

Shanghai Rongtai Health Technology Corporation Limited

RF TEST REPORT

Report Type:

FCC Part 15C RF report

Model:

RT8800, Circadian

REPORT NUMBER:

211100245SHA-001

ISSUE DATE:

December 2, 2021

DOCUMENT CONTROL NUMBER:

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Factory : Shanghai Rongtai Health Technology Corporation Limited
No. 1226, Zhufeng Road, Qingpu, Shanghai 201714, P.R.China

FCC ID : 2ACM7RT8800

SUMMARY:

The equipment complies with the requirements according to the following standard(s) or Specification:

47CFR Part 15 (2019): Radio Frequency Devices (Subpart C)

ANSI C63.10 (2014): American National Standard of Procedures for Compliance Testing of
Unlicensed Wireless Devices

PREPARED BY:**REVIEWED BY:**

Project Engineer
Sky Yang

Reviewer
Eric Li

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TEST REPORT

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Revision History

Report No.	Version	Description	Issued Date
211100245SHA-001	Rev. 01	Initial issue of report	December 2, 2021

Measurement result summary

TEST ITEM	FCC REFERENCE	RESULT
Radiated emissions	15.209	Pass
Conducted emissions	15.207	Pass

Notes: 1: NA =Not Applicable

2: Determination of the test conclusion is based on IEC Guide 115 in consideration of measurement uncertainty.

3: Additions, Deviations and Exclusions from Standards: None.

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1 GENERAL INFORMATION

1.1 Description of Equipment Under Test (EUT)

Product name:	Massage Chair
Type/Model:	RT8800, Circadian
Description of EUT:	EUT is a massage chair. It supports wireless charging and Bluetooth functions, the Bluetooth used the approved module, the FCC ID is 2AC7Z-ESP32WROVERE. There are two models, they are the same except model name, Circadian is the guest model. We test RT8800 and list the results in this report.
Rating:	110-120VAC, 60Hz, 1.9A
Category of EUT:	Class B
EUT type:	<input type="checkbox"/> Table top <input checked="" type="checkbox"/> Floor standing
Software Version:	/
Hardware Version:	/
Sample number:	0211104-001
Sample received date:	November 04, 2021
Date of test:	November 08, 2021~ November 17, 2021

1.2 Technical Specification

Frequency Range:	111kHz – 205kHz
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1.3 Description of Test Facility

Name:	Intertek Testing Services Shanghai
Address:	Building 86, No. 1198 Qinzhou Road (North), Shanghai 200233, P.R. China
Telephone:	86 21 61278200
Telefax:	86 21 54262353

The test facility is recognized, certified, or accredited by these organizations:	CNAS Accreditation Lab Registration No. CNAS L0139
	FCC Accredited Lab Designation Number: CN1175
	IC Registration Lab CAB identifier.: CN0051
	VCCI Registration Lab Registration No.: R-14243, G-10845, C-14723, T-12252
	A2LA Accreditation Lab Certificate Number: 3309.02

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2 TEST SPECIFICATIONS

2.1 Standards or specification

47CFR Part 15 (2019)
ANSI C63.10 (2014)

2.2 Mode of operation during the test

Within this test report, EUT was tested under all available operation modes and tested under its rating voltage and frequency. Other voltage and frequency are specified if used.

2.3 Test software list

Test Items	Software	Manufacturer	Version
Conducted emission	SKET Auto EMC Test Software	Keleto	V3.0
Radiated emission	SKET Auto EMC Test Software	Keleto	V3.0

2.4 Test peripherals list

Item No.	Name	Brand and Model	Description
1	Mobile Phone	iPhone 6	-

2.5 Test environment condition:

Test items	Temperature	Humidity
Radiated emission	25°C	54% RH
Power line conducted emission	24°C	54% RH

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2.6 Instrument list

Conducted Emission					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
<input checked="" type="checkbox"/>	Test Receiver	R&S	ESCS 30	EC 2107	2022-07-07
<input checked="" type="checkbox"/>	A.M.N.	R&S	ESH2-Z5	EC 3119	2022-11-09
<input checked="" type="checkbox"/>	Shielding room	Zhongyu	-	EC 2838	2022-01-12
Radiated Emission					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
<input checked="" type="checkbox"/>	Test Receiver	R&S	ESIB 26	EC 3045	2022-09-15
<input checked="" type="checkbox"/>	Bilog Antenna	TESEQ	CBL 6112D	EC 4206	2022-09-24
<input type="checkbox"/>	Horn antenna	R&S	HF 906	EC 3049	2022-01-17
<input type="checkbox"/>	Pre-amplifier	R&S	Pre-amp 18	EC5262	2022-06-10
<input checked="" type="checkbox"/>	Active loop antenna	Schwarzbeck	FMZB1519	EC 5345	2022-03-06
<input checked="" type="checkbox"/>	Semi-anechoic chamber	Albatross project	-	EC 3048	2022-07-13
Additional instrument					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
<input checked="" type="checkbox"/>	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 3783	2022-03-03
<input checked="" type="checkbox"/>	Pressure meter	YM3	Shanghai Mengde	EC 4620	2022-09-08

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2.7 Measurement uncertainty

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

Measurement	Frequency	Expanded Uncertainty ($k=2$)
Conducted emission at mains ports	9kHz ~ 150kHz	3.52 dB
	150kHz ~ 30MHz	3.19 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	4.90 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.02 dB
	6GHz ~ 18GHz	5.28 dB

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3 Radiated emissions

Test result: Pass

3.1 Limit

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

3.2 Measurement Procedure

For Radiated emission below 30MHz:

- The EUT was placed on the top of a rotating table 0.1 meters above the ground at a 3 meters chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- Both X and Y axes of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

NOTE:

- The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz:

- The EUT was placed on the top of a rotating table 0.1 meters above the ground at 3 meters chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- 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.

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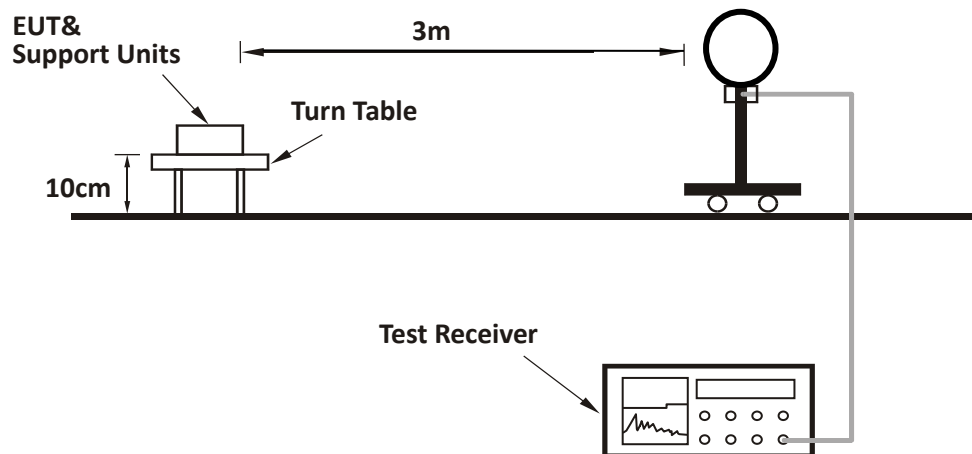
- d) For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e) The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f) The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

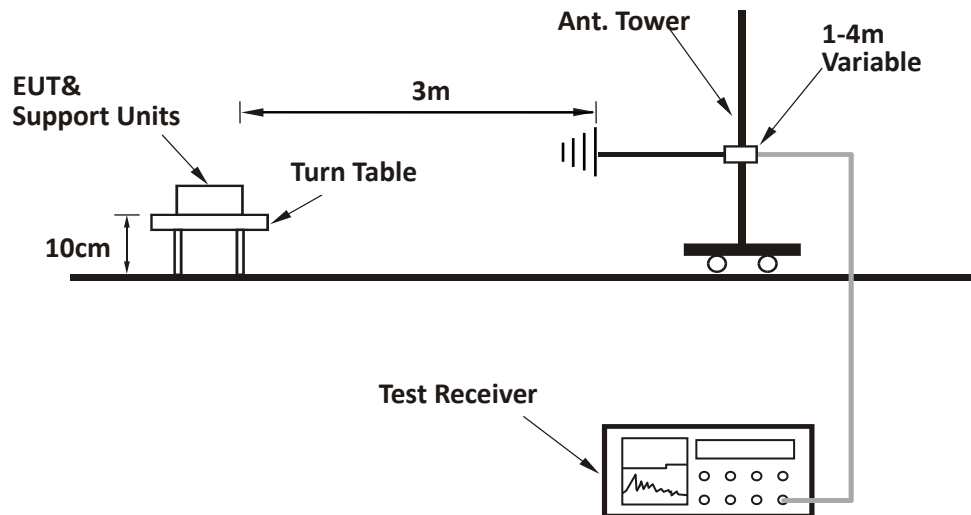
- 1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
- 2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
- 3. All modes of operation were evaluated and the worst-case emissions were reported

3.3 Test Configuration

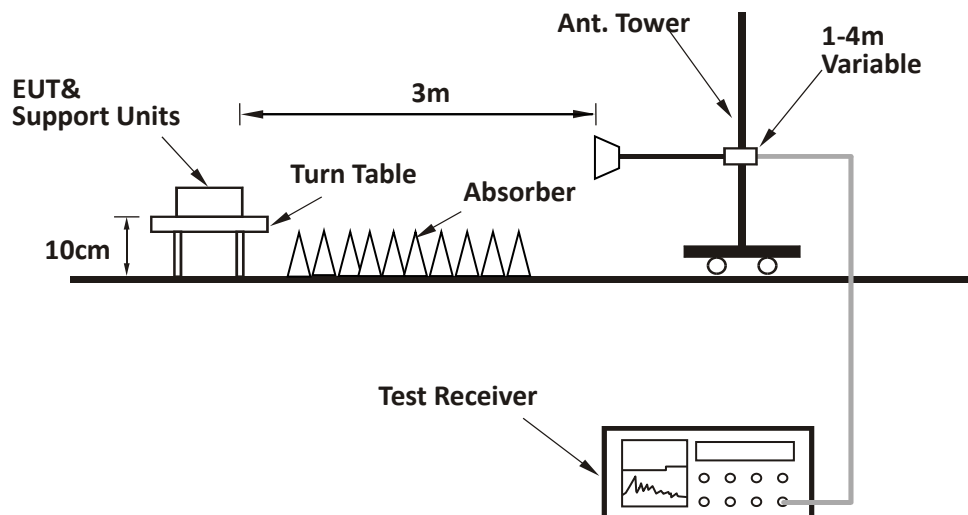
For Radiated emission below 30MHz:



For Radiated emission 30MHz to 1GHz:



For Radiated emission above 1GHz:



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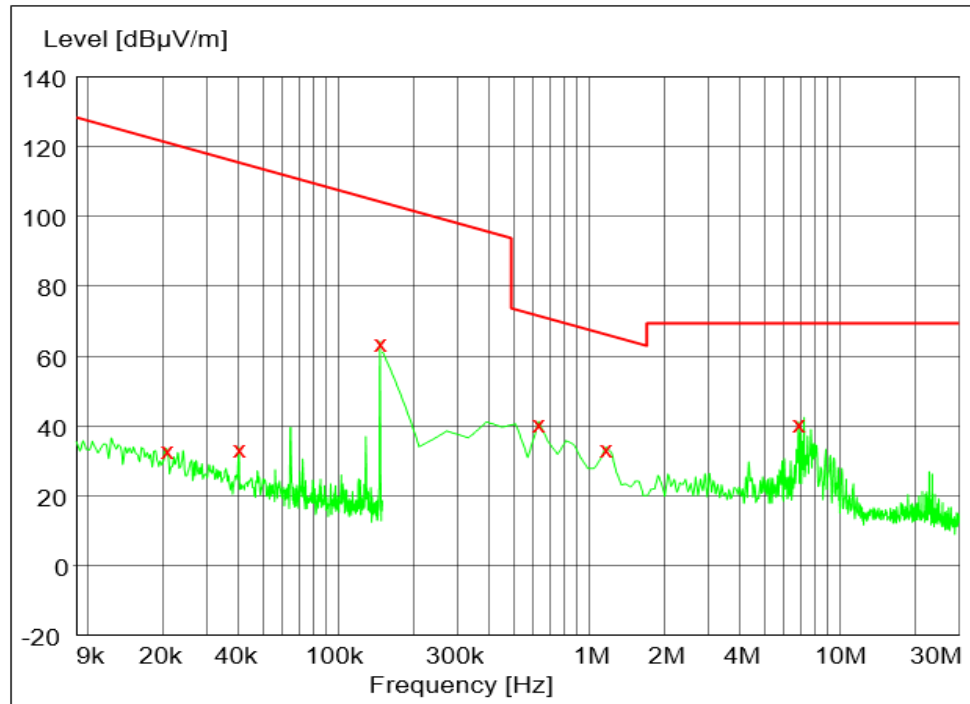
3.4 Test Results of Radiated Emissions

EUT was tested with empty load, half load and full load, the full load is the worst case and we listed the results in the report.

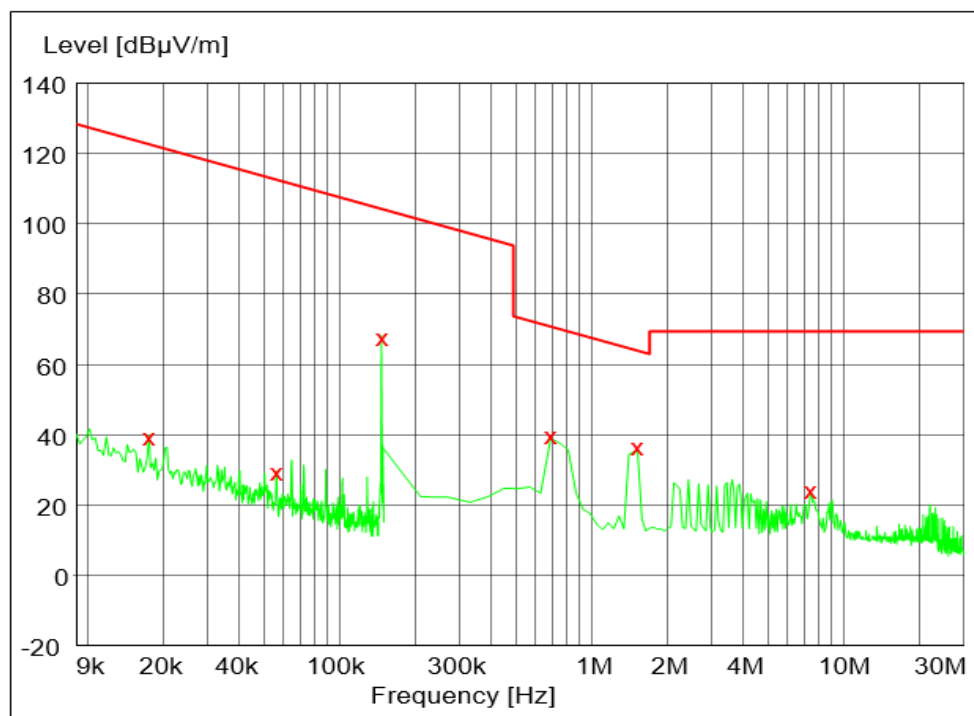
Below 30MHz:

Test Curve:

X



Y



TEST REPORT

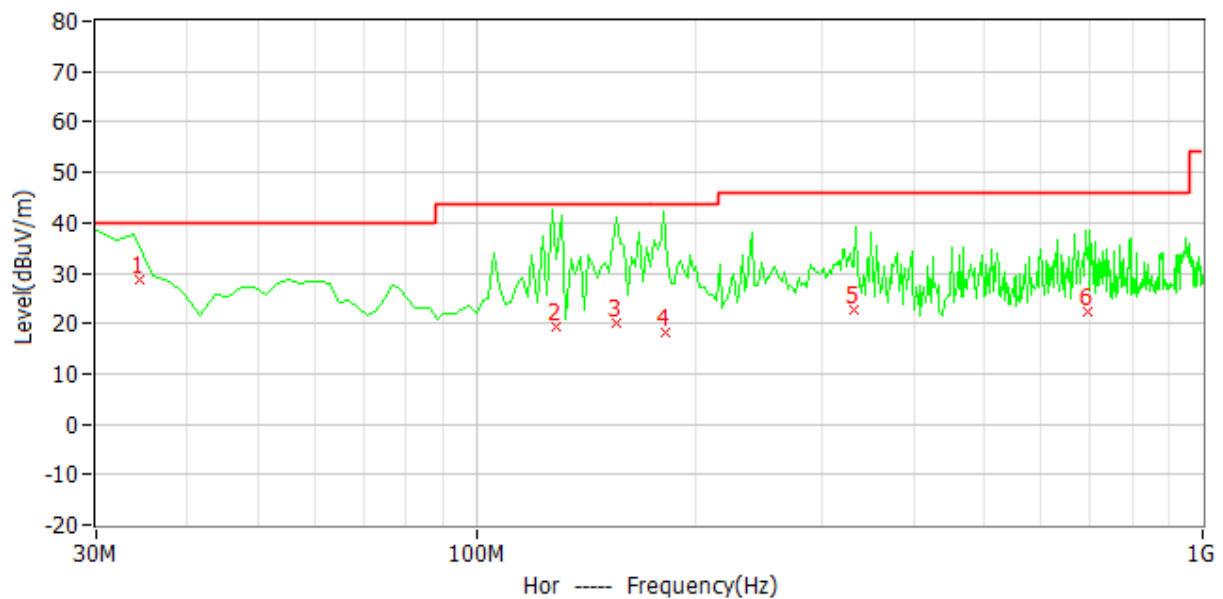
Test Data:

Antenna Polarization	Frequency (MHz)	Limit (dBuV/m)	Level (dBuV/m)	Delta	Factor (dB/m)	Detector	Remark
X	0.021	121.3	33.6	87.7	10.6	PK	Spurious
X	0.040	115.5	33.9	81.6	10.6	PK	Spurious
X	0.146	104.3	64.3	40.0	10.6	PK	Fundamental
X	0.629	71.6	41.3	30.3	10.6	PK	Spurious
X	1.167	66.3	34.0	32.3	11.6	PK	Spurious
X	6.850	69.5	41.3	28.2	11.8	PK	Spurious
Y	0.017	122.7	39.9	82.8	10.8	PK	Spurious
Y	0.056	112.6	29.7	82.9	10.6	PK	Spurious
Y	0.147	104.3	68.3	36.0	10.6	PK	Fundamental
Y	0.688	70.9	39.2	31.7	10.6	PK	Spurious
Y	1.526	64.0	36.7	27.3	11.6	PK	Spurious
Y	7.448	69.5	23.9	45.6	11.8	PK	Spurious

30MHz to 1000MHz:

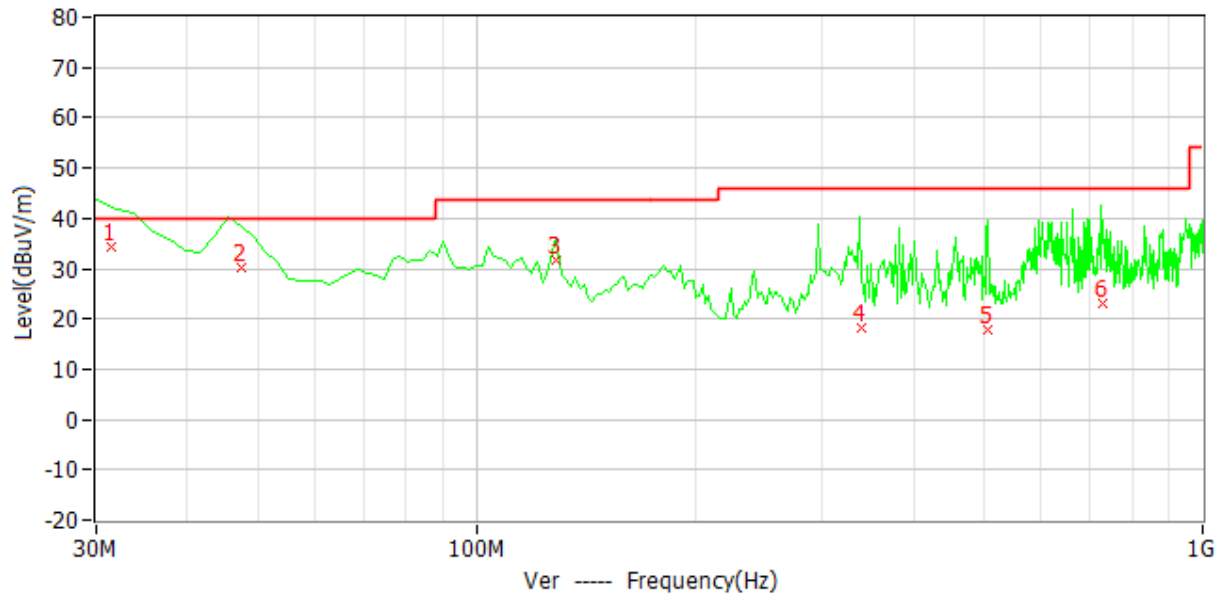
Test Curve:

Horizontal



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Vertical



Test Data:

Frequency (MHz)	Limit (dBuV/m)	Level (dBuV/m)	Delta	Factor (dB/m)	Detector	Polar
34.383	40.0	28.8	11.2	18.0	QP	Hor
128.585	43.5	19.3	24.2	12.2	QP	Hor
156.248	43.5	20.0	23.5	10.8	QP	Hor
182.476	43.5	18.2	25.3	9.7	QP	Hor
331.197	46.0	22.8	23.2	14.6	QP	Hor
695.226	46.0	22.2	23.8	19.8	QP	Hor
31.476	40.0	34.2	5.8	19.9	QP	Ver
47.425	40.0	30.3	9.7	10.7	QP	Ver
128.511	43.5	31.8	11.7	12.2	QP	Ver
339.479	46.0	18.2	27.8	14.8	QP	Ver
507.129	46.0	18.0	28.0	18.0	QP	Ver
726.551	46.0	23.0	23.0	20.0	QP	Ver

Remark: 1. Factor = Antenna Factor + Cable Loss (+ Amplifier, for higher than 1GHz), the value was added to Original Receiver Reading by the software automatically.
 2. Level = Original Receiver Reading + Factor
 3. Delta = Limit - Level
 4. If the PK Level is lower than AV limit, the AV test can be elided.

4 Conducted emissions

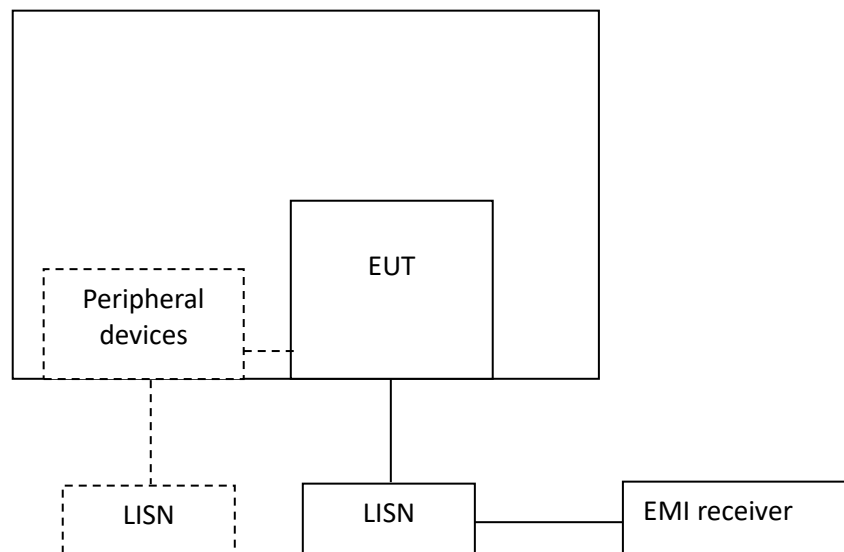
Test result: Pass

4.1 Limit

Frequency of Emission (MHz)	Conducted Emissions Limit (dBuV)	
	QP	AV
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.

4.2 Test Configuration



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Measured levels of ac power-line conducted emission shall be the emission voltages from the voltage probe, where permitted, or across the 50 Ω LISN port (to which the EUT is connected), where permitted, terminated into a 50 Ω measuring instrument. All emission voltage and current measurements shall be made on each current-carrying conductor at the plug end of the EUT power cord by the use of mating plugs and receptacles on the LISN, if used. Equipment shall be tested with power cords that are normally supplied or recommended by the manufacturer and that have electrical and shielding characteristics that are the same as those cords normally supplied or recommended by the manufacturer. For those measurements using a LISN, the 50 Ω measuring port is terminated by a measuring instrument having 50 Ω input impedance. All other ports are terminated in 50 Ω loads.

Tabletop devices shall be placed on a platform of nominal size 1 m by 1.5 m, raised 80 cm above the reference ground plane. The vertical conducting plane or wall of an RF-shielded (screened) room shall be located 40 cm to the rear of the EUT. Floor-standing devices shall be placed either directly on the reference ground-plane or on insulating material as described in ANSI C63.4. All other surfaces of tabletop or floor-standing EUTs shall be at least 80 cm from any other grounded conducting surface, including the case or cases of one or more LISNs.

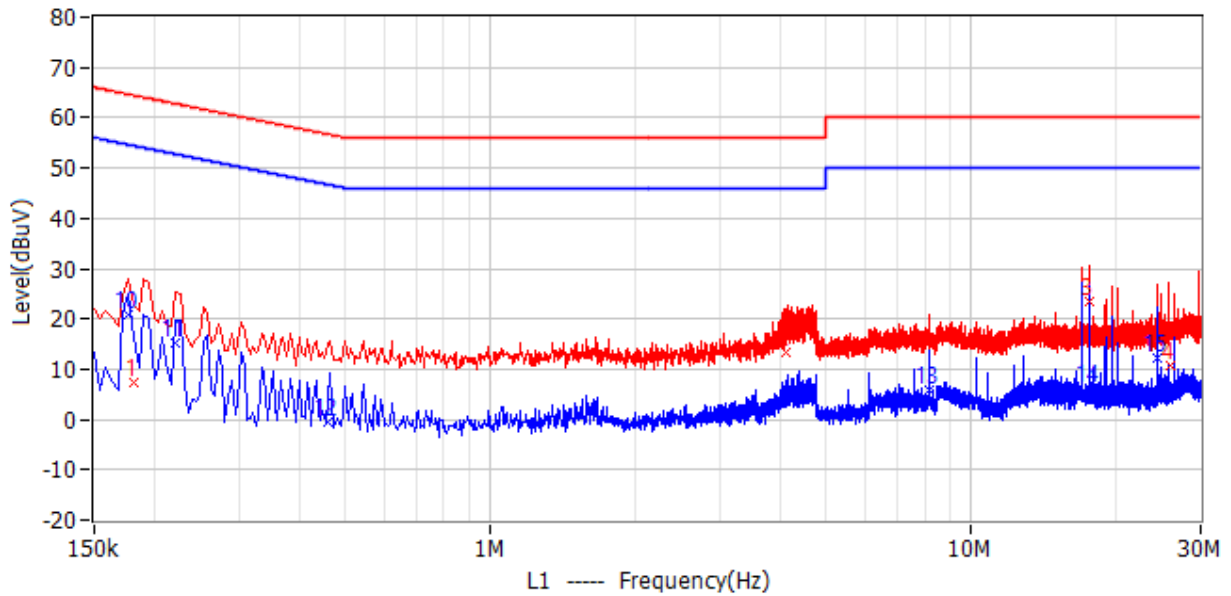
The bandwidth of the test receiver is set at 9 kHz.

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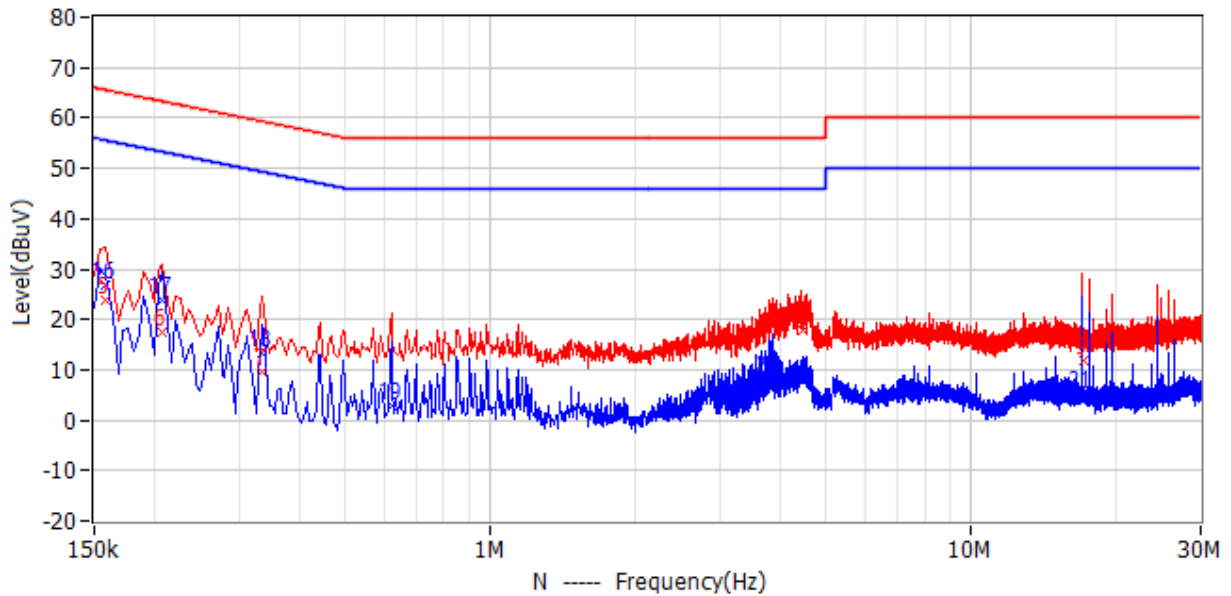
4.4 Test Results of Conducted Emissions

Test Curve:

L Line



N Line



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Test Data:

Frequency	Limit (dBuV)	Level (dBuV)	Delta	Reading (dBuV)	Factor (dB)	Detector	Phase
181.500kHz	64.4	7.3	57.2	-3.0	10.3	QP	L
4.119MHz	56.0	13.2	42.8	2.8	10.4	QP	L
17.561MHz	60.0	23.5	36.5	12.3	11.2	QP	L
25.850MHz	60.0	10.6	49.4	-1.1	11.7	QP	L
159.000kHz	65.5	24.0	41.5	13.6	10.4	QP	N
208.500kHz	63.3	17.6	45.7	7.2	10.4	QP	N
334.500kHz	59.3	9.5	49.9	-0.8	10.3	QP	N
4.448MHz	56.0	17.9	38.1	7.5	10.4	QP	N
17.133MHz	60.0	11.9	48.1	0.9	11.0	QP	N
177.000kHz	54.6	21.0	33.6	10.7	10.3	AV	L
222.000kHz	52.7	15.3	37.4	4.9	10.4	AV	L
460.500kHz	46.7	-0.6	47.3	-10.9	10.3	AV	L
8.196MHz	50.0	5.8	44.2	-5.0	10.8	AV	L
17.552MHz	50.0	6.1	43.9	-5.1	11.2	AV	L
24.288MHz	50.0	12.2	37.8	0.6	11.6	AV	L
159.000kHz	55.5	26.8	28.7	16.4	10.4	AV	N
208.500kHz	53.3	23.7	29.5	13.3	10.4	AV	N
334.500kHz	49.3	13.4	36.0	3.1	10.3	AV	N
622.500kHz	46.0	2.8	43.2	-7.6	10.4	AV	N
3.813MHz	46.0	8.2	37.8	-2.2	10.4	AV	N
17.003MHz	50.0	5.2	44.8	-5.8	11.0	AV	N

Remark: 1. Factor = LISN Factor + Cable Loss, the value was added to Original Receiver Reading by the software automatically.
 2. Level = Reading + Factor
 3. Delta = Limit - Level
 4. If the PK Level is lower than AV limit, the AV test can be elided.

***** END *****