

Report No.: GZEM200401150702

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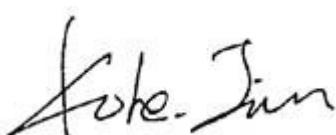
FCC ID: 2AV93-EF40

TEST REPORT

Application No.: GZEM2004011507CR
Applicant: FOCAL POINT FIRES LTD
Address of Applicant: Unit 10, Avon Trading Park CHRISTCHURCH BH23 2BT UNITED KINGDOM
Manufacturer: Guangdong Paite Electrical Technology Co., Ltd.
Address of Manufacturer: No.2 South Shenghui Rd, Nantou town, Zhongshan, Guangdong, China
Factory: Guangdong Paite Electrical Technology Co., Ltd.
Address of Factory: No.2 South Shenghui Rd, Nantou town, Zhongshan, Guangdong, China
Equipment Under Test (EUT):
EUT Name: Electric Fireplace
Model No.: EF40-48B, EF40-32B
 Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.
Standard(s): 47 CFR Part 15, Subpart C 15.231
Date of Receipt: 2020-04-10
Date of Test: 2020-04-16 to 2020-05-29
Date of Issue: 2020-06-12

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards specified above.



Kobe Jian
EMC Laboratory Manager



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Revision Record

Version	Chapter	Date	Modifier	Remark
01		2020-06-12		Original

Authorized for issue by:			
Tested By	 Curry_Wu /Project Engineer	2020-04-16 to 2020-05-29	Date
Checked By	 Jerry_Chan /Reviewer	2020-06-12	Date

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2 Test Summary

Radio Spectrum Technical Requirement				
Item	Standard	Method	Requirement	Result
Antenna Requirement	47 CFR Part 15, Subpart C 15.231	N/A	47 CFR Part 15, Subpart C 15.203	Pass

N/A: Not applicable

Radio Spectrum Matter Part				
Item	Standard	Method	Requirement	Result
20dB Bandwidth	47 CFR Part 15, Subpart C 15.231	ANSI C63.10 (2013) Section 6.9	47 CFR Part 15, Subpart C 15.231(c)	Pass
Dwell Time (15.231(a))	47 CFR Part 15, Subpart C 15.231	ANSI C63.10 (2013) Section 7.8.4	47 CFR Part 15, Subpart C 15.231(a)	Pass
Field Strength of the Fundamental Signal (15.231(b))	47 CFR Part 15, Subpart C 15.231	ANSI C63.10 (2013) Section 6.5	47 CFR Part 15, Subpart C (15.231(b))	Pass
Radiated Emissions & Radiated emissions which in restriction band	47 CFR Part 15, Subpart C 15.231&15.205	ANSI C63.10 (2013) Section 6.4&6.5&6.6	47 CFR Part 15, Subpart C (15.231(b))	Pass

N/A: Not applicable

¤ Declaration of EUT Family Grouping:

Model No.: EF40-48B, EF40-32B

According to the declaration from the applicant, the electrical circuit design, layout, components used and internal wiring were identical for all models, with only difference on appearance size and Lamp plate length of receiver.

Therefore only models EF40-48B was tested in this report.

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4 General Information

4.1 Details of E.U.T.

Power Supply:	DC 3V = 2 x 1.5V with size 'AAA' battery for transmitter AC 120V 60Hz for receiver
Test Voltage:	DC 3V
Antenna Gain:	0dBi
Antenna Type:	Integrated Antenna
Modulation Type:	OOK
Operation Frequency:	433.92MHz
Wireless Function:	Wireless remote controller with 433.92MHz as carrier for data transmission.

4.2 Description of Support Units

The EUT has been tested as an independent unit.

4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	$\pm 5.5 \times 10^{-8}$
2	Duty cycle	$\pm 0.57\%$
3	Occupied Bandwidth	$\pm 3\%$
4	RF Conducted power	$\pm 0.68\text{dB}$
5	RF Power Density	$\pm 1.50\text{dB}$
6	Conducted Spurious Emissions	$\pm 1.04\text{dB}$
7	RF Radiated Power	$\pm 4.5\text{dB}$ (below 1GHz)
		$\pm 4.8\text{dB}$ (above 1GHz)
8	Radiated Spurious Emission Test	$\pm 4.5\text{dB}$ (30MHz-1GHz)
		$\pm 4.8\text{dB}$ (1GHz-18GHz)
9	Temperature	$\pm 0.4^\circ\text{C}$
10	Humidity	$\pm 1.3\%$
11	Supply Voltages	$\pm 1.5\%$
12	Time	$\pm 3\%$

4.4 Test Location

All tests were performed at:

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Guangzhou, China 510663

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No tests were sub-contracted.

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4.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

● **NVLAP (Lab Code: 200611-0)**

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

● **ACMA**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our NVLAP accreditation.

● **SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO**

Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.

● **CNAS (Lab Code: L0167)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been assessed and in compliance with CNAS-CL01:2018 accreditation criteria for testing laboratories (identical to

ISO/IEC 17025:2017 General Requirements) for the Competence of Testing Laboratories.

● **FCC Recognized 2.948 Listed Test Firm(Registration No.: 282399)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 282399, May 31, 2002.

● **FCC Recognized Accredited Test Firm(Registration No.: 486818)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been accredited and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Designation Number: CN5016, Test Firm Registration Number: 486818, Jul 13, 2017.

● **Industry Canada (Registration No.: 4620B, CAB identifier: CN0052)**

SGS-CSTC Standards Technical Services Co., Ltd., has been registered by Innovation Science and Economic Development Canada for Wireless Device Testing laboratories to test to Canadian radio equipment requirements. Registration No. 4620B, CAB identifier: CN0052.

● **VCCI (Registration No.: R-12460, C-12584, G-10449 and T-11179)**

The 10m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-12460, C-12584, G-10449 and T-11179 respectively.

● **CBTL (Lab Code: TL129)**

SGS-CSTC Standards Technical Services Co., Ltd., E&E Laboratory has been assessed and fully comply with the requirements of ISO/IEC 17025:2005, the Basic Rules, IECEE 01 and Rules of procedure IECEE 02, and the relevant IECEE CB-Scheme Operational documents.

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4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None



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5 Equipment List

20dB Bandwidth						
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date	
EXA Signal Analyzer	Agilent Technologies	N9010A	EMC2138	2019-11-18	2020-11-17	
6dB Attenuator	HP	8491A	EMC2062	2020-04-15	2022-04-14	
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A	
MI CABLE	SGS-EMC	0.8M	EMC2136	2019-11-02	2021-11-01	
MI CABLE	SGS-EMC	0.8M	EMC2137	2019-11-02	2021-11-01	

Dwell Time (15.231(a))						
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date	
EXA Signal Analyzer	Agilent Technologies	N9010A	EMC2138	2019-11-18	2020-11-17	
6dB Attenuator	HP	8491A	EMC2062	2020-04-15	2022-04-14	
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A	
MI CABLE	SGS-EMC	0.8M	EMC2136	2019-11-02	2021-11-01	
MI CABLE	SGS-EMC	0.8M	EMC2137	2019-11-02	2021-11-01	

General used equipment						
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date	
DMM	Fluke	73	EMC0006	2019-07-16	2020-07-15	
DMM	Fluke	73	EMC0007	2019-07-16	2020-07-15	



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Radiated Emission						
No.	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. date	Cal.Due date
					(YYYY-MM-DD)	(YYYY-MM-DD)
EMC0525	Compact Semi-Anechoic Chamber	ChangZhou ZhongYu	N/A	N/A	2019-10-20	2022-10-19
EMC0522	EMI Test Receiver	Rohde & Schwarz	ESIB26	100283	2020-01-10	2021-01-09
EMC0056	EMI Test Receiver	Rohde & Schwarz	ESCI	100236	2020-01-10	2021-01-09
EMC2174	Trilog Broadband Antenna 30-1000MHz	SCHWARZBECK MESS-ELEKTRONIK	VULB 9168	0920	2018-09-06	2021-09-05
SEM003-18	Trilog Broadband Antenna 25-2000MHz	SCHWARZBECK MESS-ELEKTRONIK	VULB 9168	00666	2019-02-22	2022-02-22
EMC0519	Bilog Type Antenna	Schaffner -Chase	CBL6143	5070	2017-06-01	2020-05-31
EMC2016	Horn Antenna	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	9120D-841	2019-09-25	2022-09-24
EMC0518	Horn Antenna (1G~18G)	R& S	HF906	100096	2018-09-02	2021-09-01
EMC0521	1-26.5 GHz Pre-Amplifier	Agilent	8449B	3008A01649	2020-01-10	2021-01-09
EMC2065	Amplifier	HP	8447F	N/A	2020-05-26	2021-05-25
EMC2086	PRE AMPLIFIER MH648A	ANRITSU CORP	MH648A	N/A	2019-11-18	2020-11-17
EMC0523	Active Loop Antenna	EMCO	6502	42963	2020-05-19	2022-05-18
EMC2041	Broad-Band Horn Antenna (14)15-26.5(40)GHz	SCHWARZBECK MESS-ELEKTRONI	BBHA 9170	9170-375	2017-06-16	2020-06-16
EMC2079	High Pass Filter(915MHz)	FSY MICROWAVE	HM1465-9SS	009	2020-01-10	2021-01-09
EMC2142	966 Anechoic Chamber	C.R.T	9mX6mX6m	NA	2017-12-19	2020-12-18
EMC2139	MXE EMI Receiver	Keysight	N9038A	MY57290121	2019-11-18	2020-11-17
EMC2138	EXA Signal Analyzer	Keysight	N9010A	MY57120105	2019-11-18	2020-11-17
EMC2069	2.4GHz Filter	Micro-Tronics	BRM 50702	149	2020-01-10	2021-01-09
EMC0530	10m Semi-Anechoic Chamber	ETS	N/A	N/A	2019-10-20	2022-10-19

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6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

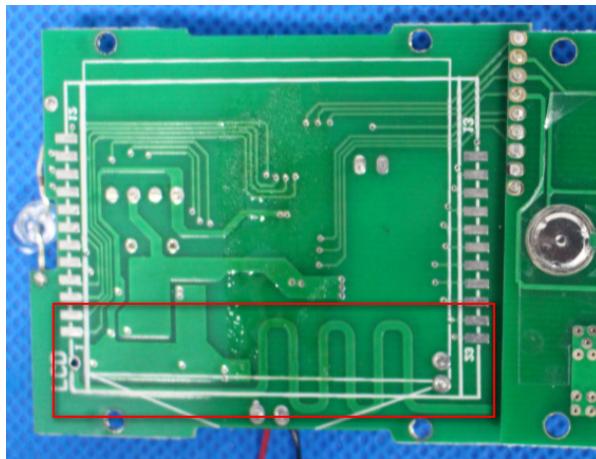
6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203

6.1.2 Conclusion

Standard 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 antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit permanently attached antenna or of an 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:

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 0dBi.



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7 Radio Spectrum Matter Test Results

7.1 20dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.231(c)

Test Method: ANSI C63.10 (2013) Section 6.9

Limit:

Frequency range(MHz)	Limit
70-900	No wider than 0.25% of the center frequency
Above 900	No wider than 0.5% of the center frequency

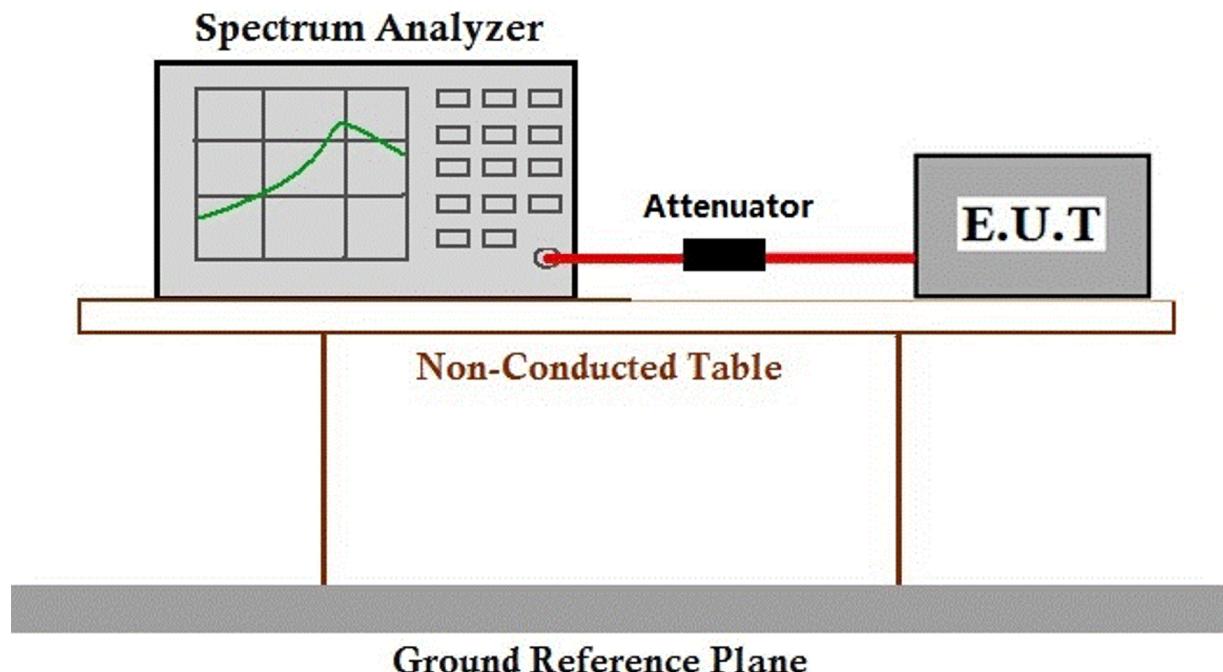
7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 26.2 °C Humidity: 56 % RH Atmospheric Pressure: 1020 mbar

Test mode a: TX mode_Keep the EUT in transmitting with modulation mode.

7.1.2 Test Setup Diagram



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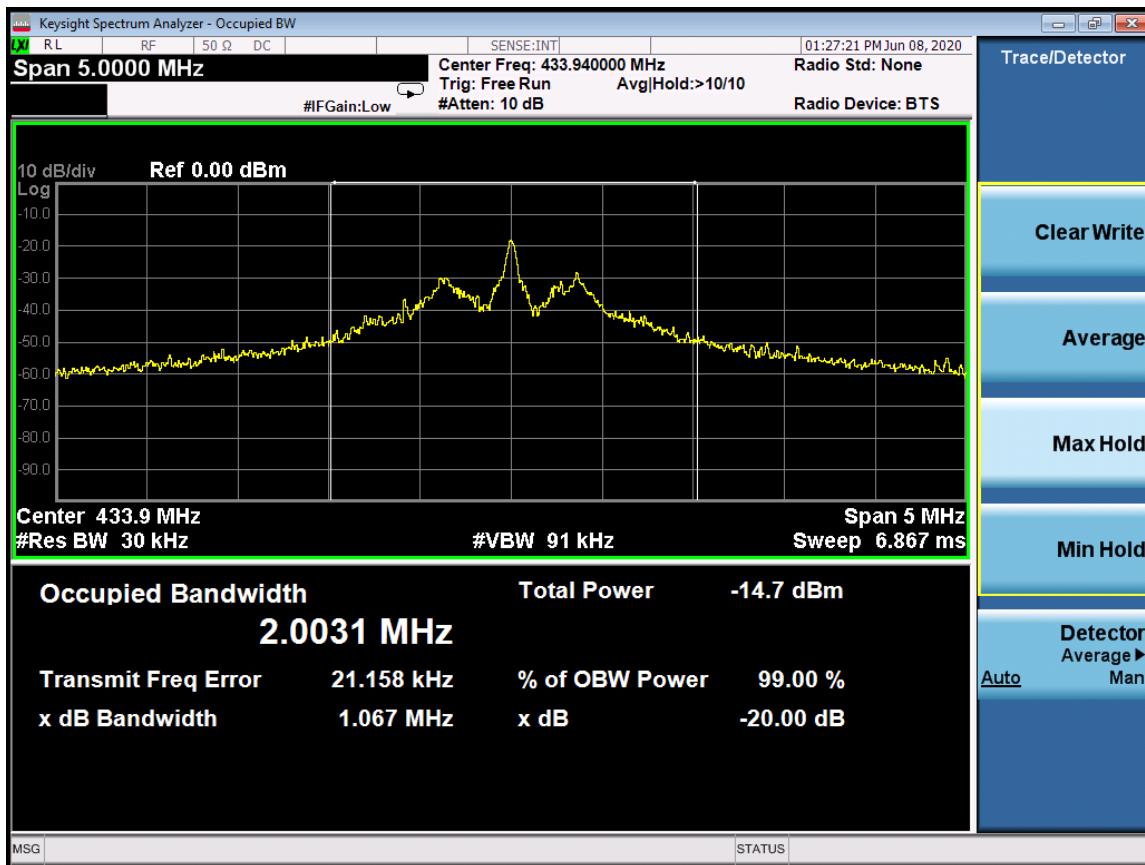
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7.1.3 Measurement Procedure and Data

Test Result:

Test Channel	Bandwidth	Limit	Verdict
433.92MHz	1.067MHz	1.08MHz	PASS

Test Plot:



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7.2 Dwell Time (15.231(a))

Test Requirement 47 CFR Part 15, Subpart C 15.231(a)

Test Method: ANSI C63.10 (2013) Section 7.8.4

Limit:

Device type	Limit
Manually operated transmitter	The switch automatically deactivate the transmitter within not more than 5 seconds of being released
Automatically activated transmitter	Cease transmission within 5 seconds after activation
Periodic transmissions to determine system integrity of transmitters used in security or safety applications	The total transmission time does not exceed 2 seconds per hour

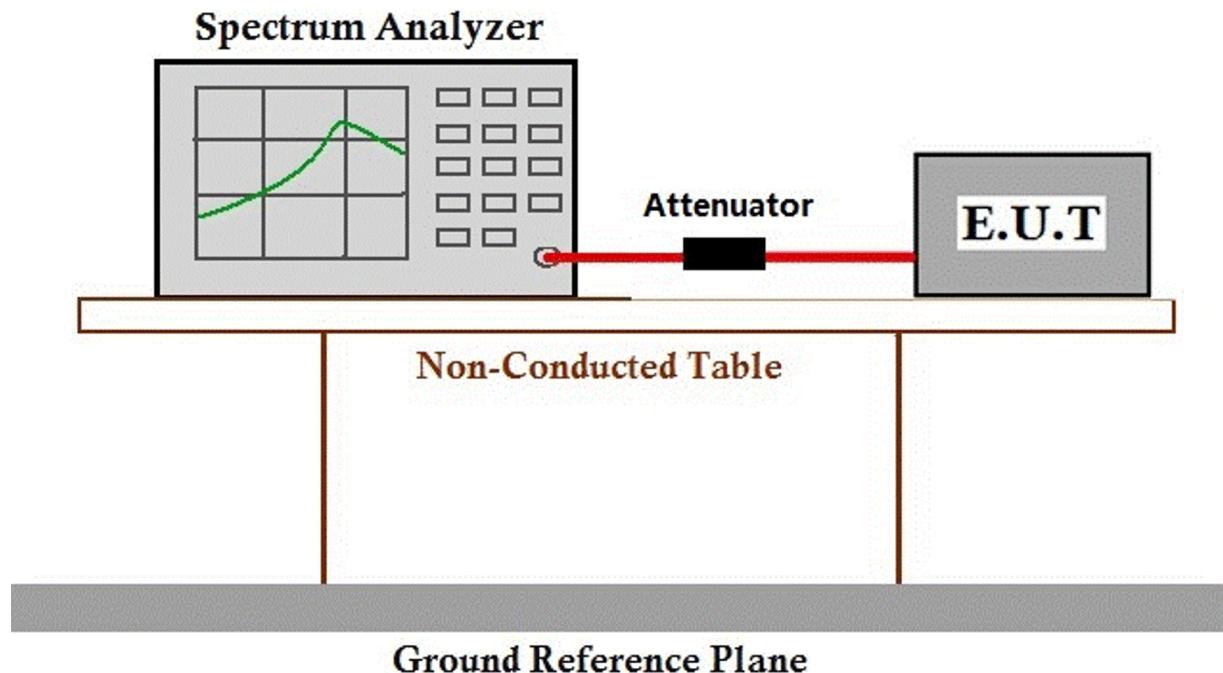
7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 26.2 °C Humidity: 56.1 % RH Atmospheric Pressure: 1020 mbar

Test mode a: TX mode_Keep the EUT in transmitting with modulation mode.

7.2.2 Test Setup Diagram



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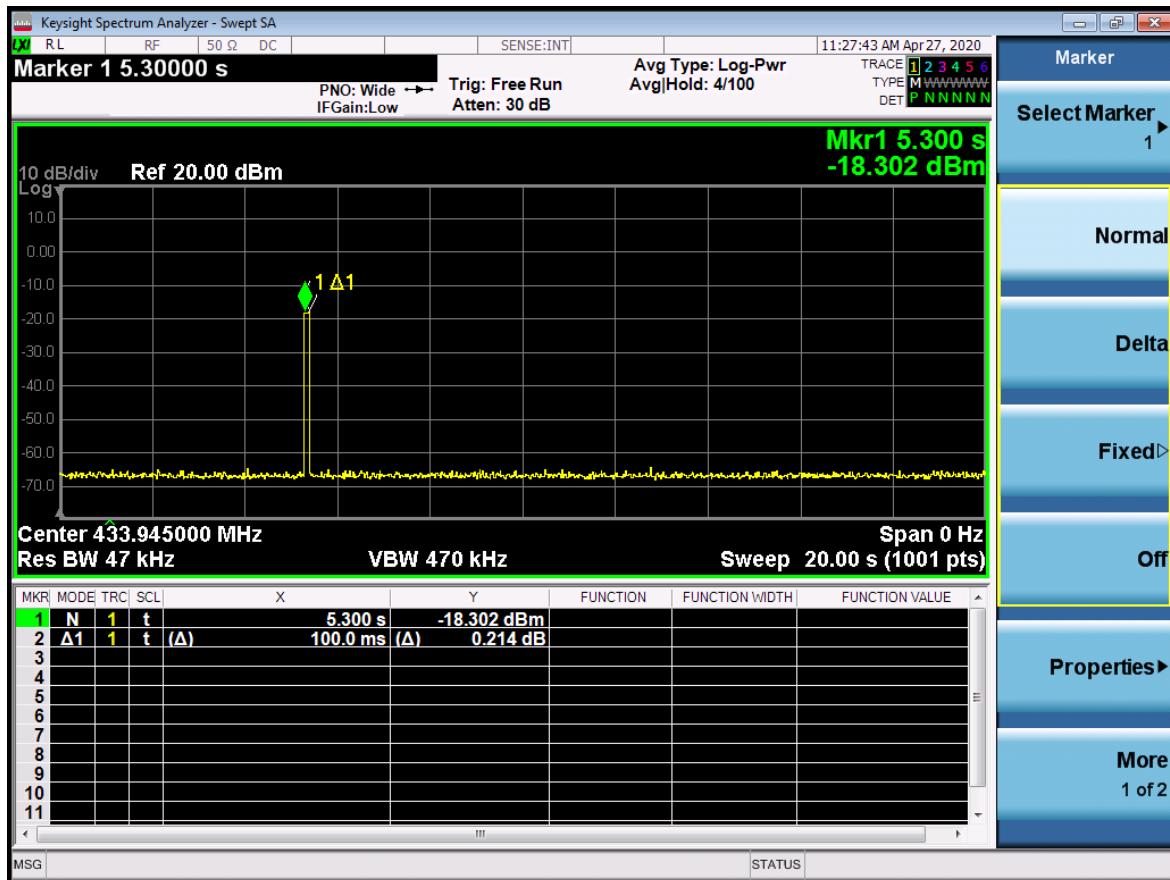
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7.2.3 Measurement Procedure and Data

Test Result:

Test Channel	Shutdown Time	Limit	Verdict
433.92MHz	0.1s	≤5s	PASS

Test Plot:



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7.3 Field Strength of the Fundamental Signal (15.231(b))

Test Requirement 47 CFR Part 15, Subpart C 15.231(b)

Test Method: ANSI C63.10 (2013) Section 6.5

Measurement Distance: 3m

Limit:

Fundamental frequency(MHz)	Field strength of fundamental(microvolts/meter)	Field strength of spurious emissions(microvolts/meter)
40.66-40.70	2250	225
70-130	1250	125
130-174	1250 to 3750	125 to 375
174-260	3750	375
260-470	3750 to 12500	375 to 1250
Above 470	12500	1250

*Linear interpolation with frequency, f, in MHz:

For 130-174 MHz: Field Strength (μ V/m) = $(56.82 \times f) - 6136$ For 260-470 MHz: Field Strength (μ V/m) = $(41.67 \times f) - 7083$

Remark:

1. The emission limit is based on measurement instrumentation employing an average detector at a distance of 3 meters. The frequencies above 1000MHz are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.
2. The fundamental frequency of the EUT is 433.92 MHz, so the limit for average or QP field strength dB μ V/m for the fundamental emission= 80.8 dB μ V/m.
3. The average correction factor is computed by analyzing the on time in 100ms over one complete pulse train. Analysis of the remote transmitter on time in one complete pulse train, therefore the average value of fundamental frequency is: Average = Peak value + 20log (Duty cycle), where the Duty cycle is calculated from formula:

$$\text{Duty cycle} = \text{Ton_cum} / \text{Ton+off}$$

Here,

$$\text{Ton_cum} = 2.48 \times 1 + 0.35 \times 57 = 22.43 \text{ (ms)}$$

$$\text{Ton+off} = 52.6 \text{ (ms)}$$

$$\text{Duty cycle} = 22.43 / 52.6 = 0.426$$

$$20\log (\text{Duty cycle}) = 20\log(0.426) = -7.41$$

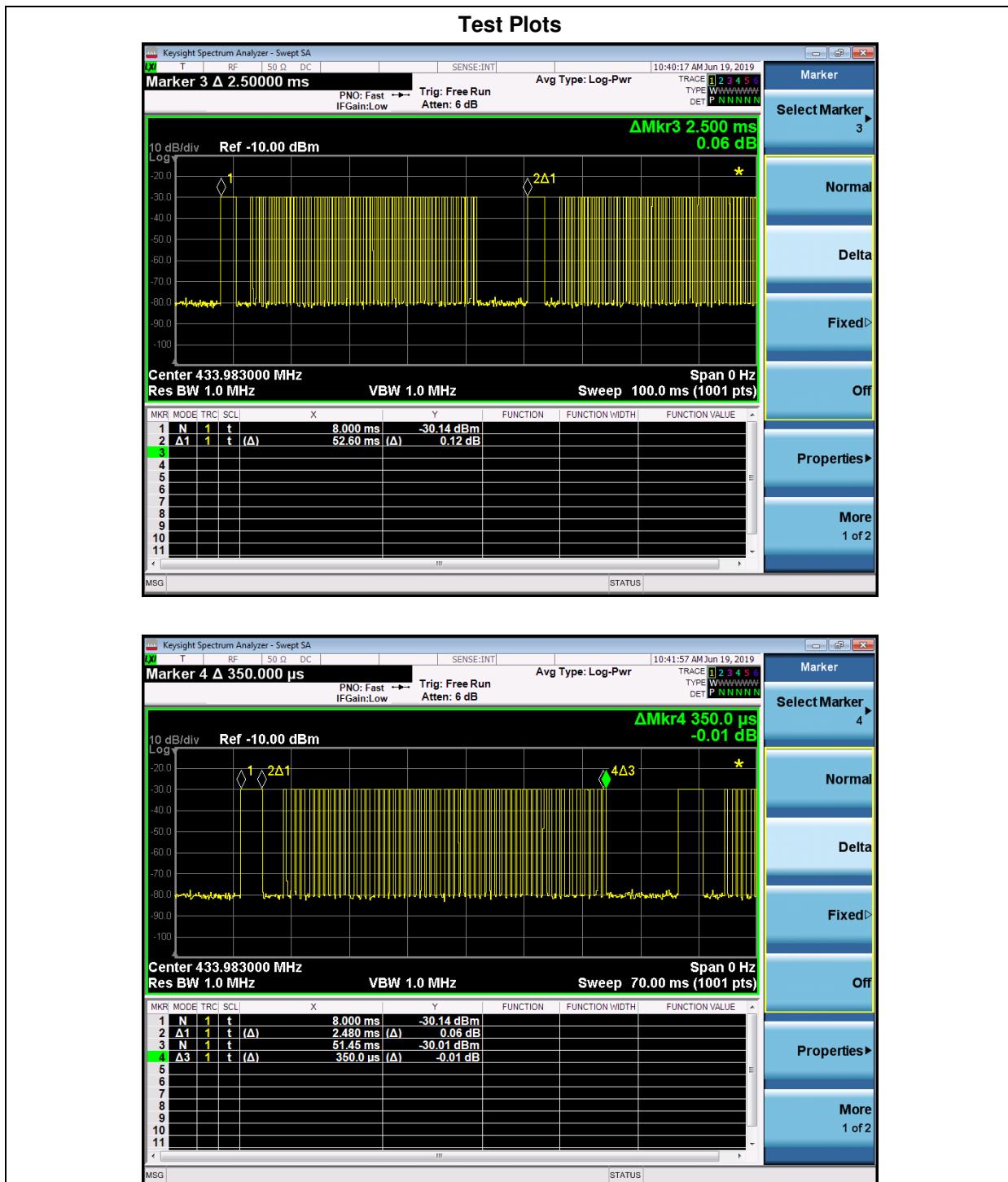
Please refer to below test plots for more details.



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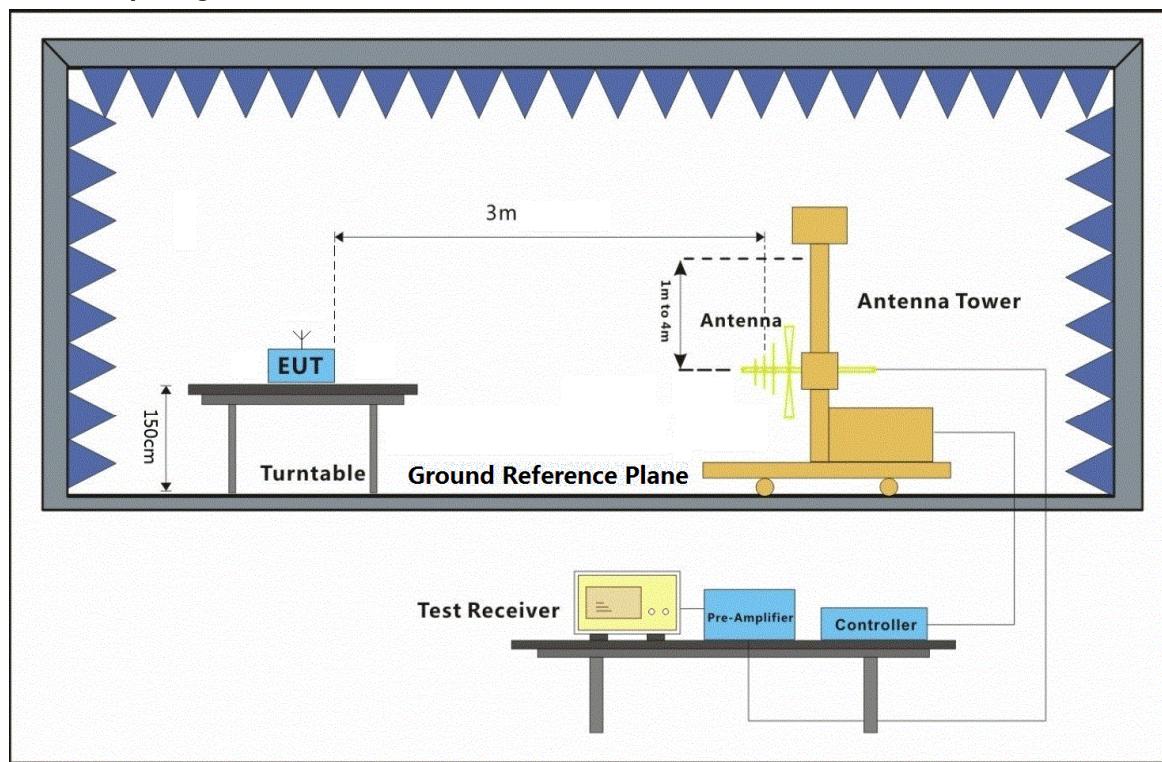


7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 52 % RH Atmospheric Pressure: 1020 mbar

Test mode a: TX mode_Keep the EUT in transmitting with modulation mode.

7.3.2 Test Setup Diagram

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7.3.3 Measurement Procedure and Data

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. 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.
- 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. 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.
- h. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.

Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

Frequency (MHz)	Polarization	Emission Level (dB μ V/m)	Limit Line (dB μ V/m)	Over Limit (dB)	Remark	Verdict
433.92	Horizontal	82.78	108.8	-26.02	Peak	PASS
433.92	Horizontal	75.37	80.8	-5.43	Average	PASS
433.92	Vertical	75.69	108.8	-33.11	Peak	PASS
433.92	Vertical	68.28	80.8	-12.52	Average	PASS

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7.4 Radiated Emissions& Radiated emissions which in restriction band

Test Requirement	47 CFR Part 15, Subpart C 15.231&15.205
Test Method:	ANSI C63.10 (2013) Section 6.4&6.5&6.6
Measurement Distance:	3m
Limit:	
Remark:	For frequency not applicable to 15.205, the emission limit 80.8dB _{UV} /m (peak detector) is higher than limit below, so the EUT would be pass if meet the limit in below table

Frequency(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

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.



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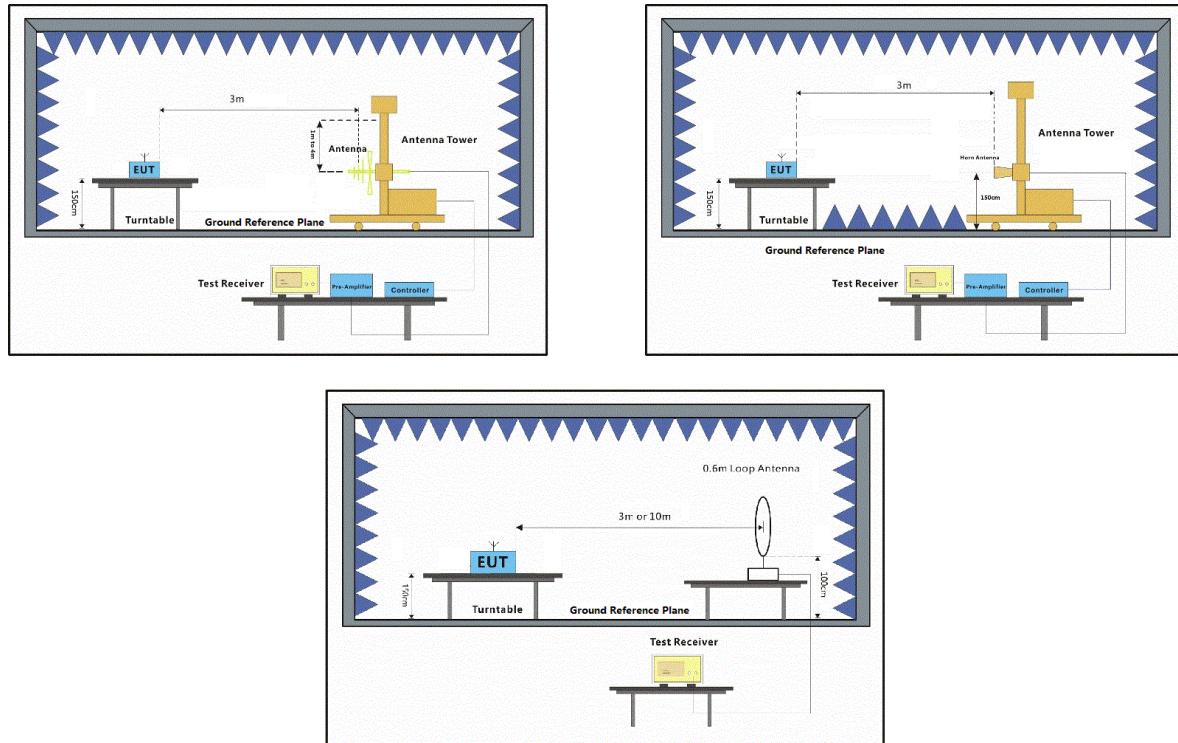
7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 52 % RH Atmospheric Pressure: 1020 mbar

Test mode a: TX mode_Keep the EUT in transmitting with modulation mode.

7.4.2 Test Setup Diagram



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7.4.3 Measurement Procedure and Data

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. 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.
- 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. 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.
- h. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.

Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

Radiated emission below 30MHz

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



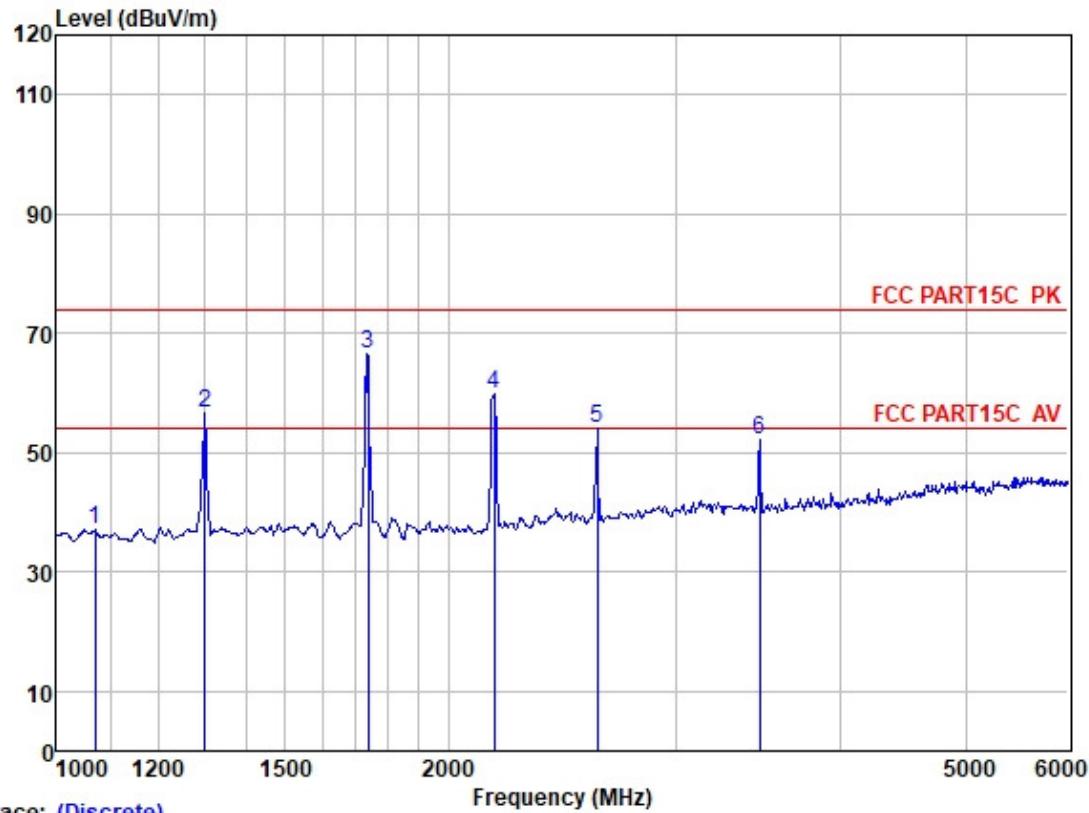
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Mode:a; Polarization:Horizontal



Trace: (Discrete)

Freq	ReadAntenna	Cable	Preamp	Limit	Over	Over	Remark
	Level	Loss	Factor				
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1 1070.458	47.80	24.31	2.36	37.38	37.09	74.00	-36.91 HORIZONTAL Peak
2 1301.332	66.20	25.20	2.60	37.30	56.70	74.00	-17.30 HORIZONTAL Peak
3 1736.022	74.93	25.82	2.86	37.04	66.57	74.00	-7.43 HORIZONTAL Peak
4 2172.398	66.99	26.49	3.19	36.97	59.70	74.00	-14.30 HORIZONTAL Peak
5 2603.351	59.95	27.63	3.50	36.85	54.23	74.00	-19.77 HORIZONTAL Peak
6 3473.883	55.39	28.89	4.25	36.46	52.07	74.00	-21.93 HORIZONTAL Peak

Frequency	Level	Limit	Over limit	Remark
1070.458	29.66	54	-24.34	AV
1301.332	49.29	54	-4.71	AV

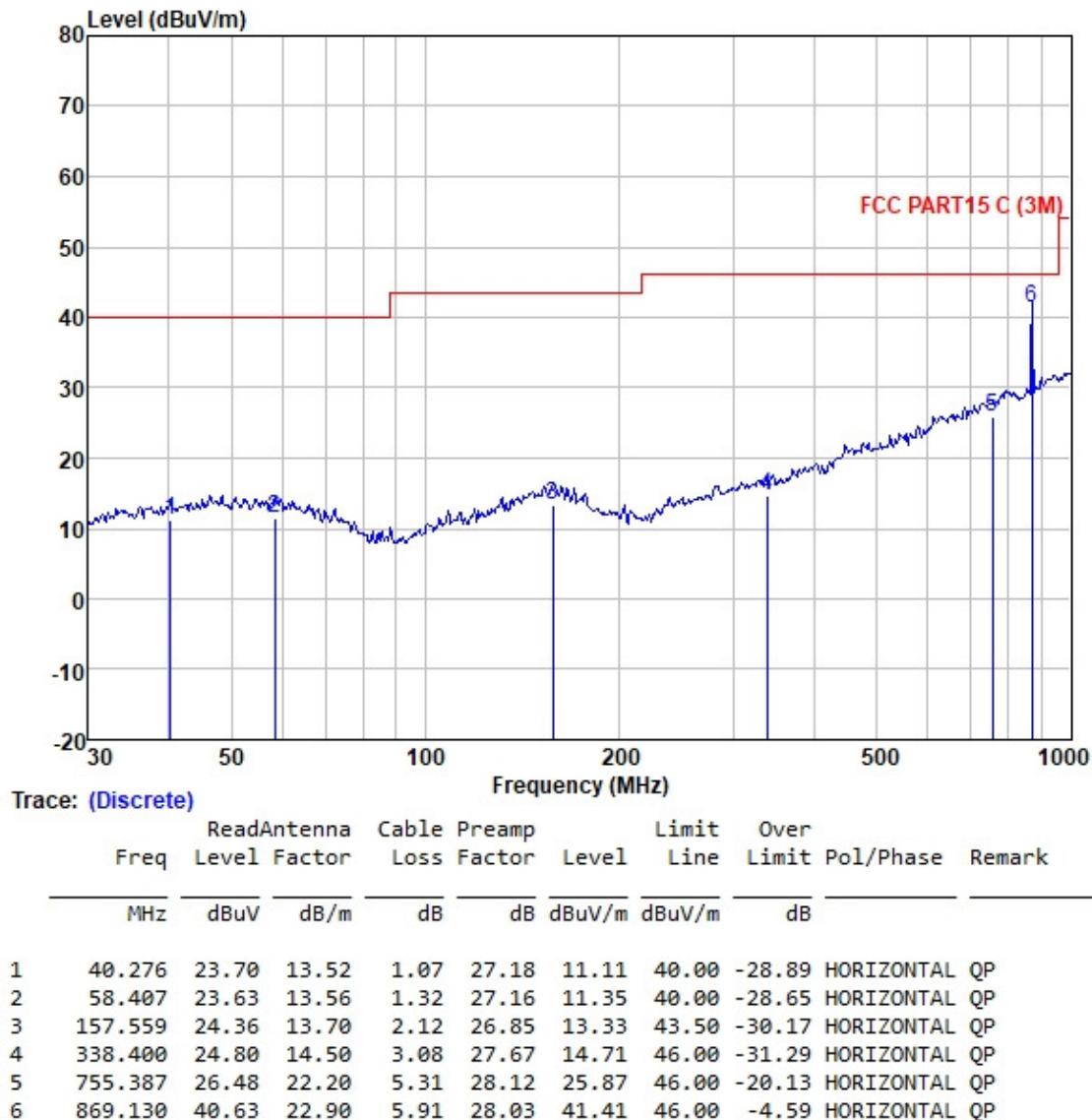
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Mode:a; Polarization:Horizontal



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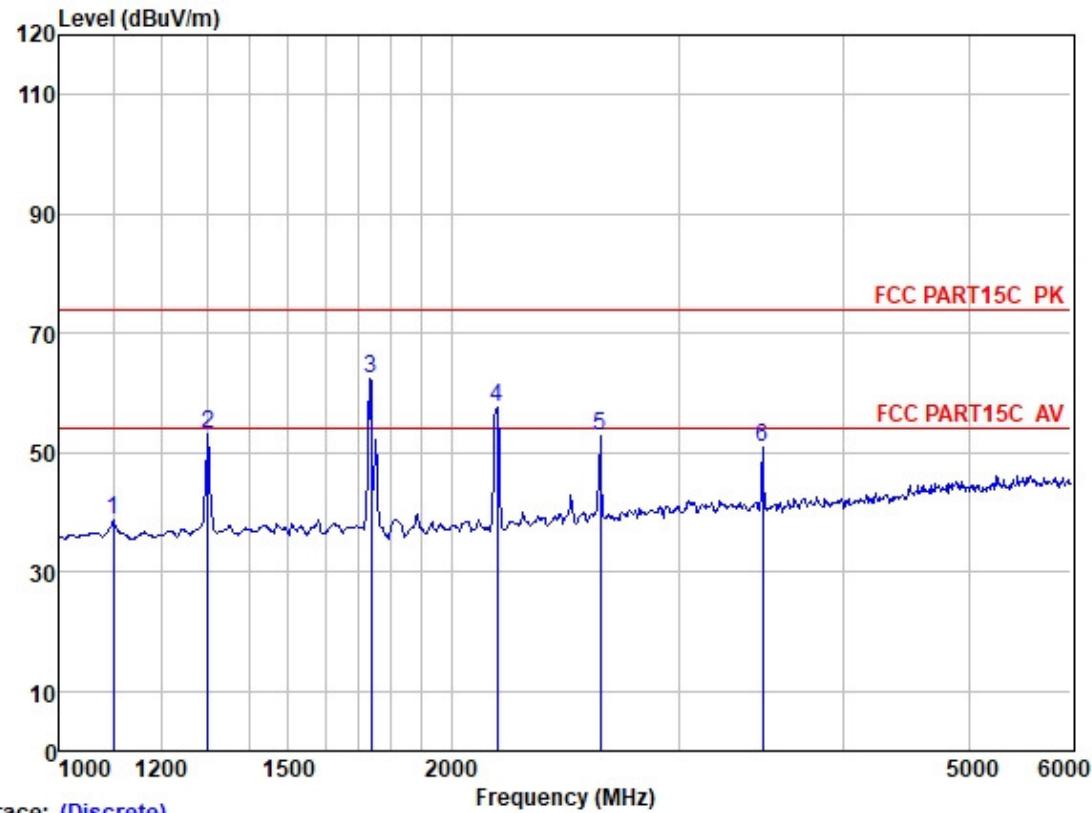
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Mode:a; Polarization:Vertical



Trace: (Discrete)

Freq	Read	Antenna	Cable	Preamp	Limit	Over	Over	Pol/Phase	Remark
	Level	Factor	Loss	Factor					
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	1099.618	49.27	24.37	2.30	37.38	38.56	74.00	-35.44	VERTICAL Peak
2	1301.332	62.77	25.20	2.60	37.30	53.27	74.00	-20.73	VERTICAL Peak
3	1735.921	70.92	25.82	2.86	37.04	62.56	74.00	-11.44	VERTICAL Peak
4	2172.398	64.76	26.49	3.19	36.97	57.47	74.00	-16.53	VERTICAL Peak
5	2603.351	58.47	27.63	3.50	36.85	52.75	74.00	-21.25	VERTICAL Peak
6	3473.883	54.05	28.89	4.25	36.46	50.73	74.00	-23.27	VERTICAL Peak

Frequency	Level	Limit	Over limit	Remark
1099.618	31.15	54	-22.85	AV
1301.332	45.86	54	-8.14	AV

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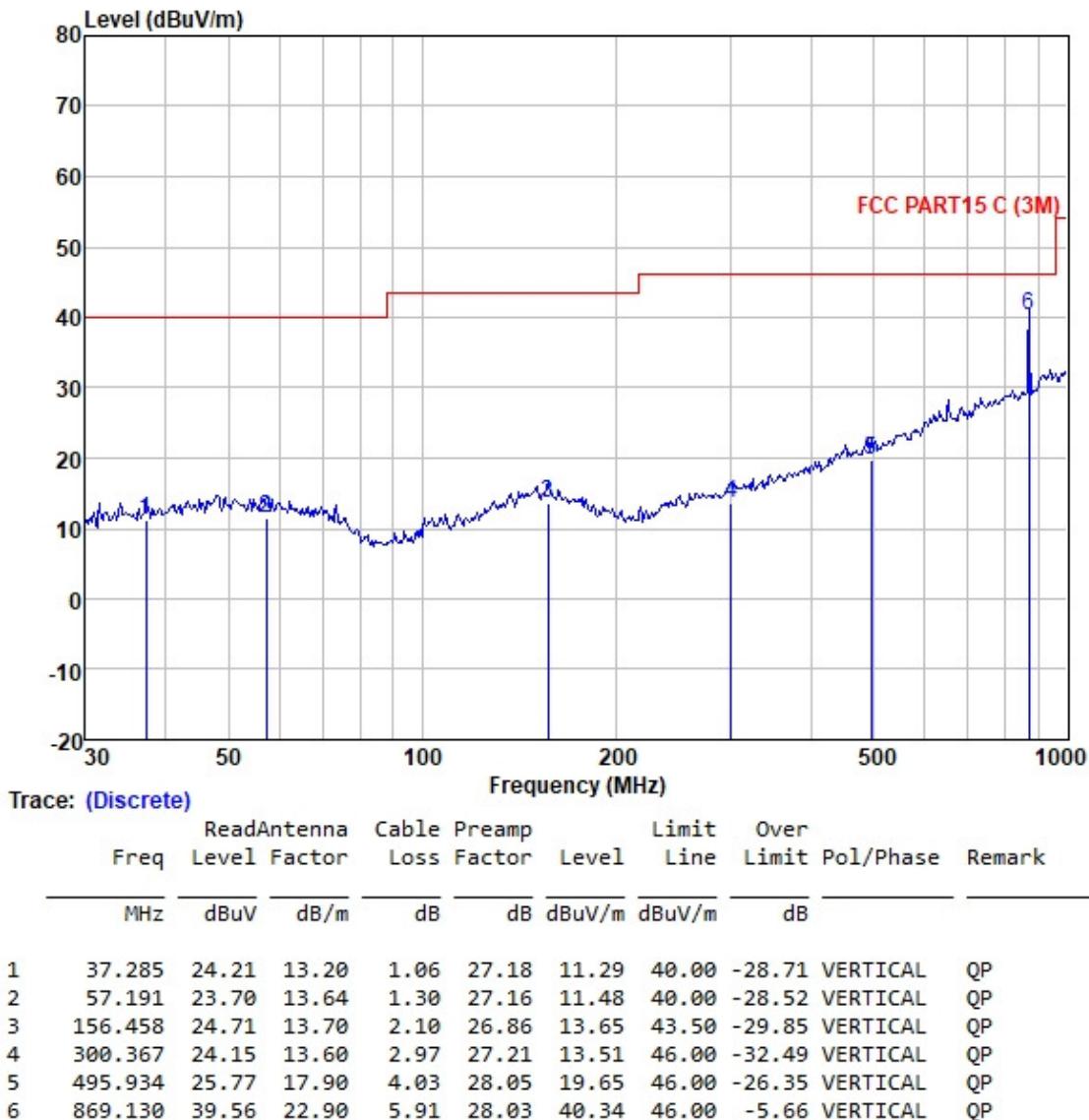
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Mode:a; Polarization:Vertical



--End of Report--

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