

FCC TEST REPORT

Product : GV WIRELESS LIGHT
Trade mark : N/A
Model/Type reference : GV-3/1F-RC-M433
Serial Number : N/A
Report Number : EED32K00106502
FCC ID : 2ACO2-GV-RC433
Date of Issue : Jun. 14, 2018
Test Standards : 47 CFR Part 15 Subpart C
Test result : PASS

Prepared for:

Golden Vessel Electronic & Lighting Inc
Industrial District, ZhongHan Town ChaoHun City, AnHui China

Prepared by:

Centre Testing International Group Co., Ltd.
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Date:

Jun. 14, 2018

Check No.:3319510877



2 Version

Version No.	Date	Description
00	Jun. 14, 2018	Original

3 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	N/A
Field Strength of the Fundamental Signal	47 CFR Part 15 Subpart C Section 15.231 (b)	ANSI C63.10-2013	PASS
Spurious Emissions	47 CFR Part 15 Subpart C Section 15.231 (b)/15.209	ANSI C63.10-2013	PASS
20dB Bandwidth	47 CFR Part 15 Subpart C Section 15.231 (c)	ANSI C63.10-2013	PASS
Dwell Time	47 CFR Part 15 Subpart C Section 15.231 (a)	ANSI C63.10-2013	PASS

Remark:

The tested sample(s) and the sample information are provided by the client.

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5 General Information

5.1 Client Information

Applicant:	Golden Vessel Electronic & Lighting Inc
Address of Applicant:	Industrial District, ZhongHan Town ChaoHun City, AnHui China

5.2 General Description of EUT

Product Name:	GV WIRELESS LIGHT
Model No.(EUT):	GV-3/1F-RC-M433
Trade Mark:	N/A
EUT Supports Radios application:	433.92MHz
Power Supply:	LITHIUM BATTERY CR2025 3V
Hardware Version:	ZQRGBW1801 (manufacturer declare)
Firmware Version:	V2.0 (manufacturer declare)

5.3 Product Specification subjective to this standard

Frequency Range:	433.92MHz
Modulation Type:	ASK
Number of Channels:	1 (declared by the client)
Sample Type:	Portable production
Antenna type:	PCB antenna
Antenna gain:	1dBi
Test voltage:	LITHIUM BATTERY CR2025 3V
Sample Received Date:	May 03, 2018
Sample tested Date:	May 03, 2018 to Jun. 12, 2018

5.4 Test Environment and Mode

Operating Environment:	
Temperature:	24.3 °C
Humidity:	50.9 % RH
Atmospheric Pressure:	1010mbar
Test mode:	
TX mode:	The EUT transmitted the continuous signal at the specific channel(s).

5.5 Description of Support Units

The EUT has been tested independently.

5.6 Test Location

All tests were performed at:

Centre Testing International Group Co., Ltd.

Hongwei Industrial Zone, Bao'an 70 District, Shenzhen, Guangdong, China 518101

Telephone: +86 (0) 755 3368 3668 Fax: +86 (0) 755 3368 3385

No tests were sub-contracted.

FCC Designation No.: CN1164

5.7 Deviation from Standards

None.

5.8 Abnormalities from Standard Conditions

None.

5.9 Other Information Requested by the Customer

None.

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

No.	Item	Measurement Uncertainty
1	Radio Frequency	7.9×10^{-8}
2	RF power, conducted	0.31dB (30MHz-1GHz)
		0.57dB (1GHz-18GHz)
3	Radiated Spurious emission test	4.5dB (30MHz-1GHz)
		4.8dB (1GHz-12.75GHz)
4	Conduction emission	3.6dB (9kHz to 150kHz)
		3.2dB (150kHz to 30MHz)
5	Temperature test	0.64°C
6	Humidity test	2.8%
7	DC power voltages	0.025%

6 Equipment List

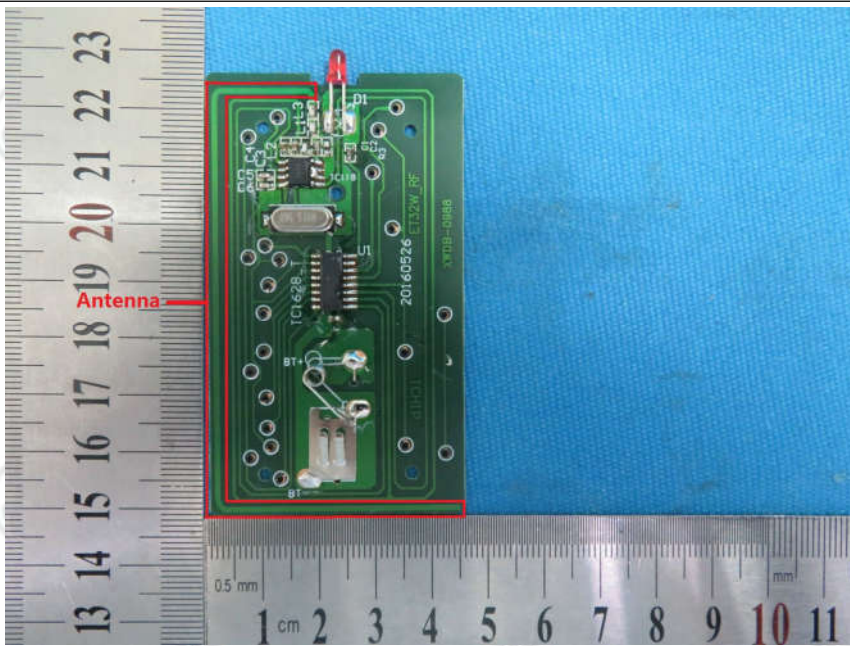
Conducted disturbance Test					
Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
Receiver	R&S	ESCI	100435	05-26-2017 05-25-2018	05-25-2018 05-24-2019
Temperature/ Humidity Indicator	TAYLOR	1451	1905	05-02-2018	05-01-2019
Communication test set	R&S	CMW500	152394	03-16-2018	03-15-2019
LISN	R&S	ENV216	100098	05-12-2017 05-11-2018	05-11-2018 05-10-2019

RF Conducted test					
Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
Spectrum Analyzer	R&S	FSP40	100416	05-12-2017 05-11-2018	05-11-2018 05-10-2019
Temperature & Humidity Chamber	TAYLOR	1451	1905	05-02-2018	05-01-2019

3M Semi/full-anechoic Chamber					
Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
3M Chamber & Accessory Equipment	TDK	SAC-3	---	06-04-2016	06-03-2019
TRILOG Broadband Antenna	SCHWARZBECK	VULB9163	9163-484	06-06-2017 06-05-2018	06-05-2018 06-04-2019
Preamplifier	JS Tonscend	EMC051845SE	980380	01-19-2018	01-18-2019
Horn Antenna	ETS-LINDGREN	3117	00057407	07-20-2015	07-18-2018
Loop Antenna	ETS	6502	00071730	06-22-2017	06-21-2019
Spectrum Analyzer	R&S	FSP40	100416	05-12-2017 05-11-2018	05-11-2018 05-10-2019
Receiver	R&S	ESCI	100435	05-26-2017 05-25-2018	05-25-2018 05-24-2019
LISN	schwarzbeck	NNBM8125	81251547	05-12-2017 05-11-2018	05-11-2018 05-10-2019
LISN	schwarzbeck	NNBM8125	81251548	05-12-2017 05-11-2018	05-11-2018 05-10-2019
Signal Generator	Agilent	E4438C	MY45095744	03-13-2018	03-12-2019
Signal Generator	Keysight	E8257D	MY53401106	03-13-2018	03-12-2019
Temperature/ Humidity Indicator	TAYLOR	1451	1905	05-02-2018	05-01-2019
Communication test set	Agilent	E5515C	GB47050534	03-16-2018	03-15-2019
Cable line	Fulai(7M)	SF106	5219/6A	01-10-2018	01-09-2019
Cable line	Fulai(6M)	SF106	5220/6A	01-10-2018	01-09-2019
Cable line	Fulai(3M)	SF106	5216/6A	01-10-2018	01-09-2019
Cable line	Fulai(3M)	SF106	5217/6A	01-10-2018	01-09-2019
Communication test set	R&S	CMW500	152394	03-16-2018	03-15-2019
High-pass filter	Sinoscite	FL3CX03WG18NM1 2-0398-002	---	01-10-2018	01-09-2019
band rejection filter	Sinoscite	FL5CX01CA09CL12 -0395-001	---	01-10-2018	01-09-2019
band rejection filter	Sinoscite	FL5CX01CA08CL12 -0393-001	---	01-10-2018	01-09-2019
band rejection filter	Sinoscite	FL5CX02CA04CL12 -0396-002	---	01-10-2018	01-09-2019
band rejection filter	Sinoscite	FL5CX02CA03CL12 -0394-001	---	01-10-2018	01-09-2019

7 Test results and Measurement Data

7.1 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:	 The antenna is PCB antenna and no consideration of replacement. The best case gain of the antenna is 1dBi.

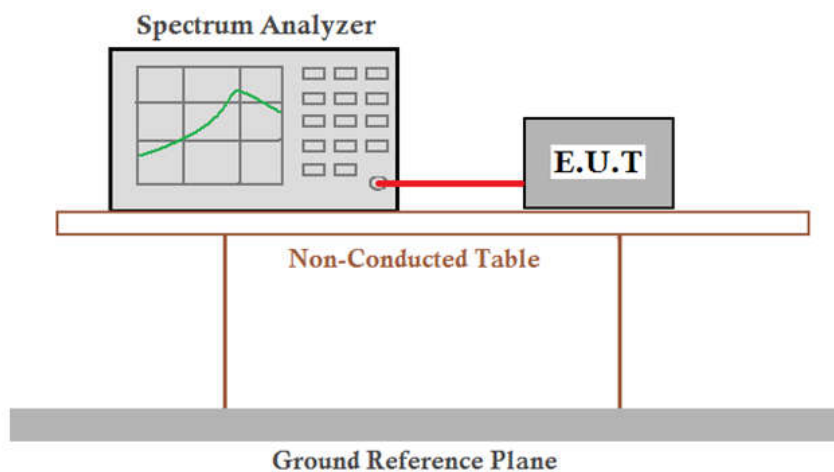
7.2 Spurious Emissions

7.2.1 Duty Cycle

Test Requirement: 47 CFR Part 15C Section 15.35 (c)

Test Method: ANSI C63.10

Test Setup:



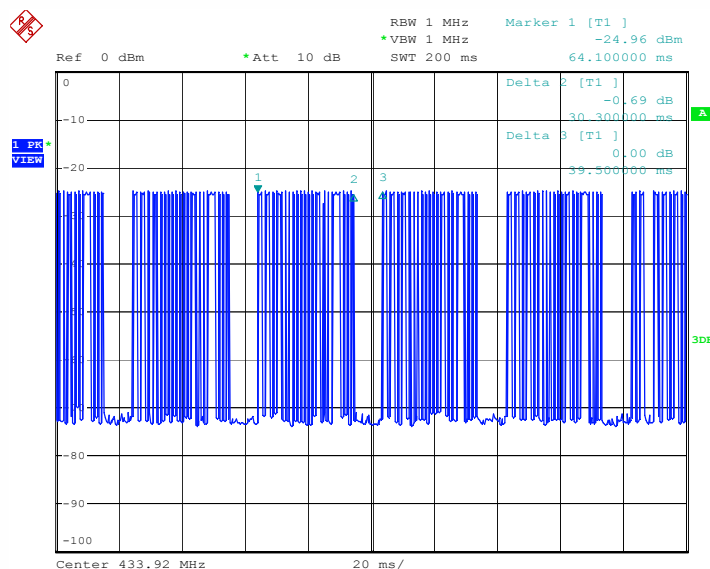
Limit: N/A

Test Mode: TX mode

Instruments Used: Refer to section 6 for details

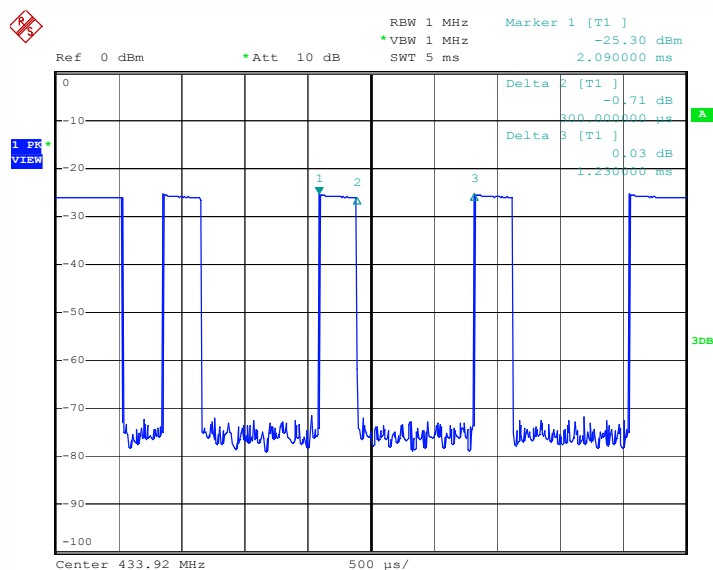
Test Results: Pass

Test plot as follows:

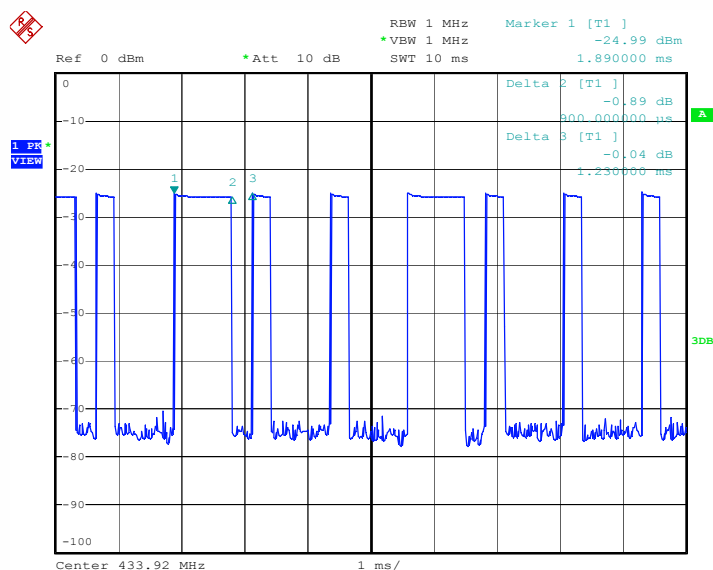


Date: 11.JUN.2018 15:04:04

Time slot:



Date: 11.JUN.2018 15:06:31



Date: 11.JUN.2018 15:07:32

7.2.2 Spurious Emissions

Test Requirement: 47 CFR Part 15C Section 15.231(b) and 15.209

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	10Hz	Average

Test Setup:

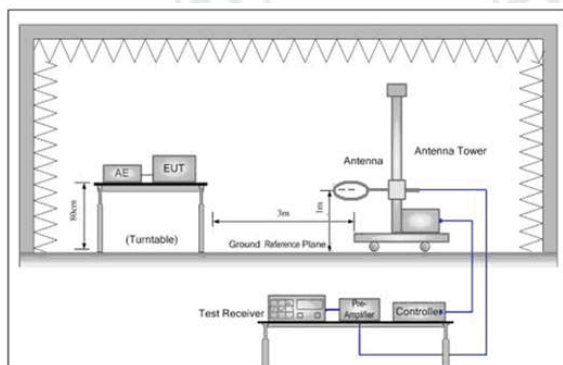


Figure 1. Below 30MHz

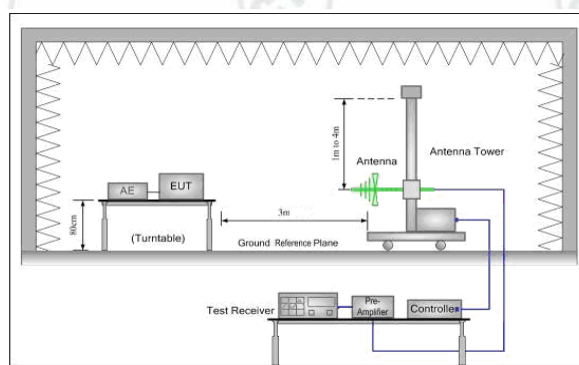


Figure 2. 30MHz to 1GHz

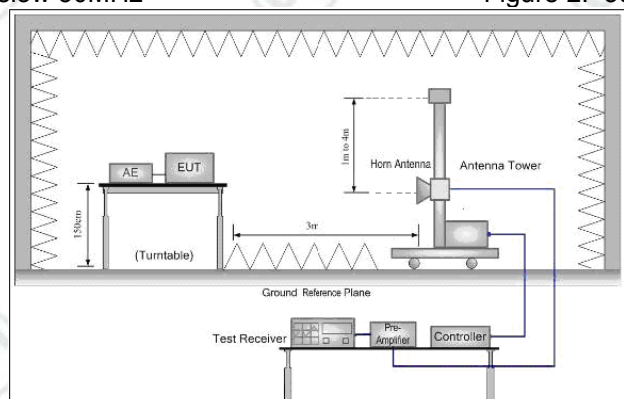


Figure 3. Above 1GHz

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 chamber. 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 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.
- 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.

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
433.92MHz	80.8	Average Value
	100.8	Peak Value

Test Mode:

TX mode

Instruments Used:

Refer to section 6 for details

Test Results:

Pass

Test data

Field Strength of the Fundamental Signal

Frequency (MHz)	Correct Factor (dB)	Read Level (dBuV)	Peak Value (dBμV/m)	PDCF (dB)	Average value (dBuV/m)	Average Limit (dBμV/m)	Over Limit (dB)	Polarization
433.943	27.66	-65.2	-37.54	-16.8	-54.34	80.8	-135.14	H
433.943	27.66	-62.25	-34.59	-16.8	-51.39	80.8	-132.19	V

Average value:

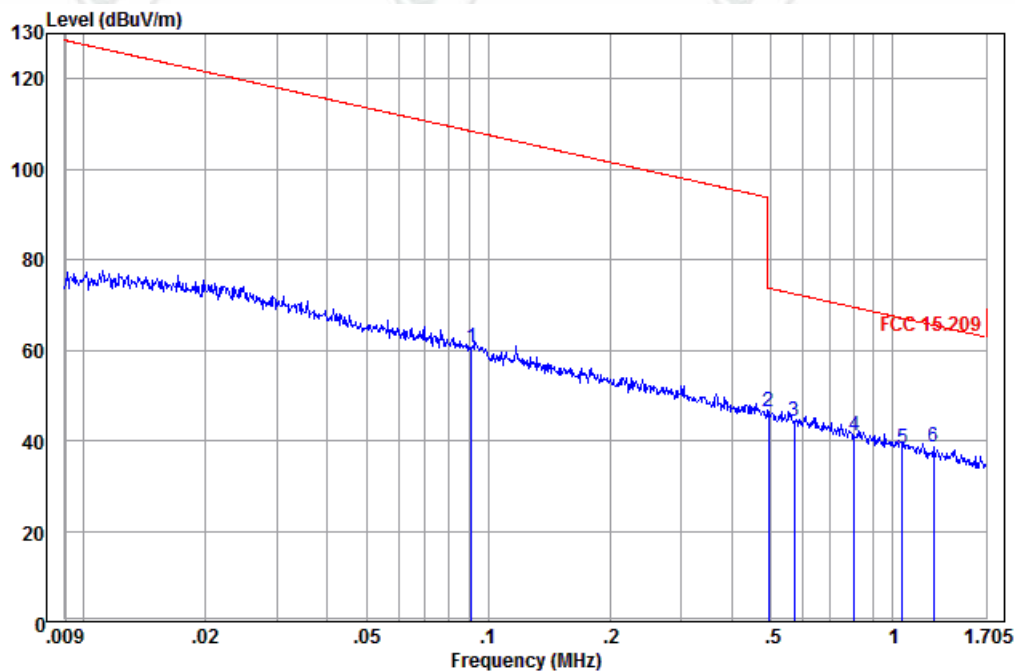
Calculate Formula:	Average value=Peak value + PDCF
	PDCF=20 log(Duty cycle)
	Duty cycle= T on time / T period
Test data:	Ton time =(0.3×16+0.9×1)ms=5.7ms
	T period =39.5ms
	PDCF= 20 log(Duty cycle)=20 log(5.7/39.5)= -16.8dB

Test data

Spurious Emissions

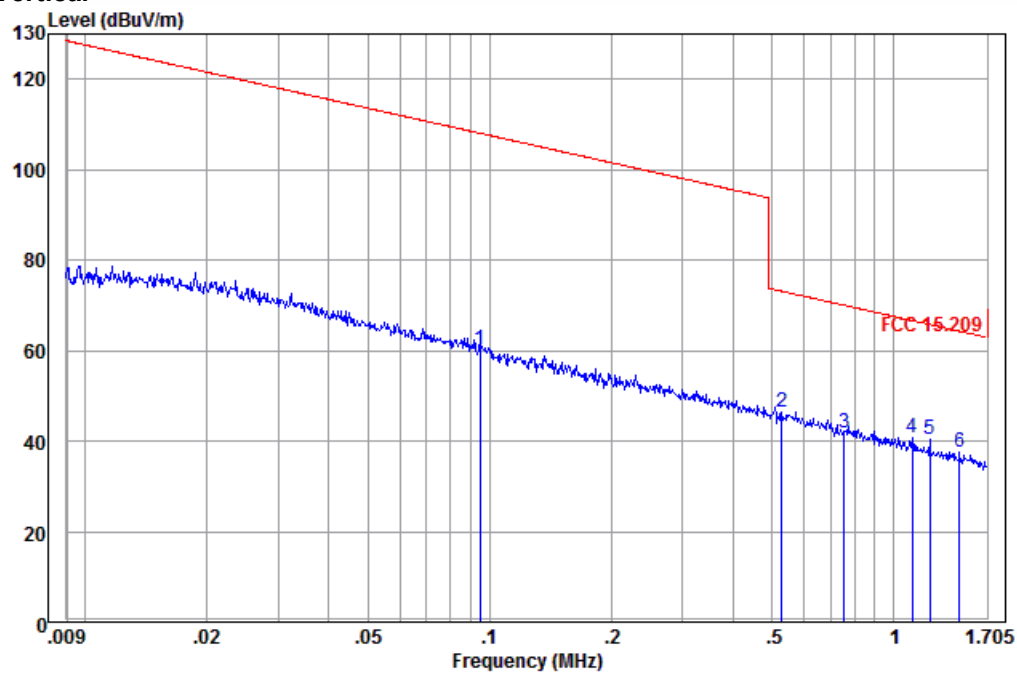
9 kHz-1.705MHz

Horizontal



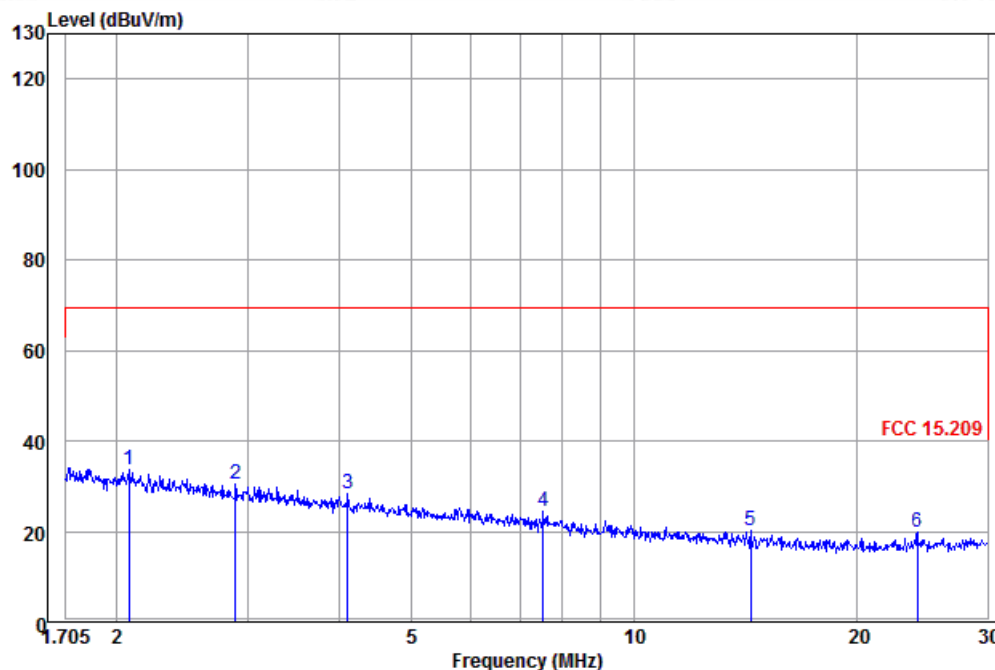
	Ant	Cable	Read	Limit	Over			
Freq	Factor	Loss	Level	Line	Limit	Pol/Phase	Remark	
MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	0.091	11.43	0.10	48.95	60.48	108.42	-47.94	Horizontal QP
2	0.495	11.30	0.12	34.88	46.30	73.72	-27.42	Horizontal QP
3	0.573	11.30	0.12	32.78	44.20	72.44	-28.24	Horizontal QP
4	0.805	11.32	0.12	29.48	40.92	69.46	-28.54	Horizontal QP
5	1.058	11.40	0.14	26.80	38.34	67.07	-28.73	Horizontal QP
6 pp	1.264	11.40	0.15	26.92	38.47	65.51	-27.04	Horizontal QP

Vertical



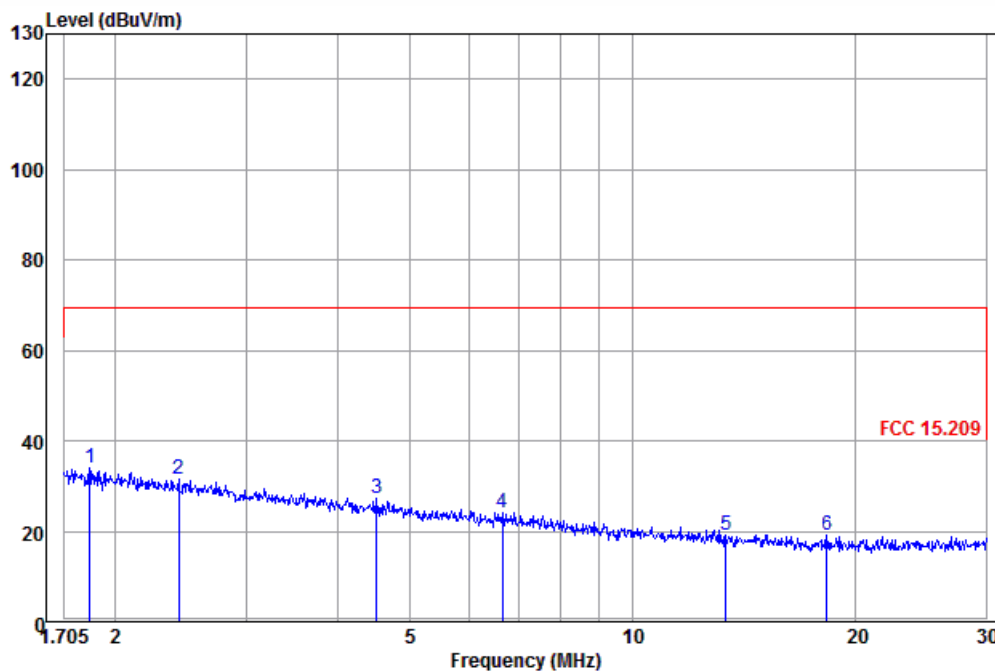
	Ant Freq	Cable Factor	Cable Loss	Read Level	Limit Level	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dB		
1	0.095	11.42	0.11	48.54	60.07	108.06	-47.99	Vertical QP
2	0.529	11.30	0.12	35.07	46.49	73.12	-26.63	Vertical QP
3	0.756	11.30	0.12	30.24	41.66	70.01	-28.35	Vertical QP
4	1.115	11.40	0.14	29.22	40.76	66.61	-25.85	Vertical QP
5 pp	1.232	11.40	0.15	28.66	40.21	65.74	-25.53	Vertical QP
6	1.457	11.40	0.17	26.08	37.65	64.28	-26.63	Vertical QP

Horizontal



	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1 pp	2.072	11.41	0.20	22.21	33.82	69.50	-35.68	Horizontal	QP
2	2.890	11.49	0.16	18.91	30.56	69.50	-38.94	Horizontal	QP
3	4.100	11.29	0.19	16.77	28.25	69.50	-41.25	Horizontal	QP
4	7.531	11.02	0.44	12.86	24.32	69.50	-45.18	Horizontal	QP
5	14.357	10.72	0.69	8.87	20.28	69.50	-49.22	Horizontal	QP
6	24.125	9.60	1.00	9.22	19.82	69.50	-49.68	Horizontal	QP

Vertical

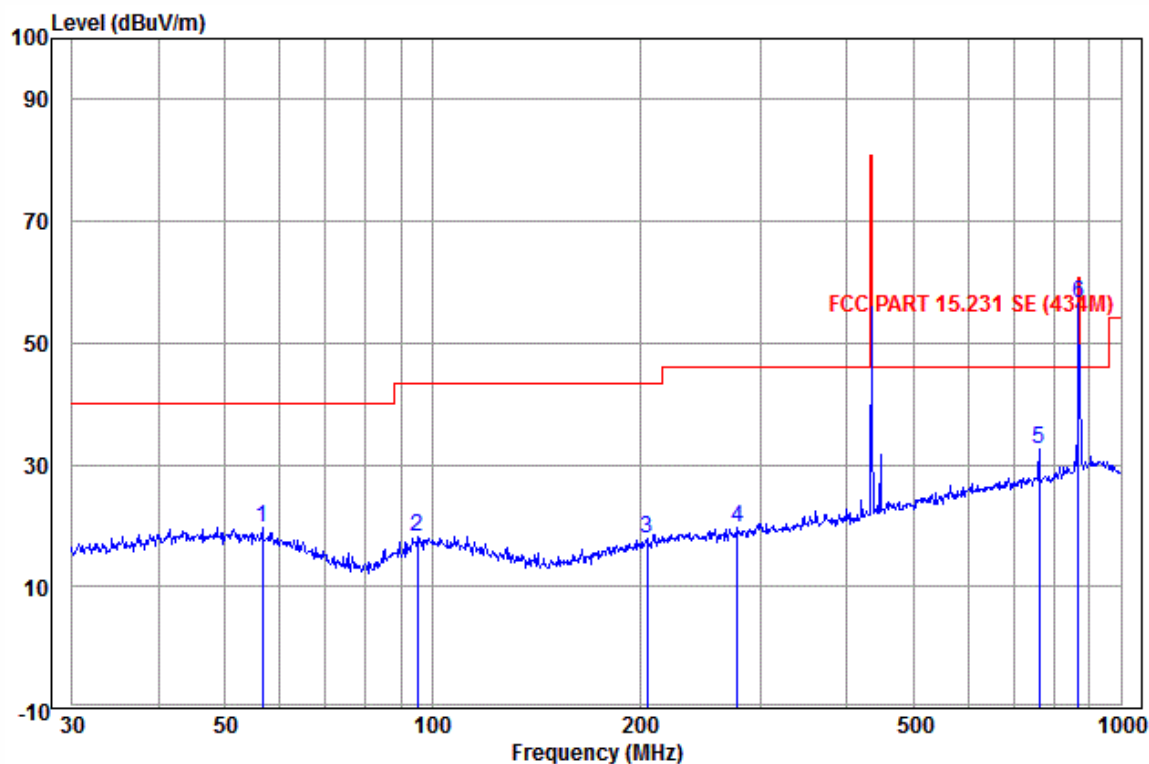


	Ant Freq	Cable Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1 pp	1.842	11.40	0.19	22.33	33.92	69.50	-35.58	Vertical	QP
2	2.433	11.45	0.18	19.77	31.40	69.50	-38.10	Vertical	QP
3	4.507	11.25	0.17	15.72	27.14	69.50	-42.36	Vertical	QP
4	6.657	11.08	0.35	12.73	24.16	69.50	-45.34	Vertical	QP
5	13.363	10.76	0.68	7.84	19.28	69.50	-50.22	Vertical	QP
6	18.267	10.29	0.75	8.24	19.28	69.50	-50.22	Vertical	QP

30MHz-1GHz

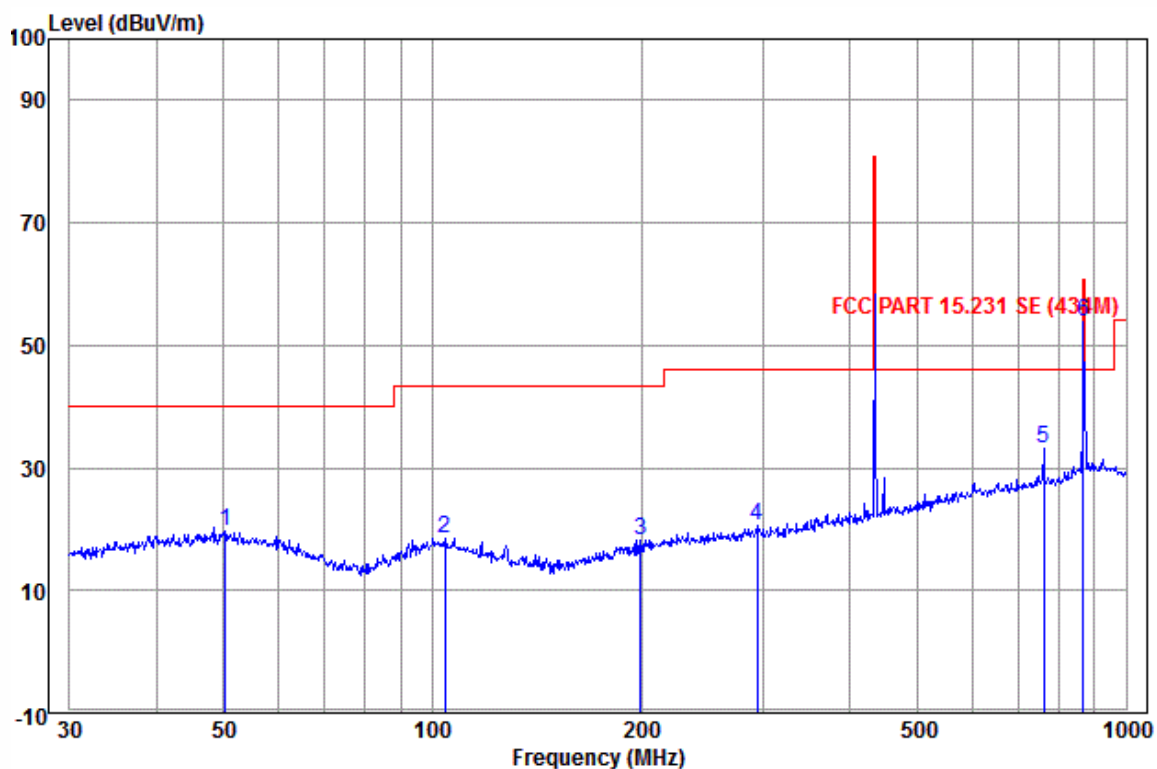
QP value:

Horizontal



	Ant Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	56.593	13.58	0.18	5.94	19.70	40.00	-20.30	Horizontal	QP
2	95.093	11.74	0.50	5.99	18.23	43.50	-25.27	Horizontal	QP
3	204.955	11.62	1.13	5.22	17.97	43.50	-25.53	Horizontal	QP
4	277.094	13.05	1.19	5.43	19.67	46.00	-26.33	Horizontal	QP
5	760.704	19.57	2.50	10.63	32.70	46.00	-13.30	Horizontal	QP
6 pp	869.130	21.61	2.47	32.54	56.62	60.80	-4.18	Horizontal	

Vertical



	Ant Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	50.232	14.56	0.11	5.12	19.79	40.00	-20.21	Vertical	QP
2	104.170	12.13	0.59	5.83	18.55	43.50	-24.95	Vertical	QP
3	199.286	11.47	1.09	5.68	18.24	43.50	-25.26	Vertical	QP
4	294.114	13.31	1.10	6.06	20.47	46.00	-25.53	Vertical	QP
5	760.704	19.57	2.50	11.20	33.27	46.00	-12.73	Vertical	QP
6 pp	869.130	21.61	2.47	29.70	53.78	60.80	-7.02	Vertical	

Above 1GHz

Peak value:

Frequency (MHz)	Height (cm)	Azimuth (deg)	Correct Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Antenna Polaxis
1301.332	150	201	55.66	55.66	80.80	-25.14	H
1733.375	149	189	51.63	51.63	80.80	-29.17	H
2168.51	151	145	54.48	54.48	80.80	-26.32	H
3037.063	151	100	49.98	49.98	80.80	-30.82	H
3909.967	149	54	51.71	51.71	80.80	-29.09	H
4338.163	150	48	51.36	51.36	80.80	-29.44	H
1301.332	149	100	56.19	56.19	80.80	-24.61	V
1736.483	150	25	52.48	52.48	80.80	-28.32	V
2168.510	149	321	50.57	50.57	80.80	-30.23	V
3037.063	150	254	53.82	53.82	80.80	-26.98	V
4338.163	151	156	52.18	52.18	80.80	-28.62	V
4778.879	149	12	52.22	52.22	80.80	-28.58	V

Remark:

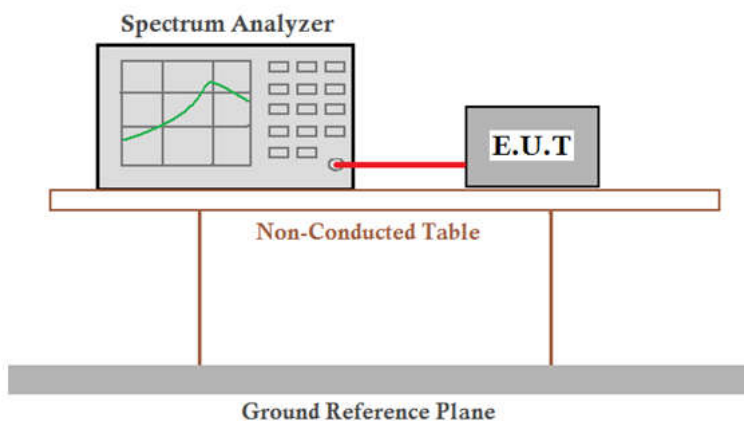
- 1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
 Final Test Level = Receiver Reading - Correct Factor
 Correct Factor = Preamplifier Factor - Antenna Factor - Cable Factor
- 2) Scan from 9kHz to 25GHz, the disturbance above 13GHz and 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.

7.3 20dB Bandwidth

Test Requirement: 47 CFR Part 15C Section 15.231 (c)

Test Method: ANSI C63.10

Test Setup:



Limit:

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

Test Mode: TX mode

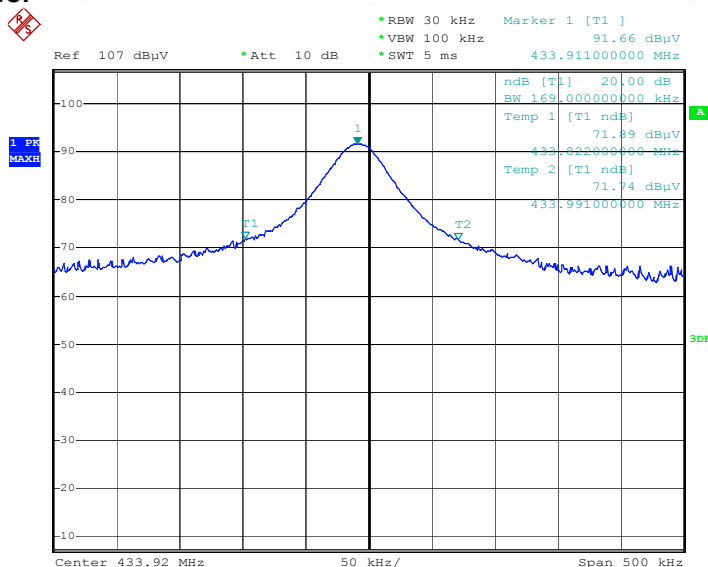
Instruments Used: Refer to section 6 for details

Test Results: Pass

Test data

20dB bandwidth (kHz)	Limit (kHz)	Results
169	1084.78	Pass

Test plot as follows:



Date: 11.JUN.2018 15:00:14

7.4 Dwell Time

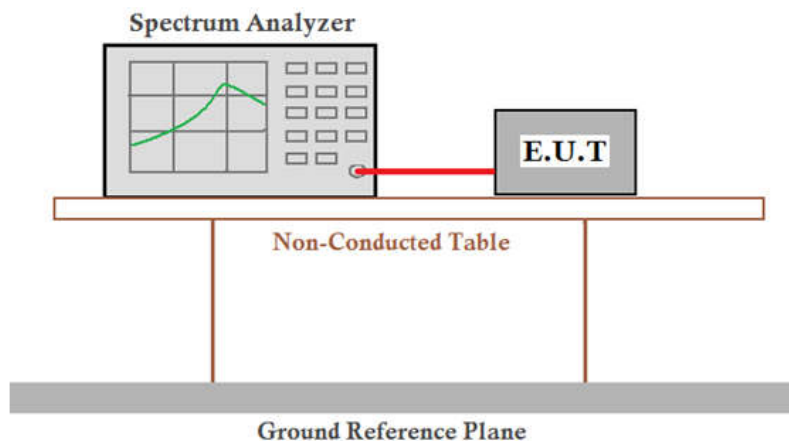
Test Requirement:

47 CFR Part 15C Section 15.231 (a) (1)

Test Method:

ANSI C63.10

Test Setup:



Limit:

Not more than 5 seconds

Test Mode:

TX mode

Instruments Used:

Refer to section 6 for details

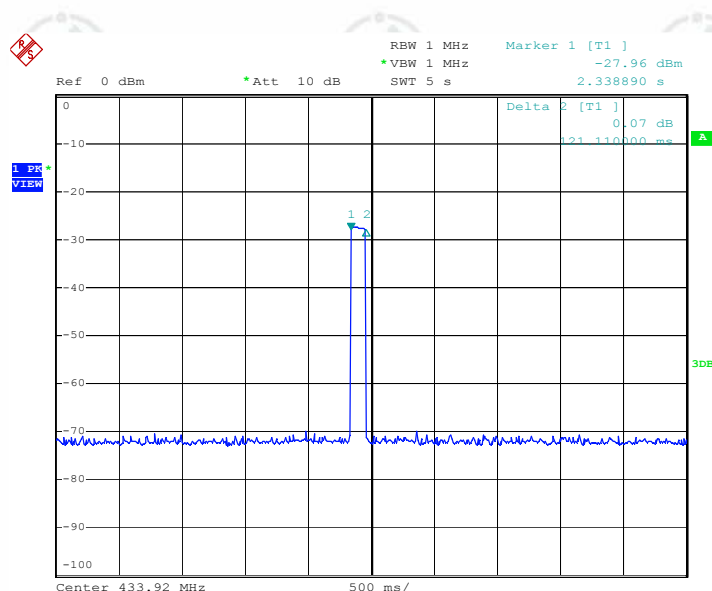
Test Results:

Pass

Test data:

Test item	Test value	Limit (MHz)	Results
Transmitting time	0.12111s	≤5s	Pass

Test plot as follows:



Date: 11.JUN.2018 15:14:28

APPENDIX 1 PHOTOGRAPHS OF TEST SETUP

Test Model No.: GV-3/1F-RC-M433



Radiated spurious emission Test Setup-1(9kHz~30MHz)



Radiated spurious emission Test Setup-2 (30MHz~1GHz)



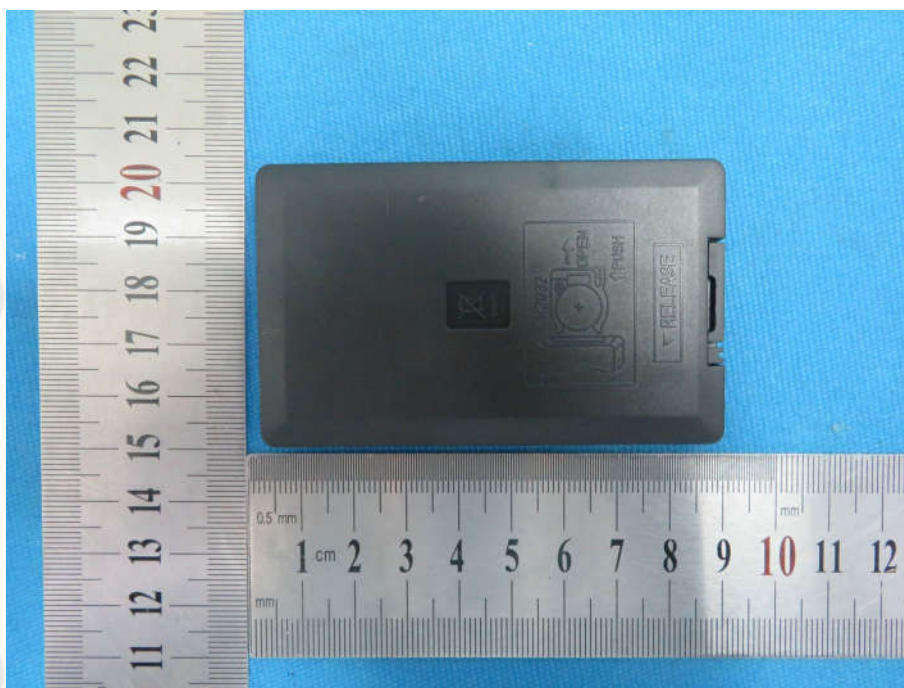
Radiated spurious emission Test Setup-3(Above 1GHz)

APPENDIX 2 PHOTOGRAPHS OF EUT

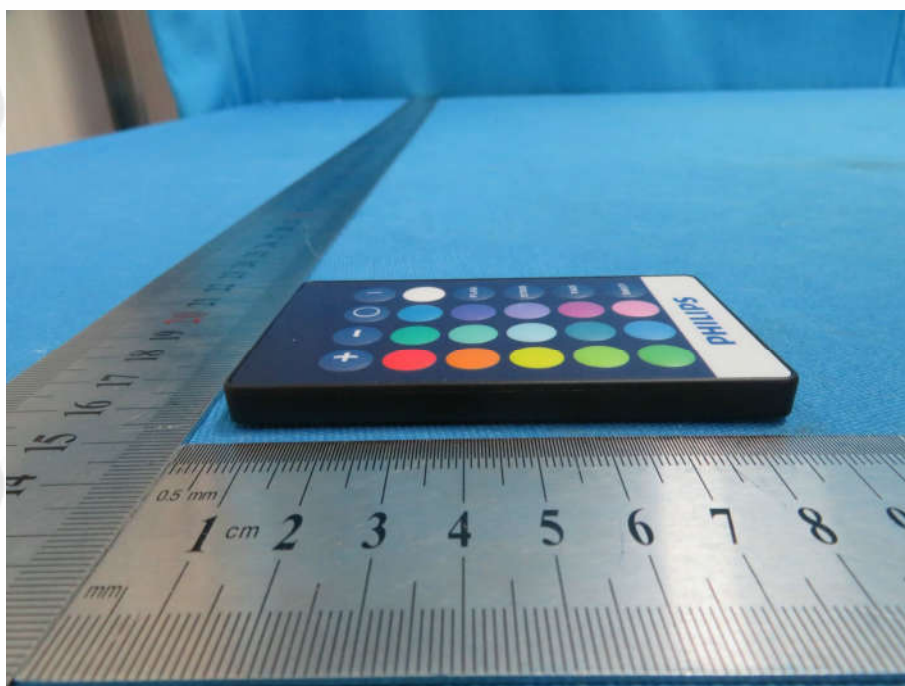
Test model No.: GV-3/1F-RC-M433



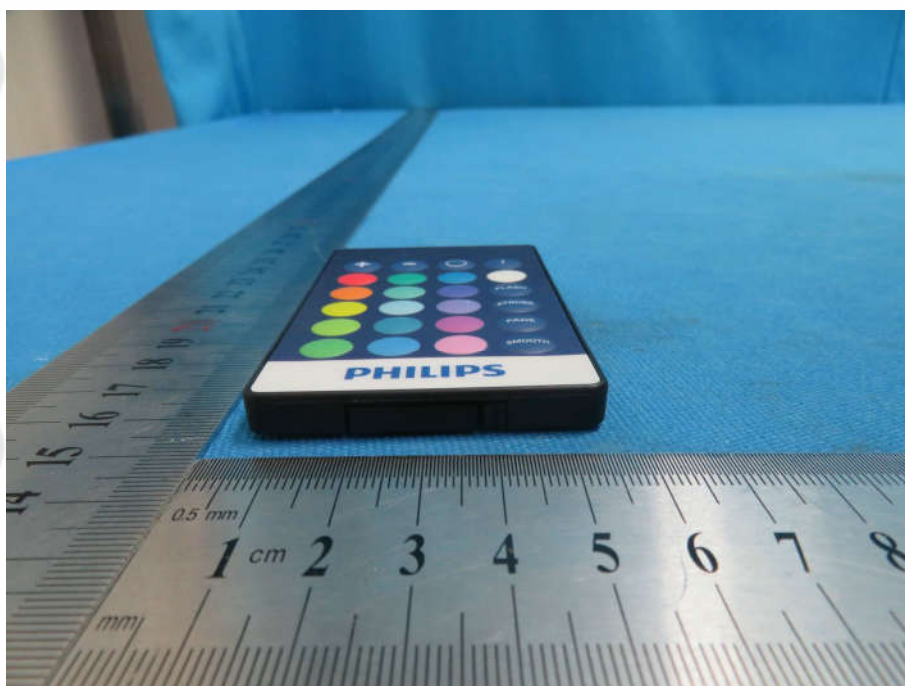
View of Product-1



View of Product-2



View of Product-3



View of Product-4



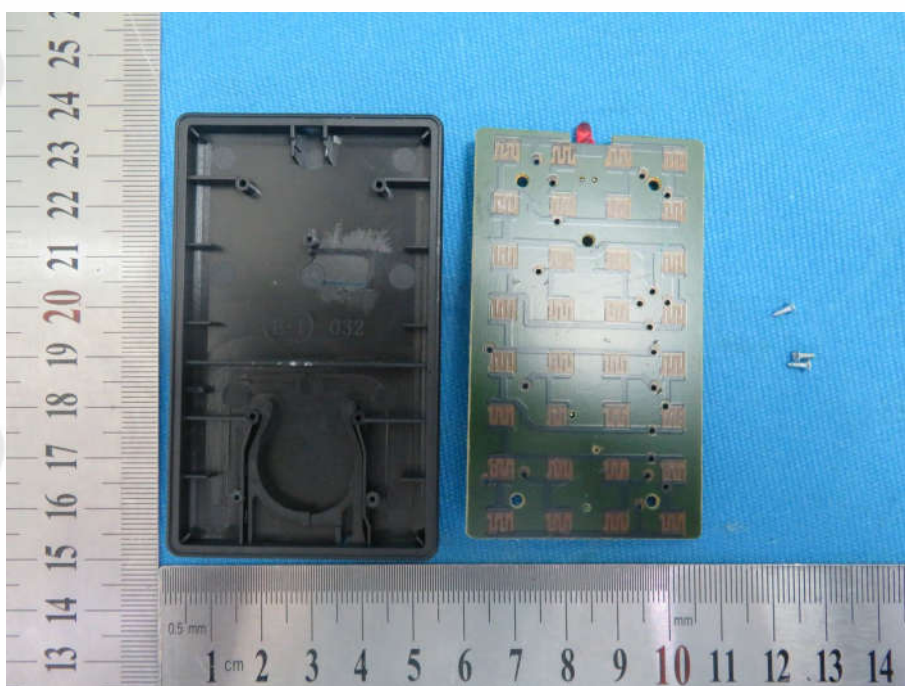
View of Product-5



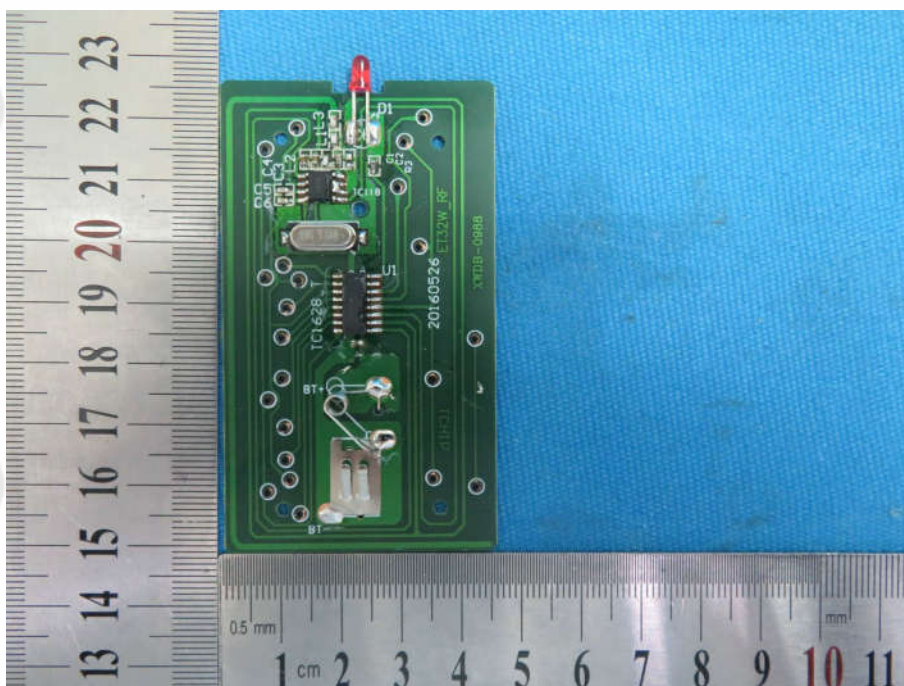
View of Product-6



View of Product-7



View of Product-8



View of Product-9

*** End of Report ***

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