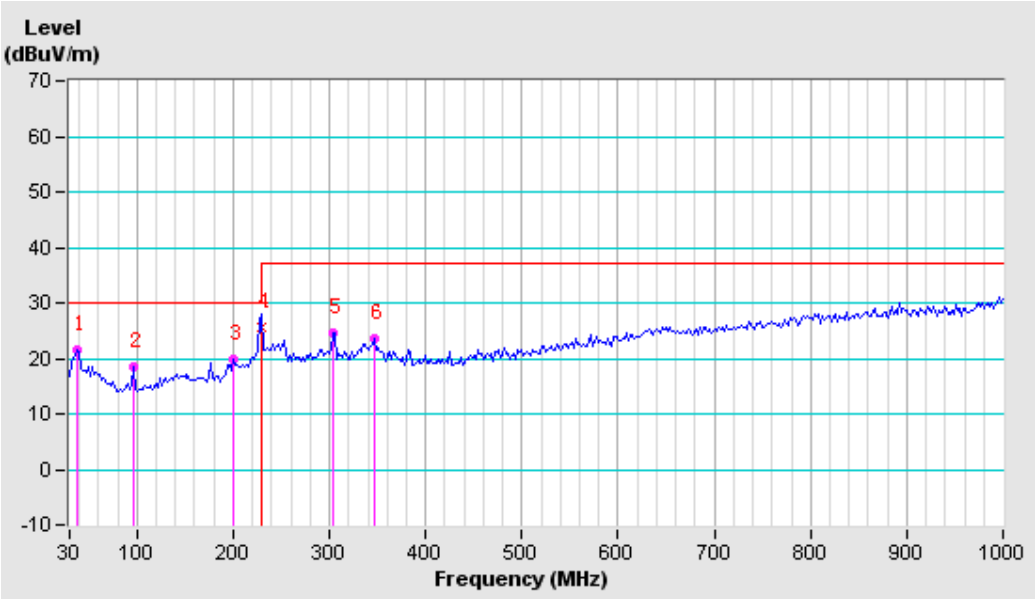
REMARKS:
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
2. Negative sign (-) in the margin column signify levels below the limit.
3. Frequency range scanned: 30MHz to 1000MHz.
4. Only emissions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



TEST MODE	Charging + Discharging	**FREQUENCY RANGE**	30-1000MHz
TEST VOLTAGE	DC 5V from USB	**DETECTOR FUNCTION & RESOLUTION BANDWIDTH**	Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	22deg. C, 51% RH	**TESTED BY**: Wang	

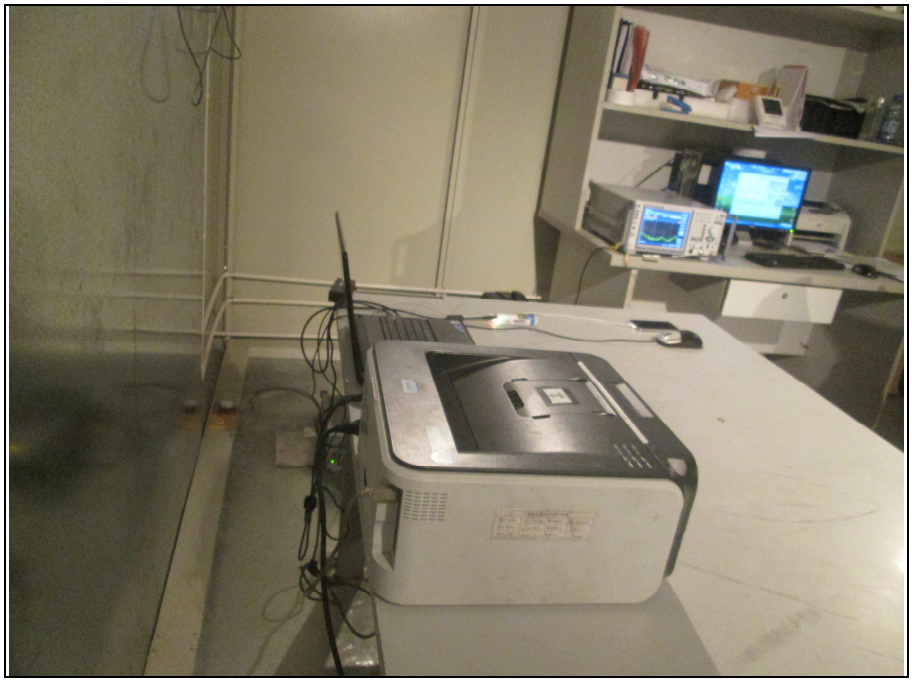
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 10 M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	37.760	-9.50	31.18	21.68	30.00	-8.32	100	297
2	95.960	-13.37	31.95	18.58	30.00	-11.42	100	282
3	200.720	-11.19	31.10	19.91	30.00	-10.09	300	251
4	229.680	-10.01	35.61	25.60	30.00	-4.40	100	150
5	303.540	-7.26	31.79	24.53	37.00	-12.47	100	278
6	346.220	-6.03	29.58	23.55	37.00	-13.45	100	280

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.

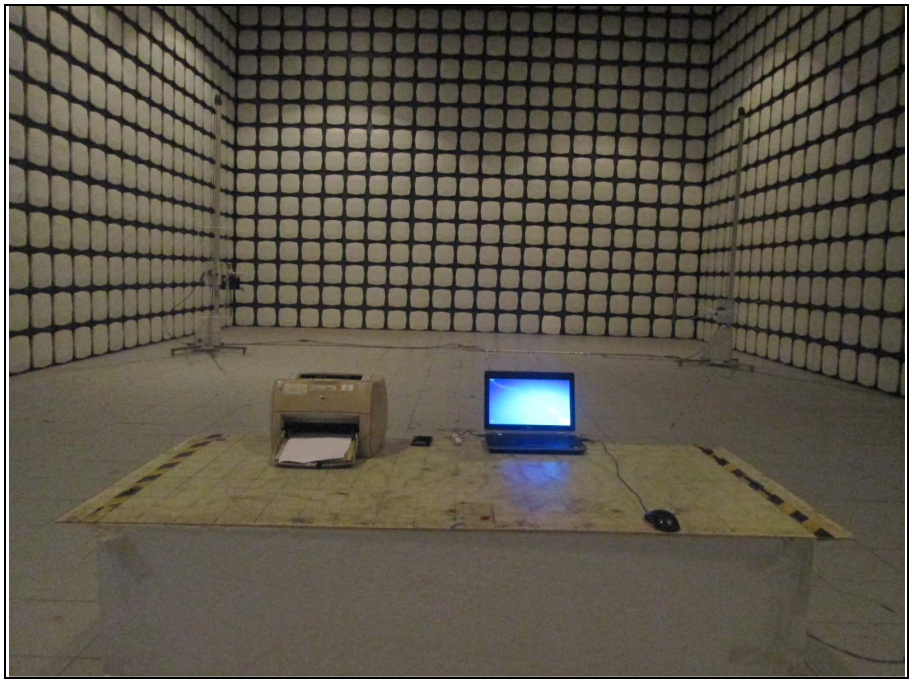


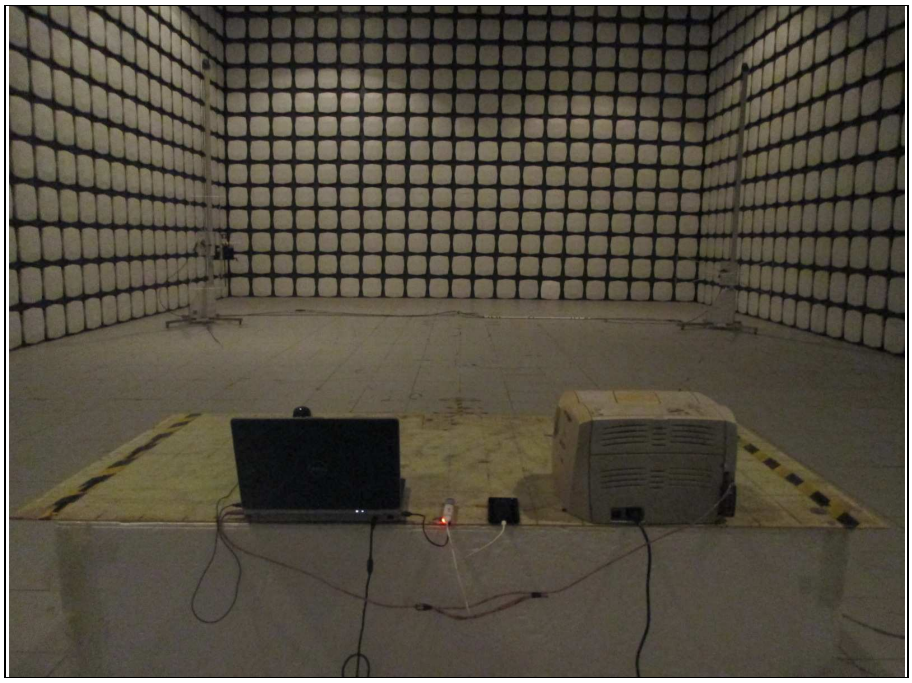
4 PHOTOGRAPHS OF THE TEST CONFIGURATION

CONDUCTED EMISSION TEST



RADIATED EMISSION TEST





5 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.

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