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Report No.: GZEM190601347402
Page: 1 of 23
FCC ID: 2AQAGEF42-23A

TEST REPORT

Application No.: GZEM1906013474CR
Applicant: Guangdong Paite Electrical Technology Co., Ltd
Address of Applicant: No. 2, South Shenghui Road, Nantou Town, Zhongshan, Guangdong
Manufacturer: Guangdong Paite Electrical Technology Co., Ltd
Address of Manufacturer: No. 2, South Shenghui Road, Nantou Town, Zhongshan, Guangdong
Factory: Guangdong Paite Electrical Technology Co., Ltd
Address of Factory: No. 2, South Shenghui Road, Nantou Town, Zhongshan, Guangdong
Equipment Under Test (EUT):
FCC ID: 2AQAGEF42-23A
EUT Name: Electric Fireplace
Model No.: EF42-23A, FA5523.
Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.
Trade Mark: SEI
Standard(s) : 47 CFR Part 15, Subpart C 15.231
Date of Receipt: 2019-06-11
Date of Test: 2019-06-13 to 2019-06-19
Date of Issue: 2019-06-21

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



Kobe Jian

Lab Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2019-06-21		Original

Authorized for issue by:			
Tested By		Kevin Zhang	2019-06-13 to 2019-06-19
		Kevin_Zhang /Project Engineer	Date
Checked By		Ricky Liu	2019-06-21
		Ricky_Liu /Reviewer	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

Radio Spectrum Matter Part				
Item	Standard	Method	Requirement	Result
Occupied Bandwidth	47 CFR Part 15, Subpart C 15.231	ANSI C63.10 (2013) Section 6.9	47 CFR Part 15, Subpart C 15.231(a)	Pass
Dwell Time	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	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	47 CFR Part 15, Subpart C 15.231	ANSI C63.10 (2013) Section 6.4&6.5&6.6	47 CFR Part 15, Subpart C (15.231(b))	Pass

¤ Declaration of EUT Family Grouping:

Model No.: EF42-23A, FA5523

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 the model name.

Therefore only one model EF42-23A was tested in this report.

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4 General Information

4.1 Details of E.U.T.

Power Supply:	AC 120V, 60Hz, 1500W
	DC 3.0V (2x"AAA" battery) for Remote Controller
Test Voltage:	DC 3.0V
Cable:	AC mains (unshielded, 1.8m)
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 Environment parameter

Environment Parameter	Selected Values During Tests	
Relative Humidity	Ambient	
Value	Temperature(°C)	Voltage(V)
TNVN	+20	3.0
TLVN	-20	3.0
THVN	+50	3.0
TNVL	+20	2.55
TNVH	+20	3.45

Note:

VN: Normal Voltage
TN: Normal Temperature
TL: Low Temperature
TH: High Temperature
VL: Low Voltage
VH: High Voltage

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4.4 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	$\pm 3\%$

4.5 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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4.6 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-CL01:2006 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2005 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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4.7 Deviation from Standards

None

4.8 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	AgilentTechnologies	N9010A	EMC2138	2018-11-19	2019-11-18
6dB Attenuator	HP	8491A	EMC2062	2018-04-04	2020-04-03
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS	0.8M	EMC2136	2017-11-02	2019-11-01
MI CABLE	SGS	0.8M	EMC2137	2017-11-02	2019-11-01

Dwell Time (15.231(a))					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EXA Signal Analyzer	AgilentTechnologies	N9010A	EMC2138	2018-11-19	2019-11-18
6dB Attenuator	HP	8491A	EMC2062	2018-04-04	2020-04-03
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS	0.8M	EMC2136	2017-11-02	2019-11-01
MI CABLE	SGS	0.8M	EMC2137	2017-11-02	2019-11-01

Radiated Emissions					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Temperature Chamber	GZ GongWen Co.Ltd.	GDJW-100	EMC0039	2018-07-06	2019-07-05
Compact Semi-Anechoic Chamber	ChangZhou ZhongYu	N/A	EMC0525	2016-12-04	2019-12-03
10m Semi- Anechoic Chamber	ETS	N/A	EMC0530	2018-12-08	2019-12-07
Horn Antenna (Rx)	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	EMC2026	2019-09-08	2019-09-08
Bilog Type Antenna	Schaffner Chase	CBL6143	EMC0519	2020-05-03	2020-05-03
1-26.5GHz Pre Amplifier	Agilent	8449B	EMC0521	2020-01-06	2020-01-06
Amplifier 9kHz- 1300MHz	HP	8447F	EMC2065	2019-05-28	2020-05-27
Antenna Mask (Tx)	HD-GmbH	AS620M	EMC0507	N/A	N/A
Antenna Mask (Rx)	HD-GmbH	MA240	EMC0508	N/A	N/A
966 Anechoic Chamber	C.R.T	9mX6mX6m	EMC2142	2017-12-19	2019-12-18
Signal Analyzer (20Hz ~ 26.5Ghz	R&S	FSIQ26	EMC0069	2018-11-19	2019-11-18

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General used equipment

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
DMM	Fluke	73	EMC0006	2018-07-20	2019-07-19
DMM	Fluke	73	EMC0007	2018-07-19	2019-07-18

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6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

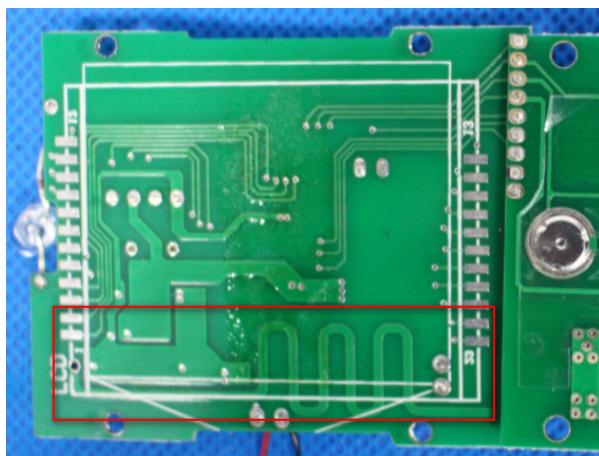
6.1.1 Test Requirement:

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 an 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 Occupied 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

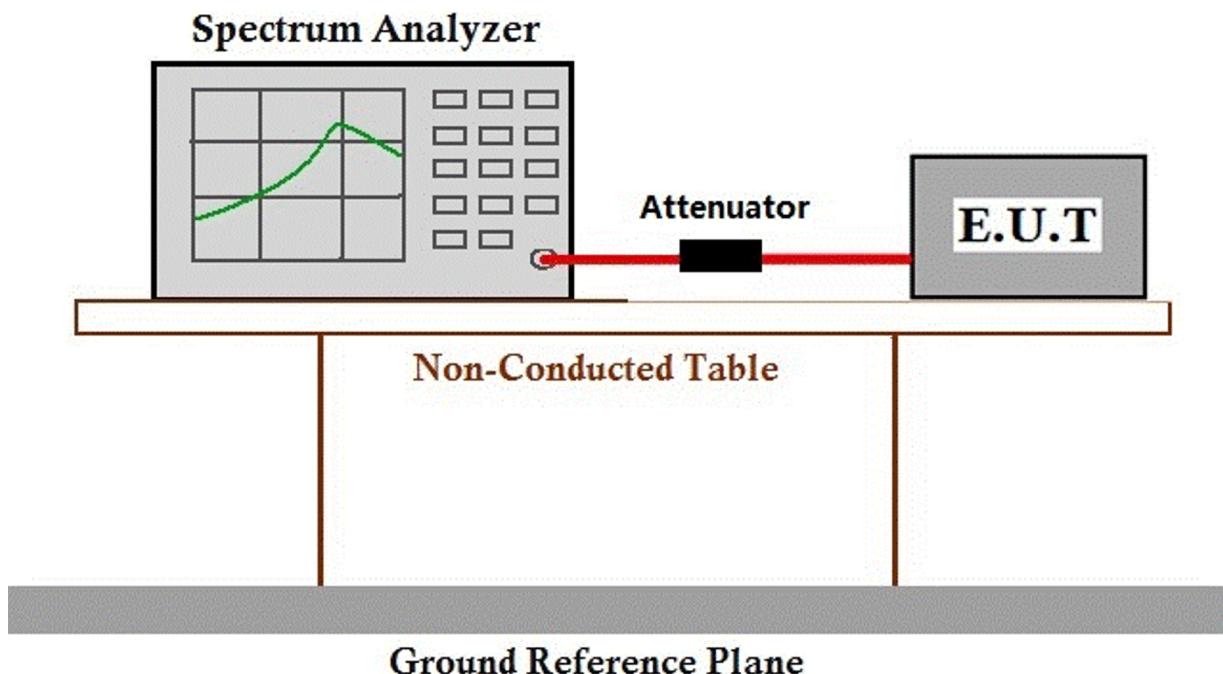
7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 26 °C Humidity: 55 % RH Atmospheric Pressure: 1020 mbar

Test mode d: Tx mode_Keep the EUT in continuously transmitting mode.

7.1.2 Test Setup Diagram



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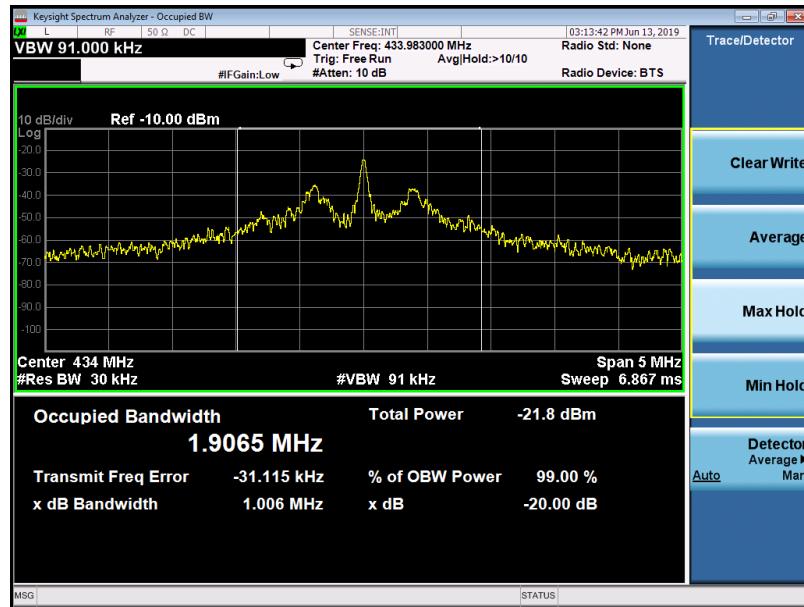
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7.1.3 Measurement Procedure and Data

Test Result:

Test Channel	Bandwidth	Limit	Verdict
433.92MHz	1.006MHz	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

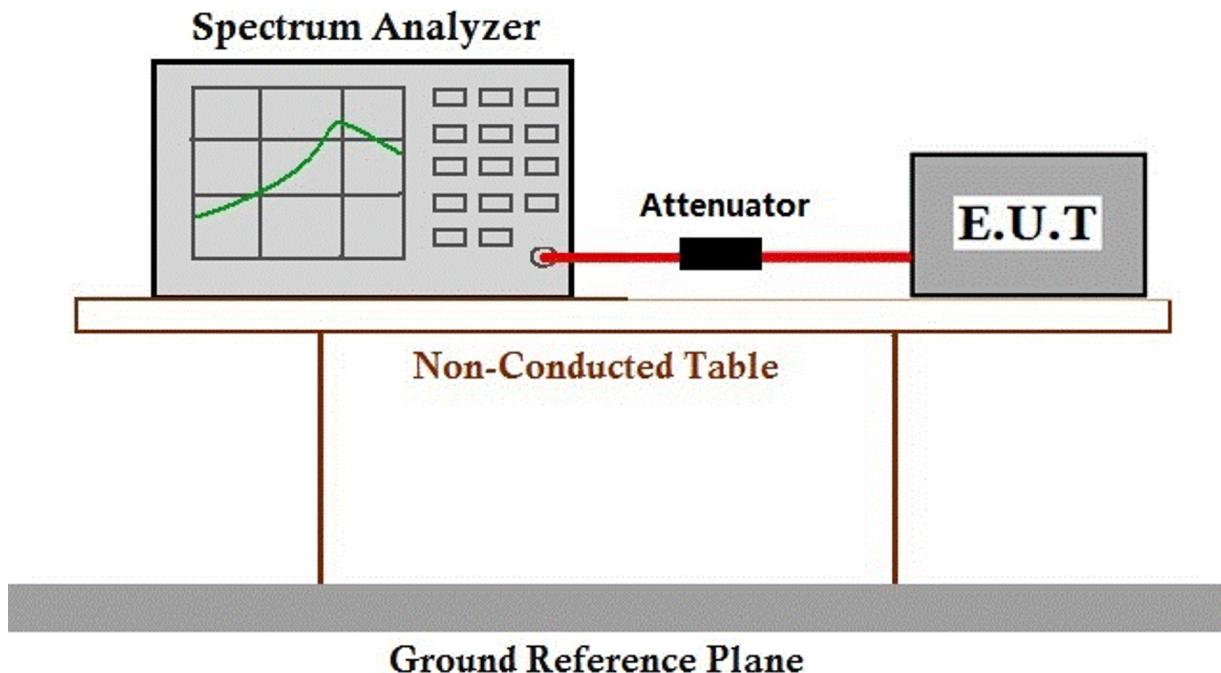
7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 26 °C Humidity: 55.1 % RH Atmospheric Pressure: 1020 mbar

Test mode d: Tx mode_Keep the EUT in continuously transmitting mode.

7.2.2 Test Setup Diagram



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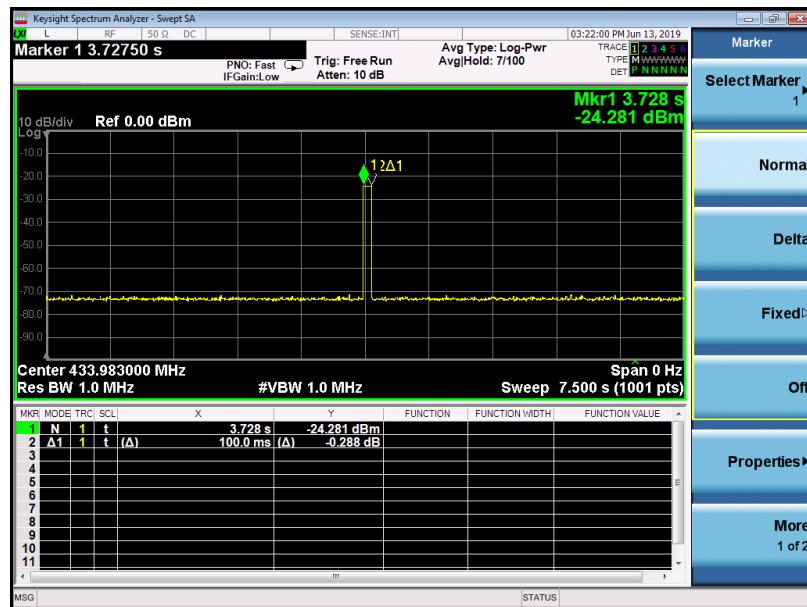
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7.2.3 Measurement Procedure and Data

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,

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

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

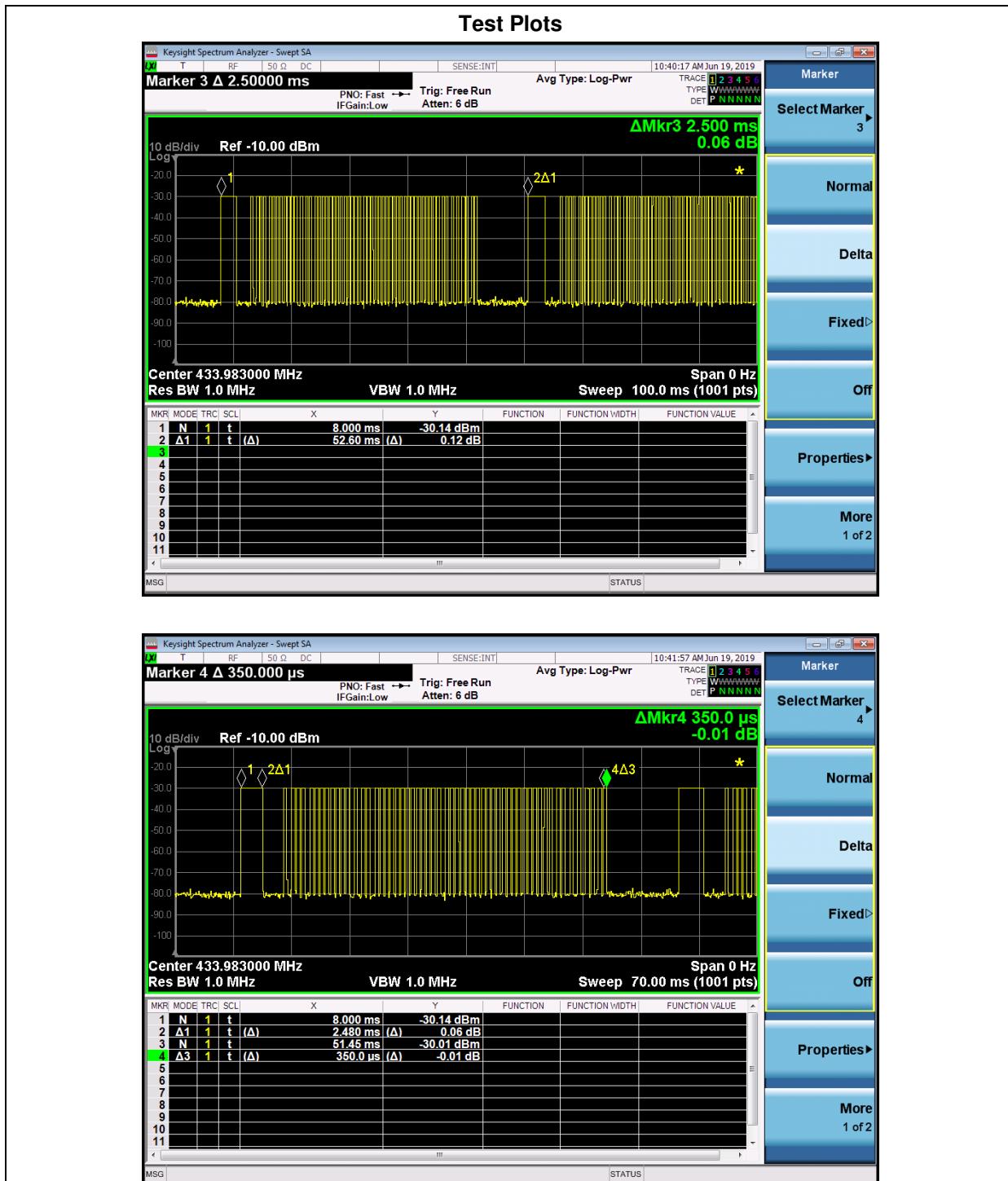
$$\text{Duty cycle} = 22.43 / 52.6 = 0.426$$

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

Please refer to below test plots for more details.

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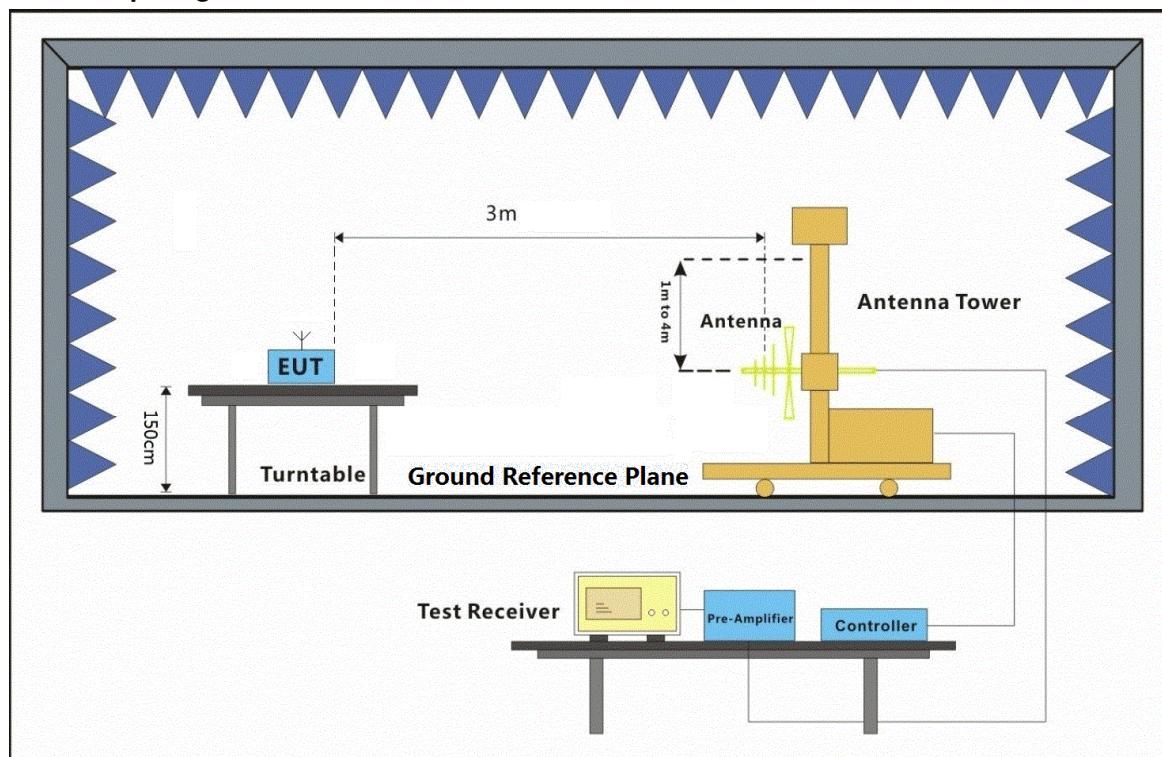
7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 23 °C Humidity: 52 % RH Atmospheric Pressure: 1020 mbar

Test mode d: Tx mode_Keep the EUT in continuously transmitting 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	69.92	108.8	-38.88	Peak	PASS
433.92	Horizontal	62.51	80.8	-18.29	Average	PASS
433.92	Vertical	71.78	108.8	-37.02	Peak	PASS
433.92	Vertical	64.37	80.8	-16.43	Average	PASS

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7.4 Radiated Emissions

Test Requirement N/A
Test Method: ANSI C63.10 (2013) Section 6.4&6.5&6.6
Measurement Distance: 3m
Limit:

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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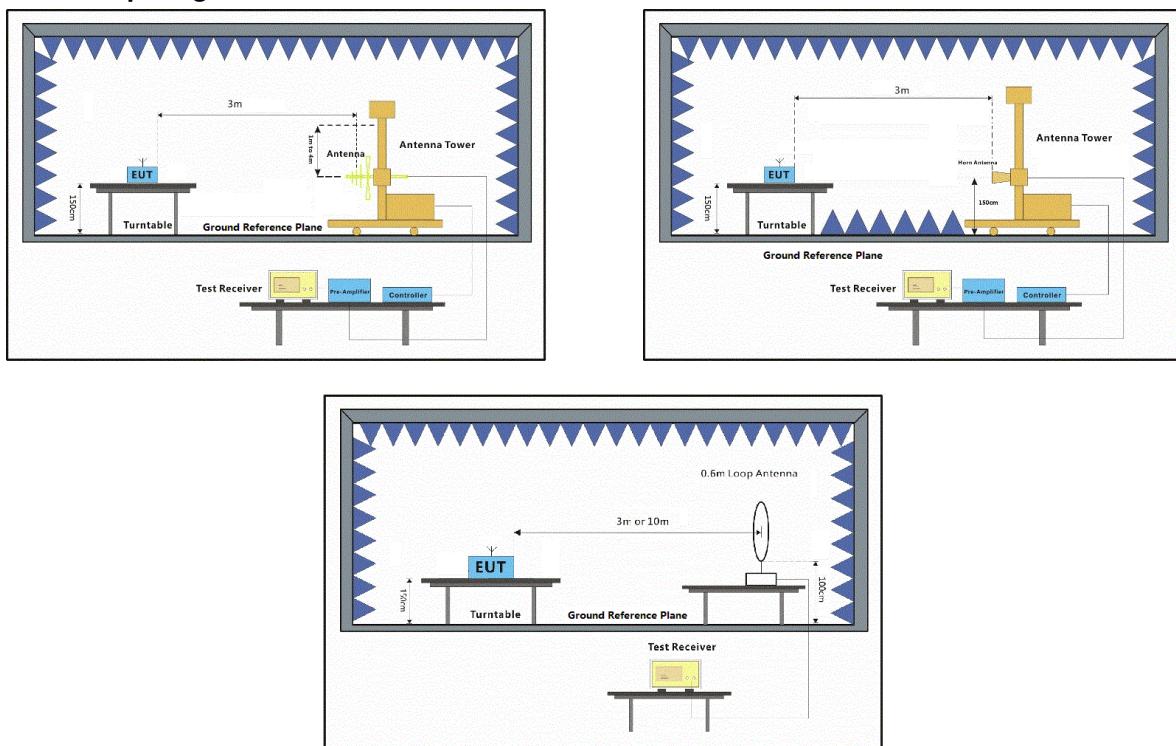
7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 23 °C Humidity: 54 % RH Atmospheric Pressure: 1020 mbar

Test mode d: Tx mode_Keep the EUT in continuously transmitting 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.

Frequency (MHz)	Polarization	Emission Level (dB μ V/m)	Limit Line (dB μ V/m)	Over Limit (dB)	Remark	Verdict
37.548	Horizontal	7.31	54	-46.69	QP	PASS
52.575	Horizontal	8.64	60.8	-52.16	QP	PASS
67.675	Horizontal	7.97	60.8	-52.83	QP	PASS
117.36	Horizontal	8.97	54	-45.03	QP	PASS
280.024	Horizontal	30.5	54	-23.5	QP	PASS
867.962	Horizontal	44.5	60.8	-16.3	QP	PASS
47.659	Vertical	10.88	60.8	-49.92	QP	PASS
72.338	Vertical	6.91	60.8	-53.89	QP	PASS
144.842	Vertical	8.42	60.8	-52.38	QP	PASS
177.509	Vertical	22.9	60.8	-37.9	QP	PASS
699.305	Vertical	18.42	60.8	-42.38	QP	PASS
867.998	Vertical	47.08	60.8	-13.72	QP	PASS

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Radiated emission above 1GHz

Frequency (MHz)	Polarization	Emission Level (dB μ V/m)	Limit Line (dB μ V/m)	Over Limit (dB)	Remark	Verdict
1302.653	Horizontal	59.22	74	-14.78	Peak	PASS
1302.653	Horizontal	51.81	54	-2.19	Average	PASS
1735.272	Horizontal	51.96	80.8	-28.84	Peak	PASS
1735.272	Horizontal	44.55	60.8	-16.25	Average	PASS
2169.004	Horizontal	48.14	80.8	-32.66	Peak	PASS
2169.004	Horizontal	40.73	60.8	-20.07	Average	PASS
2605.555	Horizontal	61.15	80.8	-19.65	Peak	PASS
2605.555	Horizontal	53.74	60.8	-7.06	Average	PASS
3036.894	Horizontal	42.58	80.8	-38.22	Peak	PASS
3036.894	Horizontal	35.17	60.8	-25.63	Average	PASS
3470.316	Horizontal	44.13	80.8	-36.67	Peak	PASS
3470.316	Horizontal	36.72	60.8	-24.08	Average	PASS
1301.332	Vertical	52.71	74	-21.29	Peak	PASS
1301.332	Vertical	45.3	54	-8.7	Average	PASS
1735.272	Vertical	44.42	80.8	-36.38	Peak	PASS
1735.272	Vertical	37.01	60.8	-23.79	Average	PASS
2169.382	Vertical	43.24	80.8	-37.56	Peak	PASS
2169.382	Vertical	35.83	60.8	-24.97	Average	PASS
2603.351	Vertical	55.64	80.8	-25.16	Peak	PASS
2603.351	Vertical	48.23	60.8	-12.57	Average	PASS
3036.632	Vertical	41.44	80.8	-39.36	Peak	PASS
3036.632	Vertical	34.03	60.8	-26.77	Average	PASS
3470.283	Vertical	44.02	80.8	-36.78	Peak	PASS
3470.283	Vertical	36.61	60.8	-24.19	Average	PASS

--End of Report--

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