FCC PART 18

Embedded smart furniture wireless charger

MODEL No.: T02

FCC ID: 2BD2K-T02

REPORT NO.:NCT24010143XE-1

ISSUE DATE: Mar. 12, 2024

Prepared for

SHENZHEN HOPEPOWER TECHNOLOGY CO.,LTD

NO.302-326 Room,3F ChangAn ZhiGu,Xitou community,
Songgang Street, Bao'an district, Shenzhen city, China.

Prepared by

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TEST REPORT DESCRIPTION

Applicant	:	SHENZHEN HOPEPOWER TECHNOLOGY CO.,LTD
Address	:	NO.302-326 Room,3F ChangAn ZhiGu,Xitou community, Songgang Street, Bao'an district, Shenzhen city, China.
Manufacturer	:	SHENZHEN HOPEPOWER TECHNOLOGY CO.,LTD
Address	:	NO.302-326 Room,3F ChangAn ZhiGu,Xitou community, Songgang Street, Bao'an district, Shenzhen city, China.
EUT	:	Embedded smart furniture wireless charger
Model Name	:	T02
Trademark	:	HKT

Measurement Procedure Used:

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR Part 18	PASS

The above equipment was tested by Shenzhen NCT Testing Technology Co., Ltd.The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 18

The test results of this report relate only to the tested sample identified in this report.

Test Engineer:

Keven Wu / Engineer

Technical Manager:

Henry Wang / Manager

Modified Information

Version	Report No.	Revision Data	Summary
Ver.1.0	NCT24010143XE-1	Mar. 12, 2024	Original Version

1. SUMMARY OF TEST RESULTS

Test Item	Section in CFR 47	Result
Conducted Emission (150K-30MHz)	18.307	Pass
Radiated disturbance9KHz-30MHz	18.305	Pass
Radiated disturbance30MHz-1000MHz	18.305	Pass

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

EUT : Embedded smart furniture wireless charger

Model Number : T02
Model different : N/A

Power Rating :
USB Input: 5Vdc,2A; 9Vdc,2A; 12Vdc,2A
USB Output: 5Vdc,1.5-2A
Wireless Charging output:5W/7.5W/10W/15W

Date of Received : Mar.04, 2024

Date of Test : Mar.04, 2024 to Mar.11, 2024

2.2. Description of Support Units

The EUT has been tested as an independent 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.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	Embedded smart furniture wireless charger	N/A	T02	N/A	EUT
E-2	Phone	Mi	Xiaomi 13 Ultra	N/A	Auxiliary
E-3	Adapter	N/A	A18A-050100U-US2	N/A	Auxiliary

Note: (1)The support equipment was authorized by Declaration of Confirmation.
(2)For detachable type I/O cable should be specified the length in cm in『Length』column.

2.3. Independent Operation Modes

	Mode	Description	Remark()
	1.	Wireless output:5W	5%
	2.		50%
	3.		95%
	4.	Wireless output:7.5W	5%
	5.		50%
	6.		95%
	7.	Wireless output:10W	5%
	8.		50%
	9.		95%
	10.	Wireless output:15W	5%
	11.		50%
	12.		95%
	13.	USB Output: 5Vdc, 1.5A	
	14.	USB Output: 5Vdc, 2A	
Note: All modes have been tested, only the data reflecting the worst test mode is included in the report.			

2.4. Description of Test Facility

Site Description

EMC Lab. : Accredited by CNAS, 2022-09-27
The certificate is valid until 2028.01.07
The Laboratory has been assessed and proved to be in compliance with CNAS-CL01:2006 (identical to ISO/IEC 17025:2017)
The Certificate Registration Number is L8251

Designation Number: CN1347
Test Firm Registration Number: 894804
Accredited by A2LA, June 14, 2023
The Certificate Registration Number is 6837.01

Accredited by Industry Canada, November 09, 2018
The Conformity Assessment Body Identifier is CN0150
Company Number: 30806

Name of Firm : Shenzhen NCT Testing Technology Co., Ltd.

Site Location : A101&2F B2, Fuqiao 6th Area, Xintian Community, Fuhai Street, Baoan District, Shenzhen, People's Republic of China

2.5. Measurement Uncertainty

Parameter	Uncertainty
RF output power, conducted	±1.0dB
Power Spectral Density, conducted	±2.2dB
Radio Frequency	± 1 x 10^{-6}
Bandwidth	± 1.5 x 10^{-6}
Time	±2%
Duty Cycle	±2%
Temperature	±1°C
Humidity	±5%
DC and low frequency voltages	±3%
Conducted Emissions (150kHz~30MHz)	±3.64dB
Radiated Emission(9kHz~30MHz)	±4.51dB
Radiated Emission(30MHz~1GHz)	±5.03dB
Radiated Emission(1GHz~25GHz)	±4.74dB

3. MEASURING DEVICE AND TEST EQUIPMENT

Radiated emission & Radio Frequency Test Equipment

Name	Model No.	Serial No.	Manufacturer	Date of Cal.	Due Date
966 Shielded Room	966 Room	/	EMToni	2022/5/31	2025/5/30
EMI Test Receiver	ESCI	101178	Rohde & Schwarz	2023/6/21	2024/6/20
Spectrum Analyze （10Hz-26.5GHz）	N9020A	MY50510202	Agilent	2023/6/21	2024/6/20
Amplifi （30MHz-1GHz）	BBV 9743 B	00374	SCHNARZBECK	2023/6/21	2024/6/20
Bilog Antenna （30MHz-1GHz）	VULB9162	00473	SCHNARZBECK	2023/3/19	2025/3/18
Horn antenna （1GHz-18GHz）	BBHA 9120 D	02622	SCHNARZBECK	2023/3/19	2025/3/18
Pream plifier （1GHz-18GHz）	BBV 9718D	0024	SCHNARZBECK	2023/6/21	2024/6/20
Spectrum Analyze （10Hz-40GHz）	FSV 40	100952	Rohde & Schwarz	2023/6/21	2024/6/20
Pream plifier （18GHz-40GHz）	BBV 9721	0056	SCHNARZBECK	2023/6/21	2024/6/20
Double Ridge Guide Horn Antenna （18GHz-40GHz）	SAS-574	588	A.H.System	2023/3/19	2025/3/18
Loop Antenna (9KHz-30MHz)	FMZB1519B	014	SCHNARZBECK	2023/6/21	2024/6/20
Amplifier (9KHz-30MHz)	CVP 9222 C	00109	SCHNARZBECK	2023/6/21	2024/6/20
MXG Signal Analyzer	N9020A	MY50510202	Agilent	2023/6/21	2024/6/20
MXG Vector Signal Generator	N5182A	MY50140020	Agilent	2023/6/21	2024/6/20
MXG Analog Signal Generator	N5181A	MY47420919	Agilent	2023/6/21	2024/6/20
Power Sensor	TR1029-2	512364	Techoy	2023/6/21	2024/6/20
RF Swith	TR1029-1	512364	Techoy	2023/6/21	2024/6/20
Cable	DA800-4000MM	NA	DA	2023/6/21	2024/6/20
Cable	DA800-11000MM	NA	DA	2023/6/21	2024/6/20

Conducted emission Test Equipment

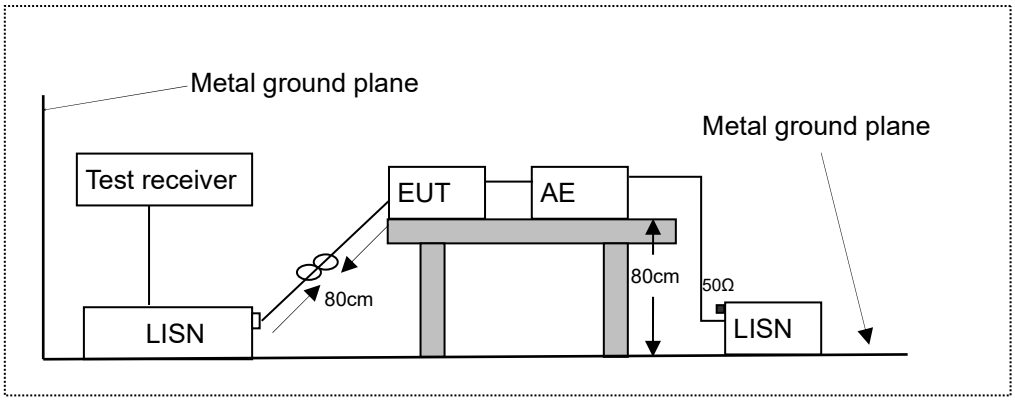
Name	Model No.	Serial No.	Manufacturer	Date of Cal.	Due Date
944 Shielded Room	944 Room	/	EMToni	2022/5/31	2025/5/30
EMI Test Receiver	ESPI	101604	Rohde & Schwarz	2023/6/21	2024/6/20
LISN	ENV 216	102796	Rohde & Schwarz	2023/6/21	2024/6/20
LISN	VN1-13S	004023	CRANAGE	2023/6/21	2024/6/20
Cable	RG223-1500MM	NA	RG	2023/6/21	2024/6/20

Other

Item	Name	Manufacturer	Model	Software version
1	EMC Conduction Test System	AUDIX	e3	6.120718
2	EMC radiation test system	AUDIX	e3	6.120718
3	RF test system	TACHOY	RFTest	V1.0.0
4	RF communication test system	TACHOY	RFTest	V1.0.0

4. POWER LINE CONDUCTED EMISSION MEASUREMENT

4.1. Block Diagram of Test Setup



LISN: Line Impedance Stabilization Network
AE: Associated equipment
EUT: Equipment under test

4.2. Limits

FCC Part 18

Frequency (MHz)			Limit (dBμV)	
			Quasi-peak Level	Average Level
0.15	~	0.50	66.0 ~ 56.0 *	56.0 ~ 46.0 *
0.50	~	5.00	56.0	46.0
5.00	~	30.00	60.0	50.0
NOTE1-The lower limit shall apply at the transition frequencies. NOTE2-The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.				

4.3. Test Procedure

The EUT was placed on a desk 0.8 m height from the metal ground plane and 0.4 m from the conducting wall of the shielding room and it was kept at least 0.8 m from any other grounded conducting surface. The size of the table will nominally be 1.5 m x1.0 m.

The rear of the arrangement shall be flush with the back of the supporting tabletop unless that would not be possible or typical of normal use.

All units of equipment forming the system under test (includes the EUT as well as connected peripherals and associated equipment or devices) shall be arranged such that a nominal 0.1 m separation is achieved between the neighboring units.

Connect EUT to the power mains through a line impedance stabilization network (LISN). Where the mains cable supplied by the manufacturer is longer than 1 m, the excess should be folded at the centre into a bundle no longer than 0.4 m, so that its length is shortened to 1 m.

All the support units are connecting to the other LISN.

The LISN provides 50 ohm coupling impedance for the measuring instrument.

Both sides of AC line were checked for maximum conducted interference.

The frequency range from 150 kHz to 30 MHz was sweep.

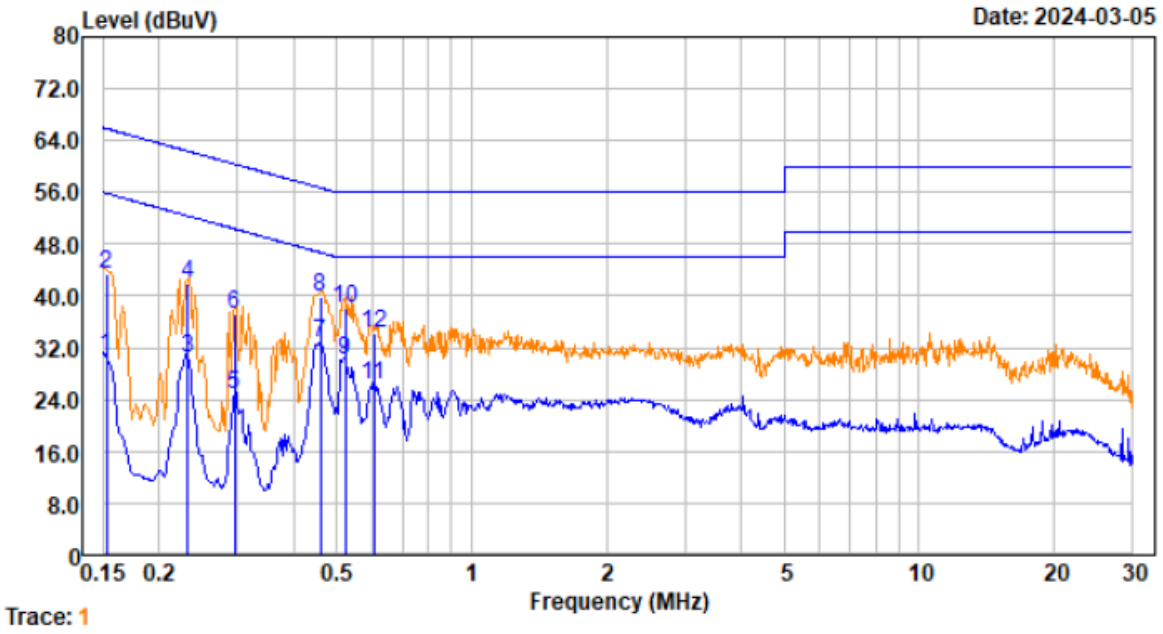
Set the test-receiver system to quasi peak detect function and average detect function, and to measure the conducted emissions values.

Test results were obtained from the following equation:
Emission Level (dBμV) = LISN Factor (dB) + Cable Loss (dB) + Reading (dBμV)
Margin (dB) = Emission Level (dBμV) - Limit (dBμV)

4.4. Measuring Results

PASS.

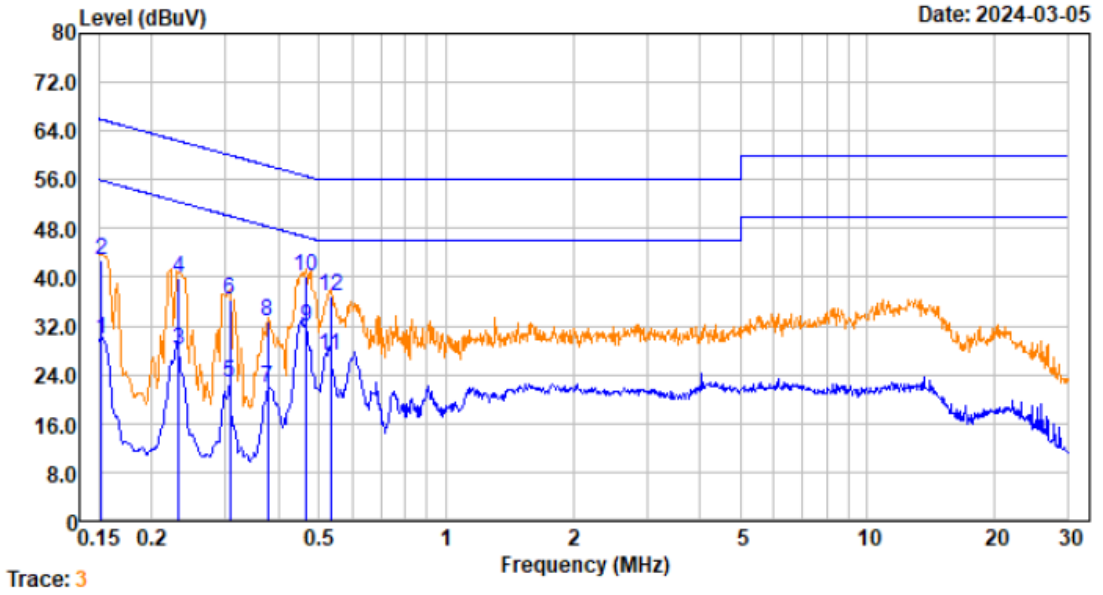
Temperature：	26℃	Relative Humidity：	54%
Pressure：	101kPa	Phase :	L
Test Voltage ：	AC 120V/60Hz	Mode:	Mode 10



No.	Freq MHz	Cable Loss dB	LISN Factor dB/m	Receiver Reading dBuV	Emission Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark
1.	0.153	0.00	9.54	10.90	30.60	55.82	-25.22	Average
2.	0.153	0.00	9.54	23.80	43.50	65.82	-22.32	QP
3.	0.232	0.01	9.55	10.76	30.46	52.39	-21.93	Average
4.	0.232	0.01	9.55	22.10	41.80	62.39	-20.59	QP
5.	0.296	0.01	9.56	5.03	24.73	50.37	-25.64	Average
6.	0.296	0.01	9.56	17.60	37.30	60.37	-23.07	QP
7.	0.459	0.01	9.57	13.19	32.89	46.71	-13.82	Average
8.	0.459	0.01	9.57	20.10	39.80	56.71	-16.91	QP
9.	0.521	0.01	9.57	10.47	30.16	46.00	-15.84	Average
10.	0.521	0.01	9.57	18.41	38.10	56.00	-17.90	QP
11.	0.604	0.02	9.58	6.60	26.31	46.00	-19.69	Average
12.	0.604	0.02	9.58	14.59	34.30	56.00	-21.70	QP

Notes:
1.An initial pre-scan was performed on the line and neutral lines with peak detector.
2.Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3.Mesurement Level = Reading level + Correct Factor

Temperature：	26℃	Relative Humidity：	54%
Pressure：	101kPa	Phase :	N
Test Voltage ：	AC 120V/60Hz	Mode:	Mode 10



No.	Freq MHz	Cable Loss dB	LISN Factor dB/m	Receiver Reading dBuV	Emission Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark
1.	0.152	0.00	9.53	10.21	29.90	55.87	-25.97	Average
2.	0.152	0.00	9.53	23.20	42.89	65.87	-22.98	QP
3.	0.232	0.01	9.55	8.25	27.95	52.39	-24.44	Average
4.	0.232	0.01	9.55	20.20	39.90	62.39	-22.49	QP
5.	0.307	0.01	9.56	2.92	22.62	50.06	-27.44	Average
6.	0.307	0.01	9.56	16.70	36.40	60.06	-23.66	QP
7.	0.377	0.01	9.57	2.19	21.90	48.34	-26.44	Average
8.	0.377	0.01	9.57	13.10	32.81	58.34	-25.53	QP
9.	0.466	0.01	9.58	12.31	32.02	46.58	-14.56	Average
10.	0.466	0.01	9.58	20.30	40.01	56.58	-16.57	QP
11.	0.532	0.01	9.58	7.37	27.07	46.00	-18.93	Average
12.	0.532	0.01	9.58	17.31	37.01	56.00	-18.99	QP

Notes:
1.An initial pre-scan was performed on the line and neutral lines with peak detector.
2.Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3.Mesurement Level = Reading level + Correct Factor

5. RADIATED EMISSION TEST

5.1.Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.

2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.

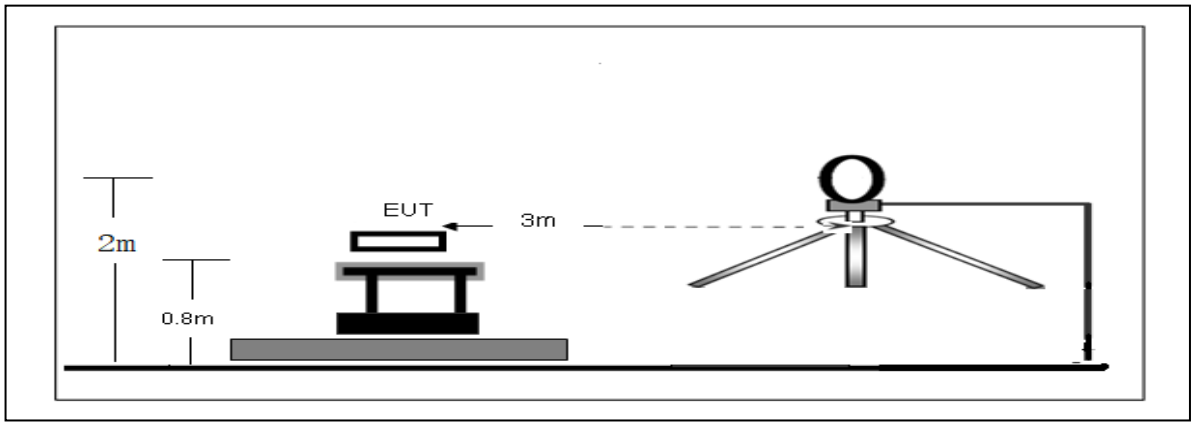
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

4. Repeat above procedures until all frequency measured were complete.

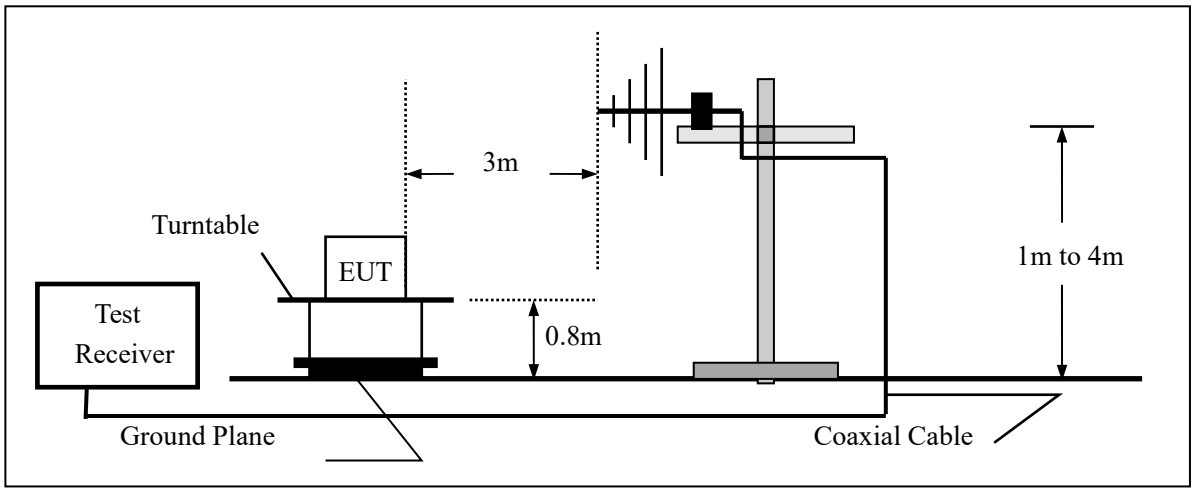
5. Use the following receiver/spectrum analyzer settings:
Span = wide enough to fully capture the emission being measured
RBW=200Hz for 9KHz to 150KHz,
RBW=9kHz for 150KHz to 30MHz,
RBW=120KHz for 30MHz to 1GHz
VBW ≥ 3*RBW
Sweep = auto
Detector function = QP
Trace = max hold

5.2.Test SET-UP (Block Diagram of Configuration)

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



(B) Radiated Emission Test Set-Up, Frequency Below 1000MHz



5.3.Radiated Emission Limit

Limits for frequency below 30MHz

Except as provided elsewhere in this Subpart 18.305 (b), the field strength levels of emissions which lie outside the bands specified in § 18.301, unless otherwise indicated, shall not exceed the following table:

Frequency MHz	Distance Meters	Field Strengths Limit	
		dBμV/m	Remark
0.009~30MHz	3	103.5	Quasi-peak

Remark: (1) Emission level dB V/m for 0.009~30MHz = 20log (15) + 40log (300/3) dB V/m; (2) Calculated according FCC 18.305. (3) The smaller limit shall apply at the cross point between two frequency bands. (4) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

Limits for frequency Above 30MHz

FREQUENCY (MHz)	DISTANCE (Meters)	FIELD STRENGTHS LIMITS (dBμV/m)
30 ~ 1000	3	63.5

(1) Emission level dB V/m for above 30MHz = 20log (15) + 20log (300/3) dB V/m

5.4. 4.4 EUT Configuration on Test

The FCC PART 18 regulations test method must be used to find the maximum emission during radiated emission test.The configuration of EUT is the same as used in conducted emission test.Please refer to Section 2.2.

5.5. 4.5 Operating Condition of EUT

Same as conducted emission test, which is listed in Section 2.2 except the test set up replaced as Section 4.1.

5.6. 4.6 Test Procedure

1) Sequence of testing 9 kHz to 30 MHz
Setup:
--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
--- If the EUT is a tabletop system, a rotatable table with 0.8 m height is used.
--- If the EUT is a floor standing device, it is placed on the ground.
--- Auxiliary equipment and cables were positioned to simulate normal operation conditions.
--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
--- The measurement distance is 3 meter.
--- The EUT was set into operation.
Premeasurement:
--- The turntable rotates from 0° to 315° using 45° steps.
--- The antenna height is 2.0 meter.
--- At each turntable position the analyzer sweeps with peak detection to find the maximum of all emissions Final measurement:
--- Identified emissions during the premeasurement the software maximizes by rotating the turntable position (0° to 360°) and by rotating the elevation axes (0° to 360°).
--- The final measurement will be done in the position (turntable and elevation) causing the highest emissions with QPK detector.
--- The final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

Sequence of testing 30 MHz to 1 GHz Setup:
--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
--- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.
--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
--- Auxiliary equipment and cables were positioned to simulate normal operation conditions
--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
--- The measurement distance is 3 meter.
--- The EUT was set into operation.
Premeasurement:
--- The turntable rotates from 0° to 315° using 45° steps.
--- The antenna is polarized vertical and horizontal.
--- The antenna height changes from 1 to 4 meter.
--- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.
Final measurement:
--- The final measurement will be performed with minimum the six highest peaks.
--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position (± 45°) and antenna movement between 1 and 4 meter.
--- The final measurement will be done with QP detector with an EMI receiver.
--- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored

5.7.Measurement Result

Measurement data:

Note: Limit dBuV/m @3m = Limit dBuV/m @300m+ 80

Limit dBuV/m @3m = Limit dBuV/m @30m + 40

9 kHz~30 MHz

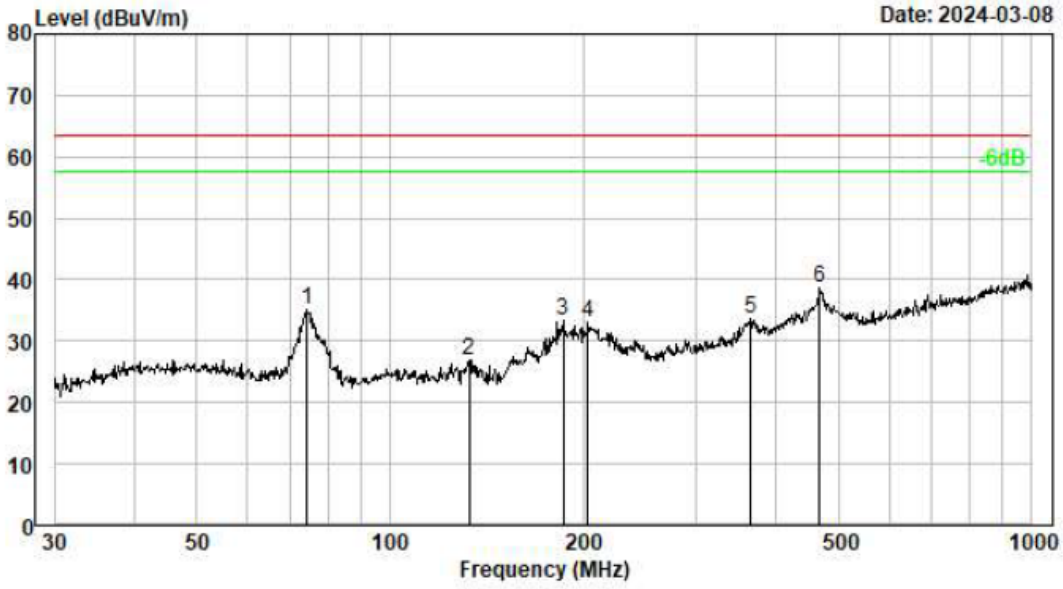
Temperature：	26℃	Relative Humidity：	54%
Pressure：	101kPa		
Test Voltage ：	AC 120V/60Hz	Mode:	Mode 10

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(kHz)	(dBμV/m)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	
125	75.69	20.17	95.86	103.5	-7.64	QP
157.3	66.86	20.17	87.03	103.5	-16.47	QP
324	70.47	20.25	90.72	103.5	-12.78	QP
1415.33	67.76	20.25	88.01	103.5	-15.49	QP
4118.74	68.15	20.24	88.39	103.5	-15.11	QP
5523.91	69.23	20.24	89.47	103.5	-14.03	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.

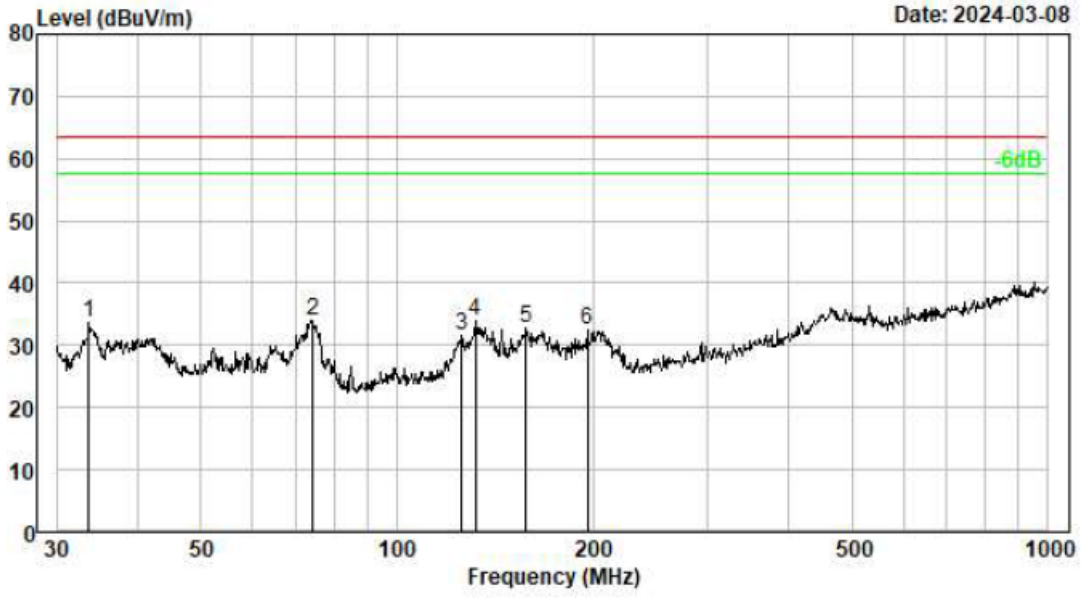
30MHz-1GHz:

Temperature:	26℃	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	Horizontal
Test Voltage:	AC 120V/60Hz	Mode:	Model 10



No.	Freq MHz	Cable Loss dB	ANT Factor dB/m	Preamp Gain dB	Receiver Reading dBµV	Emission Level dBµV/m	Limit dBµV/m	Over Limit dB	Remark
1	74.396	0.58	9.54	0.00	25.13	35.25	63.50	-28.25	QP
2	132.685	0.84	8.93	0.00	17.10	26.87	63.50	-36.63	QP
3	186.441	1.02	10.65	0.00	21.77	33.44	63.50	-30.06	QP
4	203.523	1.07	11.52	0.00	20.47	33.06	63.50	-30.44	QP
5	365.539	1.38	15.33	0.00	16.80	33.51	63.50	-29.99	QP
6	467.235	1.51	16.77	0.00	20.25	38.53	63.50	-24.97	QP

Temperature:	26℃	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	Vertical
Test Voltage:	AC 120V/60Hz	Mode:	Model 10



No.	Freq MHz	Cable Loss dB	ANT Factor dB/m	Preamp Gain dB	Receiver Reading dBµV	Emission Level dBµV/m	Limit dBµV/m	Over Limit dB	Remark
1	33.562	0.28	10.73	0.00	22.67	33.68	63.50	-29.82	QP
2	74.396	0.58	9.54	0.00	23.92	34.04	63.50	-29.46	QP
3	125.886	0.81	9.58	0.00	21.33	31.72	63.50	-31.78	QP
4	132.221	0.84	8.96	0.00	24.10	33.90	63.50	-29.60	QP
5	158.112	0.93	8.71	0.00	23.11	32.75	63.50	-30.75	QP
6	196.510	1.05	11.30	0.00	19.99	32.34	63.50	-31.16	QP

Remarks:
1.Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2.The emission levels of other frequencies are very lower than the limit and not show in test report.

6. TEST PHOTOGRAPHS AND EUT PHOTOGRAPHS

Please the attachment for details.

----------The end----------