

TEST REPORT

Report No.:	BCTC2410271588-1E					
Applicant:	Shenzhen Lingyi Innovation Tech Co., Ltd.					
Product Name:	Aramid Fiber Magnetic Power Bank					
Test Model:	PB2					
Tested Date:	2024-10-12 to 2024-10-17					
Issued Date:	2024-10-17					
She	enzhen BCTC Testing Co., Ltd.					
No.: BCTC/RF-EMC-005	Page 1 of 29 Edition: B.2					



FCC ID: 2ARI5-PB2

Product Name:	Aramid Fiber Magnetic Power Bank			
Trademark:	PITAKA			
Model/Type Reference:	PB2			
Prepared For:	Shenzhen Lingyi Innovation Tech Co., Ltd.			
Address:	12 F, Block C, Central Avenue Building, Xixiang BLVD West, Baoan District, ShenZhen, China			
Manufacturer:	Shenzhen Lingyi Innovation Tech Co., Ltd.			
Address:	12 F, Block C, Central Avenue Building, Xixiang BLVD West, Baoan District, ShenZhen, China			
Prepared By:	Shenzhen BCTC Testing Co., Ltd.			
Address:	1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China.			
Sample Received Date:	2024-10-11			
Sample Tested Date:	2024-10-12 to 2024-10-17			
Issue Date:	2024-10-17			
Report No.:	BCTC2410271588-1E			
Test Standards:	FCC Part15.209 ANSI C63.10-2013			
Test Results:	PASS			

Tested by: Shanshan . Zhang

Shanshan. Zhang / Project Handler

Approved by: Zero Zhou/Reviewer

The test report is effective only with both signature and specialized stamp. This result(s) shown in this report refer only to the sample(s) tested. Without written approval of Shenzhen BCTC Testing Co., Ltd, this report can't be reproduced except in full. The tested sample(s) and the sample information are provided by the client.

No.: BCTC/RF-EMC-005

Page 2 of 2



Table Of Content

Test	t Report Declaration	Page
1.	Version	4
2.	Test Summary	5
3.	Measurement Uncertainty	6
4.	Product Information And Test Setup	7
4.1	Product Information	
4.2	Support Equipment	7
4.3	Test Setup Configuration	8
4.4	Test Mode	9
5.	Test Facility And Test Instrument Used	10
5.1	Test Facility	10
5.2	Test Instrument Used	10
6.	Conducted Emissions	12
6.1	Block Diagram Of Test Setup	12
6.2	Limit	12
6.3	Test procedure	12
6.4	EUT operating Conditions	12
6.5	Test Result	13
7.	Radiated Emissions	15
7.1	Block Diagram Of Test Setup	15
7.2	Limit	16
7.3	Test procedure	16
7.4	Test Result	17
8.	Bandwidth Test	
8.1	Test Procedure	
8.2	Test Setup	
8.3	Test Result	
9.	Antenna Requirements	25
9.1	Limit	25
9.2	Test Result	
10.	EUT Photographs	
11.	EUT Test Setup Photographs	
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(Note: N/A Means Not Applicable)

No.: BCTC/RF-EMC-005

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1. Version

Report No.	Issue Date	Description	Approved
BCTC2410271588-1E	2024-10-17	Original	Valid





Page 4 of 29



2. Test Summary

The Product has been tested according to the following specifications:

No.	Test Parameter	Clause No.	Results
1	Conducted Emission	15.207	PASS
2	Radiated Emission	15.209	PASS
3	20dB Bandwidth	15.215	PASS
4	Antenna Requirement	15.203	PASS

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No.: BCTC/RF-EMC-005

Page 5 of 29



3. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product 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.

No.	Item	Uncertainty
1	3m chamber Radiated spurious emission(30MHz-1GHz)	U=4.3dB
2	Conducted Emission (150kHz-30MHz)	U=3.2dB
3	humidity uncertainty	U=5.3%
4	Temperature uncertainty	U=0.59°C

No.: BCTC/RF-EMC-005

Page 6 of 29



4. Product Information And Test Setup

4.1 Product Information

Model/Type Reference:	PB2
Model Differences:	N/A
Hardware Version:	N/A
Software Version:	N/A
Modulation:	ASK
Operation Frequency:	115kHz-205kHz, 360kHz
Antenna installation:	loop coil antenna
Ratings:	Input: DC 5V/3A, DC 9V/2.22A Output: DC 5V/2A, DC 9V/2.22A Battery: DC 3.85V Wireless output: 15W Max

4.2 Support Equipment

No.	Device Type	Brand	Model	Series No.	Note
E-1	Aramid Fiber Magnetic Power Bank	PITAKA	PB2	N/A	EUT
E-2	Adapter	Apple	A1718	N/A	Auxiliary
E-3	Load	N/A	N/A	N/A	Auxiliary

Notes:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.

2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.



Page 7 of 2

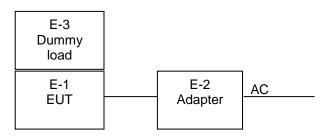


4.3 Test Setup Configuration

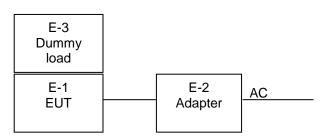
See test photographs attached in *EUT TEST SETUP PHOTOGRAPHS* for the actual connections between Product and support equipment.

Conducted Emission:

Test Mode 1



Radiated Spurious Emission: Test Mode 2



Test Mode 3, 4, 5, 6

E-3 Dummy load	
E-1 EUT	



4.4 Test Mode

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

AC Mode	Mode 1	Charging+Full Load(115-205kHz, 7.5W)	
	Mode 2	Charging+Full Load(115-205kHz, 7.5W)	
	Mode 3	Full Load(115-205kHz, EPP 15W)	
DC Mode	Mode 4	Full Load(360kHz, MPP 15W)	
	Mode 5	Half Load(115-205kHz, 7.5W)	
	Mode 6	Null Load	

Note: All test mode were tested and passed, only shows the worst case mode which were recorded in this report.

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5. Test Facility And Test Instrument Used

5.1 Test Facility

All measurement facilities used to collect the measurement data are located at Shenzhen BCTC Testing Co., Ltd. Address:1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards. FCC Test Firm Registration Number: 712850

A2LA certificate registration number is: CN1212

ISED Registered No.: 23583

ISED CAB identifier: CN0017

5.2 Test Instrument Used

Conducted Emissions Test						
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.	
Receiver	R&S	ESR3	102075	May 16, 2024	May 15, 2025	
LISN	R&S	ENV216	101375	May 16, 2024	May 15, 2025	
Software	Frad	EZ-EMC	EMC-CON 3A1	\	/	
Pulse limiter	Schwarzbeck	VTSD9561-F	01323	May 16, 2024	May 15, 2025	

RF Conducted Test					+ 1 . <i>1</i> .
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.
Power Meter	Keysight	E4419		May 16, 2024	May 15, 2025
Power Sensor (AV)	Keysight	E9300A		May 16, 2024	May 15, 2025
Signal Analyzer 20kHz-26.5G Hz	Keysight	N9020A	MY49100060	May 16, 2024	May 15, 2025
Spectrum Analyzer 9kHz-40GHz	R&S	FSP 40	$\sum_{i=1}^{n} \sum_{j=1}^{n} \sum_{i=1}^{n} \sum_{j=1}^{n} \sum_{j=1}^{n} \sum_{i=1}^{n} \sum_{j=1}^{n} \sum_{j$	May 16, 2024	May 15, 2025



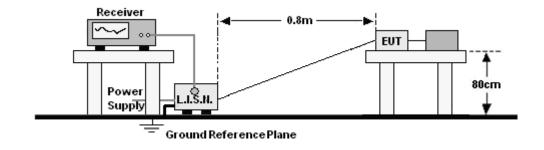
Radiated Emissions Test (966 Chamber01)							
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.		
966 chamber	ChengYu	966 Room	966	May 16, 2024	May 15, 2025		
Receiver	R&S	ESR3	102075	May 16, 2024	May 15, 2025		
Receiver	R&S	ESRP	101154	May 16, 2024	May 15, 2025		
Amplifier	Schwarzbeck	BBV9744	9744-0037	May 16, 2024	May 15, 2025		
TRILOG Broadband Antenna	Schwarzbeck	VULB9163	942	May 21, 2024	May 20, 2025		
Loop Antenna(9KHz -30MHz)	Schwarzbeck	FMZB1519B	00014	May 21, 2024	May 20, 2025		
Amplifier	SKET	LAPA_01G1 8G-45dB	SK202104090 1	May 16, 2024	May 15, 2025		
Horn Antenna	Schwarzbeck	BBHA9120D	1541	May 21, 2024	May 20, 2025		
Amplifier(18G Hz-40GHz)	MITEQ	TTA1840-35- HG	2034381	May 16, 2024	May 15, 2025		
Horn Antenn(18GH z-40GHz)	Schwarzbeck	BBHA9170	00822	May 21, 2024	May 20, 2025		
Spectrum Analyzer9kHz- 40GHz	R&S	FSP40	100363	May 16, 2024	May 15, 2025		
Software	Frad	EZ-EMC	FA-03A2 RE	\	\		

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6. Conducted Emissions

6.1 Block Diagram Of Test Setup



6.2 Limit

	Limit (dBuV)
Frequency (MHz)	Quas-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

Notes:

1. *Decreasing linearly with logarithm of frequency.

2. The lower limit shall apply at the transition frequencies.

6.3 Test procedure

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

a. The Product was placed on a nonconductive table 0.8 m above the horizontal ground reference plane, and 0.4 m from the vertical ground reference plane, and connected to the main through Line Impedance Stability Network (L.I.S.N).

b. The RBW of the receiver was set at 9 kHz in 150 kHz ~ 30MHz with Peak and AVG detector in Max Hold mode. Run the receiver's pre-scan to record the maximum disturbance generated from Product in all power lines in the full band.

c. For each frequency whose maximum record was higher or close to limit, measure its QP and AVG values and record.

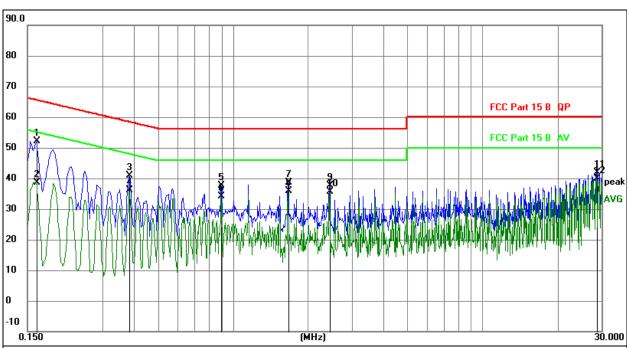
6.4 EUT operating Conditions

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.



6.5 Test Result

Temperature:	26 ℃	Relative Humidity:	54%RH
Pressure:	101KPa	Phase :	L
Test Mode:	Mode 1	Test Voltage:	AC 120V/60Hz



Remark:

All readings are Quasi-Peak and Average values.
Factor = Insertion Loss + Cable Loss.

Measurement = Reading Lev	el + Correct Factor
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4. Over = Measurement - Limit

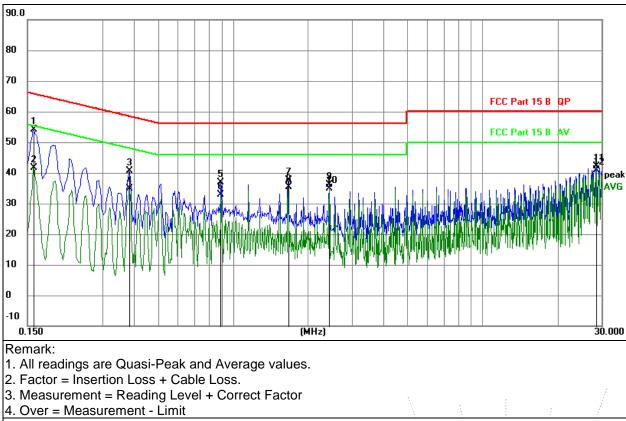
Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
MHz		dB	dBuV	dBuV	dB	Detector
0.1635	32.06	20.07	52.13	65.28	-13.15	QP
0.1635	18.61	20.07	38.68	55.28	-16.60	AVG
0.3840	20.81	20.08	40.89	58.19	-17.30	QP
0.3840	15.95	20.08	36.03	48.19	-12.16	AVG
0.8969	17.42	20.09	37.51	56.00	-18.49	QP
0.8969	13.95	20.09	34.04	46.00	-11.96	AVG
1.6664	18.49	20.10	38.59	56.00	-17.41	QP
1.6664	15.88	20.10	35.98	46.00	-10.02	AVG
2.4359	17.63	20.11	37.74	56.00	-18.26	QP
2.4359	15.47	20.11	35.58	46.00	-10.42	AVG
8.7205	21.68	20.28	41.96	60.00	-18.04	QP
8.7205	19.71	20.28	39.99	50.00	-10.01	AVG

No.: BCTC/RF-EMC-005

Page 13 of 29



Temperature:	26 ℃	Relative Humidity:	54%RH
Pressure:	101KPa	Phase :	N
Test Mode:	Mode 1	Test Voltage:	AC 120V/60Hz



			-			1		
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz		dB	dBu∨	dBuV	dB	Detector
1		0.1582	34.00	20.07	54.07	65.56	-11.49	QP
2		0.1582	21.44	20.07	41.51	55.56	-14.05	AVG
3		0.3832	20.53	20.08	40.61	58.21	-17.60	QP
4		0.3832	14.85	20.08	34.93	48.21	-13.28	AVG
5		0.8944	16.68	20.09	36.77	56.00	-19.23	QP
6		0.8944	12.84	20.09	32.93	46.00	-13.07	AVG
7		1.6625	17.42	20.10	37.52	56.00	-18.48	QP
8		1.6625	15.38	20.10	35.48	46.00	-10.52	AVG
9		2.4346	15.94	20.11	36.05	56.00	-19. <mark>9</mark> 5	QP
10		2.4346	14.69	20.11	34.80	46.00	-11.20	AVG
11		28.6030	21.94	20.28	42.22	60.00	-17.78	QP
12	*	28.6030	20.63	20.28	40.91	50.00	-9.09	AVG

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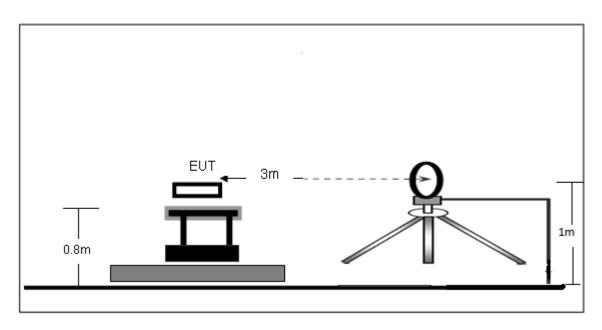
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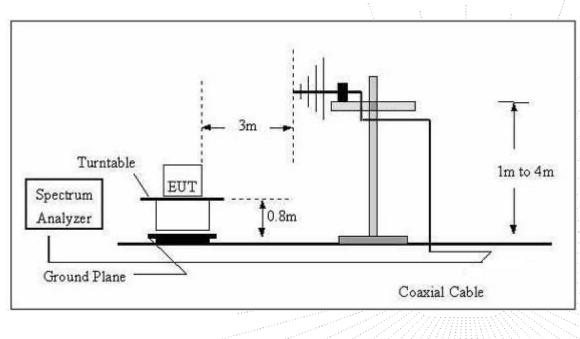
7. Radiated Emissions

7.1 Block Diagram Of Test Setup

(A) Radiated Emission Test-Up Frequency Below 30MHz



(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



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7.2 Limit

FCC §15.209; §15.205.

Test Standard	FCC Part15 C Section 15.209 and 15.205							
	Frequency (MHz)	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)			
	0.009MHz~0.490MHz	2400/F(kHz)	-	-	300			
	0.490MHz-1.705MHz	24000/F(kHz)	-	-	30			
	1.705MHz-30MHz	30	-	-	30			
Test Limit	30MHz~88MHz	100	40.0	Quasi-peak	3			
	88MHz~216MHz	150	43.5	Quasi-peak	3			
	216MHz~960MHz	200	46.0	Quasi-peak	3			
	960MHz~1000MHz	500	54.0	Quasi-peak	3			
	Above 1000MHz	500	54.0	Average	3			
	Above 1000MHz	-	74.0	Peak	3			

7.3 Test procedure

Receiver Parameter	Setting
Attenuation	Auto
9kHz~150kHz	RBW 200Hz for QP
150kHz~30MHz	RBW 9kHz for QP
30MHz~1000MHz	RBW 120kHz for QP

Below 1GHz test procedure as below:

a.The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. 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 antenna height 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 the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) 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 Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Above 1GHz test procedure as below:

g.Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 metre to 1.5 metre(Above 18GHz the distance is 1 meter and table is 1.5 metre).

h.Test the EUT in the lowest channel ,the middle channel ,the Highest channel.

Note: Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported.

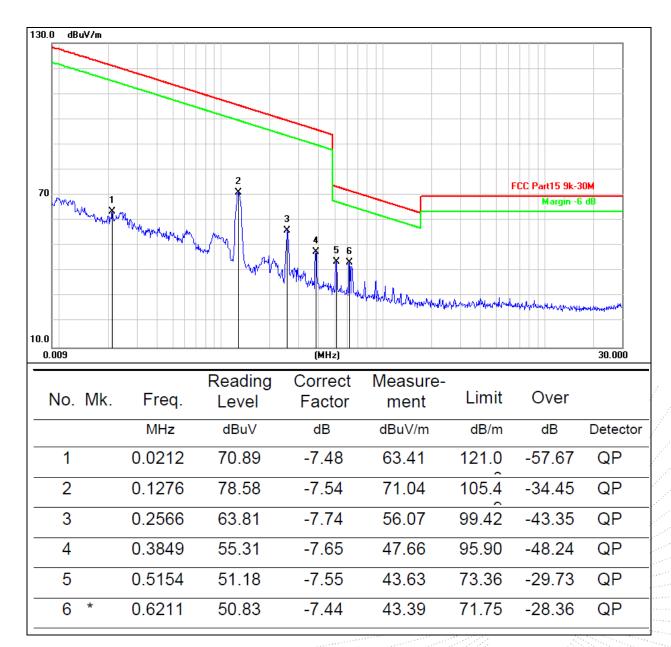
Page 16 of 29



7.4 Test Result

9kHz-30MHz

Temperature:	26 ℃	Relative Humidity:	54%RH
Pressure:	101 kPa	Test Voltage:	AC 120V/60Hz
Test Mode:	Mode 1	Polarization:	Coaxial(Worst)

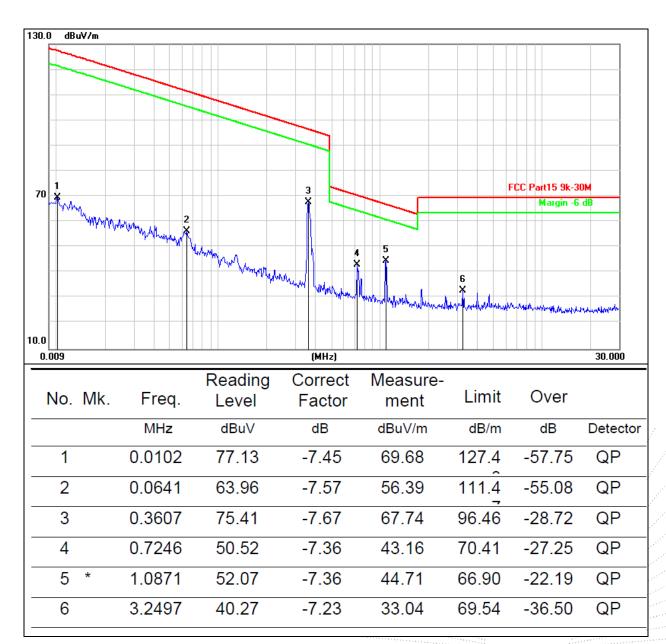


No.: BCTC/RF-EMC-005

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Temperature:	26 ℃	Relative Humidity:	54%RH
Pressure:	101 kPa	Test Voltage:	DC 3.85V
Test Mode:	Mode 4	Polarization:	Coaxial(Worst)

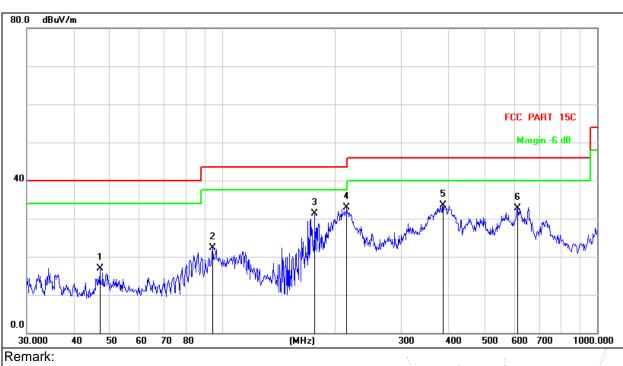


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Between 30MHz - 1GHz

Temperature:	26 ℃	Relative Humidity:	54%RH
Pressure:	101KPa	Phase:	Horizontal
Test Mode:	Mode 1(the worst mode)	Test Voltage:	AC 120V/60Hz



1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

2. Measurement = Reading Level + Correct Factor

3. Over = Measurement - Limit

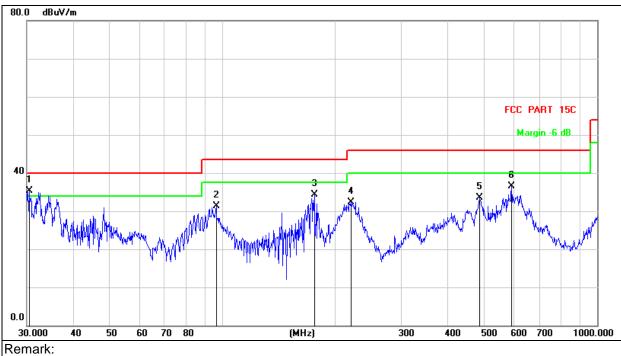
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		46.9948	31.10	-14.15	16.95	40.00	-23.05	QP
2		94.0979	39.04	-16.80	22.24	43.50	-21.26	QP
3	1	76.2686	48.86	-17.48	31.38	43.50	-12.12	QP
4	* 2	14.5143	48.23	-15.30	32.93	43.50	-10.57	QP
5	3	87.9920	44.59	-10.99	33.60	46.00	-12.40	QP
6	6	14.2142	39.48	-6.78	32.70	46.00	-13.30	QP

No.: BCTC/RF-EMC-005

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Temperature:	26 ℃	Relative Humidity:	54%RH
Pressure:	101KPa	Phase :	Vertical
Test Mode:	Mode 1(the worst mode)	Test Voltage:	AC 120V/60Hz



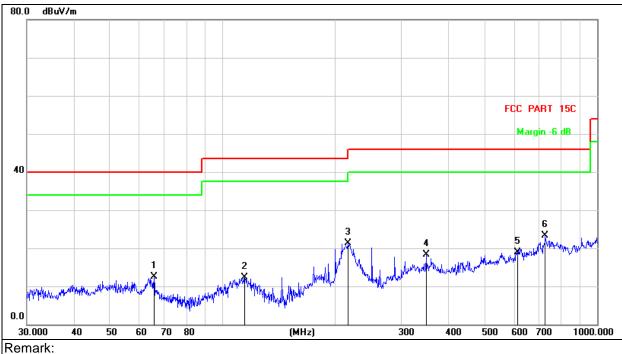
Factor = Antenna Factor + Cable Loss – Pre-amplifier.
Measurement = Reading Level + Correct Factor

3. Over = Measurement - Limit

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1	*	30.4238	51.92	-16.57	35.35	40.00	-4.65	QP
2		96.0986	47.86	-16.50	31.36	43.50	-12.14	QP
3		175.6516	51.83	-17.53	34.30	43.50	-9.20	QP
4		219.8449	47.47	-15.15	32.32	46.00	-13.68	QP
5	4	485.6093	42.52	-8.97	33.55	46.00	-12.45	QP
6		590.9737	44.10	-7.63	36.47	46.00	-9.53	QP



Temperature:	26 ℃	Relative Humidity:	54%RH
Pressure:	101KPa	Phase :	Horizontal
Test Mode:	Mode 4(the worst mode)	Test Voltage:	DC 3.85V



1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Measurement = Reading Level + Correct Factor
Over = Measurement - Limit

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		65.5727	29.36	-16.78	12.58	40.00	-27.42	QP
2		114.5146	29.33	-16.95	12.38	43.50	-31.12	QP
3		216.0240	36.58	-15.26	21.32	46.00	-24.68	QP
4		349.2500	29.88	-11.51	18.37	46.00	-27.63	QP
5	(612.0642	25.77	-6.81	18.96	46.00	-27.04	QP
6	*	726.8052	28.58	-5.32	23.26	46.00	-22.74	QP

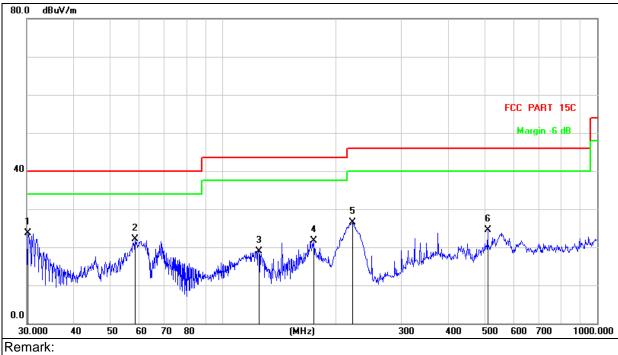
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Temperature:	26 ℃	Relative Humidity:	54%RH
Pressure:	101KPa	Phase :	Vertical
Test Mode:	Mode 4(the worst mode)	Test Voltage:	DC 3.85V



Factor = Antenna Factor + Cable Loss – Pre-amplifier. Measurement = Reading Level + Correct Factor Over = Measurement - Limit

No.	Mk. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
	MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1	* 30.2111	40.22	-16.61	23.61	40.00	-16.39	QP
2	58.4074	37.20	-15.03	22.17	40.00	-17.83	QP
3	125.0066	36.68	-17.68	19.00	43.50	-24.50	QP
4	175.0368	39.23	-17.57	21.66	43.50	-21.84	QP
5	222.1698	41.57	-15.09	26.48	46.00	-19.52	QP
6	510.0436	33.42	-8.97	24.45	46.00	-21.55	QP



8. Bandwidth Test

8.1 Test Procedure

- 1. Set RBW = 1%~5% OBW.
- 2. Set the video bandwidth (VBW) \ge 3 x RBW.
- 3. Detector = Peak.
- 4. Trace mode = max hold.
- 5. Sweep = auto couple.
- 6. Allow the trace to stabilize.

7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission.

8.2 Test Setup



Page 23 of 2



8.3 Test Result

Frequency (kHz)	20dB bandwidth (kHz)	Result
128.3	0.036	Pass
360.3	0.080	Pass







9. **Antenna Requirements**

9.1 Limit

For intentional device, according to FCC 47 CFR Section 15.203, An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

9.2 Test Result

The antenna used for this product is Inductive Loop coil antenna.

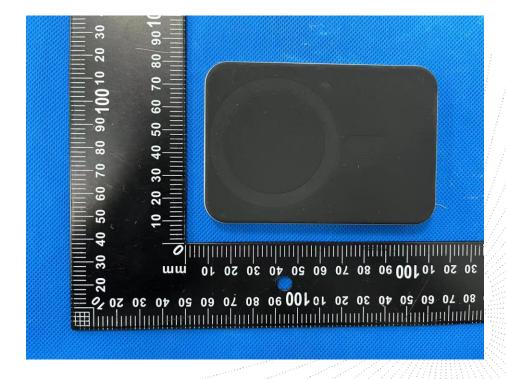
Page 25 of



10. EUT Photographs

EUT Photo





NOTE: Appendix-Photographs Of EUT Constructional Details

No.: BCTC/RF-EMC-005

Page 26 of 29

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11. EUT Test Setup Photographs

Conducted emissions



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No.: BCTC/RF-EMC-005

Page 27 of 29



Radiated Measurement Photos 30MHz-1GHz



9kHz-30MHz



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STATEMENT

1. The equipment lists are traceable to the national reference standards.

2. The test report can not be partially copied unless prior written approval is issued from our lab.

3. The test report is invalid without the "special seal for inspection and testing".

4. The test report is invalid without the signature of the approver.

5. The test process and test result is only related to the Unit Under Test.

6. Sample information is provided by the client and the laboratory is not responsible for its authenticity.

7. The quality system of our laboratory is in accordance with ISO/IEC17025.

8. If there is any objection to this test report, the client should inform issuing laboratory within 15 days from the date of receiving test report.

Address:

1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China

TEL: 400-788-9558

P.C.: 518103

FAX: 0755-33229357

Website: http://www.chnbctc.com

Consultation E-mail: bctc@bctc-lab.com.cn

Complaint/Advice E-mail: advice@bctc-lab.com.cn

***** END *****

No.: BCTC/RF-EMC-005

Page 29 of 29