

TEST REPORT

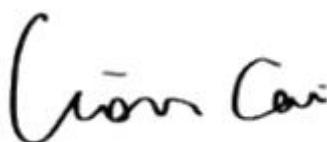
Application No.: BTEK240620001AE
Applicant: Guangdong Fenergy Technology CO LTD
Address of Applicant: Building 35, Zone 5, Huaide Cuigang Industrial Park, Fuyong Street, Bao 'an District, Shenzhen
Manufacturer: Guangdong Fenergy Technology CO LTD
Address of Manufacturer: Building 35, Zone 5, Huaide Cuigang Industrial Park, Fuyong Street, Bao 'an District, Shenzhen

Equipment Under Test (EUT):

EUT Name: Qi Charge Tower
Test Model.: AT1893
Adding Model(s): /
Trade Mark: ATOMI
FCC ID: 2BDF9-AT1893
Standard(s) : 47 CFR Part 15 Subpart C
Date of Receipt: 2024-06-21
Date of Test: 2024-06-21 to 2024-07-03
Date of Issue: 2024-07-04

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards specified above.



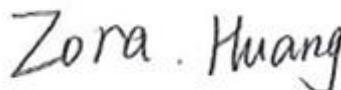
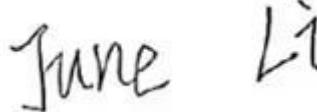
Lion Cai/ Approved & Authorized
EMC Laboratory Manager



Revision Record

Version	Chapter	Date	Modifier	Remark
V0		2024-07-04		Original

Authorized for issue by:

		 Zora Huang	
		Zora Huang /Project Engineer	
		 June Li	
		June Li /Reviewer	

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.



2 Test Summary

Item	Document Title
47 CFR Part 15, Subpart C	Intentional Radiators
ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

Item	Standard	Result
Antenna Requirements	15.203	Pass
20dB Occupied Bandwidth	15.215c	Pass
AC Power Line Conducted Emissions	15.207	Pass
Spurious Emissions	15.209	Pass

Note:

E.U.T./EUT means Equipment Under Test.

Pass means the test result passed the test standard requirement, please find the detailed decision rule in the report relative section.



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3 General Information

3.1 Details of E.U.T.

Power Supply	Input:100-240V~ 50/60Hz 1.2A Output: Current tap rating: 125V~ 60Hz, 10A 1250W Max Wireless:15W USB and USB-C:5VDC 2.4A(Each Port) USB and USB-C Total current:4A Max PD: 5VDC,3A, 9VDC,2.22A, 12VDC,1.67A Total:55W max
Modulation Type	FSK
Operating frequency	112kHz-205kHz
Antenna Type	Coil antenna
Hardware Version	M2168P-01C-IP6808-15W REV2.1
Software Version	IP6808 QFN32
Sample number	BTEK240620001AE-01

Remark: The information in this section is provided by the applicant or manufacturer, BANTEK is not liable to the accuracy, suitability, reliability or/and integrity of the information.

3.2 Description of EUT Test Mode

Test Mode List		
Test Mode	Description	Remark
1	Wireless output:15W Load 1%	Keep the EUT Wireless output:15W
2	Wireless output:15W Load 50%	Keep the EUT Wireless output:15W
3	Wireless output:15W Load 99%	Keep the EUT Wireless output:15W

Remark:1.Only show the worst case load 1% in the test report

3.3 Description of Support Units

Auxiliary Equipment			
Description	Manufacturer	Model	Serial Number
WPC charging load	EESON	2S	/

3.4 Measurement Uncertainty

The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2 and TR100 028-1/-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Measurement	Value
Occupied Channel Bandwidth	69 KHz
RF output power, conducted	0.87 dB
Power Spectral Density, conducted	0.69 dB
Unwanted Emissions, conducted	0.94 dB
All emissions, radiated(<1GHz)	4.12 dB



All emissions, radiated(>1GHz)	4.16 dB
Temperature	0.82 °C
Humidity	4.1 %

3.5 Test Location

All tests were performed at:

Shenzhen BANTEK Testing Co., Ltd.

A5&A6, Building B1&B2, No.45 Gangtou Road, Bogang Community, Shajing Street, Bao'an District, Shenzhen, Guangdong, China 518104

Tel: +86 0755-2334 4200 Fax: +86 0755-2334 4200

FCC Registration Number: 264293

Designation Number: CN1356

No tests were sub-contracted.

3.6 Deviation from Standards

None

3.7 Abnormalities from Standard Conditions

None



4 Equipment List

RF Conducted					
Equipment	Manufacturer	Model No	Serial No	Cal Date	Cal Due Date
Shielding Room	YIHENG ENECLTRONIC	5.5*3.1*3	YH-BT-220304-03	2022-03-03	2025-03-02
EXA Signal Analyzer	KEYSIGHT	N9020A	MY54230486	2024-06-11	2025-06-10
DC Power Supply	E3632A	E3642A	KR75304416	2024-06-11	2025-06-10
Attenuator	RswTech	SMA-JK-6dB	N/A	2024-06-11	2025-06-10
Attenuator	RswTech	SMA-JK-3dB	N/A	2024-06-11	2025-06-10
RF Control Unit	Techy	TR1029-1	N/A	2024-06-11	2025-06-10
RF Sensor Unit	Techy	TR1029-2	N/A	2024-06-11	2025-06-10
MXG Vector Signal Generator	Agilent	N5182A	US46240522	2024-06-11	2025-06-10
Programmable Temperature&Humidity Chamber	GRT	GR-HWX1000	GR22051001	2024-06-11	2025-06-10
Measurement Software	TACHOY	RF TestSoft	N/A	N/A	N/A

Radiated Method Test					
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
3m Semi-Anechoic Chamber	YIHENG ENECLTRONIC	966	YH-BT-220304-01	2022-05-06	2025-05-05
EMI Test Receiver	Rohde&Schwarz	ESCI	100694	2024-06-11	2025-06-10
TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	01324	2024-06-16	2025-06-15
Pre-Amplifier	Schwarzbeck	BBV 9745	#180	2024-06-11	2025-06-10
Loop Antenna	ETS	6502	00201177	2024-06-15	2025-06-14
Measurement Software	Fara	EZ EMC Ver. FA-03A2	N/A	N/A	N/A

Conducted Test					
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Shielding Room	YIHENG ENECLTRONIC	9*5*3.3	YH-BT-220304-04	2022-03-03	2025-03-02
EMI Test Receiver	Rohde&Schwarz	ESCI	101021	2024-06-11	2025-06-10
Measurement Software	Fara	EZ EMC Ver. FA-03A2	N/A	N/A	N/A
LISN	Rohde&Schwarz	ENV216	101472	2024-06-11	2025-06-10
LISN	Schwarzbeck	NSLK 8128	05127	2024-06-11	2025-06-10
Pulse Limiter	Schwarzbeck	VTSD 9561 F-N	00890	2024-06-11	2025-06-10

General used equipment					
Equipment	Manufacturer	Model No	Serial No	Cal Date	Cal Due Date
Humidity/Temperature/Barometric Pressure Indicator	KUMAR	F132	N/A	2024-06-11	2025-06-10
Humidity/Temperature/Barometric Pressure Indicator	KUMAR	F132	N/A	2024-06-11	2025-06-10



5 Radio Spectrum Technical Requirement

5.1 Antenna Requirement

5.1.1 Test Requirement:

Test Requirement FCC §15.203;

5.1.2 Conclusion

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. This requirement does not apply to carrier current devices or to devices operated under the provisions of § 15.211, § 15.213, § 15.217, § 15.219, or § 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

If directional gain of transmitting antennas is greater than 6 dBi, the power shall be reduced by the same level in dB comparing to gain minus 6 dBi. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. 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 FCC rule.

The EUT uses an Integral Antenna which in accordance to Section 15.203 is considered sufficient to comply with the provisions of this section.



6 Radio Spectrum Matter Test Results

6.1 20dB Occupied Bandwidth

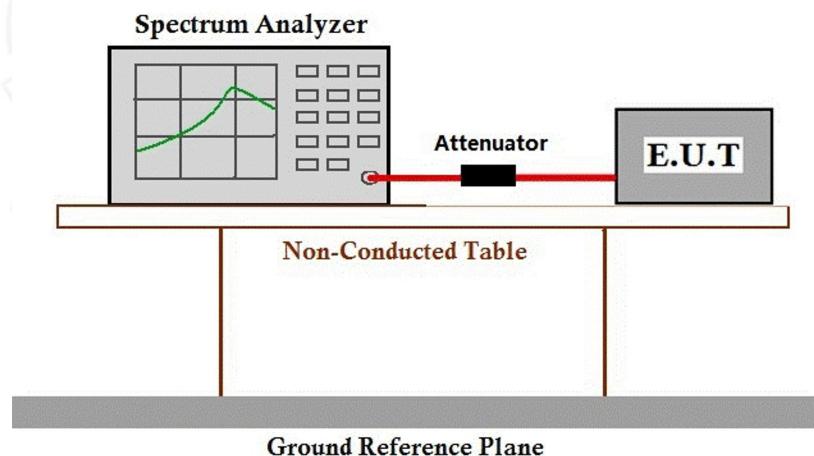
Test Requirement FCC Part 15.215c

6.1.1 E.U.T. Operation

Operating Environment:

Temperature: 25.7 °C Humidity: 53.2 % RH Atmospheric Pressure: 1010 mbar

6.1.2 Test Setup Diagram



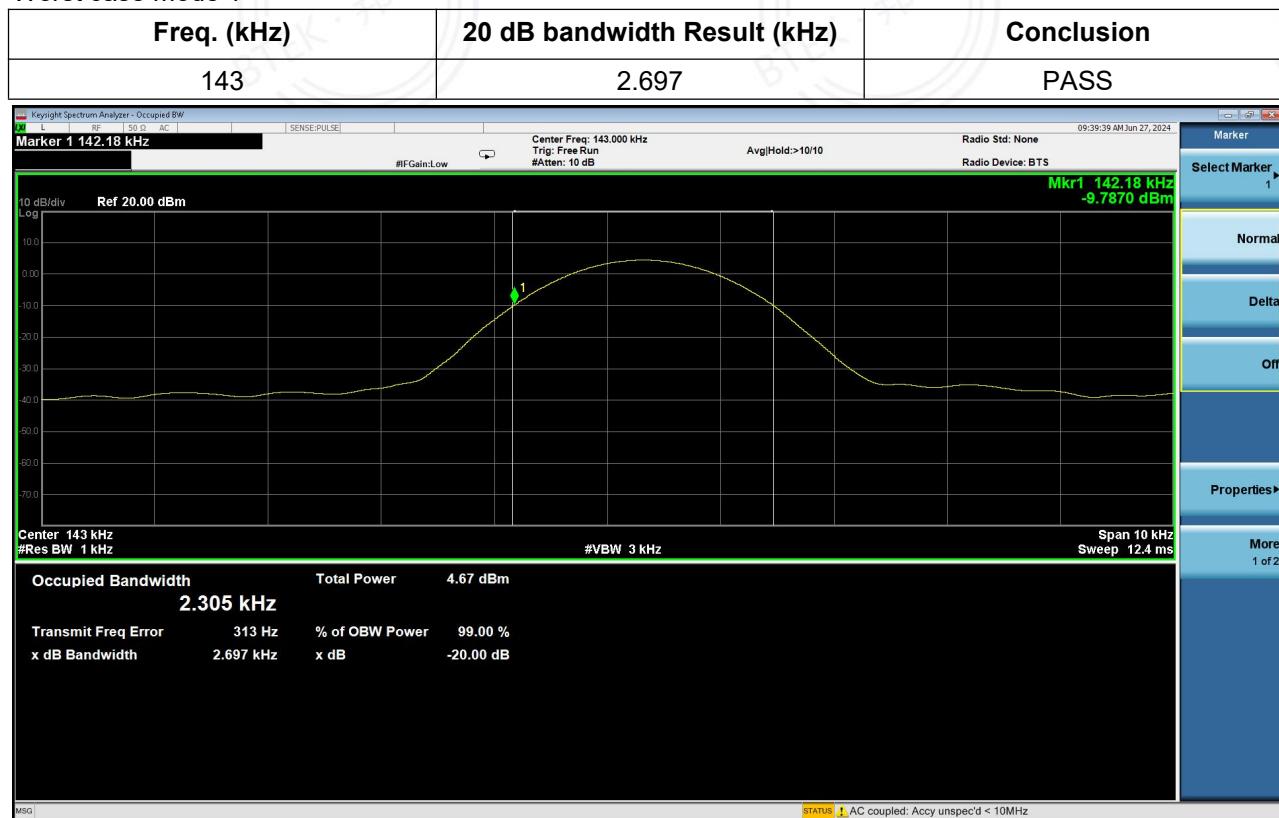
6.1.3 Measurement Procedure and Data

cable loss=0.9

1. The transmitter output was connected to the spectrum analyzer through an attenuator, the pathloss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously
3. Use the following spectrum analyzer settings:
Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel
 $RBW \geq 1\%$ of the 20 dB bandwidth, $VBW \geq RBW$
Sweep = auto, Detector function = peak, Trace = max hold
4. Measure and record the results in the test report.



Worst case mode 1



6.2 AC Power Line Conducted Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.207

Test Method:

Limit:

Frequency of emission(MHz)	Conducted limit(dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

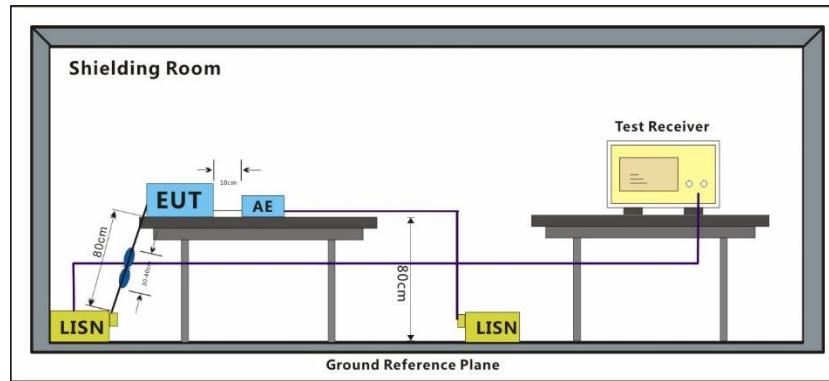
Detector: Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz

6.2.1 E.U.T. Operation

Operating Environment:

Temperature: 25.7 °C Humidity: 57.2 % RH Atmospheric Pressure: 1010 mbar

6.2.2 Test Setup Diagram



6.2.3 Measurement Procedure and Data

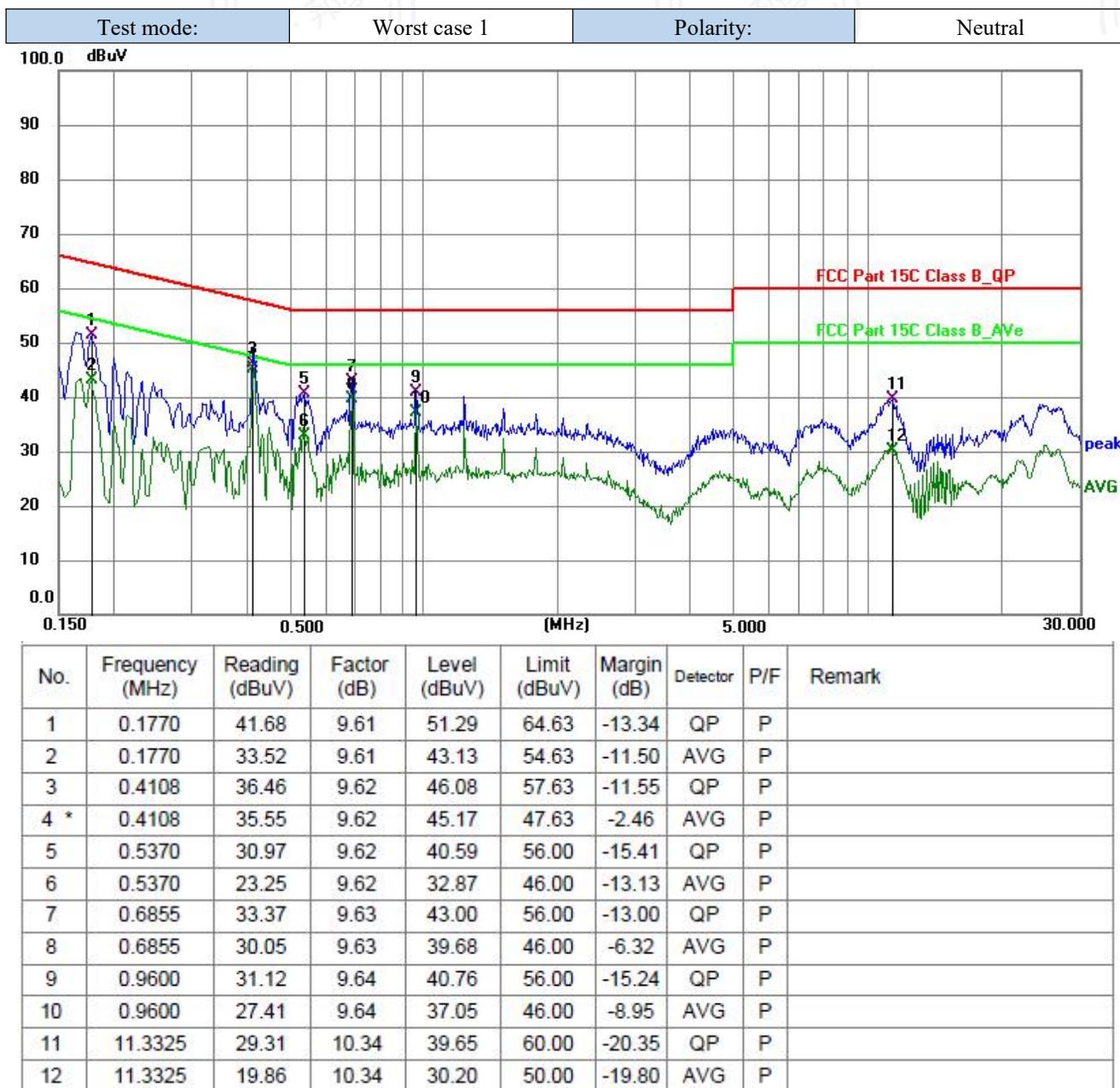
The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. Refer to recorded points and plots below.

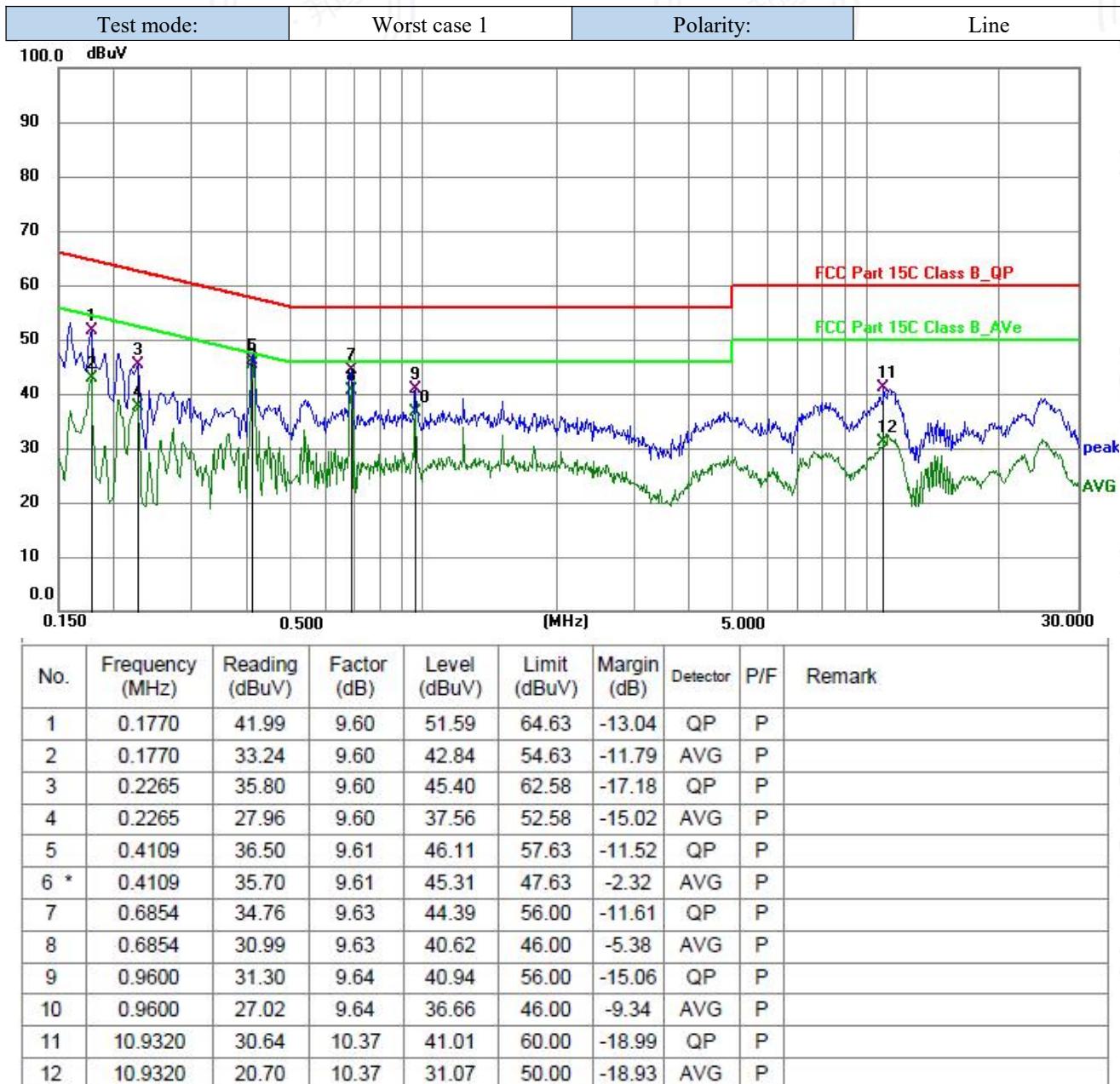
Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz) for which the device is capable of operation. A device rated for 50/60 Hz operation need not be tested at both frequencies provided the radiated and line conducted emissions are the same at both frequencies.

Remark: LISN=Read Level+ Cable Loss+ LISN Factor

Note:Level (dB μ V) = Reading (dB μ V) + Factor (dB)






NOTE:

1. Level (dBuV) = Reading (dBuV) + Factor (dB)

2. Factor = Insertion Loss + Cable Loss.

3. Margin = Level – Limit.



6.3 Radiated Spurious Emissions

Test Requirement FCC §15.209

Test Method:

Limit:

Radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the radiated emission limits specified in FCC section 15.209(a). According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

FCC Part 15.209				
Frequency (MHz)	Field Strength Limitation		Field Strength Limitation Frequency at 3m Measurement Dist	
	(uV/m)	Dist	(uV/m)	(dBuV/m)
0.009 – 0.490	2400 / F(KHz)	300m	10000 * 2400/F(KHz)	20log 2400/F(KHz) + 80
0.490 – 1.705	24000 / F(KHz)	30m	100 * 24000/F(KHz)	20log 24000/F(KHz) + 40
1.705 – 30.00	30	30m	100* 30	20log 30 + 40
30.0 – 88.0	100	3m	100	20log 100
88.0 – 216.0	150	3m	150	20log 150
216.0 – 960.0	200	3m	200	20log 200
Above 960.0	500	3m	500	20log 500

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

6.3.1 E.U.T. Operation

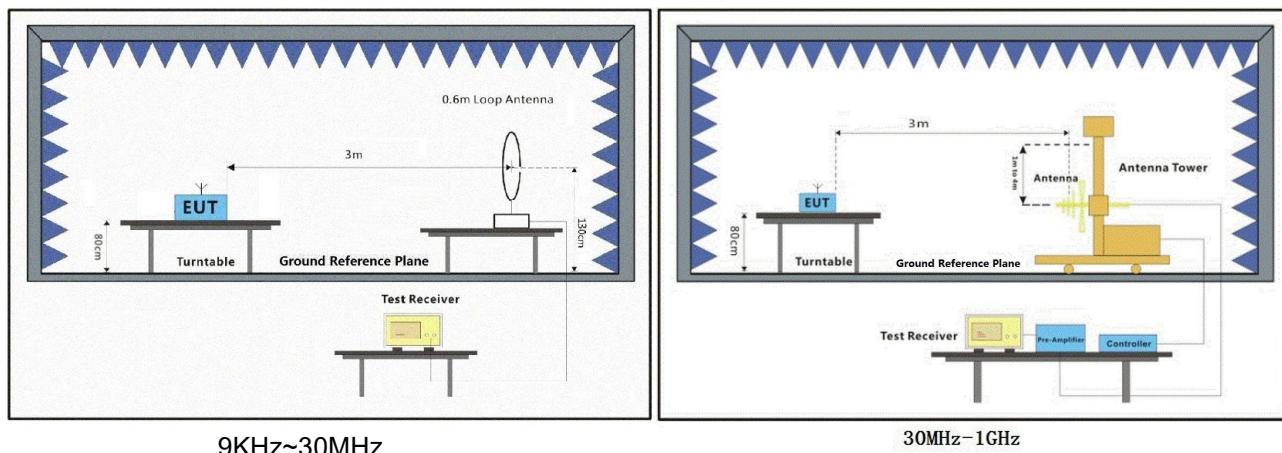
Operating Environment:

Temperature: 25.3 °C

Humidity: 57.4 % RH

Atmospheric Pressure: 1010 mbar

6.3.2 Test Setup Diagram

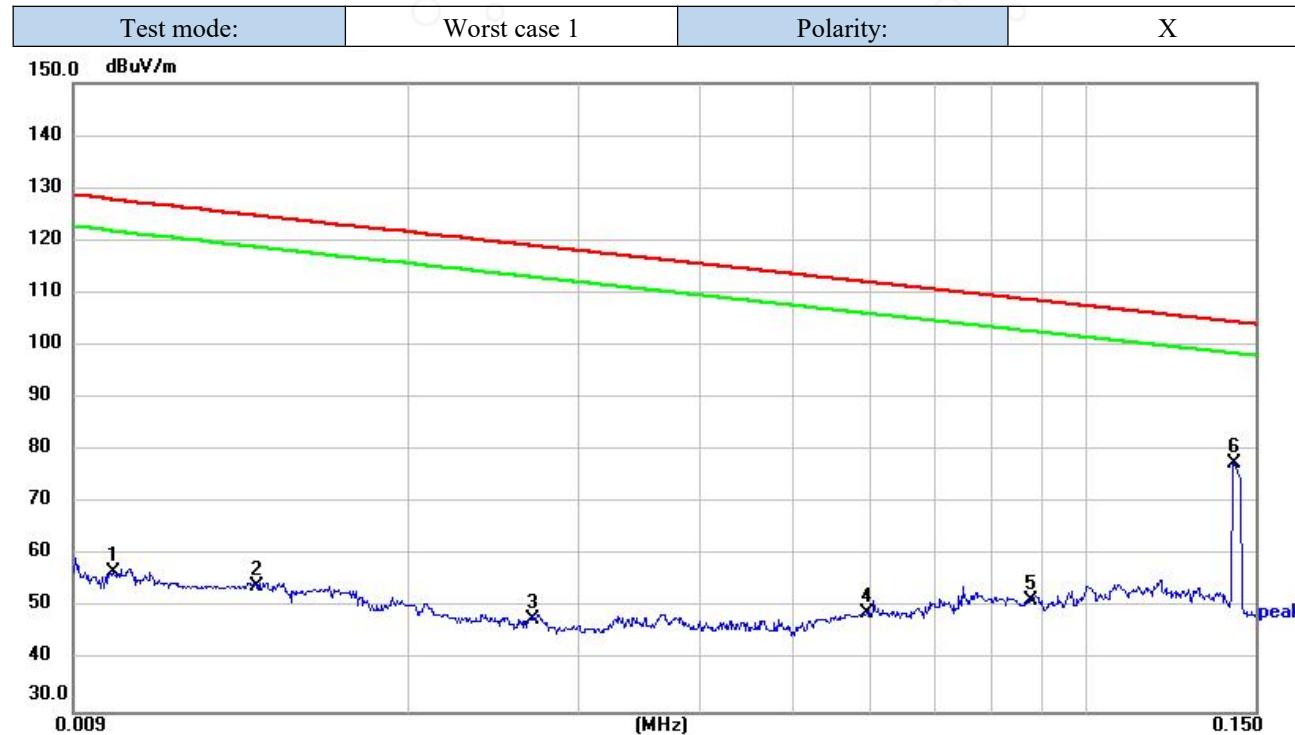


6.3.3 Measurement Procedure and Data

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can move up and down between 1 to 4 meters to find out the maximum emission level. Broadband antenna (calibrated by dipole antenna) are used as a receiving antenna. Both horizontal and vertical polarization of the antenna are set on measurement.

9 kHz ~ 30 MHz

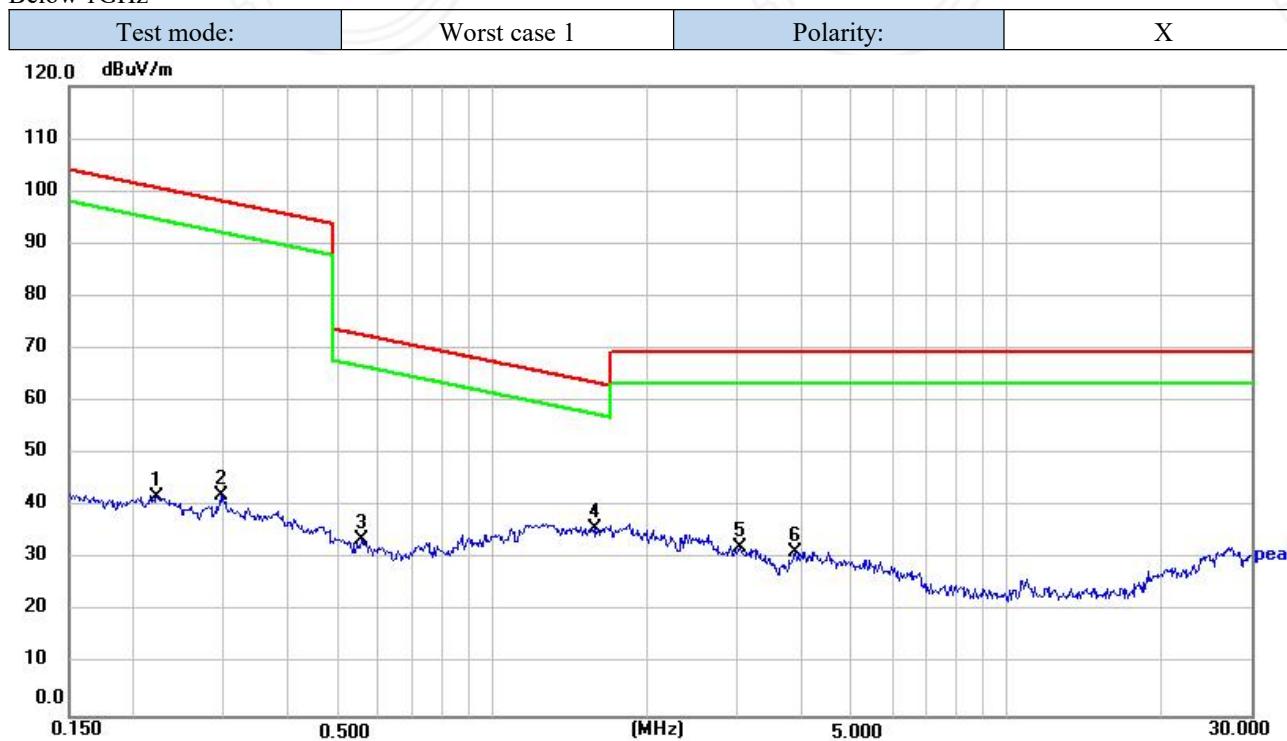
Below 1GHz



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	0.0100	87.19	-30.32	56.87	127.60	-70.73	peak
2	0.0140	84.53	-30.35	54.18	124.68	-70.50	peak
3	0.0268	78.34	-30.45	47.89	119.04	-71.15	peak
4	0.0594	79.90	-30.78	49.12	112.13	-63.01	peak
5	0.0878	82.60	-31.09	51.51	108.73	-57.22	peak
6 *	0.1423	108.69	-31.18	77.51	104.54	-27.03	peak



Below 1GHz



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	0.2220	73.06	-31.15	41.91	100.68	-58.77	peak
2	0.2953	73.35	-31.12	42.23	98.20	-55.97	peak
3	0.5551	64.83	-31.03	33.80	72.72	-38.92	peak
4 *	1.5766	66.61	-30.82	35.79	63.65	-27.86	peak
5	3.0253	63.02	-30.84	32.18	69.54	-37.36	peak
6	3.8807	62.29	-30.84	31.45	69.54	-38.09	peak

Note:

- 1). Level(dBuV/m)=Reading(dBuV)+Factor(dB/m)
- 2). Factor(dB/m)=Antenna Factor(dB/m)+Cable loss(dB)-Pre Amplifier gain(dB)
- 3). Margin(dB)=Limit(dBuV/m)-Level(dBuV/m)
- 4). This EUT was tested in 3 orthogonal positions and the worst case position data was reported.
- 5). Pre-scan coaxial and coplanar polar, only show the worst case coaxial in the test report.



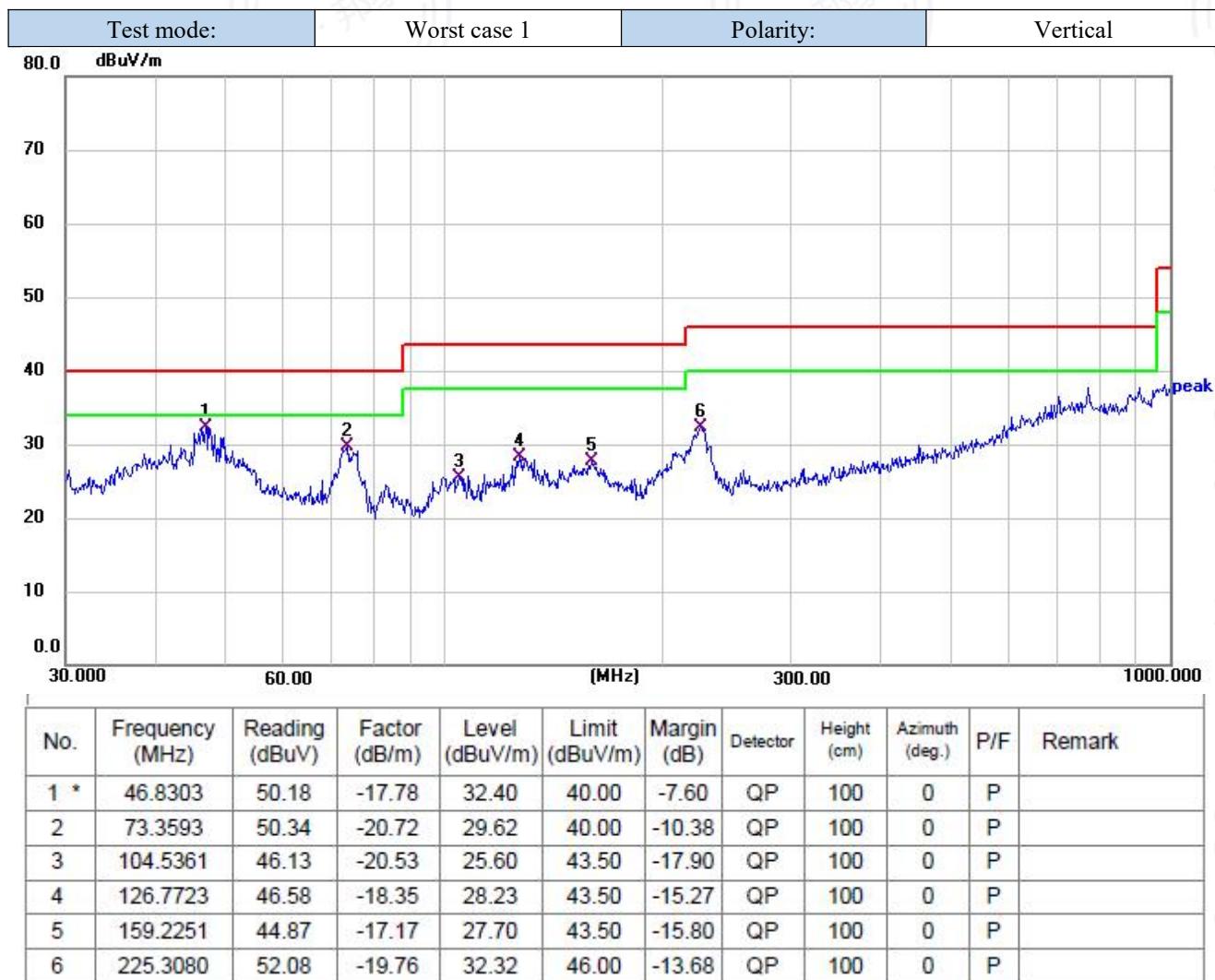
Below 1GHz

Test mode:	Worst case 1	Polarity:	Horizontal
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No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	71.8320	45.35	-20.44	24.91	40.00	-15.09	QP	100	197	P	
2	104.9033	46.30	-20.49	25.81	43.50	-17.69	QP	100	271	P	
3	132.6850	47.72	-17.99	29.73	43.50	-13.77	QP	100	135	P	
4	162.0414	46.60	-17.54	29.06	43.50	-14.44	QP	100	35	P	
5	234.9909	49.74	-19.31	30.43	46.00	-15.57	QP	100	184	P	
6 *	893.8567	44.84	-8.04	36.80	46.00	-9.20	QP	100	271	P	




NOTE:

1.Level (dBuV/m) = Reading (dBuV) + Factor (dB/m)

The reading level is calculated by software which is not shown in the sheet

2.Factor = Antenna Factor+ Cable Loss-Preamp Factor

3.Margin = Level – Limit.



7 Test Setup Photo

Please refer to the Appendix test setup Photos.

8 EUT Constructional Details (EUT Photos)

Please refer to the Appendix EUT Photos.

- End of the Report -

