

FCC RADIO TEST REPORT

Applicant..... : Leader Lao Co., Ltd
Address..... : Lot333, Savan Park, Nongdeun, Kaysone Phomvihane, Savannakhet, Laos.
Manufacturer..... : Leader Lao Co., Ltd
Address..... : Lot333, Savan Park, Nongdeun, Kaysone Phomvihane, Savannakhet, Laos.
Factory..... : Leader Lao Co., Ltd
Address..... : Lot333, Savan Park, Nongdeun, Kaysone Phomvihane, Savannakhet, Laos.
Product Name..... : WIRELESS CHARGER
Brand Name..... : N/A
Model No. : WS23012
FCC ID..... : 2BAUN-WS23012
Measurement Standard..... : 47 CFR FCC Part 15, Subpart C
Receipt Date of Samples..... : November 13, 2023
Date of Tested..... : November 15, 2023 to November 22, 2023
Date of Report..... : November 27, 2023

This report shows that above equipment is technically compliant with the requirements of the standards above. All test results in this report apply only to the tested sample(s). Without prior written approval of Dongguan Nore Testing Center Co., Ltd, this report shall not be reproduced except in full.



Prepared by

Julie Xiao / Project Engineer



Iori Fan / Authorized Signatory

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Revision History

[illegible]

1. Summary of Test Result

FCC Rules	Description of Test	Result	Remarks
§15.207 (a)	AC Power Conducted Emission	PASS	---
§15.209	Radiated Emissions	PASS	---
§15.215(c)	20dB Bandwidth	PASS	---
§15.203	Antenna Requirement	PASS	---

2. General Description of EUT

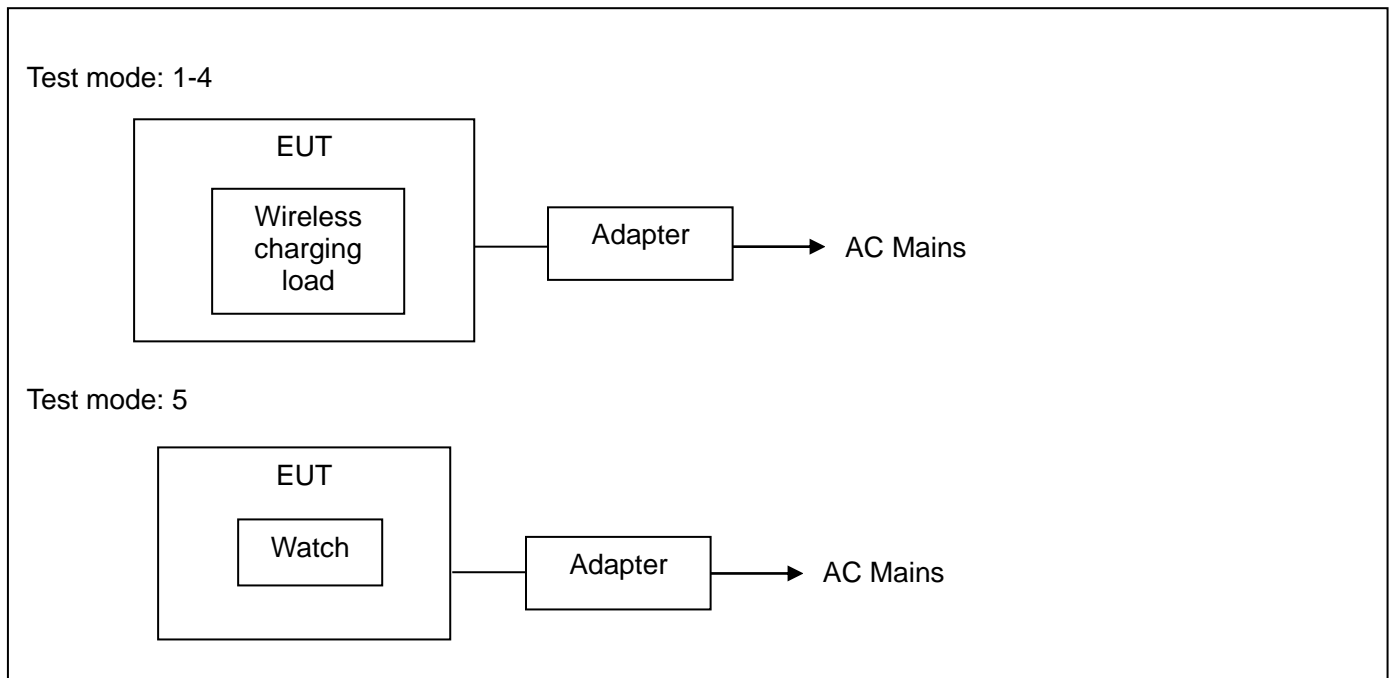
Product Information	
Product Name:	WIRELESS CHARGER
Main Model Name:	WS23012
Additional Model Name:	N/A
Model Difference:	N/A
S/N:	2311-5629
Brand Name:	N/A
Hardware Version:	Not stated
Software Version:	Not stated
Rating:	Input: DC 5V/3A, DC 9V/3A Wireless output: 15W Max
Typical Arrangement:	Table-top
I/O Port:	Refer to user manual
Accessories Information	
Adapter:	N/A
Cable:	Type-C line: 0.14m, unshielded, undetachable
Other:	N/A
Additional Information	
Note:	N/A
Remark:	All the information above are provided by the manufacturer. More detailed feature of the EUT please refers to the user manual.

Technical Specification	
Frequency Range:	110.5-205KHz; 330KHz
Modulation Type:	FSK
Antenna Type:	Coil antenna
Output power for each coil:	5W, 7.5W, 10W, 15W for Wireless Charging Mobile phones and other electronic devices 1.5W for watch

3. Test Channels and Modes Detail

Mode		Modulation
1	Charging 5W	FSK
2	Charging 7.5W	FSK
3	Charging 10W	FSK
4	Charging 15W	FSK
5	Charging watch 1.5W	FSK

4. Configuration of EUT



5. Modification of EUT

No modifications are made to the EUT during all test items.

6. Description of Support Device

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.

No.	Equipment	Brand	M/N	S/N	Cable Specification	Remarks
1.	Wireless Charging Load	Consumer Electronics	2S	---	---	Provided by the Lab.
2.	Adapter	HUAWEI	HW-20032 5CP0	---	---	Provided by the Lab.
3.	Watch	APPLE	A2474	CHHC97M 7F6	---	Provided by the Lab

7. Test Facility and Location

Test Site	:	Dongguan Nore Testing Center Co., Ltd. (Dongguan NTC Co., Ltd.)
Accreditations and Authorizations	:	<p>The Laboratory has been assessed and proved to be in compliance with CNAS/CL01</p> <p>Listed by CNAS, August 13, 2018</p> <p>The Certificate Registration Number is L5795.</p> <p>The Certificate is valid until August 13, 2024</p> <p>The Laboratory has been assessed and proved to be in compliance with ISO17025</p> <p>Listed by A2LA, November 01, 2017</p> <p>The Certificate Registration Number is 4429.01</p> <p>The Certificate is valid until December 31, 2023</p> <p>Listed by FCC, November 06, 2017</p> <p>Test Firm Registration Number: 907417</p> <p>Listed by Industry Canada, June 08, 2017</p> <p>The Certificate Registration Number. Is 46405-9743A</p>
Test Site Location	:	Building D, Gaosheng Science and Technology Park, Hongtu Road, Nancheng District, Dongguan City, Guangdong Province, China

8. Applicable Standards and References

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

Test Standards:

47 CFR Part 15, Subpart C

ANSI C63.10-2013

References Test Guidance:

N/A

9. Deviations and Abnormalities from Standard Conditions

No additions, deviations and exclusions from the standard.

10. Test Conditions

No.	Test Item	Test Mode	Test Voltage	Tested by	Remarks
1.	AC Power Conducted Emission	1-5	AC 120V 60Hz	Sean Yuan	See note 1
2.	Radiated Emissions	1-5	AC 120V 60Hz	Sean Yuan	See note 1
3.	20dB Bandwidth	1, 5	AC 120V 60Hz	Sean Yuan	See note 1
4.	Antenna Requirement	---	---	---	See note 1

Note:

1. The testing climatic conditions for temperature, humidity, and atmospheric pressure are within: 15~35℃, 30~70%, 86~106kPa.
2. Only the worst case was recorded in the report.

11. Measurement Uncertainty

No.	Test Item	Frequency	Uncertainty	Remarks
1.	Conducted Emission	150KHz ~ 30MHz	±2.52 dB	---
2.	Radiated Emission Test	9kHz ~ 30MHz	±2.60 dB	---
		30MHz ~ 1GHz	±5.66 dB	---
		1GHz ~ 18GHz	±5.19 dB	---
		18GHz ~ 40GHz	±5.19 dB	---
3.	Conducted Spurious Emissions	10Hz ~ 40GHz	±0.98 dB	---
4.	RF Output Power	10Hz ~ 40GHz	±1.18 dB	
5.	Power Spectral Density	10Hz ~ 40GHz	±1.06 dB	
6.	Occupied Channel Bandwidth	---	±0.72%	---

Note:

1. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. The measurement uncertainty levels above are estimated and calculated according to CISPR 16-4-2.
3. The conformity assessment statement in this report is based solely on the test results, measurement uncertainty is excluded.

12. Sample Calculations

Conducted Emission						
Freq. (MHz)	Reading Level (dBUV)	Correct Factor (dB)	Measurement (dBUV)	Limit (dBUV)	Over (dB)	Detector
0.1740	41.61	9.99	51.60	64.77	-13.17	QP
<p>Where,</p> <p>Freq. = Emission frequency in MHz</p> <p>Reading Level = Spectrum Analyzer/Receiver Reading</p> <p>Corrector Factor = Insertion loss of LISN + Cable Loss + RF Switching Unit attenuation</p> <p>Measurement = Reading + Corrector Factor</p> <p>Limit = Limit stated in standard</p> <p>Margin = Measurement - Limit</p> <p>Detector = Reading for Quasi-Peak / Average / Peak</p>						

Radiated Spurious Emissions and Restricted Bands						
Freq. (MHz)	Reading Level (dBUV)	Correct Factor (dB/m)	Measurement (dBUV/m)	Limit (dBUV/m)	Over (dB)	Detector
53.2800	30.08	-7.28	22.80	40.00	-17.20	QP
<p>Where,</p> <p>Freq. = Emission frequency in MHz</p> <p>Reading Level = Spectrum Analyzer/Receiver Reading</p> <p>Corrector Factor = Antenna Factor + Cable Loss - Pre-amplifier</p> <p>Measurement = Reading + Corrector Factor</p> <p>Limit = Limit stated in standard</p> <p>Over = Margin, which calculated by Measurement - Limit</p> <p>Detector = Reading for Quasi-Peak / Average / Peak</p>						

Note: For all conducted test items, the spectrum analyzer offset or transducer is derived from RF cable loss and attenuator factor. The offset or transducer is equal to the RF cable loss plus attenuator factor.

13. Test Items and Results

13.1 Conducted Emissions Measurement

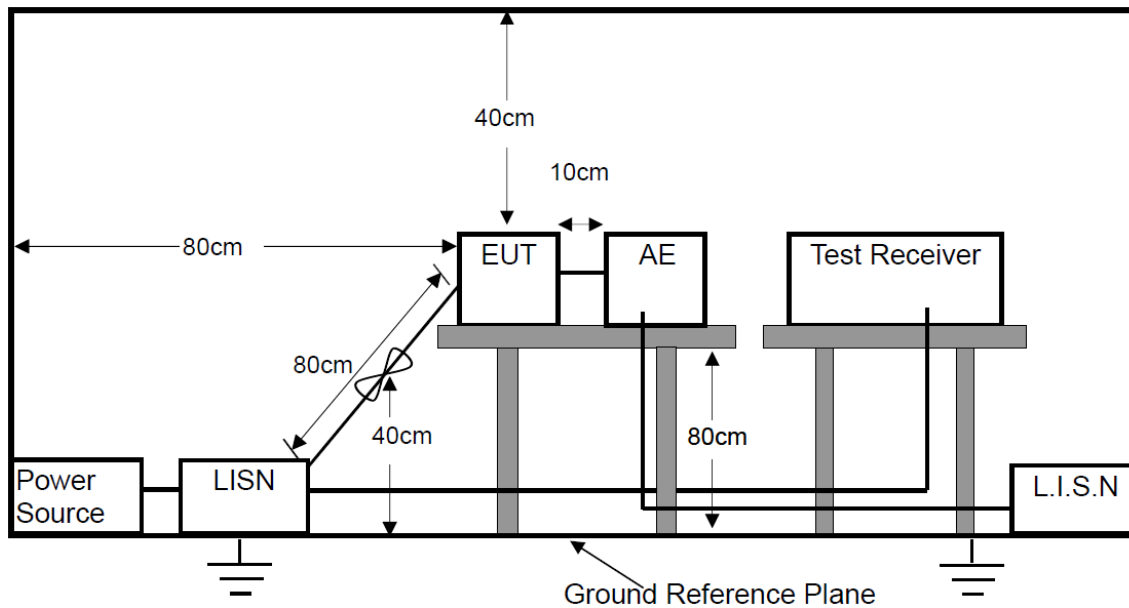
LIMITS

According to the requirements of FCC PART 15.207, the limits are as follows:

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

Note: 1. If the limits for the average detector are met when using the quasi-peak detector, then the limits for the measurements with the average detector are considered to be met.
2. The lower limit shall apply at the transition frequencies.
3. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5MHz.

BLOCK DIAGRAM OF TEST SETUP



TEST PROCEDURES

- a. The EUT was placed on a wooden table 0.8m height from the metal ground plan and 0.4m from the conducting wall of the shielding room and it was kept at 0.8m from any other grounded conducting surface.
- b. All I/O cables and support devices were positioned as per ANSI C63.10.
- c. Connect mains power port of the EUT to a line impedance stabilization network (LISN).
- d. Connect all support devices to the other LISN and AAN, if needed.
- e. Scan the frequency range from 150KHz to 30MHz at both sides of AC line for maximum conducted interference checking and record the test data.

TEST RESULTS

PASS

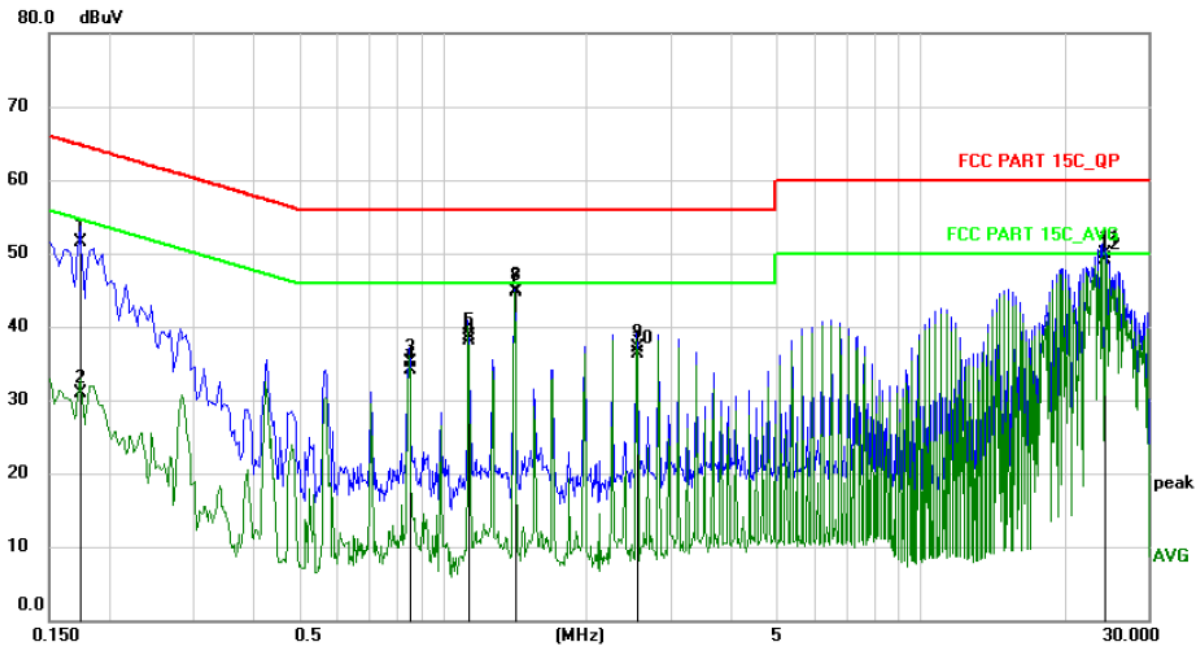
Please refer to the following pages of the worst case.

M/N: WS23012	Testing Voltage: AC 120V / 60Hz
Phase: L1	Detector: QP & AVG
Test Mode: 3	

Conducted Emission Measurement

Date: 2023/11/17

Time: 14:38:56



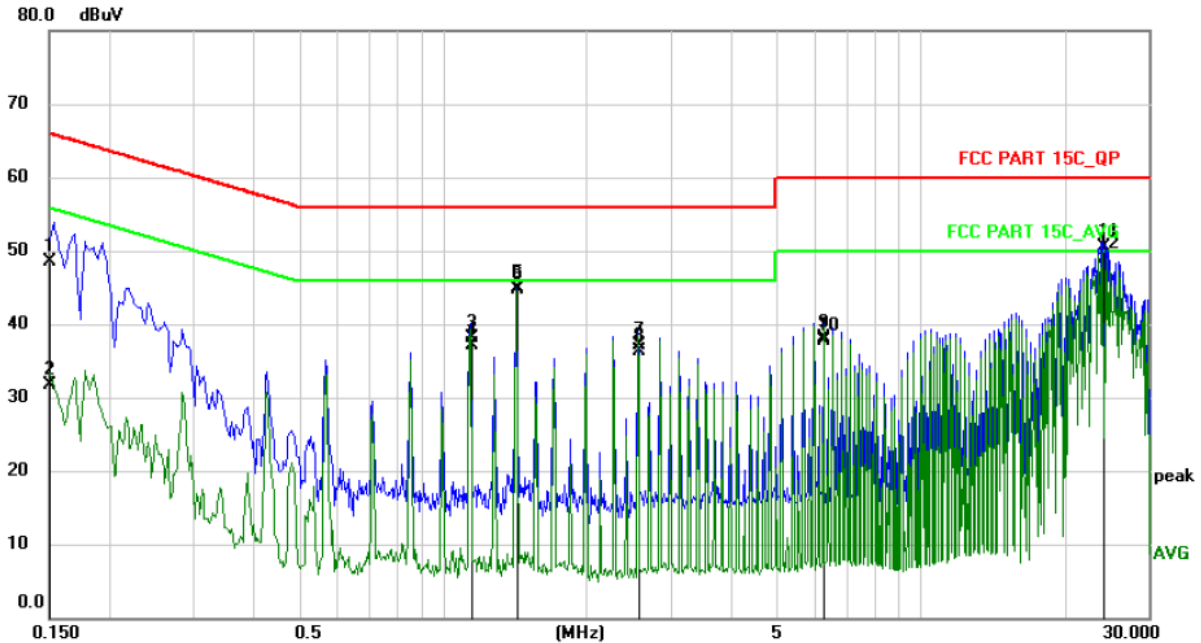
No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	0.1740	41.61	9.99	51.60	64.77	-13.17	QP	
2	0.1740	20.91	9.99	30.90	54.77	-23.87	AVG	
3	0.8500	25.09	10.01	35.10	56.00	-20.90	QP	
4	0.8500	24.09	10.01	34.10	46.00	-11.90	AVG	
5	1.1340	28.80	10.00	38.80	56.00	-17.20	QP	
6	1.1340	28.10	10.00	38.10	46.00	-7.90	AVG	
7	1.4180	34.70	10.00	44.70	56.00	-11.30	QP	
8	1.4180	34.90	10.00	44.90	46.00	-1.10	AVG	
9	2.5500	27.07	10.03	37.10	56.00	-18.90	QP	
10	2.5500	26.27	10.03	36.30	46.00	-9.70	AVG	
11	24.3660	39.59	10.41	50.00	60.00	-10.00	QP	
12 *	24.3660	38.69	10.41	49.10	50.00	-0.90	AVG	

M/N: WS23012	Testing Voltage: AC 120V / 60Hz
Phase: N	Detector: QP & AVG
Test Mode: 3	

Conducted Emission Measurement

Date: 2023/11/17

Time: 14:43:16



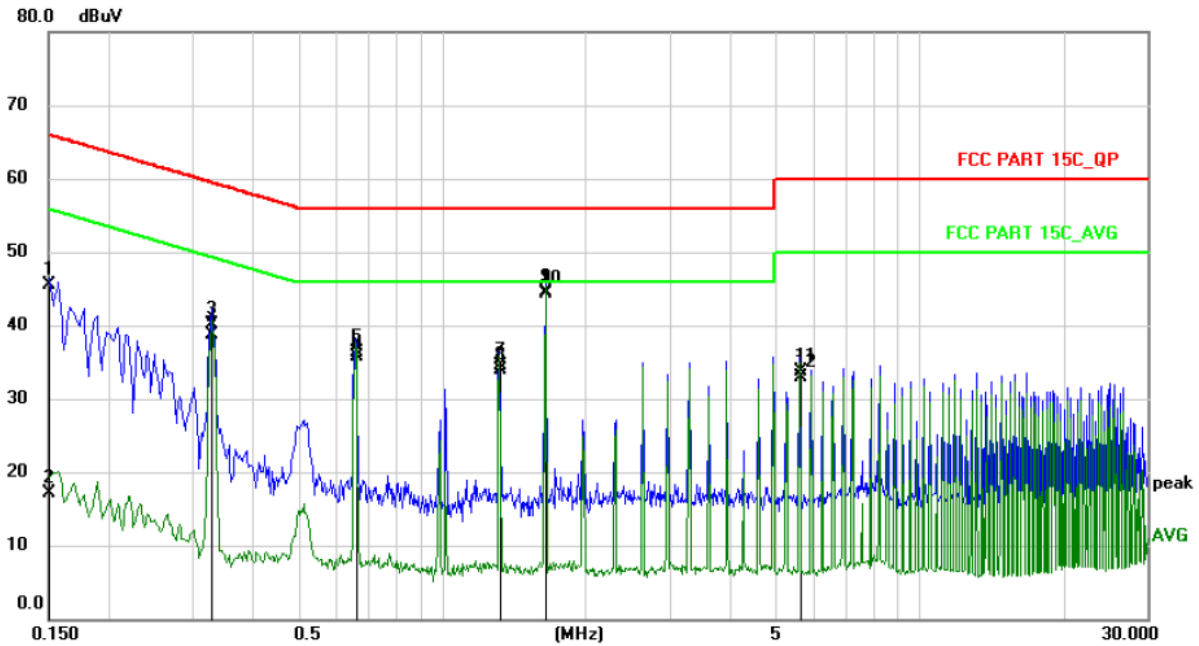
No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	0.1500	38.66	9.94	48.60	66.00	-17.40	QP	
2	0.1500	21.86	9.94	31.80	56.00	-24.20	AVG	
3	1.1419	28.14	9.96	38.10	56.00	-17.90	QP	
4	1.1419	27.24	9.96	37.20	46.00	-8.80	AVG	
5	1.4260	35.04	9.96	45.00	56.00	-11.00	QP	
6	1.4260	34.74	9.96	44.70	46.00	-1.30	AVG	
7	2.5659	27.12	9.98	37.10	56.00	-18.90	QP	
8	2.5659	26.42	9.98	36.40	46.00	-9.60	AVG	
9	6.2700	28.05	10.05	38.10	60.00	-21.90	QP	
10	6.2700	27.65	10.05	37.70	50.00	-12.30	AVG	
11	24.0860	40.24	10.36	50.60	60.00	-9.40	QP	
12 *	24.0860	38.64	10.36	49.00	50.00	-1.00	AVG	

M/N: WS23012	Testing Voltage: AC 120V / 60Hz
Phase: L1	Detector: QP & AVG
Test Mode: 5	

Conducted Emission Measurement

Date: 2023/11/17

Time: 14:01:52



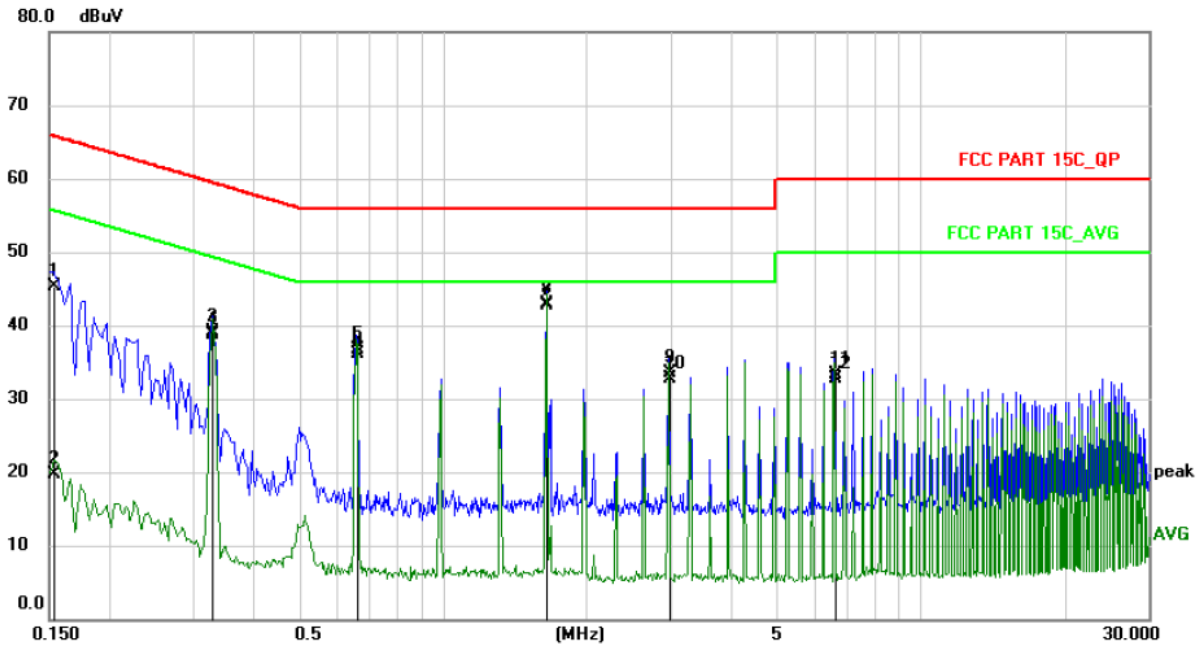
No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
	MHz	dBuV	dB	dBuV	dBuV	dB		
1	0.1500	35.62	9.98	45.60	66.00	-20.40	QP	
2	0.1500	7.22	9.98	17.20	56.00	-38.80	AVG	
3	0.3300	30.14	10.06	40.20	59.45	-19.25	QP	
4	0.3300	28.64	10.06	38.70	49.45	-10.75	AVG	
5	0.6580	26.28	10.02	36.30	56.00	-19.70	QP	
6	0.6580	25.68	10.02	35.70	46.00	-10.30	AVG	
7	1.3180	24.60	10.00	34.60	56.00	-21.40	QP	
8	1.3180	23.90	10.00	33.90	46.00	-12.10	AVG	
9	1.6500	34.59	10.01	44.60	56.00	-11.40	QP	
10 *	1.6500	34.39	10.01	44.40	46.00	-1.60	AVG	
11	5.6059	23.62	10.08	33.70	60.00	-26.30	QP	
12	5.6059	22.82	10.08	32.90	50.00	-17.10	AVG	

M/N: WS23012	Testing Voltage: AC 120V / 60Hz
Phase: N	Detector: QP & AVG
Test Mode: 5	

Conducted Emission Measurement

Date: 2023/11/17

Time: 14:08:53



No. Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Detector	Comment
	MHz	dBuV	dB	dBuV	dBuV	dB		
1	0.1539	35.36	9.94	45.30	65.79	-20.49	QP	
2	0.1539	9.76	9.94	19.70	55.79	-36.09	AVG	
3	0.3300	29.18	10.02	39.20	59.45	-20.25	QP	
4	0.3300	28.78	10.02	38.80	49.45	-10.65	AVG	
5	0.6580	26.72	9.98	36.70	56.00	-19.30	QP	
6	0.6580	26.12	9.98	36.10	46.00	-9.90	AVG	
7	1.6500	32.83	9.97	42.80	56.00	-13.20	QP	
8 *	1.6500	32.93	9.97	42.90	46.00	-3.10	AVG	
9	2.9660	23.51	9.99	33.50	56.00	-22.50	QP	
10	2.9660	22.81	9.99	32.80	46.00	-13.20	AVG	
11	6.5937	23.34	10.06	33.40	60.00	-26.60	QP	
12	6.5937	22.74	10.06	32.80	50.00	-17.20	AVG	

13.2 Radiated Spurious Emissions and Restricted Bands Measurement

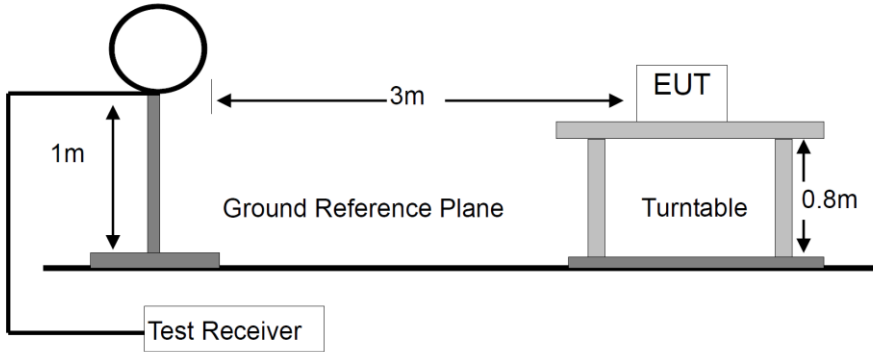
LIMITS

Frequency range MHz	Distance Meters	Field Strengths Limit (15.209)	
		$\mu\text{V/m}$	
0.009 ~ 0.490	300	2400/F(kHz)	
0.490 ~ 1.705	30	24000/F(kHz)	
1.705 ~ 30	30	30	
30 ~ 88	3	100	
88 ~ 216	3	150	
216 ~ 960	3	200	
Above 960	3	500	
Frequency range MHz	Distance Meters	Field Strengths Limit (15.249)	
		mV/m (Field strength of fundamental)	$\mu\text{V/m}$ (Field strength of Harmonics)
902 ~ 928	3	50	500
2400 ~ 2483.5	3	50	500
5725 ~ 5875	3	50	500
24000 ~ 2425000	3	250	2500

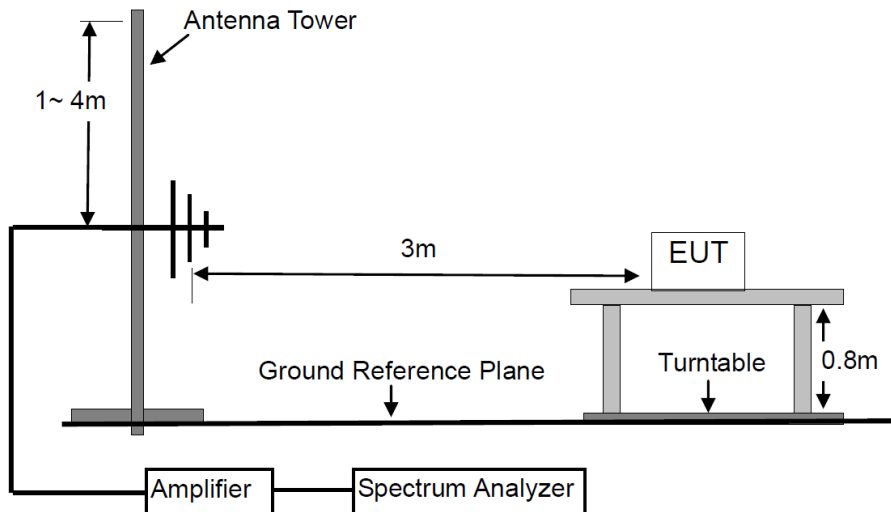
Remark: (1) Emission level (dB) μV = 20 log Emission level $\mu\text{V/m}$
 (2) The smaller limit shall apply at the cross point between two frequency bands.
 (3) As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.
 (4) The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or 40 GHz, whichever is lower.
 (5) §15.249(d) specifies that emissions which fall in the restricted bands, as defined in §15.205 comply with radiated emission limits specified in §15.209.

BLOCK DIAGRAM OF TEST SETUP

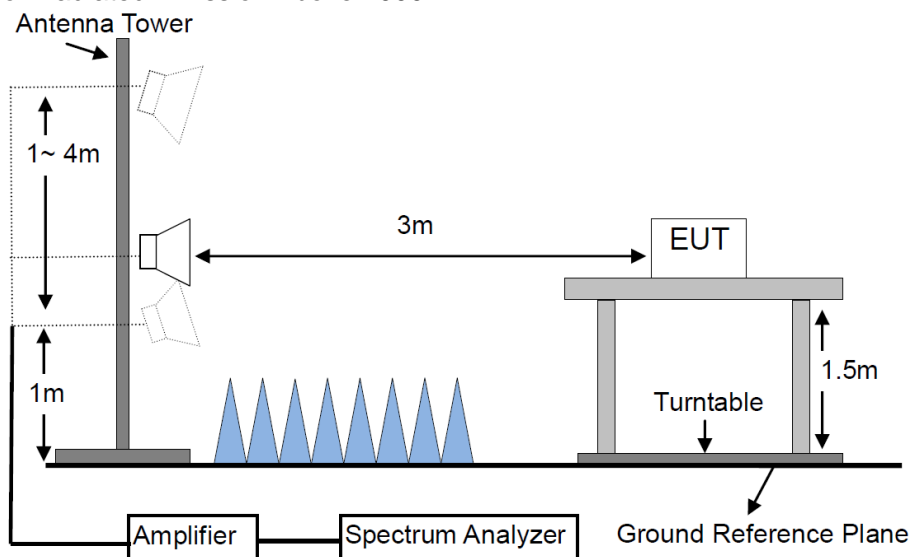
For Radiated Emission below 30MHz



For Radiated Emission 30-1000MHz



For Radiated Emission Above 1000MHz.



TEST PROCEDURES

- a. Below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi- anechoic chamber room.
- b. For the radiated emission test above 1GHz:
The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter full anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
- c. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. 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.
- e. 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. The test-receiver system was set to peak detect function and specified bandwidth with maximum hold mode.
- f. A Quasi-peak measurement was then made for that frequency point for below 1GHz test. PK and AV for above 1GHz emission test.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

Frequency Band	Detector	Resolution Bandwidth	Video Bandwidth
9KHz-90KHz	AVG	300Hz	1KHz
91KHz-109KHz	QP	300Hz	1KHz
110KHz-490KHz	AVG	300Hz/ 9KHz	1KHz /30KHz
150KHz-30MHz	QP	10KHz	30KHz
30MHz-1000MHz	QP	120KHz	300KHz
Above 1000MHz	Peak	1 MHz	3 MHz
	Average	1 MHz	10 Hz

TEST RESULTS

PASS

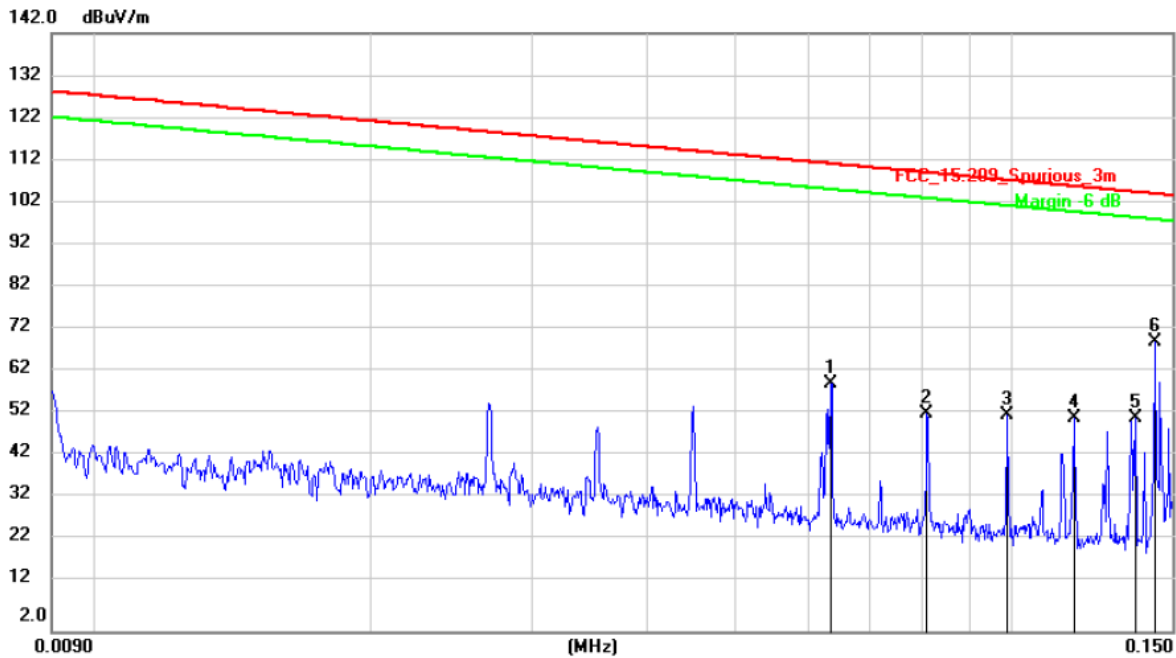
Please refer to the following pages of the worst case.

M/N: WS23012	Testing Voltage: AC 120V / 60Hz
Polarization: Horizontal	Detector: AVG, QP
Test Mode: 3	Distance: 3m

Radiated Emission Measurement

Date: 2023/11/16

Time: 18:25:47



No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1	0.0635	39.47	20.55	60.02	111.45	-51.43	AVG	
2	0.0810	32.42	20.54	52.96	109.35	-56.39	AVG	
3	0.0991	31.97	20.54	52.51	107.61	-55.10	QP	
4	0.1171	31.39	20.53	51.92	106.16	-54.24	AVG	
5	0.1367	31.28	20.52	51.80	104.83	-53.03	AVG	
6 *	0.1433	49.18	20.52	69.70	104.42	-34.72	AVG	

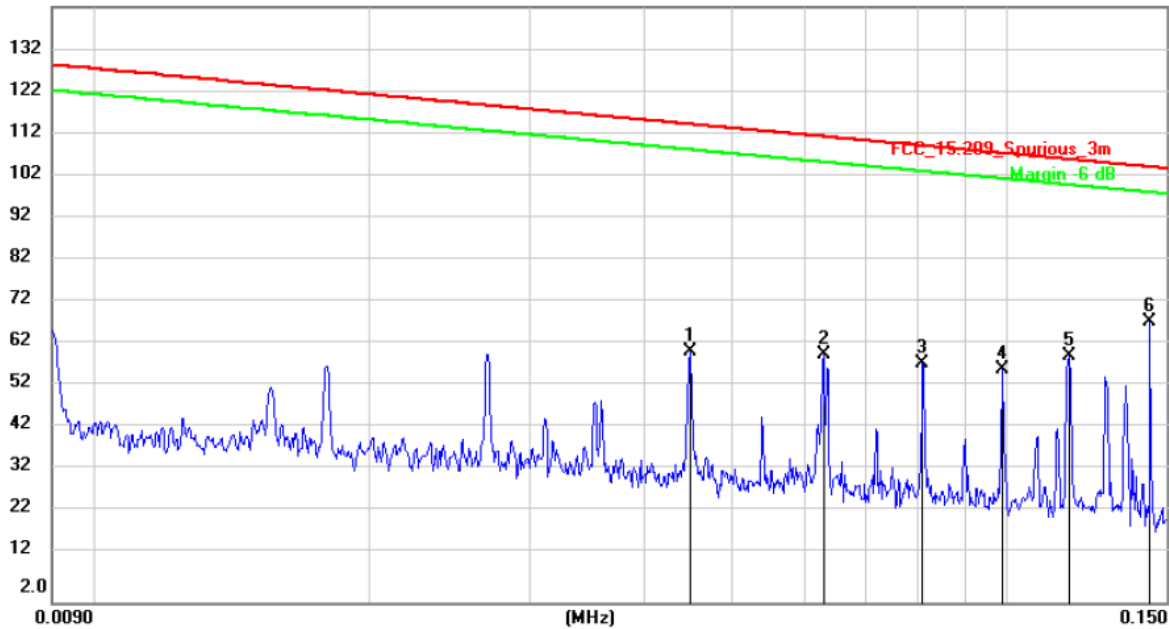
M/N: WS23012	Testing Voltage: AC 120V / 60Hz
Polarization: Vertical	Detector: AVG, QP
Test Mode: 3	Distance: 3m

Radiated Emission Measurement

Date: 2023/11/16

Time: 18:47:41

142.0 dBuV/m



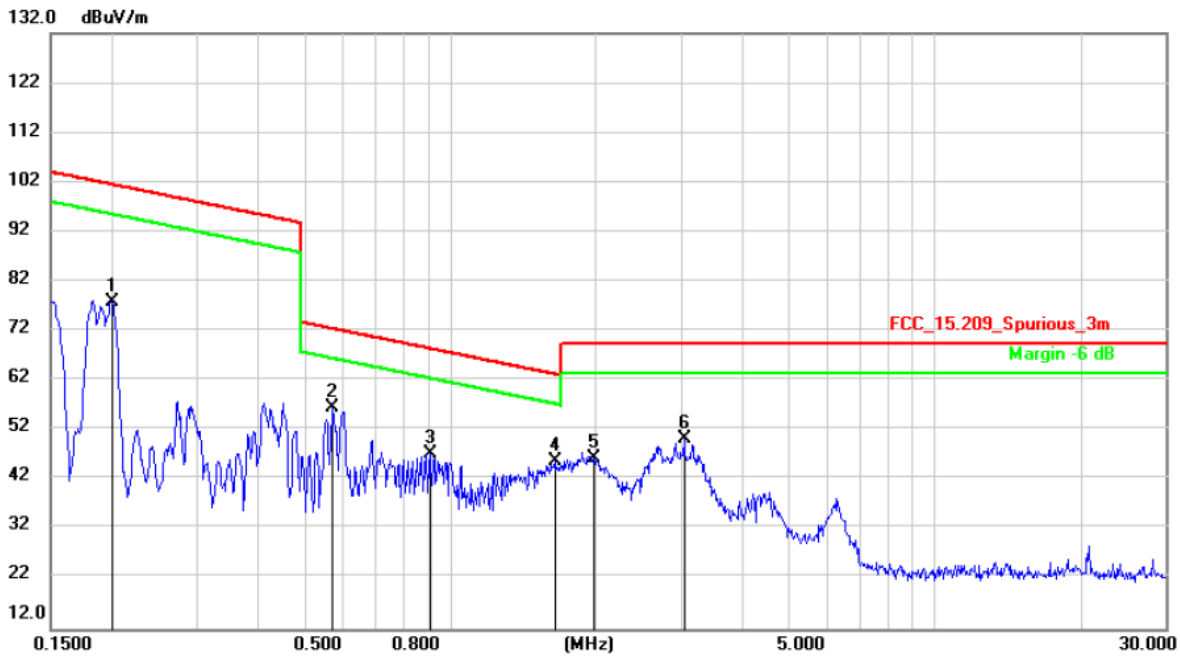
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		0.0449	40.50	20.59	61.09	114.44	-53.35	AVG	
2		0.0629	39.63	20.55	60.18	111.53	-51.35	AVG	
3		0.0810	37.58	20.54	58.12	109.35	-51.23	AVG	
4		0.0990	36.16	20.54	56.70	107.61	-50.91	QP	
5		0.1174	39.23	20.53	59.76	106.14	-46.38	AVG	
6	*	0.1438	47.41	20.52	67.93	104.39	-36.46	AVG	

M/N: WS23012	Testing Voltage: AC 120V / 60Hz
Polarization: Horizontal	Detector: AVG, QP
Test Mode: 3	Distance: 3m

Radiated Emission Measurement

Date: 2023/11/16

Time: 18:33:06



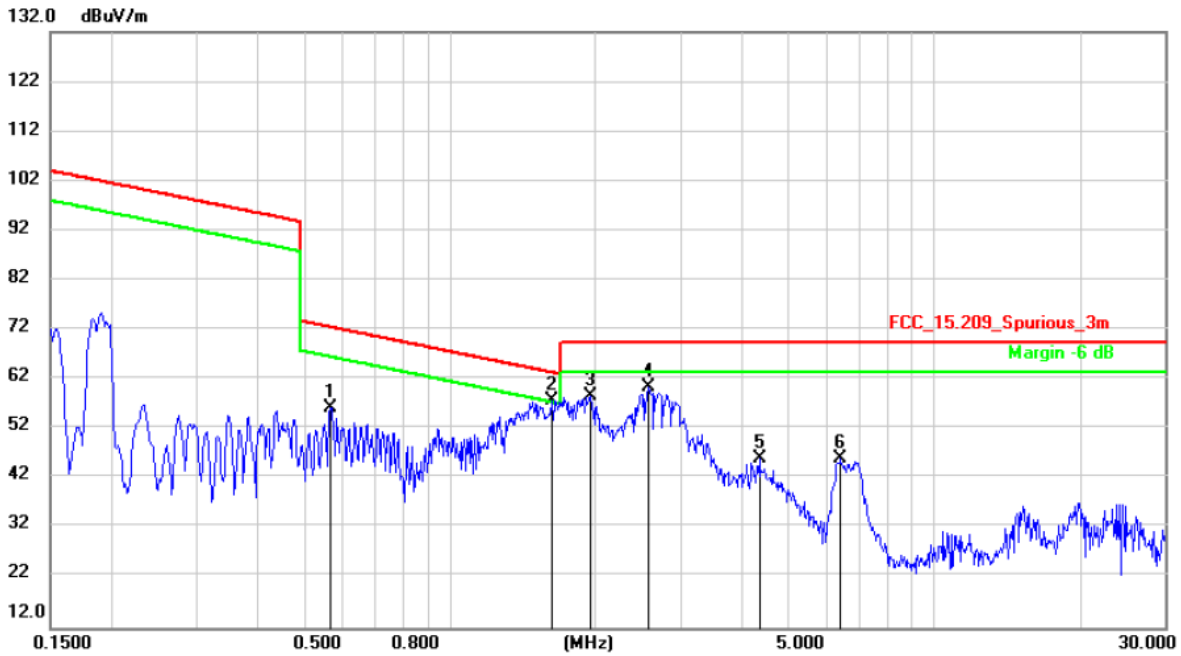
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		0.1997	57.29	20.50	77.79	101.55	-23.76	AVG	
2	*	0.5731	36.00	20.42	56.42	72.44	-16.02	QP	
3		0.9087	26.72	20.40	47.12	68.44	-21.32	QP	
4		1.6450	25.28	20.40	45.68	63.28	-17.60	QP	
5		1.9801	26.03	20.40	46.43	69.50	-23.07	QP	
6		3.0414	29.96	20.40	50.36	69.50	-19.14	QP	

M/N: WS23012	Testing Voltage: AC 120V / 60Hz
Polarization: Vertical	Detector: QP
Test Mode: 3	Distance: 3m

Radiated Emission Measurement

Date: 2023/11/16

Time: 18:40:33



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1		0.5669	35.86	20.42	56.28	72.53	-16.25	QP	
2	*	1.6275	37.43	20.40	57.83	63.37	-5.54	QP	
3		1.9489	38.39	20.40	58.79	69.50	-10.71	QP	
4		2.5807	39.99	20.40	60.39	69.50	-9.11	QP	
5		4.3605	25.68	20.44	46.12	69.50	-23.38	QP	
6		6.4198	25.58	20.47	46.05	69.50	-23.45	QP	

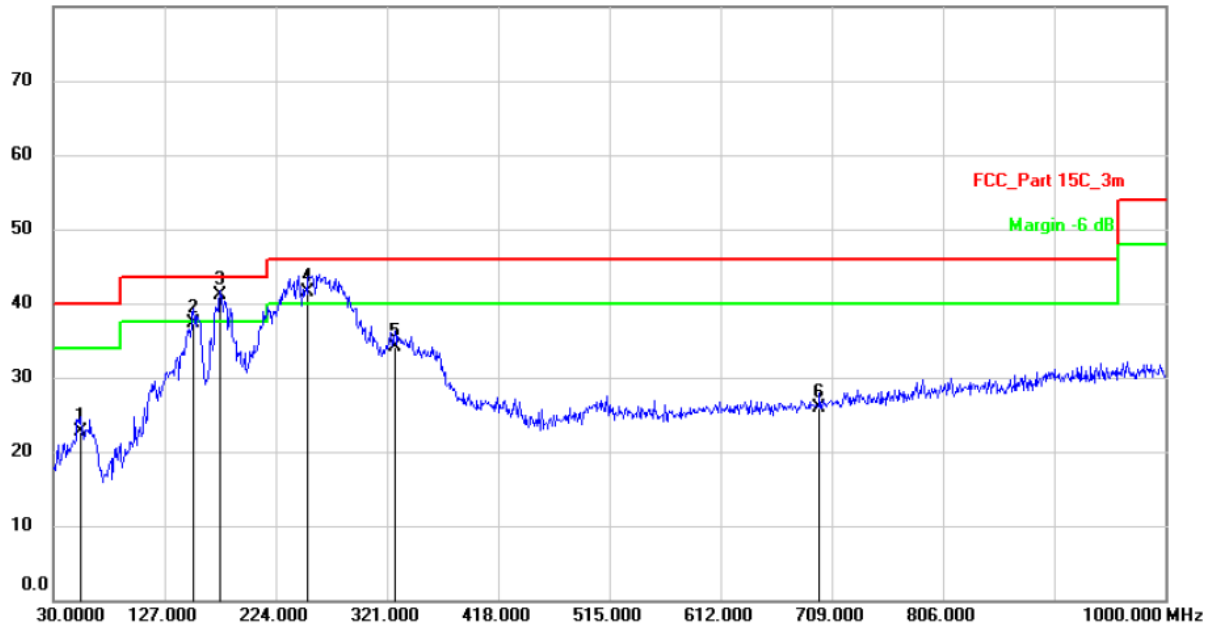
M/N: WS23012	Testing Voltage: AC 120V / 60Hz
Polarization: Horizontal	Detector: QP
Test Mode: 3	Distance: 3m

Radiated Emission Measurement

Date: 2023/11/16

Time: 17:57:41

80.0 dBuV/m



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		53.2800	30.08	-7.28	22.80	40.00	-17.20	QP	
2		152.2200	48.19	-10.79	37.40	43.50	-6.10	QP	
3	*	175.5000	50.81	-9.61	41.20	43.50	-2.30	QP	
4	!	252.1300	47.81	-6.31	41.50	46.00	-4.50	QP	
5		327.7900	38.82	-4.72	34.10	46.00	-11.90	QP	
6		698.3300	23.77	2.13	25.90	46.00	-20.10	QP	

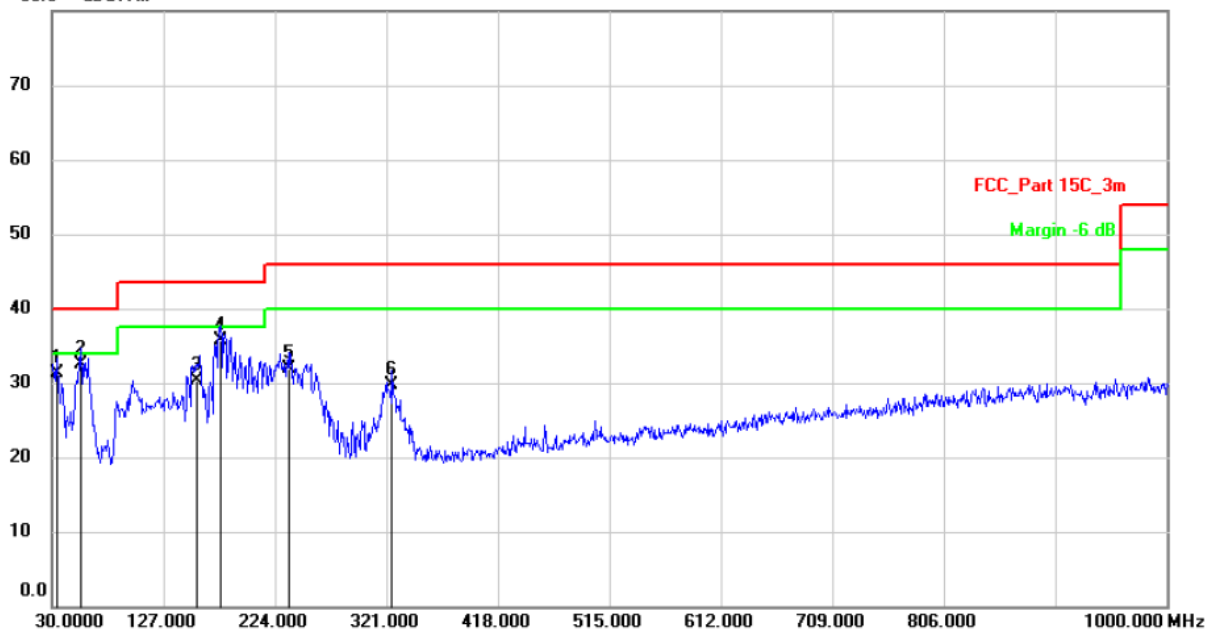
M/N: WS23012	Testing Voltage: AC 120V / 60Hz
Polarization: Vertical	Detector: QP
Test Mode: 3	Distance: 3m

Radiated Emission Measurement

Date: 2023/11/16

Time: 18:14:29

80.0 dBuV/m



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over		
		MHz	Level	Factor	ment			Detector	Comment
			dBuV	dB/m	dBuV/m	dBuV/m	dB		
1		33.8800	40.70	-9.40	31.30	40.00	-8.70	QP	
2	*	55.2200	40.35	-7.75	32.60	40.00	-7.40	QP	
3		156.1000	41.73	-11.33	30.40	43.50	-13.10	QP	
4		176.4700	45.51	-9.71	35.80	43.50	-7.70	QP	
5		236.6100	39.73	-7.73	32.00	46.00	-14.00	QP	
6		325.8500	35.58	-5.78	29.80	46.00	-16.20	QP	

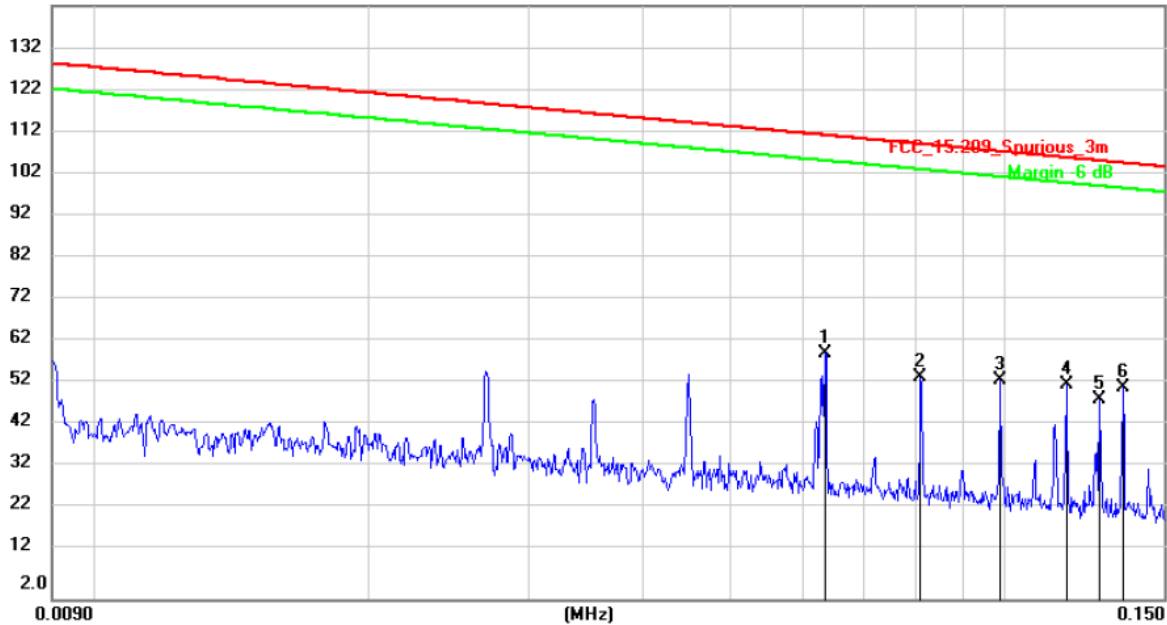
M/N: WS23012	Testing Voltage: AC 120V / 60Hz
Polarization: Horizontal	Detector: AVG, QP
Test Mode: 5	Distance: 3m

Radiated Emission Measurement

Date: 2023/11/16

Time: 20:27:09

142.0 dBuV/m



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	0.0635	39.54	20.55	60.09	111.45	-51.36	AVG	
2		0.0810	33.63	20.54	54.17	109.35	-55.18	AVG	
3		0.0991	33.08	20.54	53.62	107.61	-53.99	QP	
4		0.1171	31.92	20.53	52.45	106.16	-53.71	AVG	
5		0.1274	28.62	20.53	49.15	105.44	-56.29	AVG	
6		0.1351	31.32	20.52	51.84	104.93	-53.09	AVG	

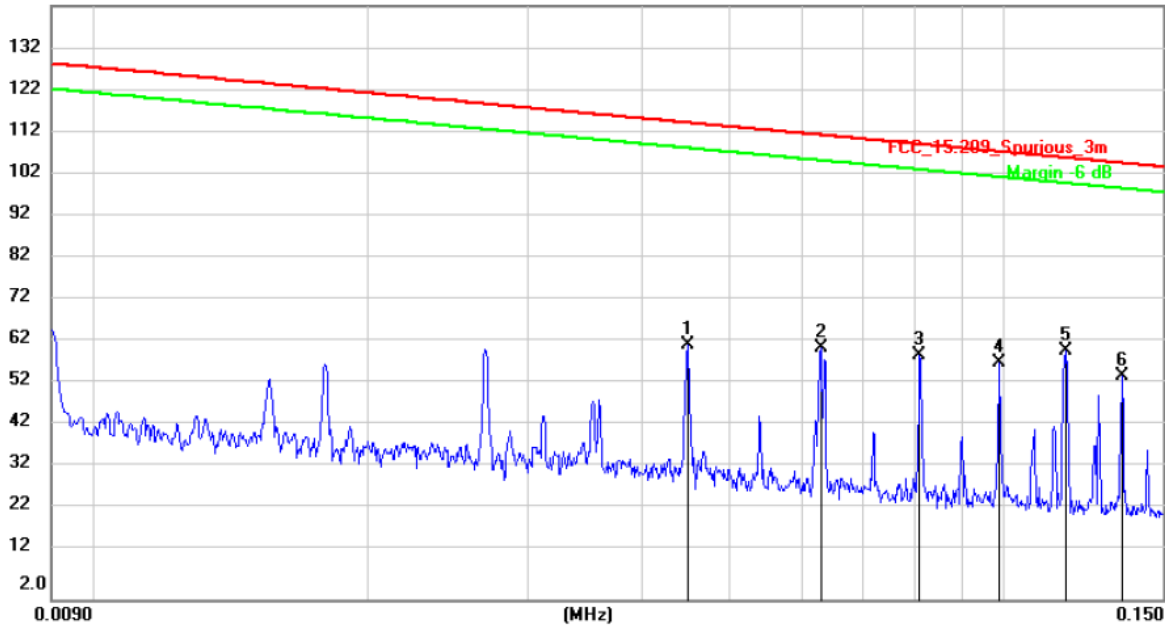
M/N: WS23012	Testing Voltage: AC 120V / 60Hz
Polarization: Vertical	Detector: AVG, QP
Test Mode: 5	Distance: 3m

Radiated Emission Measurement

Date: 2023/11/16

Time: 20:34:51

142.0 dBuV/m



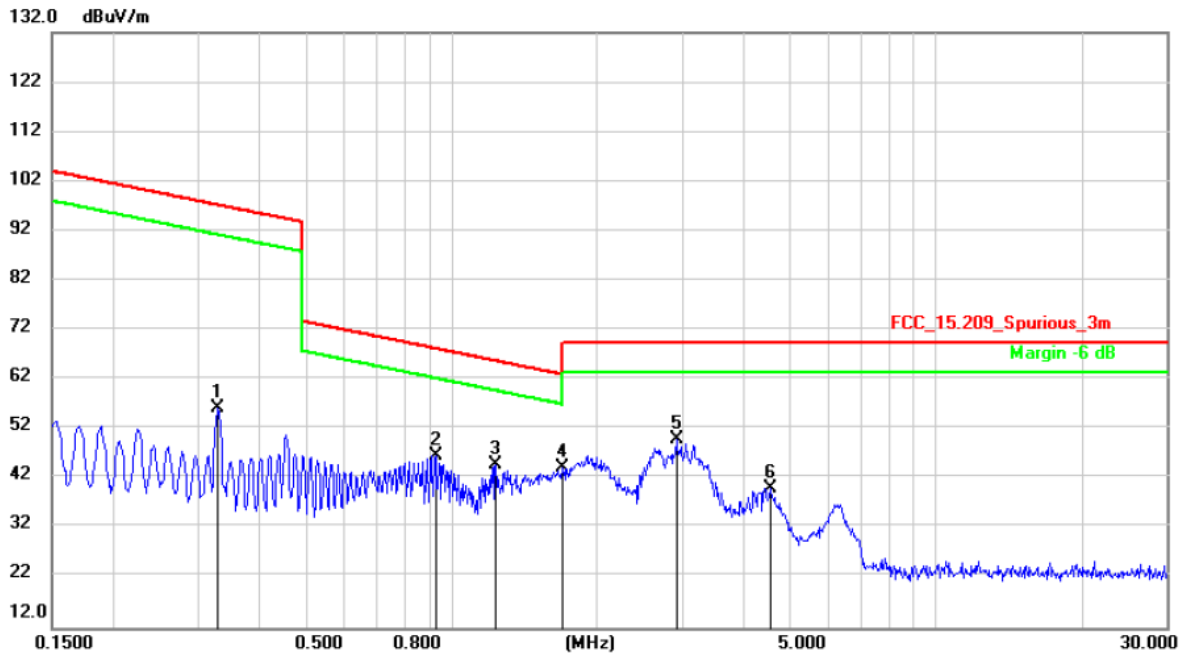
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		0.0449	41.31	20.59	61.90	114.44	-52.54	AVG	
2		0.0629	40.74	20.55	61.29	111.53	-50.24	AVG	
3		0.0810	39.09	20.54	59.63	109.35	-49.72	AVG	
4		0.0991	37.24	20.54	57.78	107.61	-49.83	QP	
5	*	0.1174	40.07	20.53	60.60	106.14	-45.54	AVG	
6		0.1351	34.02	20.52	54.54	104.93	-50.39	AVG	

M/N: WS23012	Testing Voltage: AC 120V / 60Hz
Polarization: Horizontal	Detector: QP
Test Mode: 5	Distance: 3m

Radiated Emission Measurement

Date: 2023/11/16

Time: 20:19:50



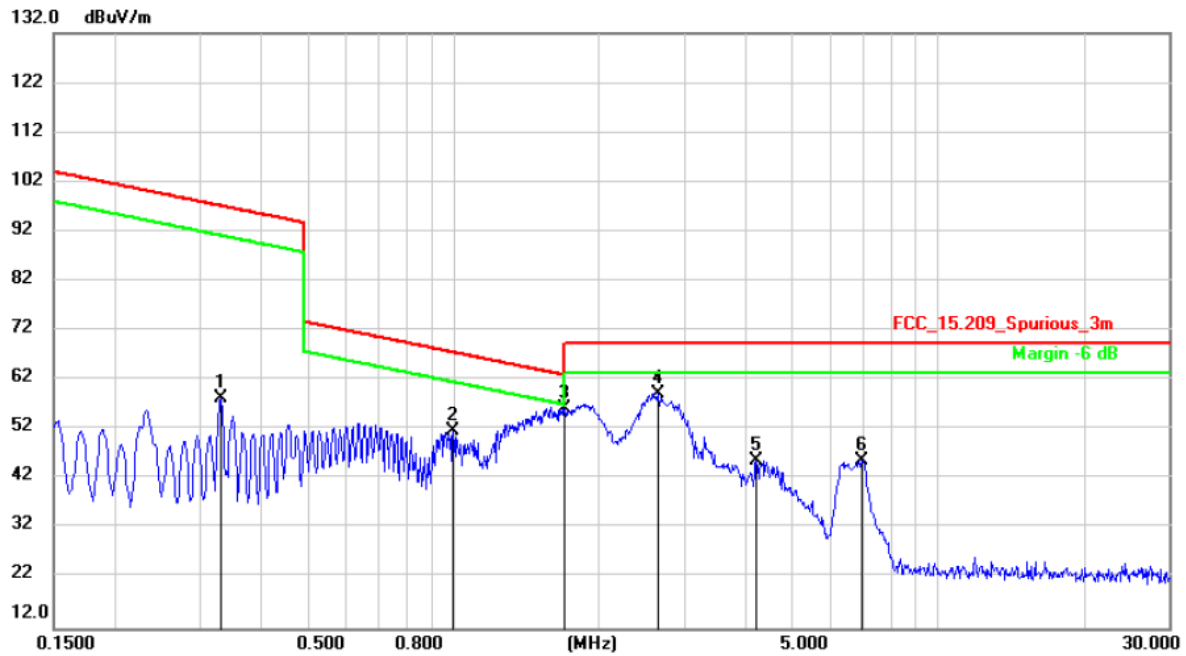
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		0.3300	35.71	20.45	56.16	97.21	-41.05	AVG	
2		0.9282	26.14	20.40	46.54	68.25	-21.71	QP	
3		1.2356	24.52	20.40	44.92	65.77	-20.85	QP	
4	*	1.6980	23.85	20.40	44.25	63.01	-18.76	QP	
5		2.9151	29.60	20.40	50.00	69.50	-19.50	QP	
6		4.5494	19.58	20.45	40.03	69.50	-29.47	QP	

M/N: WS23012	Testing Voltage: AC 120V / 60Hz
Polarization: Vertical	Detector: AVG, QP
Test Mode: 5	Distance: 3m

Radiated Emission Measurement

Date: 2023/11/16

Time: 20:41:38



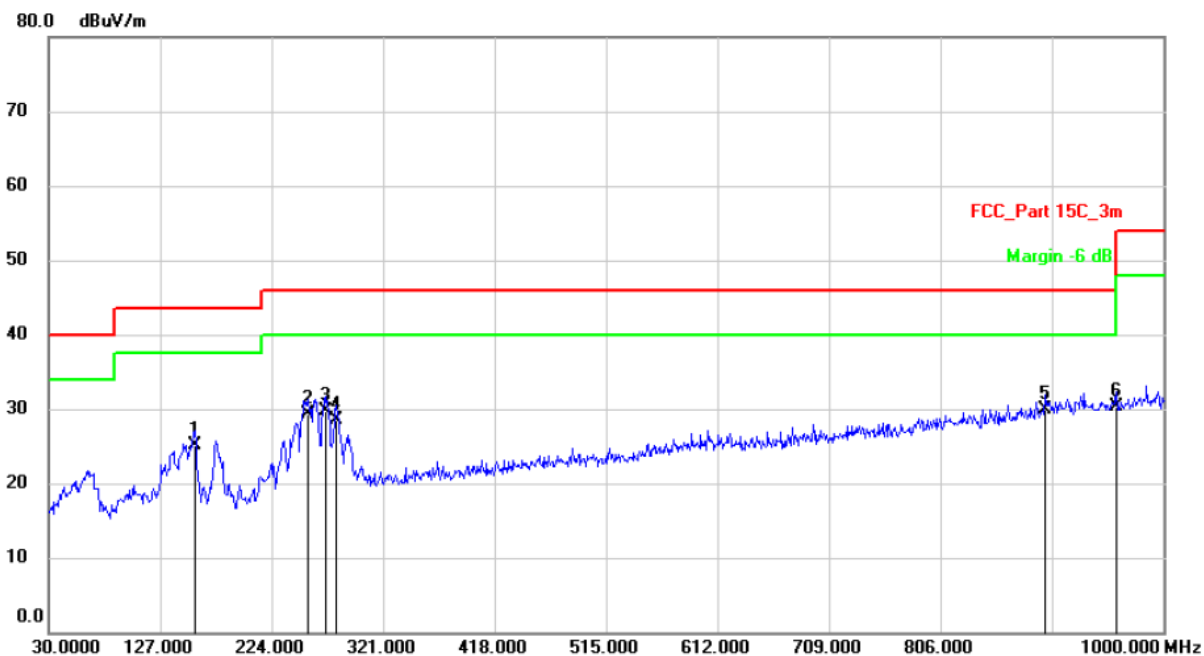
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		0.3300	37.85	20.45	58.30	97.16	-38.86	AVG	
2		0.9996	31.32	20.40	51.72	67.61	-15.89	QP	
3	*	1.6980	35.95	20.40	56.35	63.01	-6.66	QP	
4		2.6500	38.95	20.40	59.35	69.50	-10.15	QP	
5		4.2241	25.36	20.44	45.80	69.50	-23.70	QP	
6		6.9508	25.34	20.49	45.83	69.50	-23.67	QP	

M/N: WS23012	Testing Voltage: AC 120V / 60Hz
Polarization: Horizontal	Detector: QP
Test Mode: 5	Distance: 3m

Radiated Emission Measurement

Date: 2023/11/16

Time: 17:01:12



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		157.0700	35.68	-10.58	25.10	43.50	-18.40	QP	
2		255.0400	35.56	-6.26	29.30	46.00	-16.70	QP	
3		270.5600	35.70	-6.00	29.70	46.00	-16.30	QP	
4		280.2600	34.37	-5.87	28.50	46.00	-17.50	QP	
5		897.1800	23.97	6.03	30.00	46.00	-16.00	QP	
6	*	959.2600	24.00	6.30	30.30	46.00	-15.70	QP	

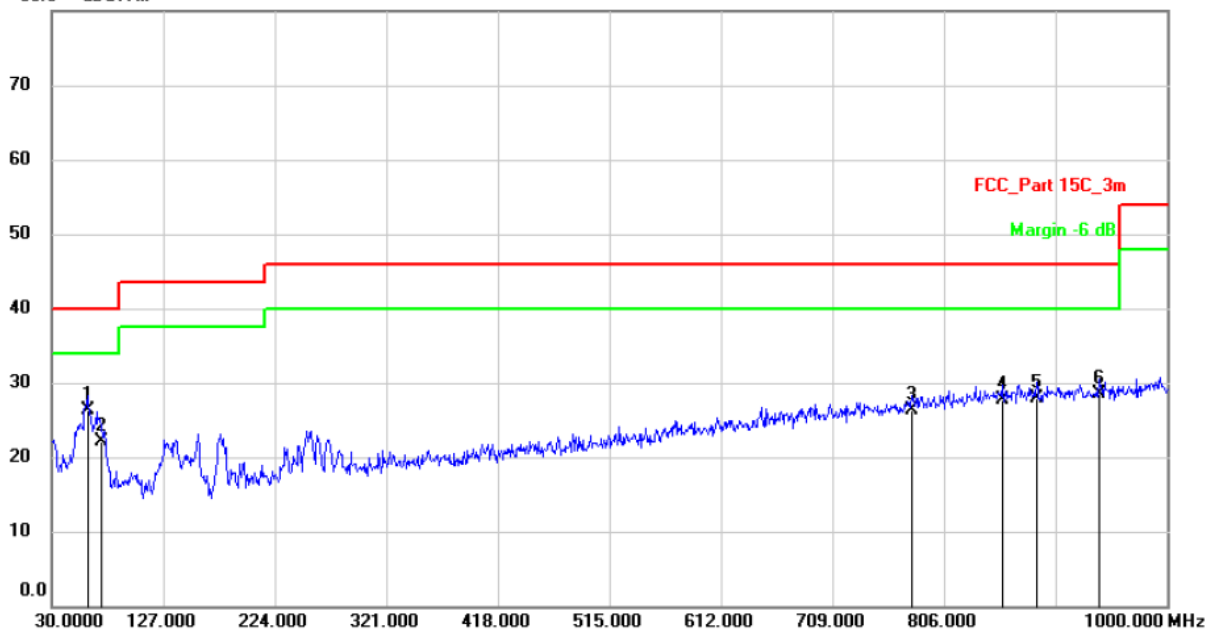
M/N: WS23012	Testing Voltage: AC 120V / 60Hz
Polarization: Vertical	Detector: QP
Test Mode: 5	Distance: 3m

Radiated Emission Measurement

Date: 2023/11/16

Time: 17:08:08

80.0 dBuV/m



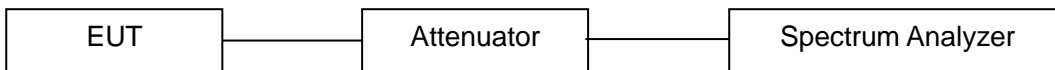
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	61.0400	34.26	-7.96	26.30	40.00	-13.70	QP	
2		73.6500	33.37	-11.27	22.10	40.00	-17.90	QP	
3		777.8700	22.74	3.56	26.30	46.00	-19.70	QP	
4		856.4400	22.96	4.84	27.80	46.00	-18.20	QP	
5		886.5100	23.06	4.94	28.00	46.00	-18.00	QP	
6		940.8300	23.47	5.03	28.50	46.00	-17.50	QP	

13.3 20dB Bandwidth Measurement

LIMITS

There is no limit.

BLOCK DIAGRAM OF TEST SETUP



TEST PROCEDURES

The 20dB bandwidth of the emission was contained within the frequency band designated which the EUT operated. The effects, if any, from frequency sweeping, frequency hopping, other modulation techniques and frequency stability over excepted variations in temperature and supply voltage were considered, FCC Rule 15.35:

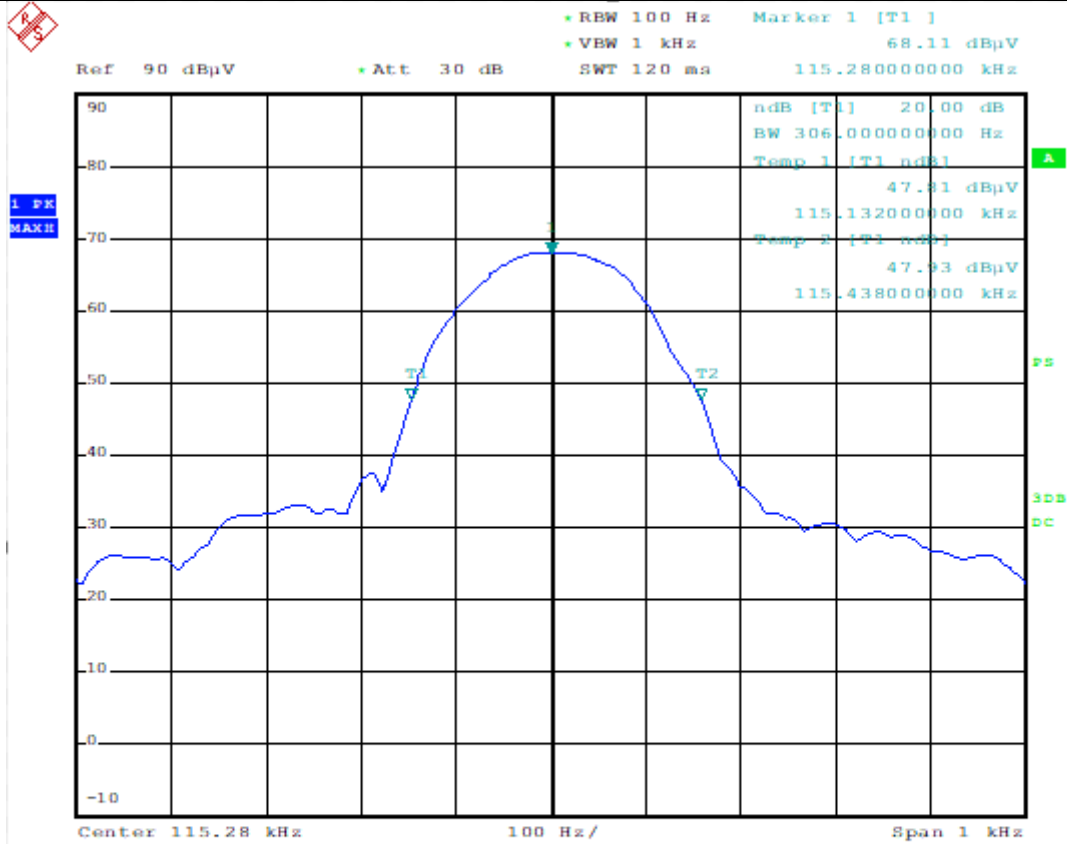
The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RBW was chosen so that the display was a result of the tested channel modulation. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. Use the spectrum 20dB down delta function to measure the bandwidth.

TEST RESULTS

PASS

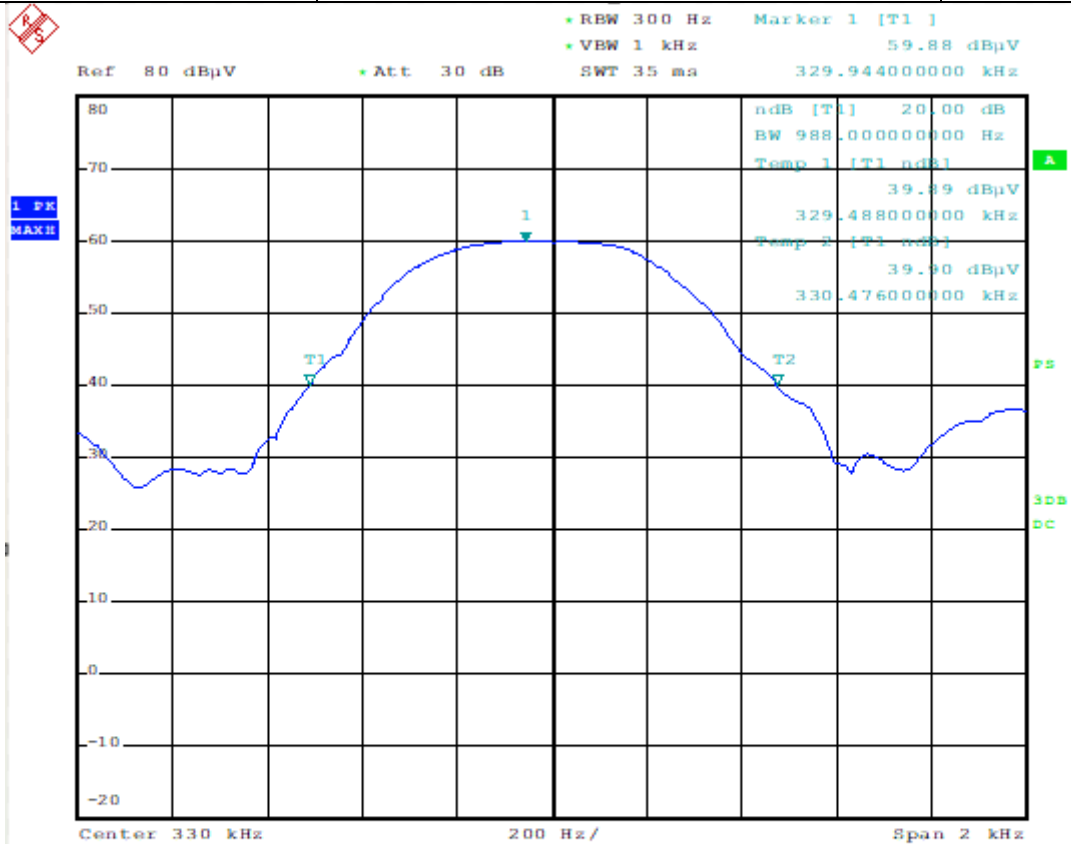
Please refer to the following table.

FSK		
Frequency (KHz)	20dB Bandwidth (Hz)	Result
115.28	306	PASS



Date: 16.NOV.2023 18:19:53

FSK		
Frequency (KHz)	20dB Bandwidth (Hz)	Result
330	988	PASS



Date: 16.NOV.2023 18:29:37

13.4 Antenna Requirement

STANDARD APPLICABLE

According to of FCC part 15C section 15.203:

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.

Systems operating in the 2400-2483.5MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum peak output power of the intentional radiator is reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

ANTENNA CONNECTED CONSTRUCTION

The antenna is coil antenna that no antenna other than furnished by the responsible party shall be used with the device. Therefore, the antenna is considered meet the requirement.

14. Test Equipment List

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCI7	100837	Mar. 13, 2023	1 Year
2.	Antenna	Schwarzbeck	VULB9162	9162-010	Mar. 23, 2022	2 Year
3.	Spectrum Analyzer	Rohde & Schwarz	FSU26	200409/026	Mar. 13, 2023	1 Year
4.	Spectrum Analyzer	Keysight	N9020A	MY54200831	Mar. 13, 2023	1 Year
5.	Spectrum Analyzer	Rohde & Schwarz	FSV40	101094	Mar. 13, 2023	1 Year
6.	Horn Antenna	Schwarzbeck	BBHA9170	9170-172	Mar. 23, 2022	2 Year
7.	Power Sensor	DARE	RPR3006W	15I00041SNO 64	Mar. 13, 2023	1 Year
8.	Communication Tester	Rohde & Schwarz	CMW500	149004	Mar. 13, 2023	1 Year
9.	Horn Antenna	COM-Power	AH-118	071078	Mar. 23, 2022	2 Year
10.	Pre-Amplifier	HP	HP 8449B	3008A00964	Mar. 13, 2023	1 Year
11.	Pre-Amplifier	HP	HP 8447D	1145A00203	Mar. 13, 2023	1 Year
12.	Loop Antenna	Schwarzbeck	FMZB 1513	1513-272	Mar. 23, 2022	2 Year
13.	Test Receiver	Rohde & Schwarz	ESCI	101152	Mar. 14, 2023	1 Year
14.	L.I.S.N	Rohde & Schwarz	ENV 216	101317	Mar. 13, 2023	1 Year
15.	L.I.S.N	Rohde & Schwarz	ESH2-Z5	893606/014	Mar. 13, 2023	1 Year
16.	RF Switching Unit	Compliance Direction Systems Inc.	RSU-M2	38311	Mar.13, 2023	1 Year
17.	Temperature & Humidity Chamber	REMAFEE	SYHR225L	N/A	Mar. 13, 2023	1 Year
18.	DC Source	Maynuo	MY8811	N/A	Mar. 13, 2023	1 Year
19.	Temporary antenna connector	TESCOM	SS402	N/A	N/A	N/A
20.	Chamber	SAEMC	9*7*7m	N/A	Apr. 21, 2023	2 Year
21.	Test Software	EZ	EZ_EMG, NTC-3A1.1	N/A	N/A	N/A

Note: For photographs of EUT and measurement, please refer to appendix in separate documents.

---End---