Johnson Health Tech. Co., Ltd.

RF TEST REPORT

Report Type:
FCC Part 15.225 RF report

Model:
MAX-ONYX-C, XL-ONYX-C

REPORT NUMBER:
231000572SHA-001

ISSUE DATE:
October 10, 2024

DOCUMENT CONTROL NUMBER:
TTRFFCCPART15C_V1 © 2018 Intertek

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TEST REPORT

Report no.: 231000572SHA-001

Applicant	:	Johnson Health Tech. Co., Ltd. No. 999, Sec. 2, Dongda Rd., Daya Dist., Taichung City 428, China.
Manufacturer	:	Same as applicant
Factory 1	:	Same as applicant
Factory 2		Johnson Industries (Shanghai) CO., LTD. 2217 hechen highway, JIADING DISTRICT, Shanghai, China
FCC ID	:	TN7ONYX01

SUMMARY:

The equipment complies with the requirements according to the following standard(s) or Specification:
47CFR Part 15 (2023): Radio Frequency Devices (Subpart C) **ANSI C63.10 (2013):** American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

PREPARED BY:	**REVIEWED BY:**
	
Project Engineer Eric Li	Reviewer Wakeyou Wang

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TEST REPORT

Content

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TEST REPORT

Revision History

Report No.	Version	Description	Issued Date
231000572SHA-001	Rev. 01	Initial issue of report	October 10, 2024

TEST REPORT

Measurement result summary

TEST ITEM	FCC REFERANCE	RESULT
Fundamental emission	15.225(a) (b) (c)	Pass
Spurious emission	15.225(d)	Pass
Frequency stability	15.225(e)	Pass
Conducted emissions	15.207	Pass
99% and 20dB Bandwidth	15.215(c)	Pass
Antenna requirement	15.203	Pass

Notes: 1: NA =Not Applicable
2: Determination of the test conclusion is based on IEC Guide 115 in consideration of measurement uncertainty.

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TEST REPORT

1 GENERAL INFORMATION

1.1 Description of Equipment Under Test (EUT)

Product name:	Fitness Equipment TV Console
Type/Model:	MAX-ONYX-C, XL-ONYX-C
Description of EUT:	The EUT is Fitness Equipment TV Console, there are two models, they are the same except model name, display size. We tested MAX-ONYX-C as representative and listed the worst results in this report.
Rating:	12Vdc, 3A
Category of EUT:	Class B
EUT type:	☒ Table top ☐ Floor standing
Software Version:	/
Hardware Version:	/
Sample received date:	July 17, 2024
Date of test:	July 18, 2024 to July 29, 2024

1.2 Technical Specification

Frequency Range:	13.56MHz ~ 13.56 MHz

1.3 Description of Test Facility

Name:	Intertek Testing Services (Shanghai FTZ) Co., Ltd.
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 L21189
	FCC Accredited Lab Designation Number: CN0175
	IC Registration Lab CAB identifier.: CN0014
	VCCI Registration Lab Registration No.: R-14243, G-10845, C-14723, T-12252
	A2LA Accreditation Lab Certificate Number: 3309.02

2 TEST SPECIFICATIONS

2.1 Standards or specification

47CFR Part 15 (2023)
ANSI C63.10 (2013)

2.2 Mode of operation during the test

While testing, the internal modulation and continuously transmission was applied.
The test was conducted with test setup as below.

2.3 Test software list

Test Items	Software	Manufacturer	Version
Conducted emission	ESxS-K1	R&S	V2.1.0
Radiated emission	ES-K1	R&S	V1.71

2.4 Test peripherals list

Item No	Description	Band and Model	Others
1	AC/DC adapter	TC-33097	Power supply only
2			
3			

2.5 Test environment condition:

Test items	Temperature	Humidity
Radiated emission	25°C	54% RH
Power line conducted emission	26°C	54% RH

2.6 Instrument list

Conducted Emission/Disturbance Power/Tri-loop Test/CDN method					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	Test Receiver	R&S	ESR7	EC 6194	2025-02-27
☒	Attenuator	Hua Xiang	Ts5-10db-6g	EC 6194-1	2024-12-07
☒	A.M.N.	R&S	ESH2-Z5	EC 3119	2024-11-19
Radiated Emission					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	Test Receiver	R&S	ESIB 26	EC 3045	2025-08-18
☒	Test Receiver	R&S	ESR	EC6501	2024-09-24
☒	TRILOG broadband Antenna	Schwarzbeck	VULB9168	EC6402	2025-03-19
☐	Pre-amplifier	R&S	AFS42-00101800-25-S-42	EC 5262	2024-06-15
☐	Pre-amplifier	Tonscend	tap01018050	EC 6432-1	2024-12-07
☐	Horn antenna	Tonscend	bha9120d	EC 6432-2	2025-03-20
☐	Horn antenna	ETS	3117	EC 4792-1	2024-09-15
☐	Horn antenna	TOYO	HAP18-26W	EC 4792-3	2026-09-12
☒	Active loop antenna	Schwarzbeck	FMZB1519	EC 5345	2025-08-10
☐	Horn antenna	ETS	3116c	EC 5955	2025-08-14
RF test					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☐	PXA Signal Analyzer	Keysight	N9030A	EC 5338	2025-03-05
☐	Vector Signal Generator	Agilent	N5182B	EC 5175	2025-03-05
☐	Universal Radio Communication Tester	R&S	CMW500	EC5944	2025-03-05
☐	MXG Analog Signal Generator	Agilent	N5181A	EC 5338-2	2025-03-07
☐	Mobile Test System	Litepoint	Iqxel	EC 5176	2025-01-11
☐	Test Receiver	R&S	ESCI 7	EC 4501	2025-03-09
☐	Climate chamber	GWS	MT3065	EC 6021	2025-03-07
☐	Spectrum Analyzer	Keysight	N9030B	EC 6078	2025-03-18
☐	Universal Radio Communication Tester	R&S	CMW500	EC 6209	2025-01-30

TEST REPORT

Tet Site					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	Shielded room	Zhongyu	-	EC 2838	2025-01-11
☐	Shielded room	Zhongyu	-	EC 2839	2025-01-11
☒	Semi-anechoic chamber	Albatross project	-	EC 3048	2026-07-11
Additional instrument					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	Thermo-Hygrograph	Testo	175h1	EC 6640	2025-08-29
☐	Thermo-Hygrograph	Testo	175h1	EC 6641	2025-08-29
☒	Thermo-Hygrograph	Testo	175h1	EC6642	2025-08-29
☐	Thermo-Hygrograph	Testo	175h1	EC 6643	2025-08-29
☐	Thermo-Hygrograph	Testo	175h1	EC 6644	2025-08-29
☐	Pressure meter	YM3	Shanghai Mengde	EC 3320	2025-08-16

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

TEST REPORT

3 Fundamental Emission

Test result: **Pass**

3.1 Limit

Frequencies (MHz)	Limit at 30m (dBuV/m)	Limit at 3m (dBuV/m)
13.110 – 13.410	40.50	80.50
13.410 – 13.553	50.50	90.50
13.553 – 13.567	84.00	124.00
13.567 – 13.710	50.50	90.50
13.710 – 14.010	40.50	80.50

3.2 Measurement Procedure

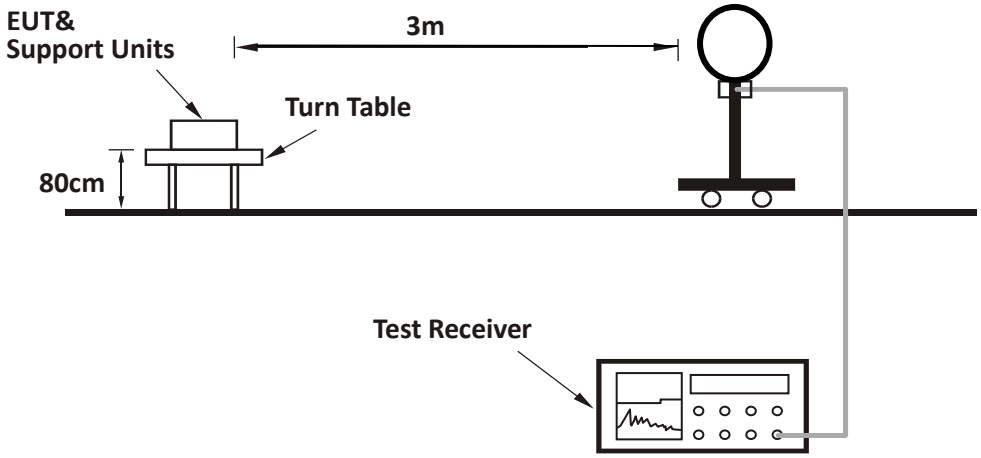
a) The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
b) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c) Both X and Y axes of the antenna are set to make the measurement.
d) 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.
e) The test-receiver system was set to PK Detect Function and Specified Bandwidth with Maximum Hold Mode.

NOTE:

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

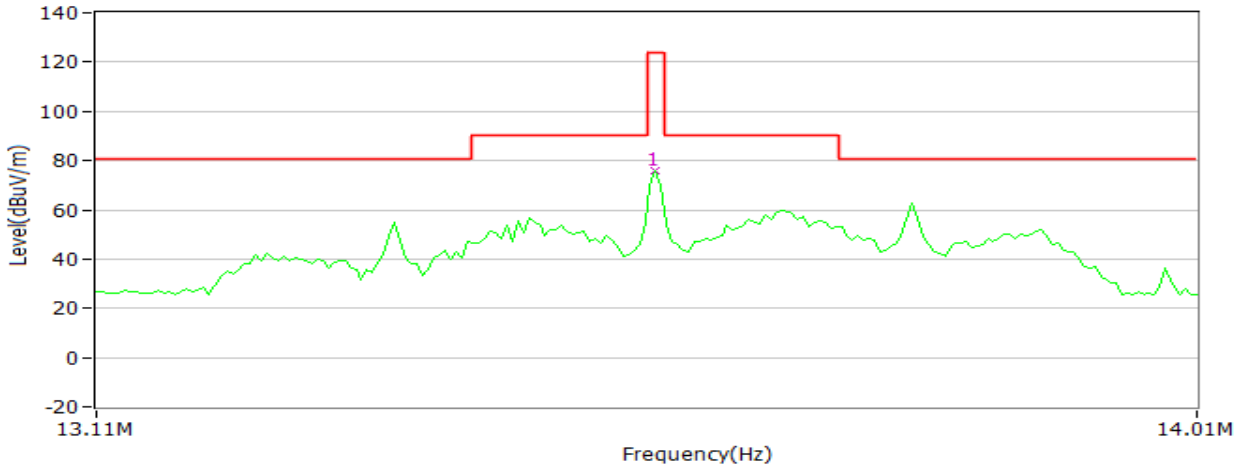
TEST REPORT

3.3 Test Configuration

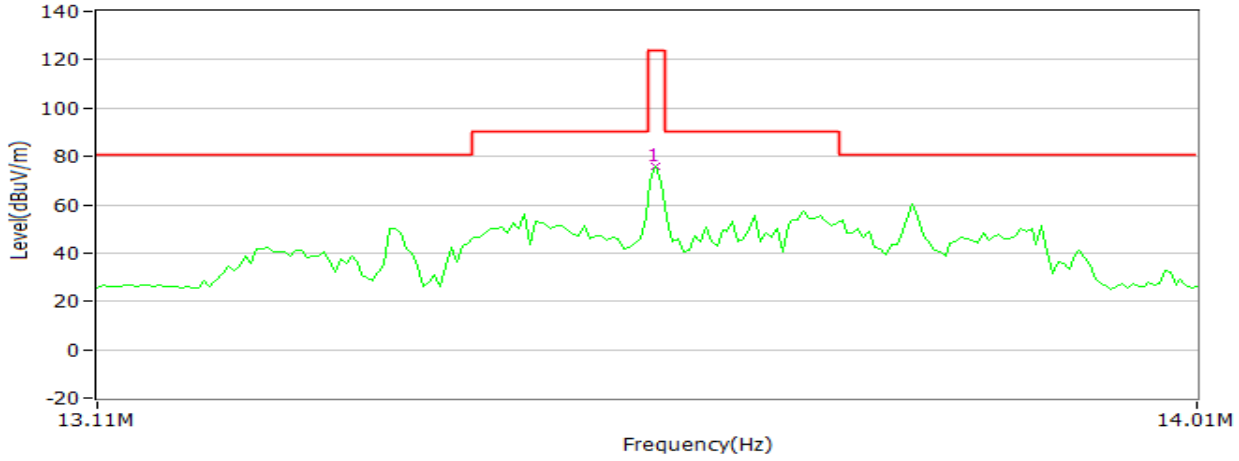


3.4 Test Results of Fundamental Emissions

Emission Mask (3m, X)



Emission Mask (3m, Y)



Antenna Polarization	Frequency (MHz)	Corrected Reading (dBuV/m)	Correct Factor (dB/m)	Limit (dBuV/m)	Margin	Detector
X	13.56	75.90	20.50	124.00	48.10	PK
Y	13.56	75.60	20.50	124.00	48.40	PK

Remark: 1. Correct Factor = Antenna Factor + Cable Loss (+ Amplifier, for higher than 1GHz), the value was added to Original Receiver Reading by the software automatically.
2. Corrected Reading = Original Receiver Reading + Correct Factor
3. Margin = Limit - Corrected Reading

Example: Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,
Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10.00dBuV,
Limit = 40.00dBuV/m.
Then Correct Factor = 30.20 + 2.00 – 32.00 = 0.20dB/m;
Corrected Reading = 10dBuV + 0.20dB/m = 10.20dBuV/m;
Margin = 40.00dBuV/m - 10.20dBuV/m = 29.80dB.

4 Spurious Emission

Test result: **Pass**

4.1 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

4.2 Measurement Procedure

For Radiated emission below 30MHz:

f) The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
g) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
h) Both X and Y axes of the antenna are set to make the measurement.
i) 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.
j) The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

NOTE:

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

For Radiated emission above 30MHz:

a) The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. 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 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

TEST REPORT

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 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.

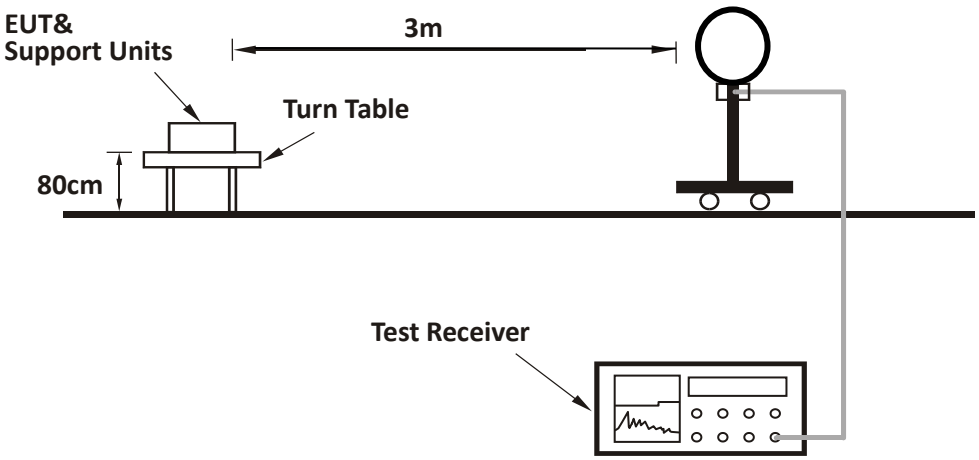
f) The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

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

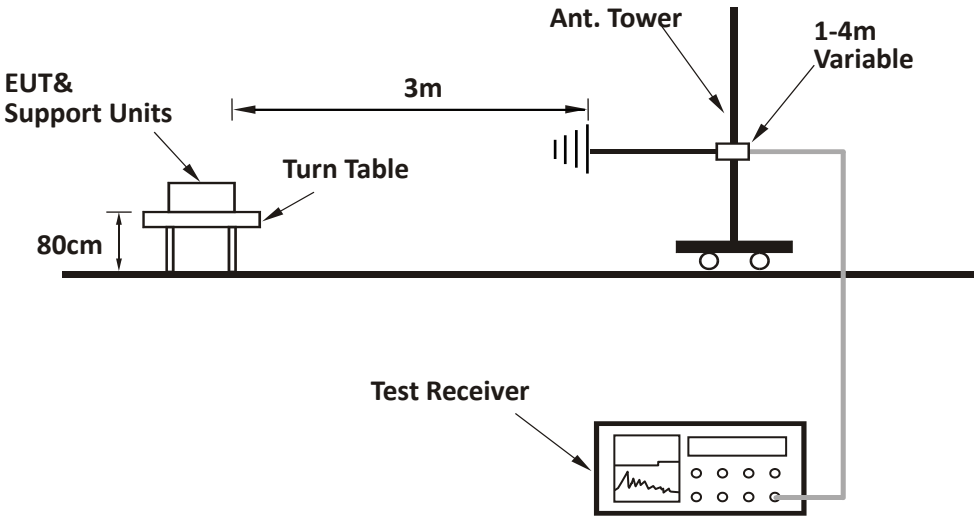
4.3 Test Configuration

For Radiated emission below 30MHz:

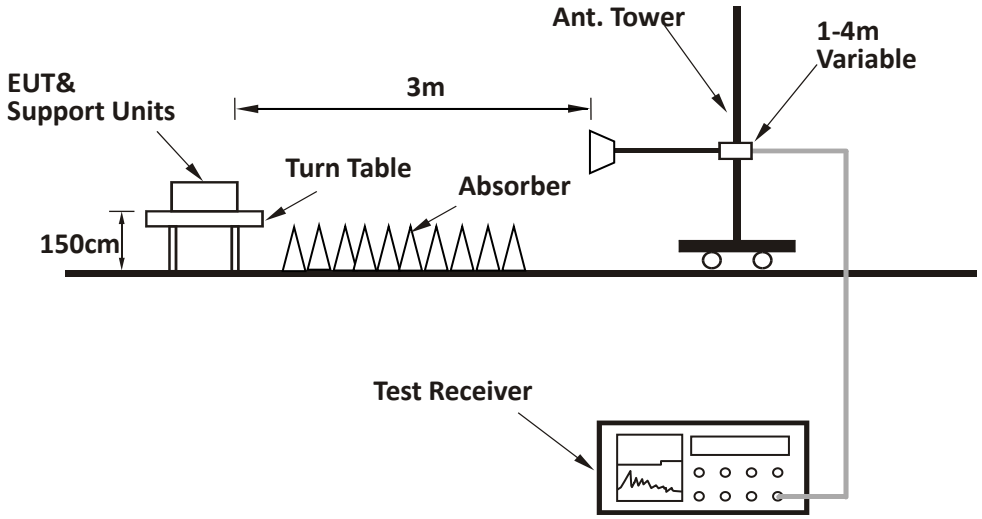


TEST REPORT

For Radiated emission 30MHz to 1GHz:



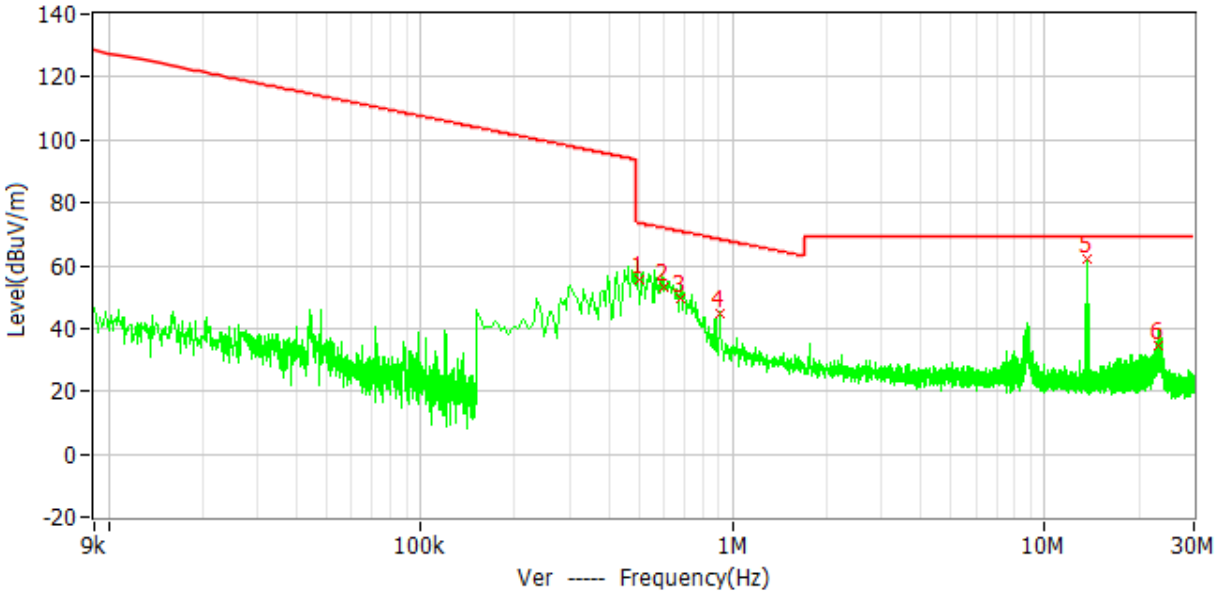
For Radiated emission above 1GHz:



TEST REPORT

4.4 Test Results of Radiated Emissions

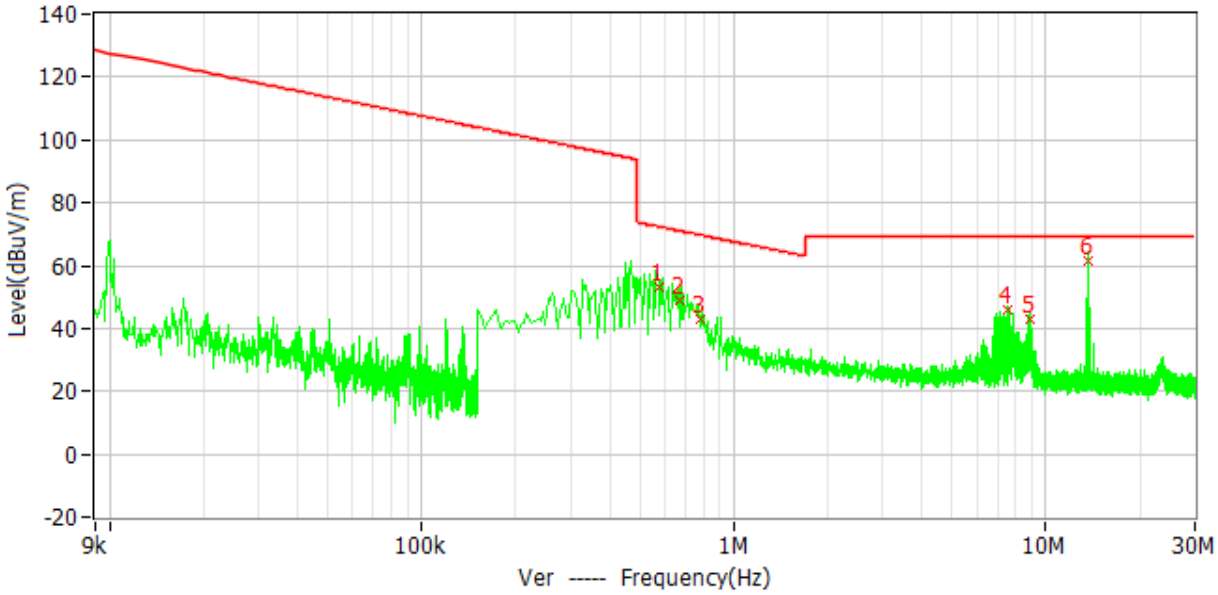
Emission (3m, X)



No.	Frequency	Limit dBuV/m	Level dBuV/m	Delta dB	Reading dBuV	Factor dB/m	Detector	Polar
1	501.000kHz	73.6	55.3	-18.3	35.1	20.2	QP	Ver
2	600.000kHz	72.0	52.9	-19.1	32.7	20.2	QP	Ver
3	676.500kHz	71.0	49.4	-21.6	29.2	20.2	QP	Ver
4	910.040kHz	68.4	44.6	-23.8	24.5	20.1	QP	Ver
5	13.560MHz	69.5	62.0	-7.5	41.5	20.5	QP	Ver
6	23.142MHz	69.5	34.6	-34.9	13.9	20.7	QP	Ver

TEST REPORT

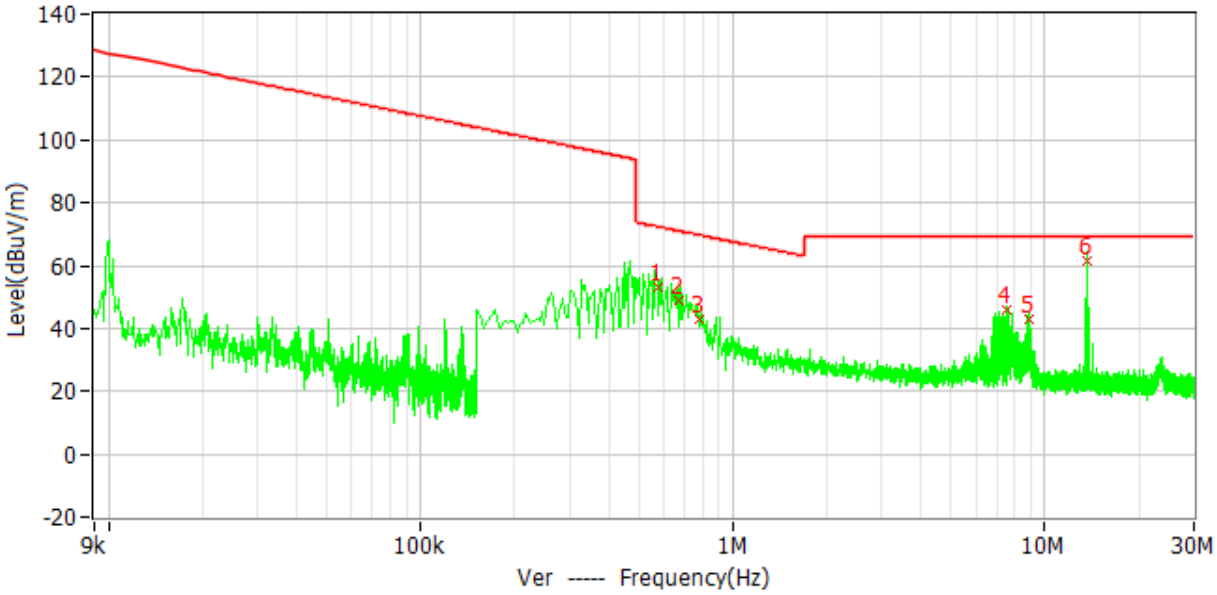
Emission (3m, Y)



No.	Frequency	Limit dBuV/m	Level dBuV/m	Delta dB	Reading dBuV	Factor dB/m	Detector	Polar
1	573.000kHz	72.4	53.4	-19.0	33.2	20.2	QP	Ver
2	675.499kHz	71.0	48.7	-22.3	28.5	20.2	QP	Ver
3	784.500kHz	69.7	42.7	-27.0	22.6	20.1	QP	Ver
4	7.537MHz	69.5	46.1	-23.4	25.7	20.4	QP	Ver
5	8.910MHz	69.5	43.1	-26.4	22.7	20.4	QP	Ver
6	13.560MHz	69.5	61.4	-8.1	40.9	20.5	QP	Ver

TEST REPORT

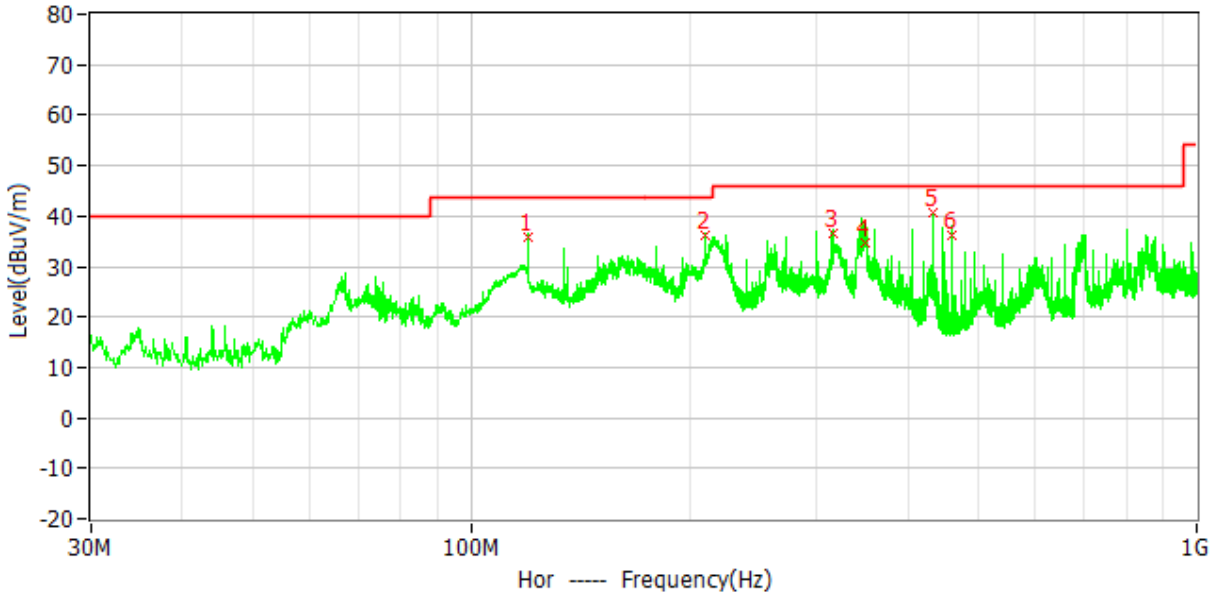
Emission (3m, Z)



No.	Frequency	Limit dBuV/m	Level dBuV/m	Delta dB	Reading dBuV	Factor dB/m	Detector	Polar
1	573.000kHz	72.4	53.4	-19.0	33.2	20.2	QP	Ver
2	675.499kHz	71.0	48.7	-22.3	28.5	20.2	QP	Ver
3	784.500kHz	69.7	42.7	-27.0	22.6	20.1	QP	Ver
4	7.537MHz	69.5	46.1	-23.4	25.7	20.4	QP	Ver
5	8.910MHz	69.5	43.1	-26.4	22.7	20.4	QP	Ver
6	13.560MHz	69.5	61.4	-8.1	40.9	20.5	QP	Ver

TEST REPORT

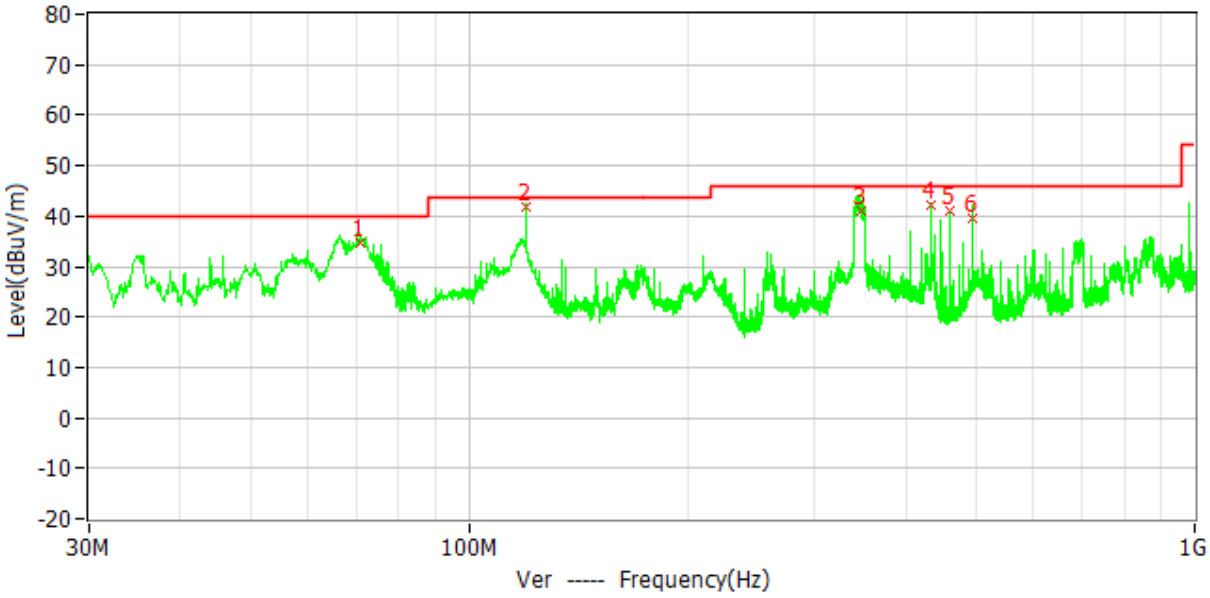
Horizontal



No.	Frequency	Limit dBuV/m	Level dBuV/m	Delta dB	Reading dBuV	Factor dB/m	Detector	Polar
1	119.992MHz	43.5	35.7	-7.8	23.6	12.1	QP	Hor
2	210.002MHz	43.5	36.3	-7.2	24.6	11.7	QP	Hor
3	315.891MHz	46.0	36.5	-9.5	21.1	15.4	QP	Hor
4	348.792MHz	46.0	34.6	-11.4	18.4	16.2	QP	Hor
5	433.917MHz	46.0	40.6	-5.4	22.3	18.3	QP	Hor
6	461.040MHz	46.0	36.1	-9.9	17.1	19.0	QP	Hor

TEST REPORT

Vertical



No.	Frequency	Limit dBuV/m	Level dBuV/m	Delta dB	Reading dBuV	Factor dB/m	Detector	Polar
1	70.842MHz	40.0	34.6	-5.4	22.4	12.2	QP	Ver
2	120.008MHz	43.5	41.8	-1.7	29.7	12.1	QP	Ver
3	348.201MHz	46.0	41.0	-5.0	24.8	16.2	QP	Ver
4	433.917MHz	46.0	42.2	-3.8	23.9	18.3	QP	Ver
5	461.040MHz	46.0	41.2	-4.8	22.2	19.0	QP	Ver
6	495.037MHz	46.0	39.5	-6.5	19.8	19.7	QP	Ver

Remark: 1. Correct 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 + Correct Factor
3. Delta = Level - Limit
4. If the PK Corrected Reading is lower than AV limit, the AV test can be elided.

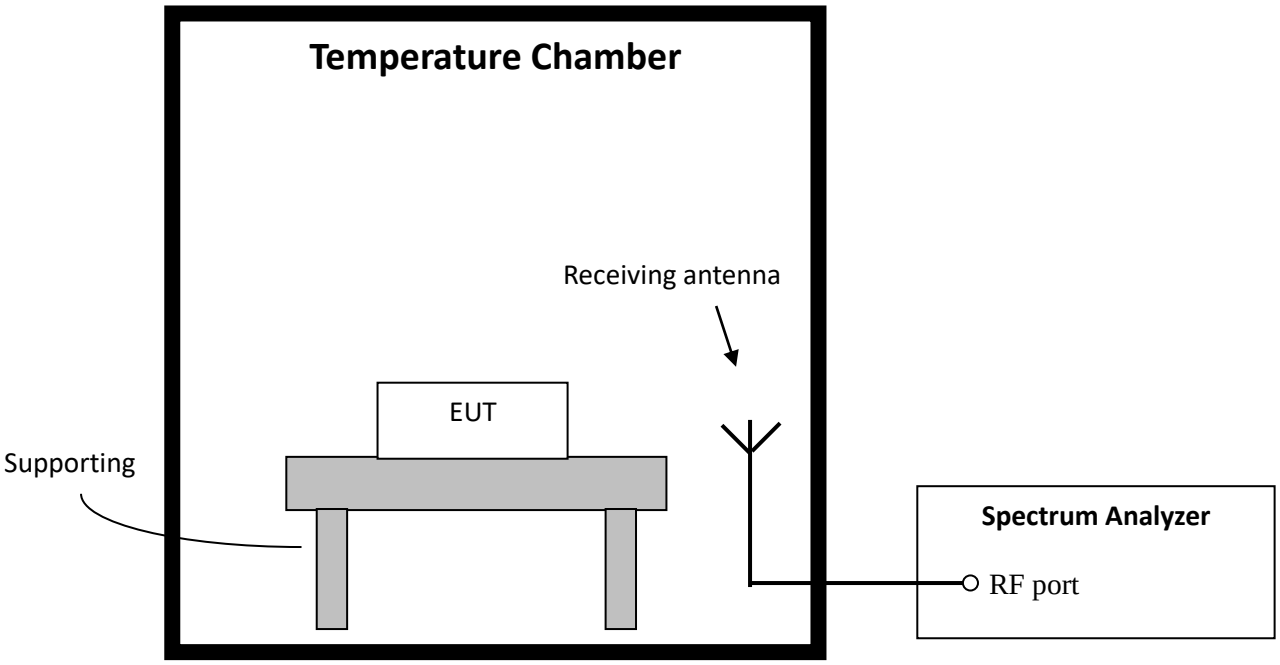
5 Frequency Stability (Temperature Variation)

Test result: PASS

5.1 Test limit

The frequency tolerance of the carrier signal shall be maintained within ±0.01% of the operating frequency over a temperature variation of −20 degrees to +50 degrees C at normal supply voltage.

5.2 Test Configuration



5.3 Test procedure and test setup

Test Procedure as per ANSI 63.10 clause 6.8.1.

TEST REPORT

5.4 Test protocol

Voltage (V)	Temp (ºC)	Freq measured (MHz)	Freq nominal (MHz)	Tolerance (%)	Limit (%)
120V	-20	13.560	13.560	0	0.01
	-10	13.560		0	
	0	13.560		0	
	10	13.560		0	
	20	13.560		0	
	30	13.560		0	
	40	13.560		0	
	50	13.559		0.003	

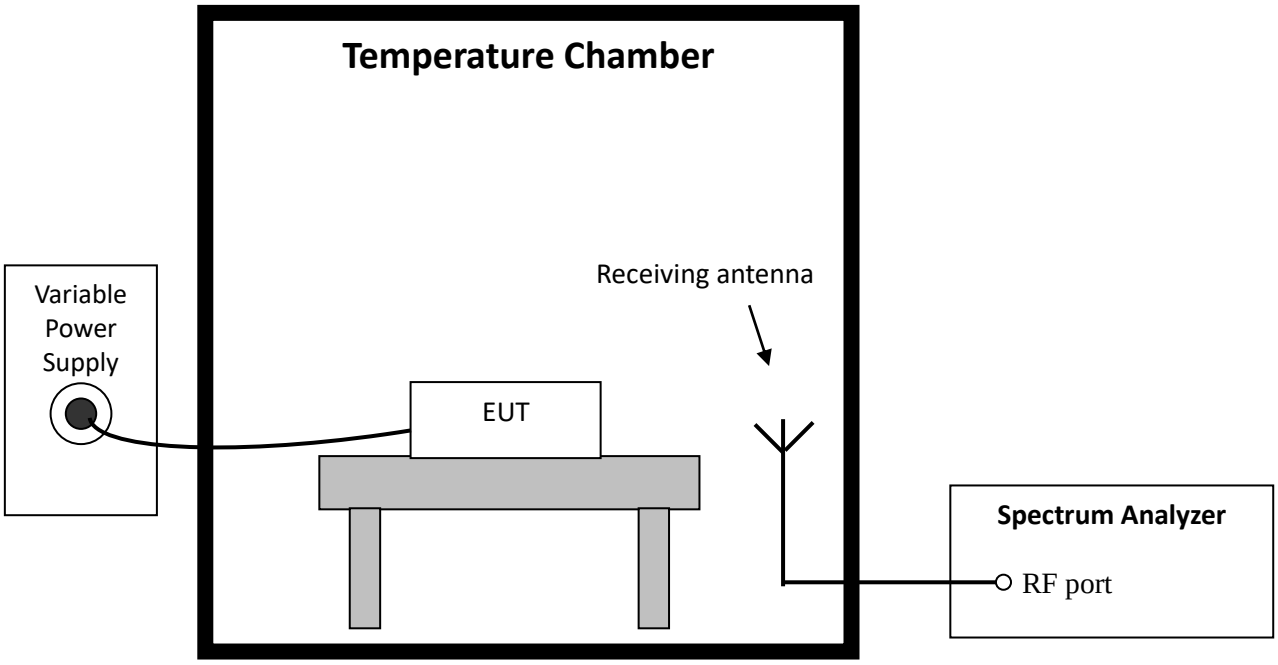
6 Frequency Stability (Voltage Variation)

Test result: PASS

6.1 Test limit

The frequency tolerance of the carrier signal shall be maintained within ±0.01% for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

6.2 Test Configuration



6.3 Test procedure and test setup

Test Procedure as per ANSI 63.10 clause 6.8.2.

6.4 Test protocol

Temp (ºC)	Voltage (V)	Freq Measured (MHz)	Freq nominal (MHz)	Tolerance (%)	Limit (%)
20	120	13.560	13.560	0	0.01
	102	13.560		0	
	138	13.560		0	
Note: here the voltage is on the input port of the AC/DC Adapter.					

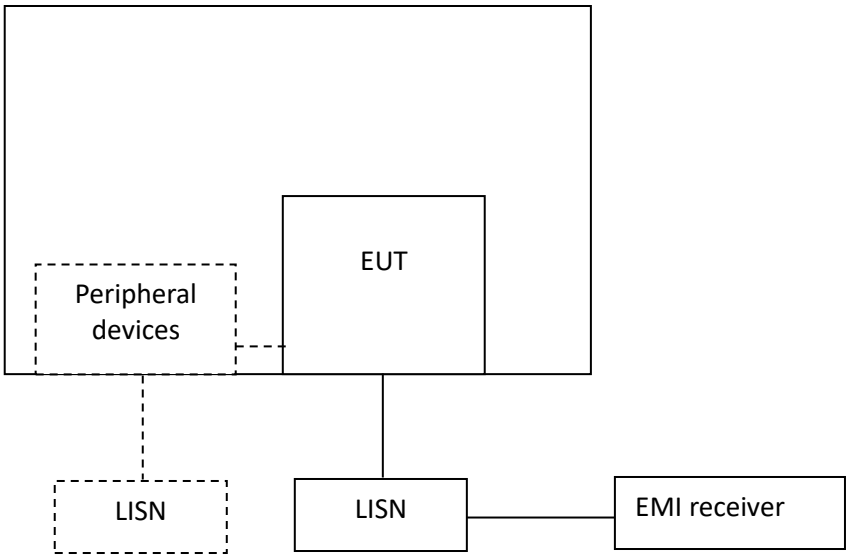
7 Conducted emissions

Test result: **Pass**

7.1 Limit

Frequency of Emission (MHz)	Conducted Emissions Limit (dBuV)	
	QP	AV
0.15 ~ 0.5	79	66
0.5 ~ 30	73	60
* Decreases with the logarithm of the frequency.		

7.2 Test Configuration



7.3 Measurement Procedure

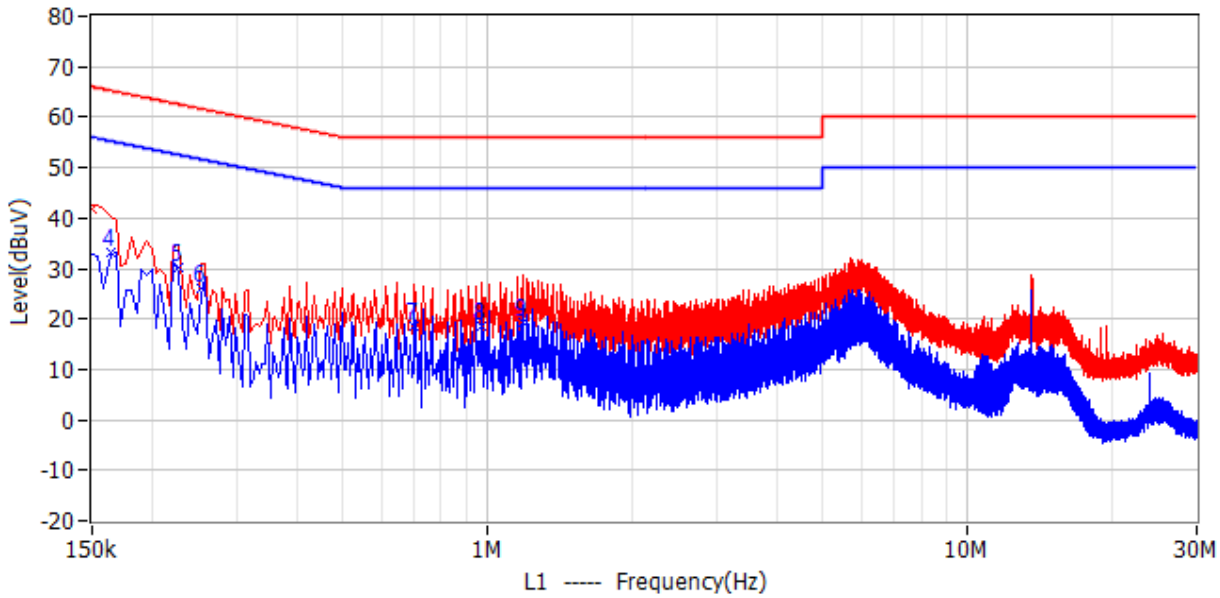
Measured levels of ac power-line conducted emission shall be the emission voltages from the voltage probe, where permitted, or across the 50 Ω LISN port (to which the EUT is connected), where permitted, terminated into a 50 Ω measuring instrument. All emission voltage and current measurements shall be 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.

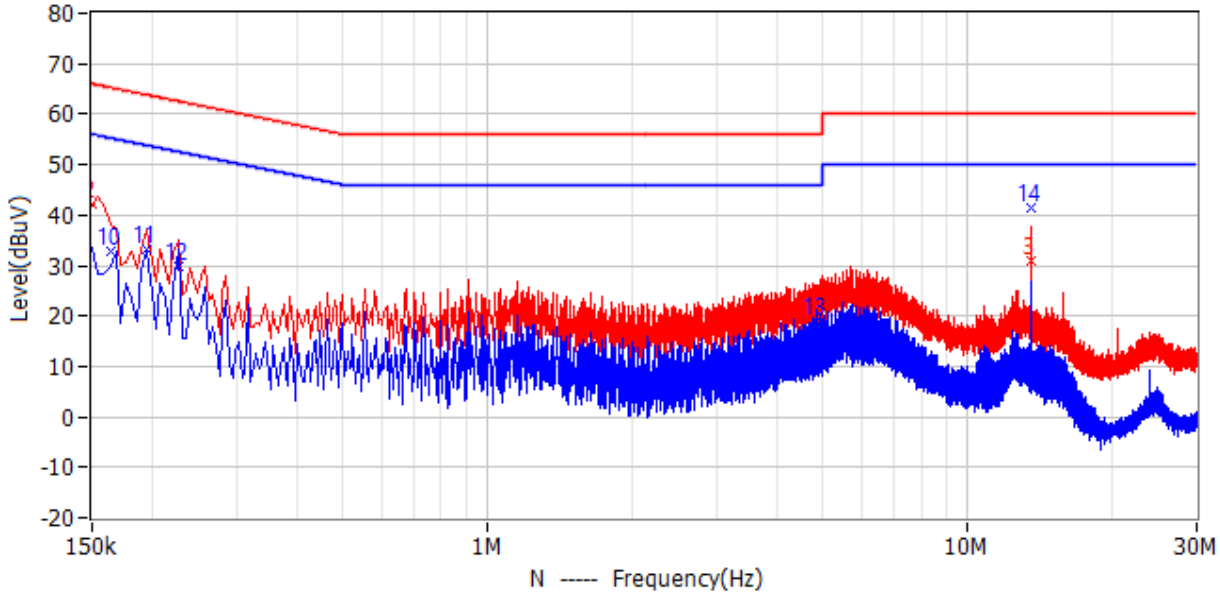
Tabletop devices shall be placed on a platform of nominal size 1 m by 1.5 m, raised 80 cm above the reference ground plane. The vertical conducting plane or wall of an RF-shielded (screened) room shall be located 40 cm to the rear of the EUT. Floor-standing devices shall be placed either directly on 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.

TEST REPORT

7.4 Test Results of Conducted Emissions





TEST REPORT

Data:

No.	Frequency	Limit dBuV	Level dBuV	Delta dB	Reading dBuV	Factor dB	Detector	Phase
1	150.000kHz	66.0	41.8	-24.2	35.6	6.2	QP	L1
2	150.000kHz	66.0	42.0	-24.0	35.8	6.2	QP	N
3	13.569MHz	60.0	31.0	-29.0	24.6	6.4	QP	N
4	163.500kHz	55.3	33.1	-22.2	26.9	6.2	CAV	L1
5	226.500kHz	52.6	30.1	-22.5	23.8	6.3	CAV	L1
6	253.500kHz	51.6	26.2	-25.4	19.9	6.3	CAV	L1
7	703.500kHz	46.0	18.5	-27.5	12.2	6.3	CAV	L1
8	973.500kHz	46.0	18.6	-27.4	12.2	6.4	CAV	L1
9	1.185MHz	46.0	19.4	-26.6	13.1	6.3	CAV	L1
10	163.500kHz	55.3	32.8	-22.4	26.6	6.2	CAV	N
11	195.000kHz	53.8	33.0	-20.9	26.7	6.3	CAV	N
12	226.500kHz	52.6	29.8	-22.8	23.5	6.3	CAV	N
13	4.844MHz	46.0	19.1	-26.9	12.7	6.4	CAV	N
14	13.560MHz	50.0	41.4	-8.6	35.0	6.4	CAV	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 = Level - Limit

4. If the PK Corrected Reading is lower than AV limit, the AV test can be elided.

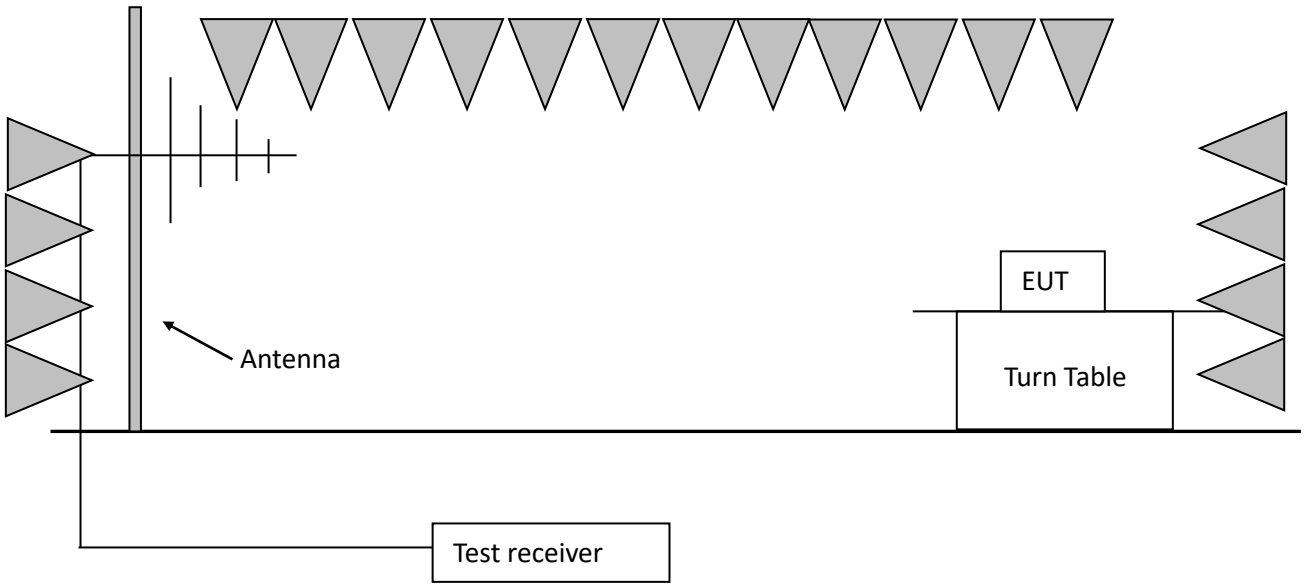
8 99% and 20dB Bandwidth

Test result: Pass

8.1 Limit

The 20dB bandwidth should be fallen in the allocated operating frequency range.
No limit for 99% bandwidth.

8.2 Test configuration



Total Quality. Assured.

TEST REPORT

8.3 Test procedure and test set up

The measurement was applied in a 3m semi-anechoic chamber.

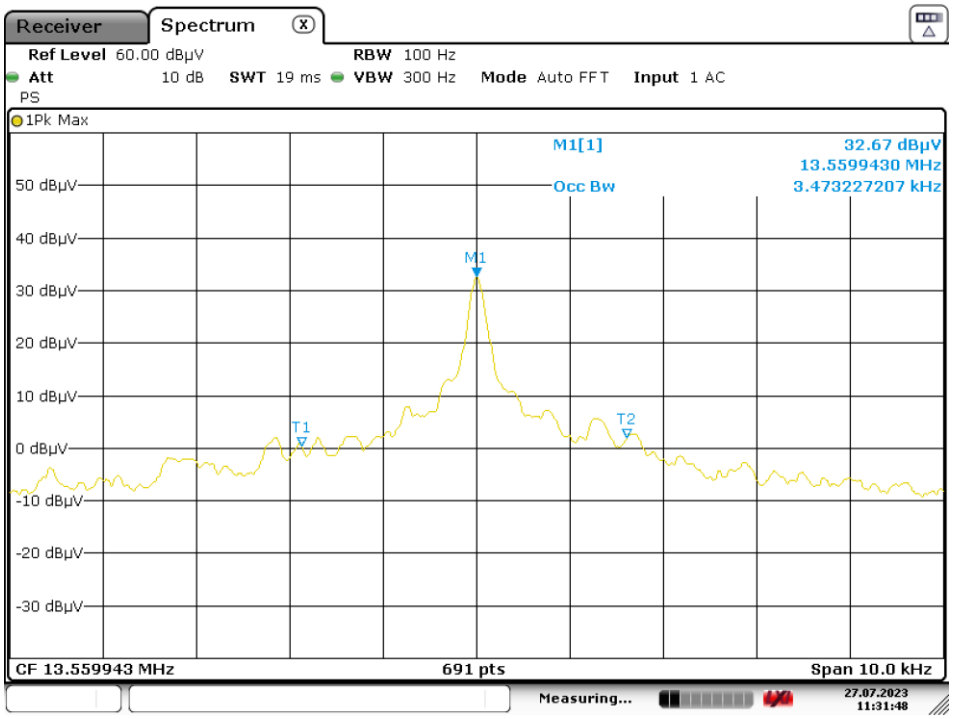
The center of the loop antenna shall be 1 m above the horizontal metal ground plane.

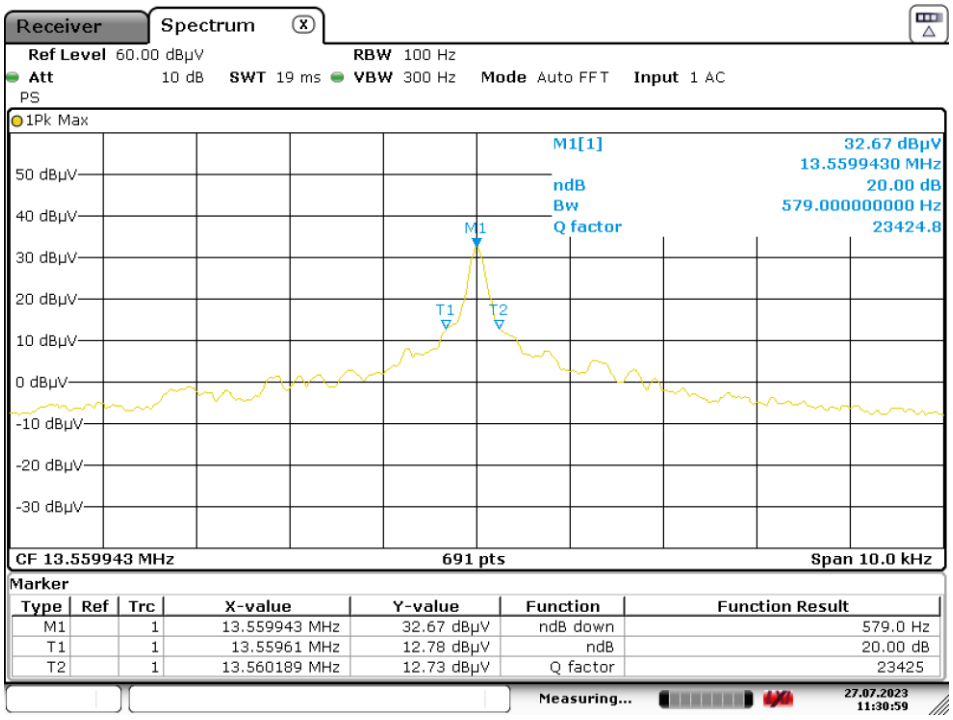
The following procedure shall be used for measuring (99 %) power bandwidth:

1. Set center frequency to the nominal EUT channel center frequency.
2. Set RBW = 1 % to 5 % of the OBW
3. Set VBW ≥ 3 · RBW
4. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
5. Use the 99 % power bandwidth function of the instrument (if available).
6. the 20dB bandwidth is also measured with the same setting.

8.4 Test protocol

	Lower point (MHz)	Higher point (MHz)	Bandwidth (kHz)	Allocated bandwidth (MHz)
99% Bandwidth	13.5593	13.5606	3.473	/
20dB Bandwidth	13.5596	13.5602	0.579	13.553 ~ 13.567





Total Quality. Assured.

TEST REPORT

9 Antenna requirement

Requirement:
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.

Result:
EUT uses permanently attached antenna to the intentional radiator, so it can comply with the provisions of this section.

********** END **********