

TEST REPORT

Product : Waterdrop Automatic Water Shutoff
Trade mark : Waterdrop
Model/Type reference : WD-WHM
Serial Number : S/N
Report Number : EED32P81980501
FCC ID : 2BD3GWD-WHMR
Date of Issue : Dec. 26, 2023
Test Standards : 47 CFR Part 15 Subpart C
Test result : PASS

Prepared for:

Qingdao Ecopure Filter Co., Ltd.

**No. 13, Yishengbai Road Environmental Protection Industry Zone Jimo,
Qingdao 266201, China**

Prepared by:

**Centre Testing International Group Co., Ltd.
Hongwei Industrial Zone, Bao'an 70 District,
Shenzhen, Guangdong, China**

TEL: +86-755-3368 3668

FAX: +86-755-3368 3385

Compiled by:

mark.chen.

Reviewed by:

Frazer. Li

Mark Chen

Frazer Li

Approved by:

Aaron Ma

Date:

Dec. 26, 2023

Aaron Ma

Check No.: 7527061223



1 Version

Version No.	Date	Description
00	Dec. 26, 2023	Original

2 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	47 CFR Part 15 Subpart C Section 15.203	ANSI C63.10-2013	PASS
AC Power Line Conducted Emission	47 CFR Part 15 Subpart C Section 15.207	ANSI C63.10-2013	PASS
Field Strength of the Fundamental Signal	47 CFR Part 15 Subpart C Section 15.249 (a)	ANSI C63.10-2013	PASS
Spurious Emissions	47 CFR Part 15 Subpart C Section 15.249 (a)/15.209	ANSI C63.10-2013	PASS
Restricted bands around fundamental frequency (Radiated Emission)	47 CFR Part 15 Subpart C Section 15.249(a)/15.205	ANSI C63.10-2013	PASS
20dB Occupied Bandwidth	47 CFR Part 15 Subpart C Section 15.215 (c)	ANSI C63.10-2013	PASS

Remark:

Company Name and Address shown on Report, the sample(s) and sample Information were provided by the applicant who should be responsible for the authenticity which CTI hasn't verified.

3 Contents

	Page
1 VERSION	2
2 TEST SUMMARY	3
3 CONTENTS	4
4 GENERAL INFORMATION	5
4.1 CLIENT INFORMATION	5
4.2 GENERAL DESCRIPTION OF EUT	5
4.3 TEST ENVIRONMENT AND MODE	7
4.4 DESCRIPTION OF SUPPORT UNITS	7
4.5 TEST LOCATION	7
4.6 DEVIATION FROM STANDARDS	7
4.7 ABNORMALITIES FROM STANDARD CONDITIONS	7
4.8 OTHER INFORMATION REQUESTED BY THE CUSTOMER	7
4.9 MEASUREMENT UNCERTAINTY (95% CONFIDENCE LEVELS, K=2)	8
5 EQUIPMENT LIST	9
6 TEST RESULTS AND MEASUREMENT DATA	12
6.1 ANTENNA REQUIREMENT	12
6.2 CONDUCTED EMISSIONS	13
6.3 RADIATED SPURIOUS EMISSIONS	16
6.3.1 Duty Cycle	16
6.3.2 Radiated Spurious Emissions	18
6.4 20dB BANDWIDTH	24
APPENDIX 1 PHOTOGRAPHS OF TEST SETUP	26
APPENDIX 2 PHOTOGRAPHS OF EUT	28

4 General Information

4.1 Client Information

Applicant:	Qingdao Ecopure Filter Co., Ltd.
Address of Applicant:	No. 13, Yishengbai Road Environmental Protection Industry Zone Jimo, Qingdao 266201, China
Manufacturer:	Qingdao Ecopure Filter Co., Ltd.
Address of Manufacturer:	No. 13, Yishengbai Road Environmental Protection Industry Zone Jimo, Qingdao 266201, China
Factory	Qingdao Ecopure Filter Co., Ltd.
Address of Factory:	No. 13, Yishengbai Road Environmental Protection Industry Zone Jimo, Qingdao 266201, China

4.2 General Description of EUT

Product Name:	Waterdrop Automatic Water Shutoff	
Model No.:	WD-WHM	
Trade mark:	Waterdrop	
Product Type:	☐ Mobile ☐ Portable ☒ Fix Location	
Operation Frequency:	915MHz	
Number of Channel:	1	
Antenna Type:	External Antenna	
Test Software of EUT:	RF test	
Power Supply:	Adapter	Model:GMA18-050100-1A Input:100-240V~50/60Hz 1.0A Output:5V---1.0A
Test Voltage:	AC 120V	
Sample Received Date:	Dec. 06, 2023	
Sample tested Date:	Dec. 06, 2023 to Dec. 18, 2023	

Operation Frequency each of channel :	
Channel	Frequency(MHz)
CH1	915

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency(MHz)
The Middle channel(CH1)	915

4.3 Test Environment and Mode

Operating Environment:	
Temperature:	22~25.0 °C
Humidity:	50~55 % RH
Atmospheric Pressure:	1010mbar
Test mode:	
Transmitting mode:	Keep the EUT in transmitting mode with modulation.

4.4 Description of Support Units

The EUT has been tested independently.

4.5 Test Location

All tests were performed at:

Centre Testing International Group Co., Ltd

Building C, Hongwei Industrial Park Block 70, Bao'an District, Shenzhen, China

Telephone: +86 (0) 755 33683668 Fax: +86 (0) 755 33683385

No tests were sub-contracted.

FCC Designation No.: CN1164

4.6 Deviation from Standards

None.

4.7 Abnormalities from Standard Conditions

None.

4.8 Other Information Requested by the Customer

None.

4.9 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Radio Frequency	7.9×10^{-8}
2	RF power, conducted	0.46dB (30MHz-1GHz)
		0.55dB (1GHz-18GHz)
3	Radiated Spurious emission test	3.3dB (9kHz-30MHz)
		4.3dB (30MHz-1GHz)
		4.5dB (1GHz-18GHz)
		3.4dB (18GHz-40GHz)
4	Conduction emission	3.5dB (9kHz to 150kHz)
		3.1dB (150kHz to 30MHz)
5	Temperature test	0.64°C
6	Humidity test	3.8%
7	DC power voltages	0.026%

5 Equipment List

RF test system					
Equipment	Manufacturer	Model No.	Serial Number	Cal. Date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
Communication test set	R&S	CMW500	107929	06-28-2023	06-27-2024
Signal Generator	R&S	SMBV100A	1407.6004K02- 262149-CV	09-05-2023	09-04-2024
Spectrum Analyzer	R&S	FSV40	101200	07-25-2023	07-24-2024
RF control unit(power unit)	MWRF-test	MW100-RFCB	MW220620CTI-42	06-28-2023	06-27-2024
high-low temperature test chamber	Dong Guang Qin Zhuo	LK-80GA	QZ20150611879	12-19-2022 12-11-2023	12-18-2023 12-10-2024
Temperature/ Humidity Indicator	biaozhi	HM10	1804186	06-01-2023	05-31-2024
BT&WI-FI Automatic test software	MWRF-test	MTS 8310	2.0.0.0	---	---

3M Semi-anechoic Chamber (2)- Radiated disturbance Test					
Equipment	Manufacturer	Model	Serial No.	Cal. Date	Due Date
3M Chamber & Accessory Equipment	TDK	SAC-3	---	05/22/2022	05/21/2025
Receiver	R&S	ESCI7	100938-003	09-22-2023	09-21-2024
TRILOG Broadband Antenna	schwarzbeck	VULB 9163	9163-618	05/22/2022	05/21/2025
Loop Antenna	Schwarzbeck	FMZB 1519B	1519B-076	04/15/2021	04/14/2024
Microwave Preamplifier	Tonscend	EMC051845SE	980380	12/23/2022	12/23/2023
Multi device Controller	maturo	NCD/070/10711112	---	---	---
Horn Antenna	ETS-LINGREN	BBHA 9120D	9120D-1869	04/15/2021	04/14/2024
Microwave Preamplifier	Agilent	8449B	3008A02425	06/20/2023	06/19/2024
Test software	Fara	EZ-EMC	EMEC-3A1-Pre	---	---

Conducted disturbance Test					
Equipment	Manufacturer	Model No.	Serial Number	Cal. date	Cal. Due date
				(mm-dd-yyyy)	(mm-dd-yyyy)
Receiver	R&S	ESCI	100435	04-25-2023	04-24-2024
Temperature/ Humidity Indicator	Defu	TH128	/	---	---
LISN	R&S	ENV216	100098	09-22-2023	09-21-2024
Barometer	changchun	DYM3	1188	---	---
Test software	Fara	EZ-EMC	EMC-CON 3A1.1	---	---

3M full-anechoic Chamber					
Equipment	Manufacturer	Model No.	Serial Number	Cal. Date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
RSE Automatic test software	JS Tonscend	JS36-RSE	10166	---	---
Receiver	Keysight	N9038A	MY57290136	02-27-2023	02-26-2024
Spectrum Analyzer	Keysight	N9020B	MY57111112	02-21-2023	02-20-2024
Spectrum Analyzer	Keysight	N9030B	MY57140871	02-21-2023	02-20-2024
TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	9163-1148	04-28-2021	04-27-2024
Horn Antenna	Schwarzbeck	BBHA 9170	9170-832	04-15-2021	04-14-2024
Horn Antenna	ETS-LINDGREN	3117	57407	07-04-2021	07-03-2024
Preamplifier	EMCI	EMC184055SE	980597	04-13-2023	04-12-2024
Preamplifier	EMCI	EMC001330	980563	03-28-2023	03-27-2024
Preamplifier	JS Tonscend	TAP-011858	AP21B806112	07-25-2023	07-24-2024
Communication test set	R&S	CMW500	102898	12-23-2022	12-22-2023
Temperature/ Humidity Indicator	biaozhi	GM1360	EE1186631	04-11-2023	04-10-2024
Fully Anechoic Chamber	TDK	FAC-3	---	01-09-2021	01-08-2024
Cable line	Times	SFT205-NMSM-2.50M	394812-0001	---	---
Cable line	Times	SFT205-NMSM-2.50M	394812-0002	---	---
Cable line	Times	SFT205-NMSM-2.50M	394812-0003	---	---
Cable line	Times	SFT205-NMSM-2.50M	393495-0001	---	---
Cable line	Times	EMC104-NMNM-1000	SN160710	---	---
Cable line	Times	SFT205-NMSM-3.00M	394813-0001	---	---
Cable line	Times	SFT205-NMNM-1.50M	381964-0001	---	---
Cable line	Times	SFT205-NMSM-7.00M	394815-0001	---	---
Cable line	Times	HF160-KMKM-3.00M	393493-0001	---	---

6 Test results and Measurement Data

6.1 Antenna Requirement

Standard requirement:	47 CFR Part 15C Section 15.203
15.203 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, 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.	
EUT Antenna:	Please see Internal photos
The antenna is integrated on the main PCB and no consideration of replacement.	

6.2 Conducted Emissions

Test Requirement: 47 CFR Part 15C Section 15.207

Test Method: ANSI C63.10 : 2013

Test Frequency Range: 150kHz to 30MHz

Limit:

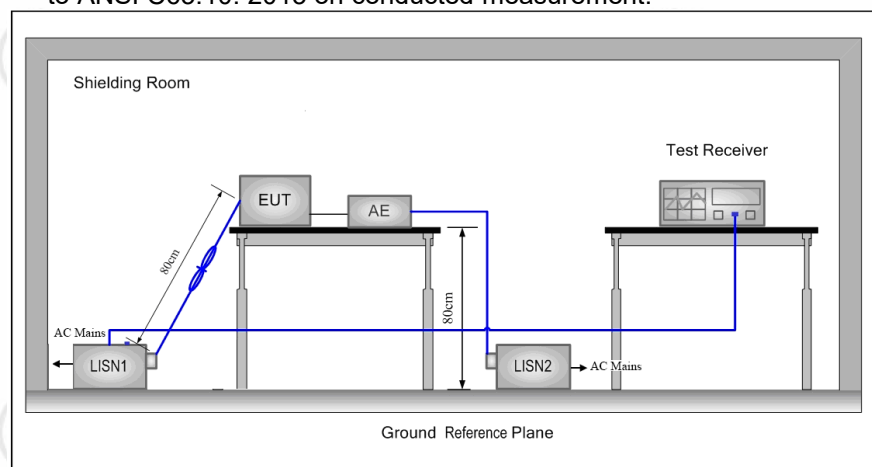
Frequency range (MHz)	Limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

Test Procedure:

- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a $50\Omega/50\mu\text{H} + 5\Omega$ linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
- 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane.
- 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
- 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement.

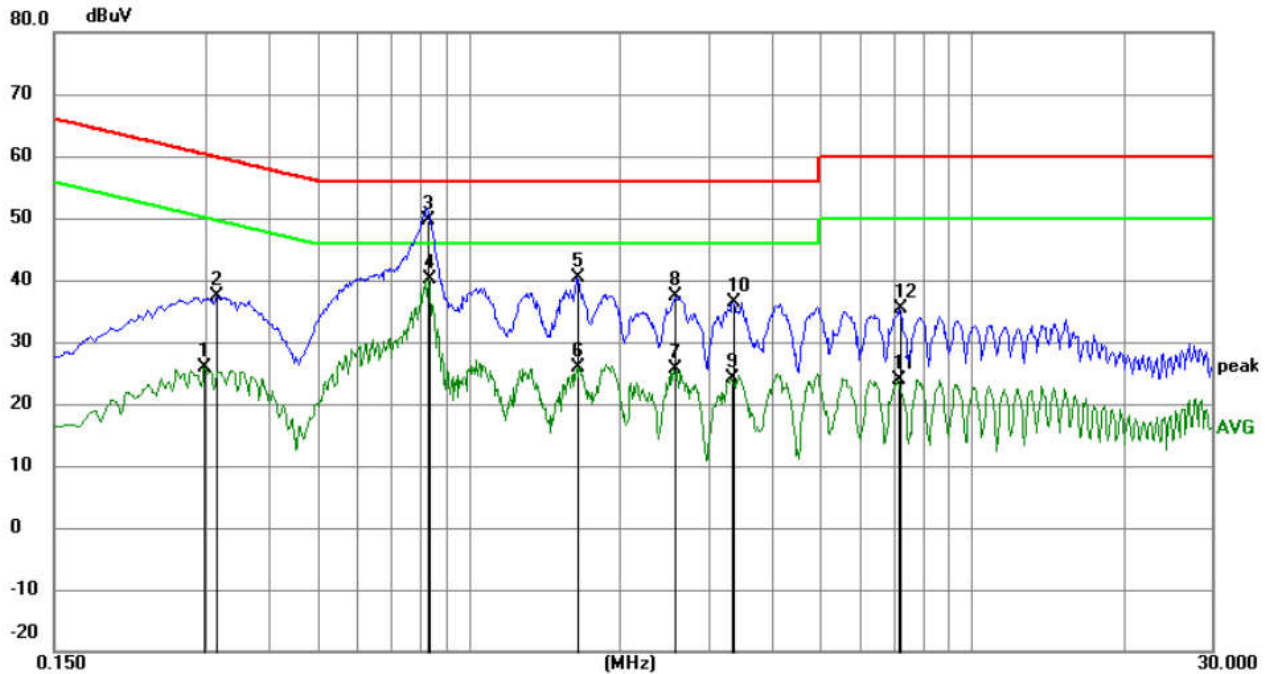
Test Setup:



Test Mode: Transmitter mode
Test Results: Pass

Measurement Data

Live line:



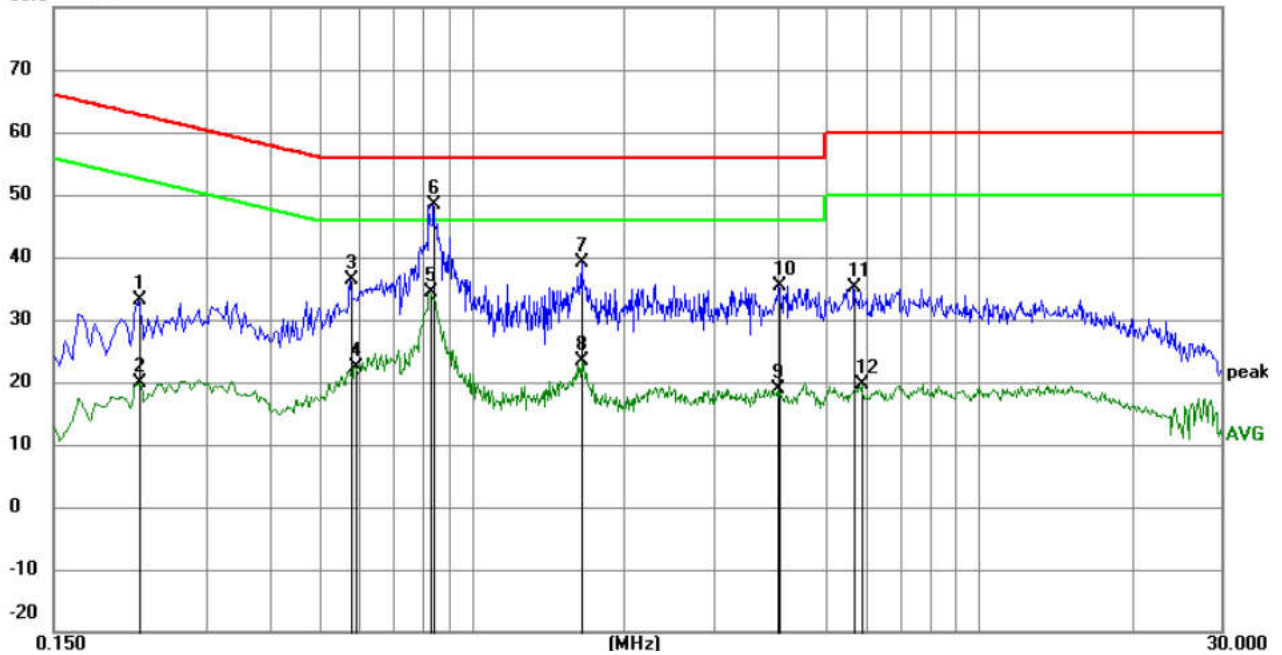
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.2985	17.06	8.84	25.90	50.28	-24.38	AVG	
2		0.3165	28.48	8.85	37.33	59.80	-22.47	QP	
3		0.8295	40.39	9.13	49.52	56.00	-6.48	QP	
4	*	0.8340	30.99	9.13	40.12	46.00	-5.88	AVG	
5		1.6395	31.08	9.20	40.28	56.00	-15.72	QP	
6		1.6484	16.76	9.20	25.96	46.00	-20.04	AVG	
7		2.5665	16.33	9.26	25.59	46.00	-20.41	AVG	
8		2.5710	28.07	9.26	37.33	56.00	-18.67	QP	
9		3.3360	14.90	9.31	24.21	46.00	-21.79	AVG	
10		3.3540	27.11	9.31	36.42	56.00	-19.58	QP	
11		7.1520	14.44	9.47	23.91	50.00	-26.09	AVG	
12		7.2015	26.03	9.47	35.50	60.00	-24.50	QP	

Remark:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level = Receiver Reading + LISN Factor + Cable Loss.
3. If the Peak value under Average limit, the Average value is not recorded in the report.

Neutral line:

80.0 dBuV



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.2220	24.65	8.55	33.20	62.74	-29.54	QP	
2		0.2220	11.27	8.55	19.82	52.74	-32.92	AVG	
3		0.5775	27.28	9.13	36.41	56.00	-19.59	QP	
4		0.5908	13.25	9.16	22.41	46.00	-23.59	AVG	
5		0.8295	25.35	9.13	34.48	46.00	-11.52	AVG	
6	*	0.8430	39.37	9.12	48.49	56.00	-7.51	QP	
7		1.6530	29.96	9.20	39.16	56.00	-16.84	QP	
8		1.6530	14.27	9.20	23.47	46.00	-22.53	AVG	
9		4.0064	9.47	9.34	18.81	46.00	-27.19	AVG	
10		4.0380	26.03	9.35	35.38	56.00	-20.62	QP	
11		5.6715	25.83	9.42	35.25	60.00	-24.75	QP	
12		5.8740	10.09	9.43	19.52	50.00	-30.48	AVG	

Remark:

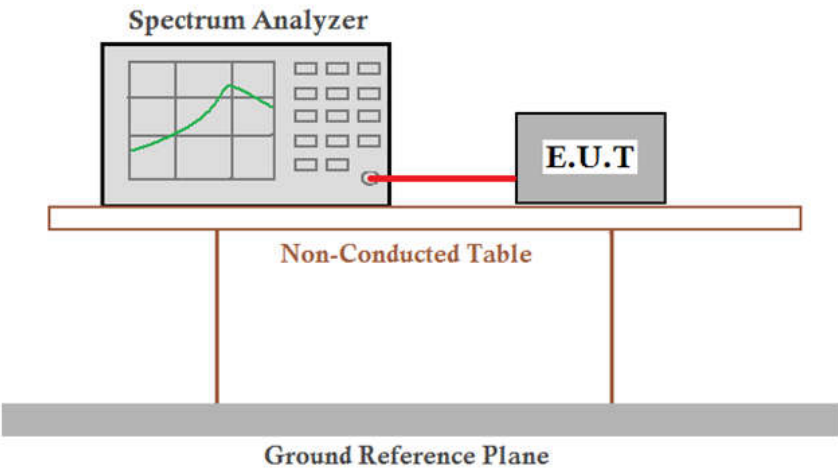
1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level = Receiver Reading + LISN Factor + Cable Loss.
3. If the Peak value under Average limit, the Average value is not recorded in the report.

6.3 Radiated Spurious Emissions

6.3.1 Duty Cycle

Test Requirement: 47 CFR Part 15C Section 15.35 (c)
Test Method: ANSI C63.10:2013

Test Setup:

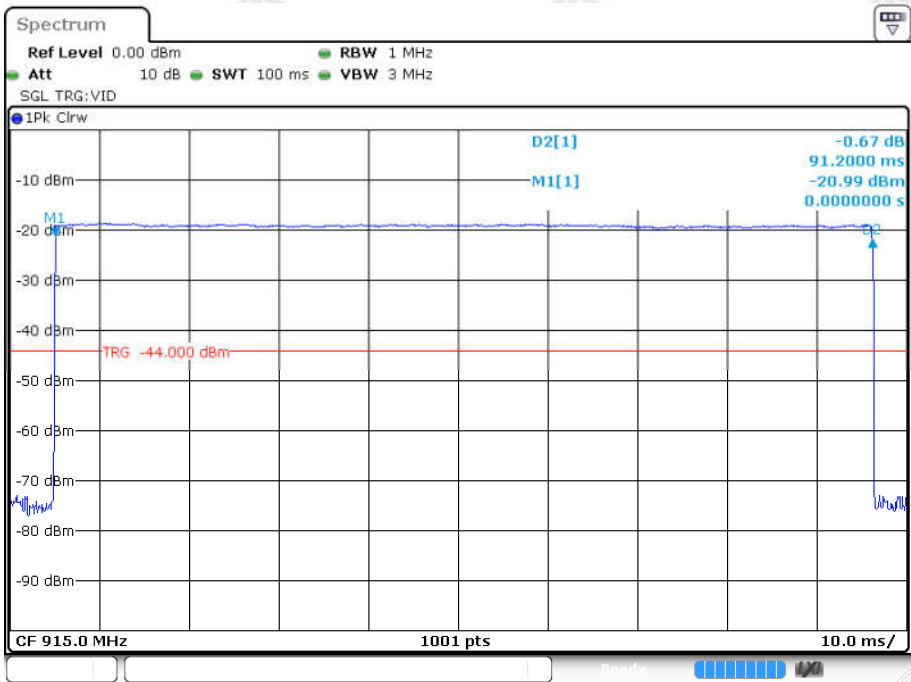


Limit: N/A
Test Mode: Transmitting mode
Test Results: Pass

The number of pulses of duration /100ms	T on time (ms)/100ms	T period (ms)	Duty cycle
1	91.2	100	0.912

Note:
The number of pulses of duration/100ms=1;
 $T \text{ on time}(\text{ms})/100\text{ms}=91.2\text{ms}\times 1=91.2\text{ms};$
 $\text{Duty cycle}=T \text{ on time} / T \text{ period}=91.2\text{ms}/100\text{ms}=0.912;$

Test plot as follows:
The number of pulses of duration/100ms: number is 1



Date: 18.DEC.2023 18:22:29

6.3.2 Radiated Spurious Emissions

Test Requirement: 47 CFR Part 15C Section 15.249 and 15.209 and 15.205

Test Method: ANSI C63.10

Test Site: Measurement Distance: 3m (Semi-Anechoic Chamber)

Receiver Setup:

Frequency	Detector	RBW	VBW	Remark
0.009MHz-0.090MHz	Peak	10kHz	30kHz	Peak
0.009MHz-0.090MHz	Average	10kHz	30kHz	Average
0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
0.110MHz-0.490MHz	Peak	10kHz	30kHz	Peak
0.110MHz-0.490MHz	Average	10kHz	30kHz	Average
0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10kHz	Average

Limit: (Spurious Emissions)

Frequency	Field strength (microvolt/meter)	Limit (dBμV/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-1GHz	500	54.0	Quasi-peak	3
Above 1GHz	500	54.0	Average	3

Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

Limit: (Field strength of the fundamental signal)

Frequency	Limit (dBμV/m @3m)	Remark
911MHz-919MHz	94.0	Average Value
	114.0	Peak Value

Test Setup:

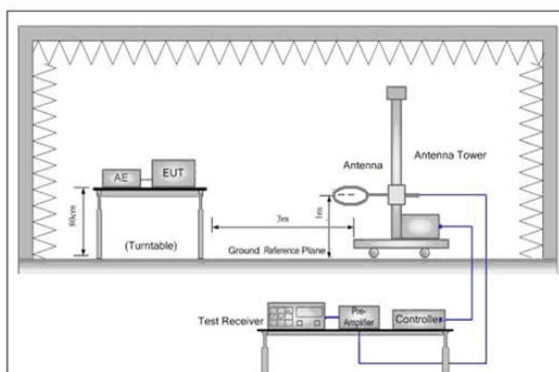


Figure 1. Below 30MHz

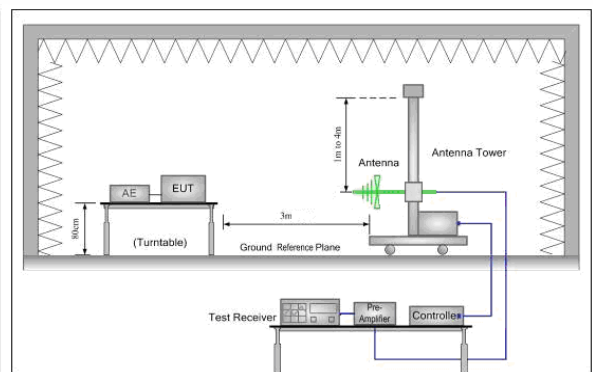


Figure 2. 30MHz to 1GHz

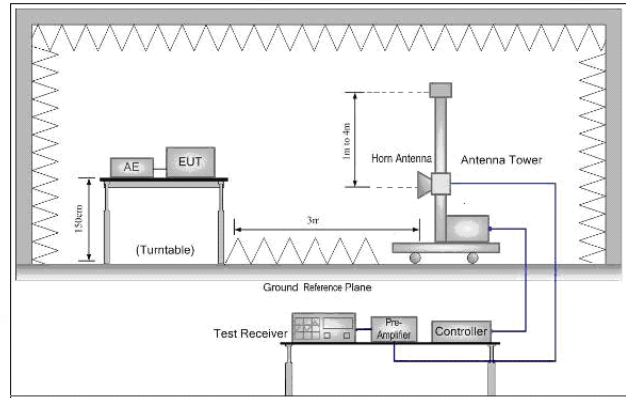


Figure 3. Above 1GHz

Test Procedure:

Below 1GHz test procedure as below:

The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. 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 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.

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 rota table table was turned from 0 degrees to 360 degrees to find the maximum reading.

The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

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:

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).

Test the EUT in the lowest channel ,middle channel, the Highest channel .

The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is worse case.

Repeat above procedures until all frequencies measured was complete.

Transmitting mode

Test Mode:

Test Results:

Pass

Test data:

Field Strength of the Fundamental Signal:

Average value:	
Calculate Formula:	Average value=Peak value + PDCF
	PDCF=20 log(Duty cycle)
	Duty cycle= T on time / T period
Test data:	T on time =91.2ms
	T period =100ms
	PDCF=-0.80

Test channel:	CH1
---------------	-----

Antenna polarization: Horizontal

Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
915	64.82	27.50	92.32	114.00	-21.68	Peak
915	-	-	91.52	94.00	-2.48	Average

Antenna polarization: Vertical

Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
915	64.60	27.50	92.10	114.00	-21.90	Peak
915	-	-	91.30	94.00	-2.70	Average

Remark:

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

Spurious Emissions

9KHz-30MHz:

9 kHz~30 MHz Field Strength of Unwanted Emissions. Quasi-Peak Measurement

The measurements with active loop antenna were greater than 20dB below the limit, so the test data were not recorded in the test report.

30MHz-1GHz & Restricted bands:

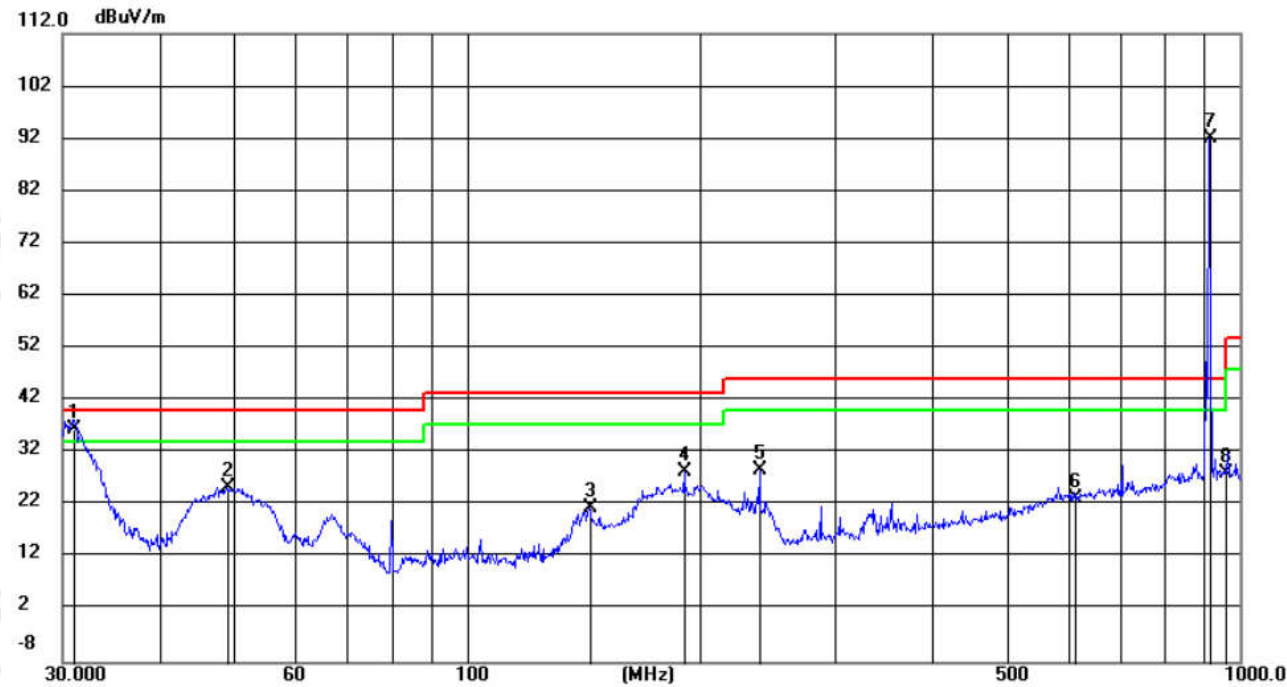
Horizontal:



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Antenna Height cm	Table Degree degree	Comment
1		30.8805	7.63	12.70	20.33	40.00	-19.67	peak	200	7	
2		79.9963	7.68	9.55	17.23	40.00	-22.77	peak	200	268	
3		104.2249	5.76	13.36	19.12	43.50	-24.38	peak	200	38	
4		239.5669	11.91	14.30	26.21	46.00	-19.79	peak	100	227	
5		287.4859	10.74	16.10	26.84	46.00	-19.16	peak	100	19	
6		614.0000	-0.68	23.61	22.93	46.00	-23.07	peak	200	7	
7	*	915.1055	64.82	27.50	92.32	46.00	46.32	peak	100	155	
8		960.0000	0.31	27.77	28.08	46.00	-17.92	peak	200	7	

Note: No.7 is the main frequency point of product operation.

Vertical:



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	Comment
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	
1	!	31.0706	23.77	12.73	36.50	40.00	-3.50	QP	100	336
2		48.8943	11.24	14.16	25.40	40.00	-14.60	peak	100	104
3		144.0567	12.02	9.63	21.65	43.50	-21.85	peak	100	294
4		191.7114	16.00	12.38	28.38	43.50	-15.12	peak	100	72
5		239.6090	14.57	14.30	28.87	46.00	-17.13	peak	200	16
6		614.0000	-0.12	23.61	23.49	46.00	-22.51	peak	200	279
7	*	915.1055	64.60	27.50	92.10	46.00	46.10	peak	200	164
8		960.0000	0.52	27.77	28.29	46.00	-17.71	peak	100	326

Note: No.7 is the main frequency point of product operation.

Above 1GHz:

Test mode:					Transmitting (CH1)				
NO	Freq. [MHz]	Factor [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	1829.88	-24.54	64.60	40.06	74.00	33.94	PASS	Horizontal	PK
2	2745.27	-22.09	56.65	34.56	74.00	39.44	PASS	Horizontal	PK
3	3659.76	-20.33	60.95	40.62	74.00	33.38	PASS	Horizontal	PK
4	5489.64	-14.37	54.55	40.18	74.00	33.82	PASS	Horizontal	PK
5	7320.43	-11.58	55.64	44.06	74.00	29.94	PASS	Horizontal	PK
6	9246.62	-7.83	49.35	41.52	74.00	32.48	PASS	Horizontal	PK
7	1829.88	-24.54	64.89	40.35	74.00	33.65	PASS	Vertical	PK
8	2745.27	-22.09	63.10	41.01	74.00	32.99	PASS	Vertical	PK
9	3659.76	-20.33	60.66	40.33	74.00	33.67	PASS	Vertical	PK
10	5489.64	-14.37	56.58	42.21	74.00	31.79	PASS	Vertical	PK
11	7597.65	-11.30	51.14	39.84	74.00	34.16	PASS	Vertical	PK
12	10064.8	-7.37	55.12	47.75	74.00	26.25	PASS	Vertical	PK

Remark:

- 1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

$$\text{Final Test Level} = \text{Receiver Reading} + \text{Correct Factor}$$

$$\text{Correct Factor} = \text{Antenna Factor} + \text{Cable Factor} - \text{Preamplifier Factor}$$
- 2) Scan from 9kHz to 18GHz, below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported .

6.4 20dB Bandwidth

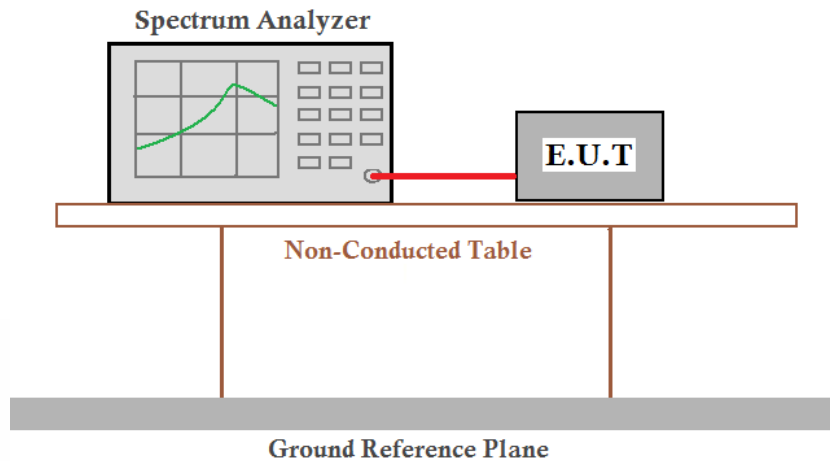
Test Requirement:

47 CFR Part 15C Section 15.215

Test Method:

ANSI C63.10: 2013

Test Setup:



Test Procedure:

Remark: Offset=Cable loss+ attenuation factor.

- 1) The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss 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 for 20dB Bandwidth measurement.
Span = approximately 2 to 5 times the 20 dB bandwidth, centered on a test channel; $1\% \leq RBW \leq 5\%$ of the 20 dB bandwidth; $VBW \geq 3RBW$;
Sweep = auto; Detector function = peak; Trace = max hold.
- 4) Measure and record the results in the test report.

Limit:

N/A

Test Mode:

Transmitter mode

Test Results:

Pass

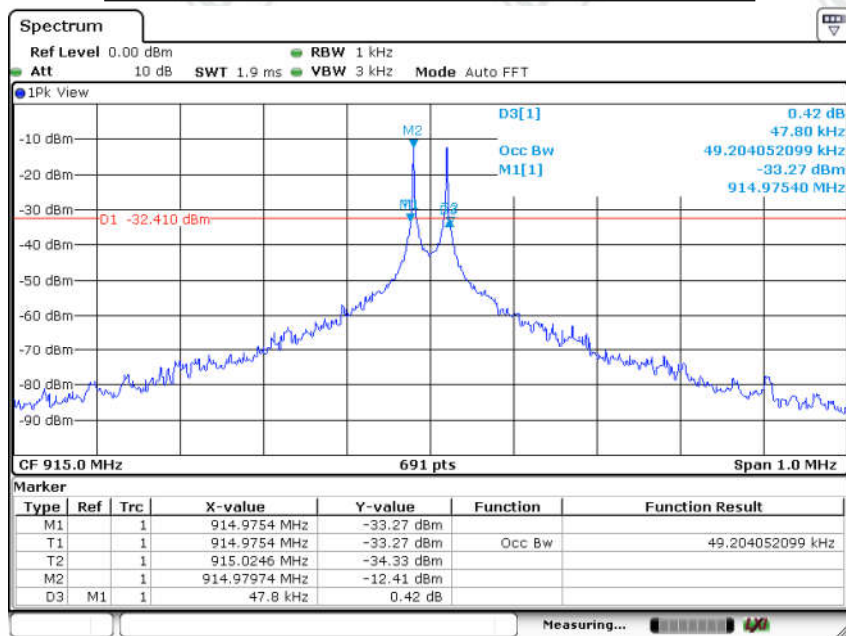
Measurement Data

Test Channel	20dB bandwidth (kHz)	Limit (kHz)	Results
CH1	47.80	N/A	Pass

Test plot as follows:

Test channel:

CH1



Date: 14 DEC 2023 18:46:15