TEST REPORT

Report No.:	BCTC2207791140-1E
Applicant:	Shenzhen U-Angel Technology Co.,Ltd
Product Name:	Power Bank
Model/Type Ref.:	QP-10100
Tested Date:	2022-07-06 to 2022-07-19
Issued Date:	2022-07-19

Shenzhen BCTC Testing Co., Ltd.

FCC ID:2AX87QP-10100

Product Name:	Power Bank
Trademark:	N/A
Model/Type Ref.:	QP-10100 QP-10100B, QP-10100W, LD10WL
Prepared For:	Shenzhen U-Angel Technology Co.,Ltd
Address:	4th Floor, Block C, Phase 2 Of Hongmen Industrial Park, No.399, Jihua Road, Jihua Street, Longgang District, Shenzhen City, Guangdong Province, China.
Manufacturer:	Shenzhen U-Angel Technology Co.,Ltd
Address:	4th Floor, Block C, Phase 2 Of Hongmen Industrial Park, No.399, Jihua Road, Jihua Street, Longgang District, Shenzhen City, Guangdong Province, 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:	2022-07-06
Sample tested Date:	2022-07-06 to 2022-07-19
Issue Date:	2022-07-19
Report No.:	BCTC2207791140-1E
Test Standards:	FCC Part15.209 ANSI C63.10-2013
Test Results:	PASS

Tested by:

Jeff.Fu/Project Handler

Approved by:

Zero Zhou/Reviewer

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(Note: N/A Means Not Applicable)

1. Version

Report No.	Issue Date	Description	Approved
BCTC2207791140-1E	2022-07-19	Original	Valid

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

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(9kHz-30MHz)	U=3.7dB
2	3m chamber Radiated spurious emission(30MHz-1GHz)	U=4.3dB
3	3m chamber Radiated spurious emission(1GHz-18GHz)	U=4.5dB
4	3m chamber Radiated spurious emission(18GHz-40GHz)	U=3.34dB
5	Conducted Emission(150kHz-30MHz)	U=3.20dB
6	Conducted Adjacent channel power	U=1.38dB
7	Conducted output power uncertainty Above 1G	U=1.576dB
8	Conducted output power uncertainty below 1G	U=1.28dB
9	humidity uncertainty	U=5.3%
10	Temperature uncertainty	U=0.59℃

4. Product Information And Test Setup

4.1 Product Information

Model/Type Ref.:	QP-10100 QP-10100B, QP-10100W, LD10WL
Model differences:	All the model are the same circuit and RF module, except model names.
Product Description:	Power Bank
Operation Frequency:	115kHz-205kHz
Antenna installation:	Loop coil antenna
Ratings:	Type-C input: 5V⎓ 3A, 9V⎓ 2A Lightning input: 5V⎓ 3A, 9V⎓ 2A Type-C output: 5V⎓ 3A, 9V⎓ 2.22A, 12V⎓ 1.5A USB-A output: 5V⎓ 3A, 9V⎓ 2A, 12V⎓ 1.5A Wireless out: 9V⎓ 15W/9V⎓ 10W/ 7.5V⎓ 7.5W/5V⎓ 5W Total output: 20W(Max) for Type-C only 15W(Max) for Wireless output
Hardware Version:	N/A
Software Version:	N/A

4.2 Support Equipment

No.	Device Type	Brand	Model	Series No.	Note
1.	Power Bank	--	QP-10100	---	---
2	ADAPTER	UGREEN	CD122	--	--
3	Dummy load	N/A	DL01	N/A	Auxiliary
4	Dummy load	N/A	--	N/A	Auxiliary
5	Dummy load	N/A	--	N/A	Auxiliary

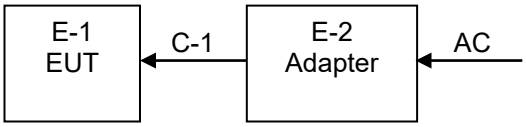
Item	Shielded Type	Ferrite Core	Length	Note
C-1	NO	NO	0.6M	DC cable unshielded

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.

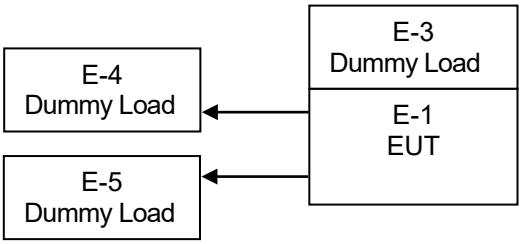
4.3 Test Setup Configuration

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

Conducted Emission:



Radiated Spurious Emission



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

.

Test Mode 1	Charging(Type-C)*
Test Mode 2	Charging(Lightning)
Test Mode 3	Type-C 5V3A
Test Mode 4	Type-C 9V2.22A
Test Mode 5	Type-C 12V1.5A
Test Mode 6	5W
Test Mode 7	7.5W
Test Mode 8	10W
Test Mode 9	15W*
Test Mode 10	USB-A 5V3A
Test Mode 11	USB-A 9V2A
Test Mode 12	USB-A 12V1.5A
Test Mode 13	Type-C 5V1A+USB-A 5V1A+5W

Note:
All test mode were tested and passed, only Conducted Emissions, Radiated Emissions shows (*) is the worst case mode which were recorded in this report.

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
IC Registered No.: 23583

5.2 Test Instrument Used

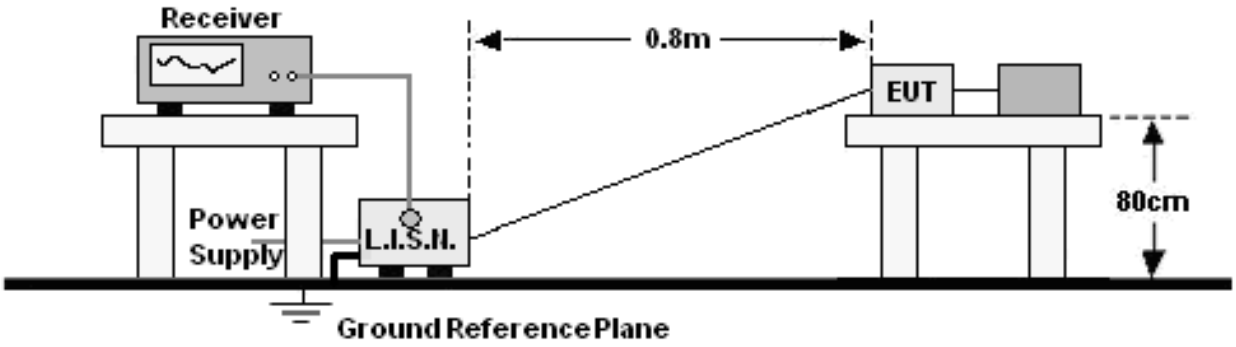
Conducted emissions Test					
Equipment	**Manufacturer**	**Model#**	**Serial#**	**Last Cal.**	**Next Cal.**
Receiver	R&S	ESR3	102075	May 24, 2022	May 23, 2023
LISN	R&S	ENV216	101375	May 24, 2022	May 23, 2023
Software	Frad	EZ-EMC	EMC-CON 3A1	\	\
Attenuator	\	10dB DC-6GHz	1650	May 24, 2022	May 23, 2023

RF Conducted Test					
Equipment	**Manufacturer**	**Model#**	**Serial#**	**Last Cal.**	**Next Cal.**
Power Metter	Keysight	E4419	\	May 24, 2022	May 23, 2023
Power Sensor (AV)	Keysight	E9300A	\	May 24, 2022	May 23, 2023
Signal Analyzer20kHz-26.5GHz	Keysight	N9020A	MY49100060	May 24, 2022	May 23, 2023
Spectrum Analyzer9kHz-40GHz	R&S	FSP40	\	May 24, 2022	May 23, 2023

Radiated emissions Test (966 chamber)					
Equipment	**Manufacturer**	**Model#**	**Serial#**	**Last Cal.**	**Next Cal.**
966 chamber	ChengYu	966 Room	966	Jun. 06. 2020	Jun. 05, 2023
Receiver	R&S	ESR3	102075	May 24, 2022	May 23, 2023
Receiver	R&S	ESRP	101154	May 24, 2022	May 23, 2023
Amplifier	SKET	LAPA_01G18G-45dB	\	May 24, 2022	May 23, 2023
Amplifier	Schwarzbeck	BBV9744	9744-0037	May 24, 2022	May 23, 2023
TRILOG Broadband Antenna	Schwarzbeck	VULB9163	942	May 26, 2022	May 25, 2023
Horn Antenna	Schwarzbeck	BBHA9120D	1541	May 24, 2022	May 23, 2023
Horn Antenn(18GHz-40GHz)	Schwarzbeck	BBHA9170	00822	Jun. 06, 2022	Jun. 05, 2023
Amplifier(18GHz-40GHz)	MITEQ	TTA1840-35-HG	2034381	May 24, 2022	May 23, 2023
Loop Antenna(9KHz-30MHz)	Schwarzbeck	FMZB1519B	00014	May 26, 2022	May 25, 2023
RF cables1(9kHz-30MHz)	Huber+Suhnar	9kHz-30MHz	B1702988-0008	May 26, 2022	May 25, 2023
RF cables2(30MHz-1GHz)	Huber+Suhnar	30MHz-1GHz	1486150	May 26, 2022	May 25, 2023
RF cables3(1GHz-40GHz)	Huber+Suhnar	1GHz-40GHz	1607106	May 26, 2022	May 25, 2023
Power Metter	Keysight	E4419	\	May 26, 2022	May 25, 2023
Power Sensor (AV)	Keysight	E9300A	\	May 26, 2022	May 25, 2023
Signal Analyzer20kHz-26.5GHz	Keysight	N9020A	MY49100060	May 26, 2022	May 25, 2023
Spectrum Analyzer9kHz-40GHz	R&S	FSP40	\	May 26, 2022	May 25, 2023
Software	Frad	EZ-EMC	FA-03A2 RE	\	\

6. Conducted Emissions

6.1 Block Diagram Of Test Setup



6.2 Limit

FREQUENCY (MHz)	Limit (dBuV)	
	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

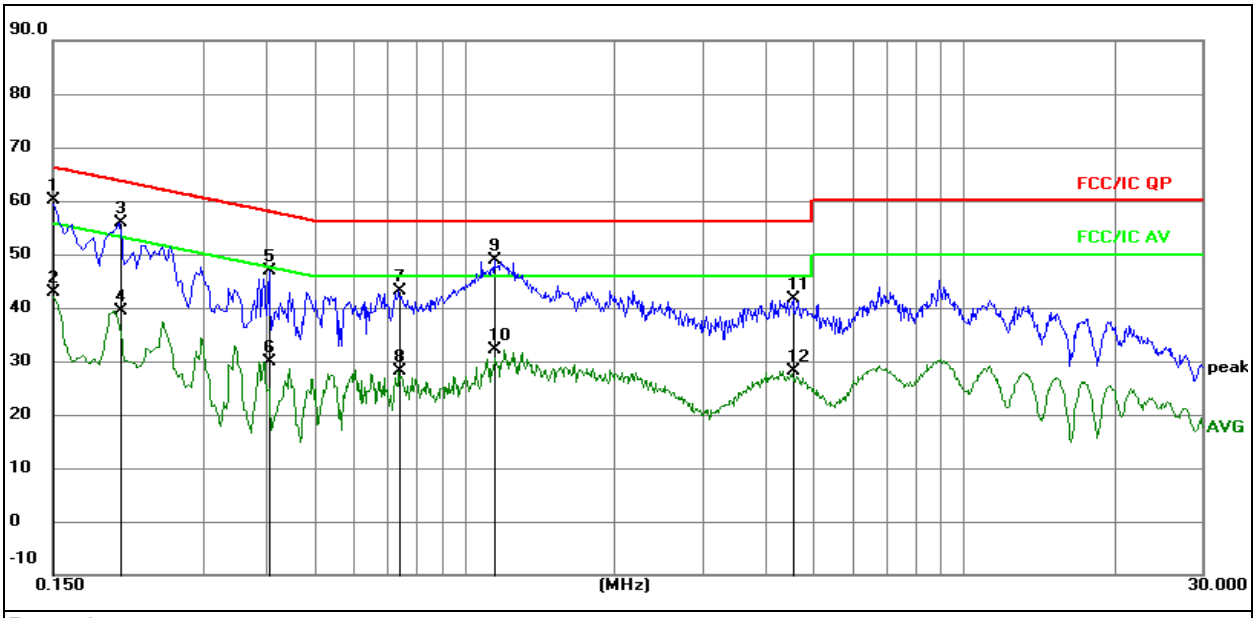
a. The Product was placed on a nonconductive table 0.8 m above the horizontal ground reference plane, and 0.4 m from the vertical ground reference plane, and connected to the main through Line Impedance Stability Network (L.I.S.N).
b. The RBW of the receiver was set at 9 kHz in 150 kHz ~ 30MHz with Peak 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

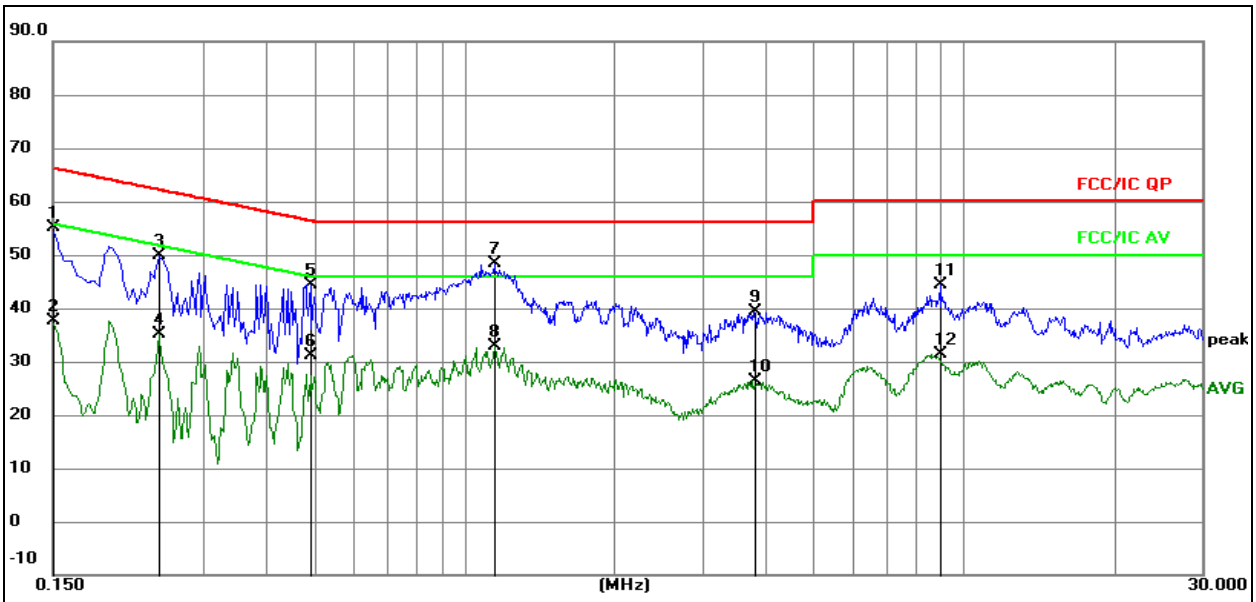
Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101kPa	Phase :	L
Test Voltage :	AC120V/50Hz	Test Mode:	Mode 1



Remark:
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.
3. Measurement=Reading Level+ Correct Factor
4. Over=Measurement-Limit

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz		dB	dBuV	dBuV	dB	Detector
1	*	0.1500	40.38	19.67	60.05	66.00	-5.95	QP
2		0.1500	23.09	19.67	42.76	56.00	-13.24	AVG
3		0.2040	36.12	19.80	55.92	63.45	-7.53	QP
4		0.2040	19.63	19.80	39.43	53.45	-14.02	AVG
5		0.4061	27.21	19.74	46.95	57.73	-10.78	QP
6		0.4061	10.13	19.74	29.87	47.73	-17.86	AVG
7		0.7391	23.39	19.74	43.13	56.00	-12.87	QP
8		0.7391	8.37	19.74	28.11	46.00	-17.89	AVG
9		1.1473	28.98	19.78	48.76	56.00	-7.24	QP
10		1.1473	12.45	19.78	32.23	46.00	-13.77	AVG
11		4.5494	21.62	20.11	41.73	56.00	-14.27	QP
12		4.5494	7.99	20.11	28.10	46.00	-17.90	AVG

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101kPa	Phase :	N
Test Voltage :	AC120V/50Hz	Test Mode:	Mode 1



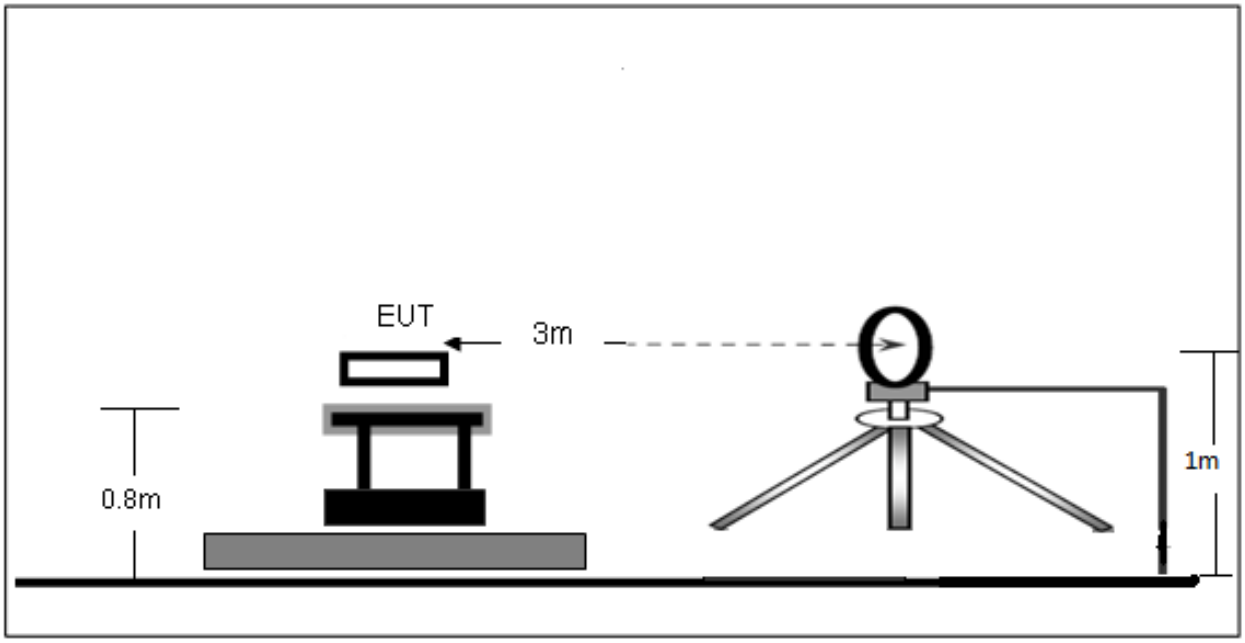
Remark:
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.
3. Measurement=Reading Level+ Correct Factor
4. Over=Measurement-Limit

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz		dB	dBuV	dBuV	dB	Detector
1		0.1500	35.37	19.67	55.04	66.00	-10.96	QP
2		0.1500	18.03	19.67	37.70	56.00	-18.30	AVG
3		0.2445	29.97	19.79	49.76	61.94	-12.18	QP
4		0.2445	15.36	19.79	35.15	51.94	-16.79	AVG
5		0.4920	24.71	19.72	44.43	56.13	-11.70	QP
6		0.4920	11.39	19.72	31.11	46.13	-15.02	AVG
7	*	1.1490	28.59	19.78	48.37	56.00	-7.63	QP
8		1.1490	13.16	19.78	32.94	46.00	-13.06	AVG
9		3.7995	19.37	20.08	39.45	56.00	-16.55	QP
10		3.7995	6.28	20.08	26.36	46.00	-19.64	AVG
11		8.9745	24.01	20.25	44.26	60.00	-15.74	QP
12		8.9745	11.06	20.25	31.31	50.00	-18.69	AVG

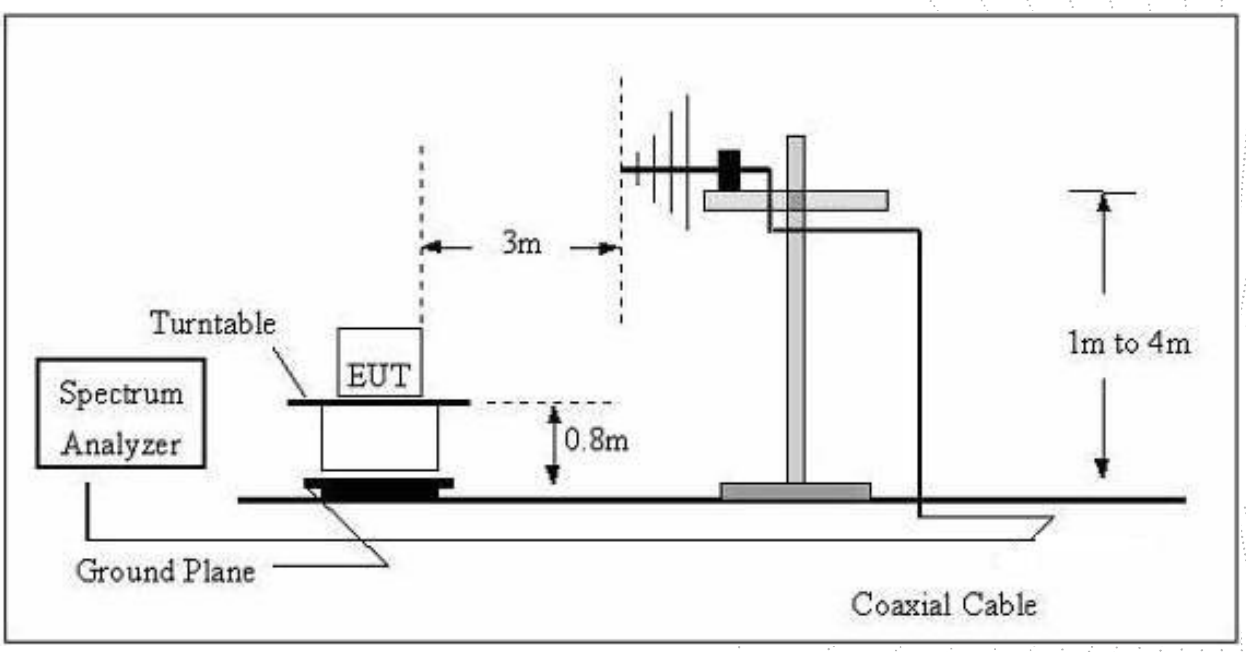
7. Radiated Emissions

7.1 Block Diagram Of Test Setup

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



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



7.2 Limit

FCC §15.209; §15.205.

Test Standard	FCC Part15 C Section 15.209 and 15.205				
Test Limit	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
	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
		-	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 chamber. 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.

7.4 Test Result

9kHz-30MHz

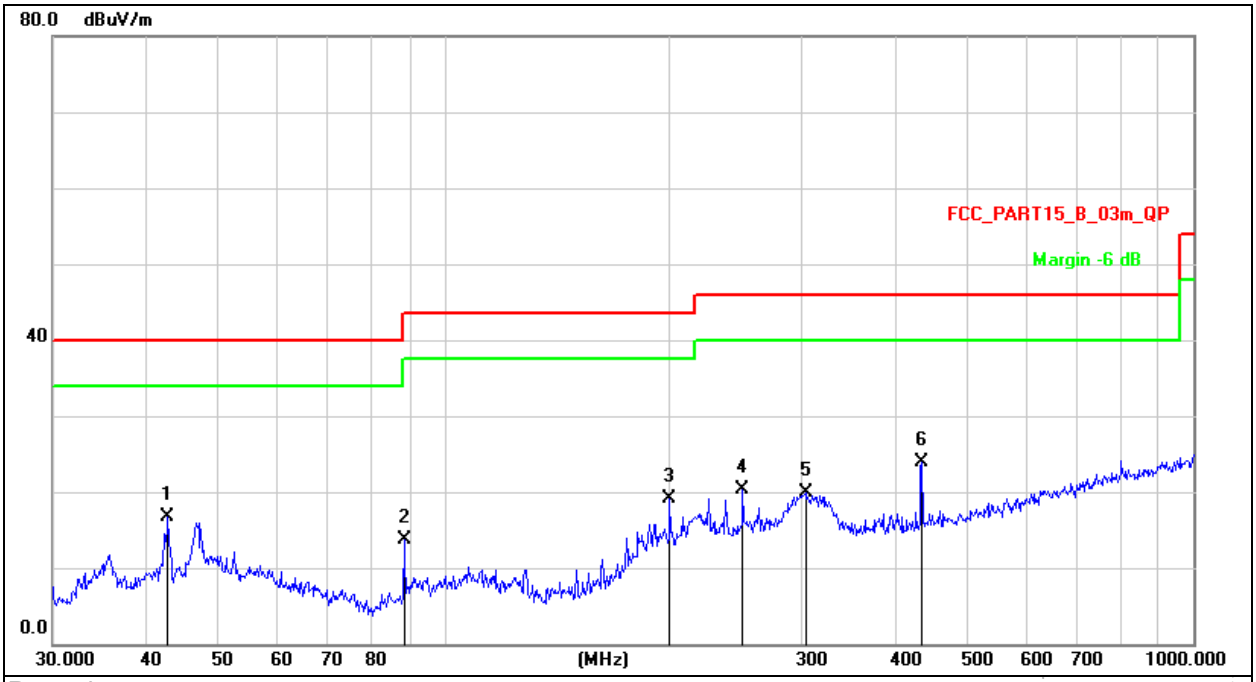
Temperature:	26℃	Relative Humidity:	24%
Pressure:	101 kPa	Test Voltage :	AC120V/60Hz, DC 3.7V
Test Mode :	Mode 9	Polarization :	--

Frequency (kHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
21.92	64.84	20.15	84.99	140.79	-55.80	PK
21.92	40.58	20.15	60.73	120.79	-60.06	AV
61.27	52.04	20.33	72.37	131.86	-59.49	PK
61.27	38.22	20.33	58.55	111.86	-53.31	AV
151.18	54.03	20.55	74.58	124.01	-49.43	PK
151.18	47.54	20.55	68.09	104.01	-35.92	AV
523.57	25.66	20.64	46.30	73.22	-26.92	QP
751.84	29.90	21.26	51.16	70.08	-18.92	QP
1250.77	18.35	22.32	40.67	65.66	-24.99	QP

Note:
Pre-scan in the all of mode, the worst case in of was recorded.
Factor = antenna factor + cable loss – pre-amplifier.
Margin = Emission Level- Limit.

Between 30MHz – 1GHz

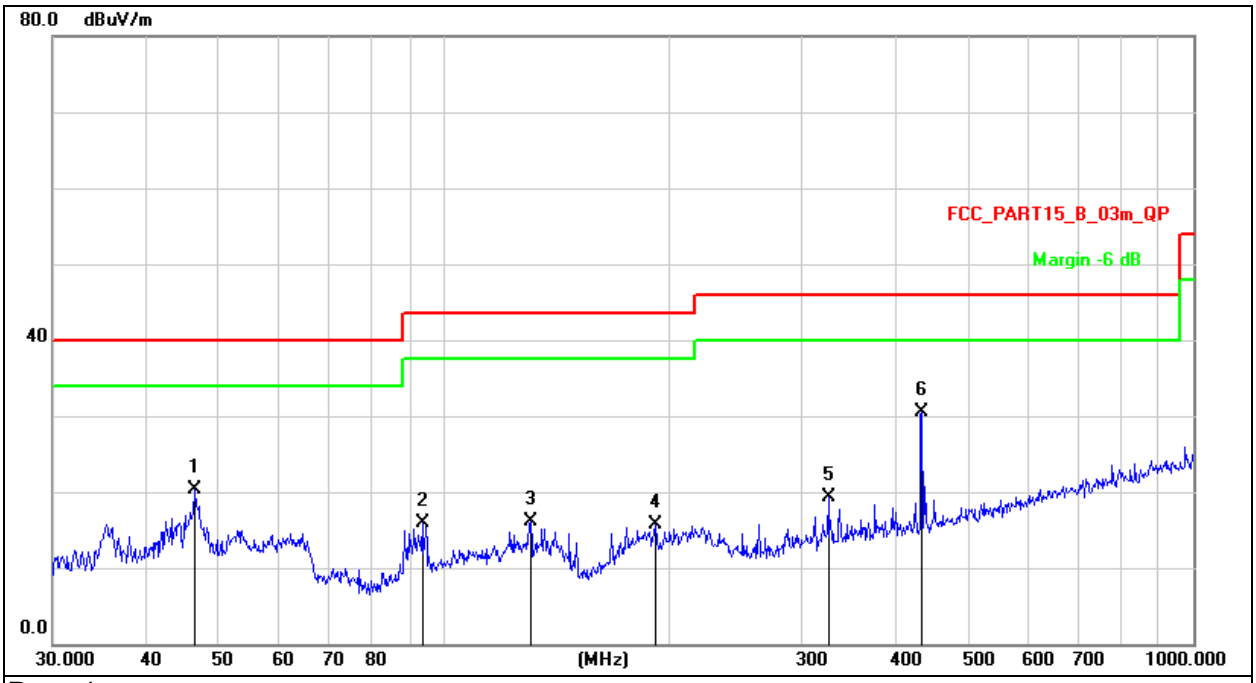
Temperature:	26℃	Relative Humidity:	54%
Pressure:	101 kPa	Test Voltage :	DC 3.7V
Test Mode:	Mode 9	Polarization :	Horizontal



Remark:
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		42.7496	32.60	-15.92	16.68	40.00	-23.32	QP
2		88.3421	32.47	-18.74	13.73	43.50	-29.77	QP
3		199.9856	35.02	-15.95	19.07	43.50	-24.43	QP
4		250.3012	34.45	-14.18	20.27	46.00	-25.73	QP
5		303.5437	32.66	-12.82	19.84	46.00	-26.16	QP
6	*	434.0651	33.49	-9.51	23.98	46.00	-22.02	QP

Temperature:	26℃	Relative Humidity:	54%
Pressure:	101 kpa	Test Voltage :	DC 3.7V
Test Mode:	Mode 9	Polarization :	Vertical



Remark:
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		46.5030	35.71	-15.46	20.25	40.00	-19.75	QP
2		93.4402	33.65	-17.79	15.86	43.50	-27.64	QP
3		130.3789	34.66	-18.63	16.03	43.50	-27.47	QP
4		191.7450	32.27	-16.60	15.67	43.50	-27.83	QP
5		325.5958	31.15	-11.93	19.22	46.00	-26.78	QP
6	*	434.0651	39.98	-9.51	30.47	46.00	-15.53	QP

8. Bandwidth Test

1. Set RBW = 1%~5% OBW.

2. Set the video bandwidth (VBW) ≥ 3 x RBW.

3. Detector = Peak.

4. Trace mode = max hold.

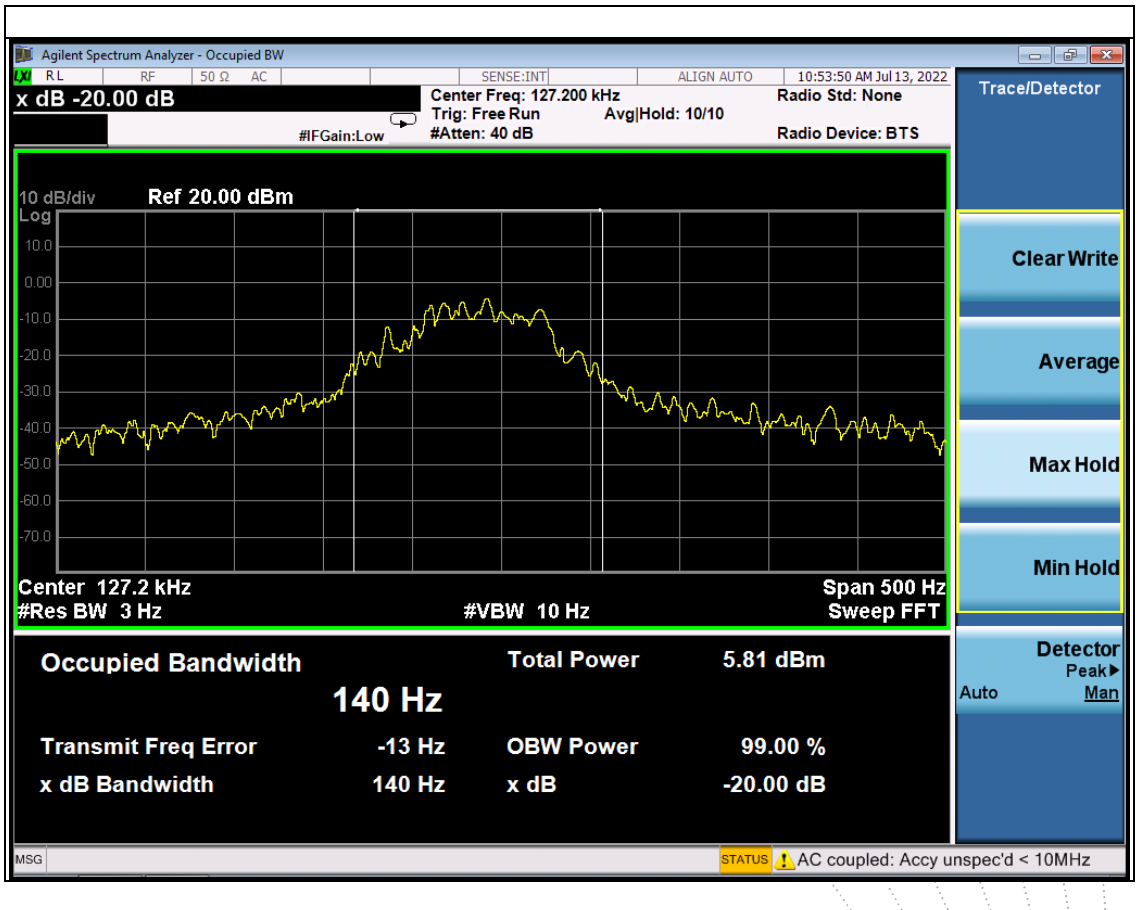
5. Sweep = auto couple.

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.

TEST SETUP

Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	101kPa		



9. Antenna Requirements

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

10. EUT Photographs

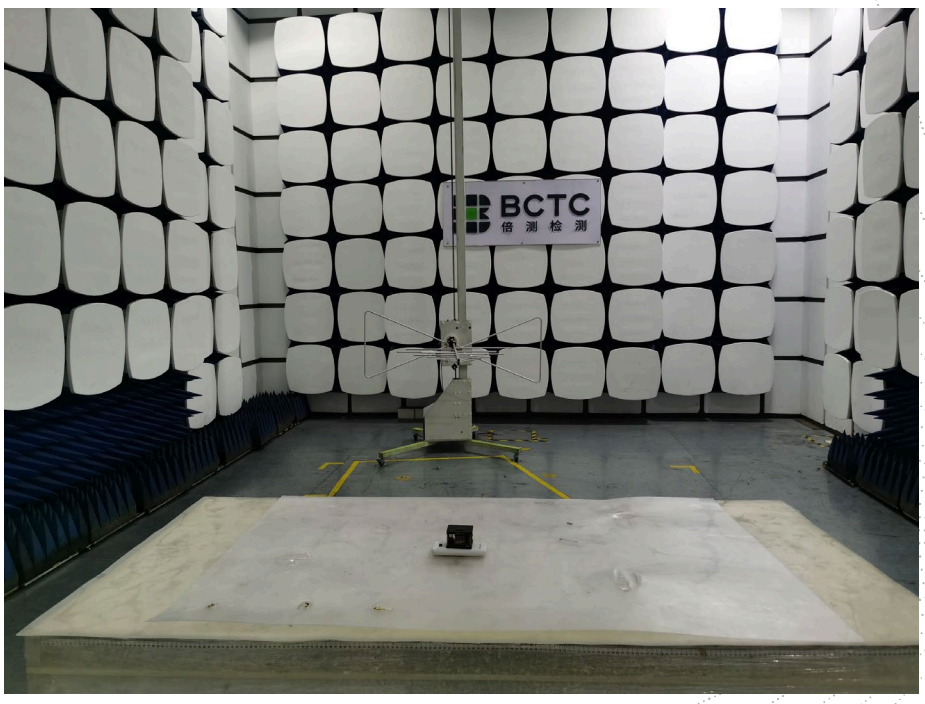
EUT Photo 1

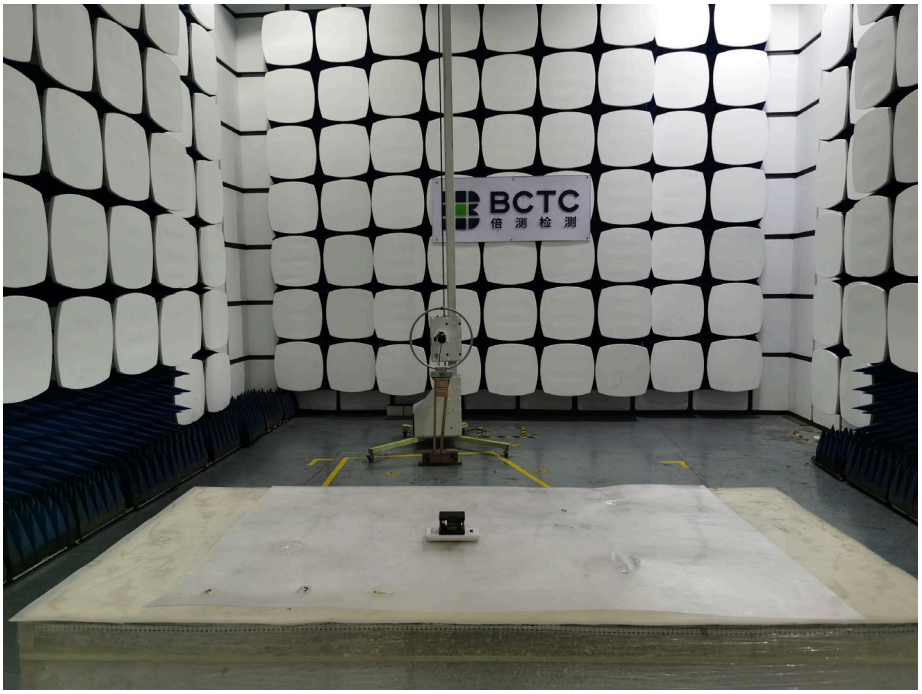
EUT Photo 2

11. EUT Test Setup Photographs

Conducted emissions Photo

Radiated Measurement Photos

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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 test report without CMA mark is only used for scientific research, teaching, enterprise product development and internal quality control purposes.

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

9. 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.

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