

FCC Test Report

Product Name	Wireless Remote Control
Model No.	883822
FCC ID.	X96883822

Applicant	COMEUP INDUSTRIES INC.
Address	No.139, Jieyukeng Rd., Ruifang Dist., New Taipei City 22453, Taiwan

Date of Receipt	Mar. 27, 2020
Issued Date	Jul. 17, 2020
Report No.	2030763R-RFUSP01V00-A
Report Version	V1.0



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.

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Test Report

Issued Date: Jul. 17, 2020

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Manufacturer	COMEUP INDUSTRIES INC.
Model No.	883822
FCC ID.	X96883822
EUT Rated Voltage	DC 3V (Power by battery)
EUT Test Voltage	DC 3V (Power by battery)
Trade Name	COMEUP
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C
	ANSI C63.4: 2014, ANSI C63.10: 2013
Test Result	Complied

Documented By	:	Joanne Lin
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Tested By	:	Ivan Chuang
		(Senior Engineer / Ivan Chuang)
Approved By	:	Stant 3
		(Director / Vincent Lin)



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Revision History

Report No.	Version	Description	Issued Date
2030763R-RFUSP01V00-A	V1.0	Initial issue of report.	2020-07-17



1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Wireless Remote Control
Trade Name	COMEUP
Model No.	883822
FCC ID.	X96883822
Frequency Range	2402-2480MHz
Channel Number	79CH
Type of Modulation	GFSK
Antenna Type	PCB Antenna
Channel Control	Auto
Antenna Gain	Refer to the table "Antenna List"

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	COMEUP	N/A	PCB Antenna	-0.24dBi for 2.4GHz

Note: The antenna of EUT is conforming to FCC 15.203.



Center Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 02:	2402 MHz	Channel 23:	2423 MHz	Channel 44:	2444 MHz	Channel 65:	2465 MHz
Channel 03:	2403 MHz	Channel 24:	2424 MHz	Channel 45:	2445 MHz	Channel 66:	2466 MHz
Channel 04:	2404 MHz	Channel 25:	2425 MHz	Channel 46:	2446 MHz	Channel 67:	2467 MHz
Channel 05:	2405 MHz	Channel 26:	2426 MHz	Channel 47:	2447 MHz	Channel 68:	2468 MHz
Channel 06:	2406 MHz	Channel 27:	2427 MHz	Channel 48:	2448 MHz	Channel 69:	2469 MHz
Channel 07:	2407 MHz	Channel 28:	2428 MHz	Channel 49:	2449 MHz	Channel 70:	2470 MHz
Channel 08:	2408 MHz	Channel 29:	2429 MHz	Channel 50:	2450 MHz	Channel 71:	2471 MHz
Channel 09:	2409 MHz	Channel 30:	2430 MHz	Channel 51:	2451 MHz	Channel 72:	2472 MHz
Channel 10:	2410 MHz	Channel 31:	2431 MHz	Channel 52:	2452 MHz	Channel 73:	2473 MHz
Channel 11:	2411 MHz	Channel 32:	2432 MHz	Channel 53:	2453 MHz	Channel 74:	2474 MHz
Channel 12:	2412 MHz	Channel 33:	2433 MHz	Channel 54:	2454 MHz	Channel 75:	2475 MHz
Channel 13:	2413 MHz	Channel 34:	2434 MHz	Channel 55:	2455 MHz	Channel 76:	2476 MHz
Channel 14:	2414 MHz	Channel 35:	2435 MHz	Channel 56:	2456 MHz	Channel 77:	2477 MHz
Channel 15:	2415 MHz	Channel 36:	2436 MHz	Channel 57:	2457 MHz	Channel 78:	2478 MHz
Channel 16:	2416 MHz	Channel 37:	2437 MHz	Channel 58:	2458 MHz	Channel 79:	2479 MHz
Channel 17:	2417 MHz	Channel 38:	2438 MHz	Channel 59:	2459 MHz	Channel 80:	2480 MHz
Channel 18:	2418 MHz	Channel 39:	2439 MHz	Channel 60:	2460 MHz		
Channel 19:	2419 MHz	Channel 40:	2440 MHz	Channel 61:	2461 MHz		
Channel 20:	2420 MHz	Channel 41:	2441 MHz	Channel 62:	2462 MHz		
Channel 21:	2421 MHz	Channel 42:	2442 MHz	Channel 63:	2463 MHz		
Channel 22:	2422 MHz	Channel 43:	2443 MHz	Channel 64:	2464 MHz		

- 1. The EUT is a Wireless Remote Control with built-in 2.4GHz wireless transceiver, this report for 2.4GHz wireless.
- 2. These tests were conducted on a sample for the purpose of demonstrating compliance of transmitter with Part 15 Subpart C Paragraph 15.247 for spread spectrum devices.
- 3. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.

Test Mode Mode 1: Transmit

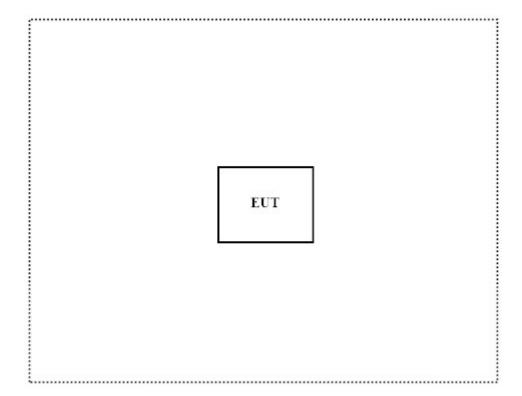


1.3. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product	Manufacturer	Model No.	Serial No.	Power Cord	
N/A					
Signal Cable Type Signal cable Description					
N/A					

1.4. Configuration of Tested System



1.5. EUT Exercise Software

- (1) Setup the EUT as shown in Section 1.4.
- (2) Press the button of the EUT.
- (3) Configure the test mode, the test channel.
- (4) Start the continuous Transmit.
- (5) Verify that the EUT works properly.



1.6. Test Facility

Ambient conditions in the laboratory:

Performed Item	Items	Required	Actual
D 1: 4 1 E : :	Temperature (°C)	10~40 °C	21.8 °C
Radiated Emission	Humidity (%RH)	10~90 %	68 %
	Temperature (°C)	10~40 °C	22 °C
Conductive	Humidity (%RH)	10~90 %	55 %

USA : FCC Registration Number: TW0023 Canada : IC Registration Number: 25880

Site Description : Accredited by TAF

Accredited Number: 3023

Test Laboratory : DEKRA Testing and Certification Co., Ltd Address : No.159, Sec. 2, Wenhua 1st Rd., Linkou Dist.,

New Taipei City 24457, Taiwan, R.O.C.

Phone number : 886-2-2602-7968

Fax number : 866-2-2602-3286

Email address : info.tw@dekra.com

Website : http://www.dekra.com.tw



1.7. List of Test Equipment

For Conducted measurements /ASR2

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	Spectrum Analyzer	R&S	FSV30	103466	2019.12.16	2020.12.15
X	Peak Power Analyzer	KEYSIGHT	8900B	MY51000539	2020.05.13	2021.05.12
X	Power Sensor	KEYSIGHT	N1923A	MY59240002	2020.05.22	2021.05.21
X	Power Sensor	KEYSIGHT	N1923A	MY59240003	2020.05.22	2021.05.21

Note:

- 1. All equipments are calibrated every one year.
- 2. The test instruments marked with "X" are used to measure the final test results.
- 3. Test Software version: DEKRA Conduction Test System V9.0.5

For Radiated measurements /ACB1

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	Loop Antenna	AMETEK	HLA6121	49611	2020.03.16	2021.03.15
X	Bi-Log Antenna	SCHWARZBECK	VULB9168	9168-675	2019.07.01	2020.06.30
X	Horn Antenna	ETS-Lindgren	3117	00203761	2019.10.31	2020.10.30
X	Horn Antenna	Com-Power	AH-840	101087	2020.06.08	2021.06.07
X	Pre-Amplifier	EMCI	EMC001330	980301	2020.06.04	2021.06.03
X	Pre-Amplifier	EMCI	EMC051835SE	980312	2020.06.10	2021.06.09
X	Pre-Amplifier	EMCI	EMC05820SE	980308	2019.09.02	2020.09.01
X	Pre-Amplifier	EMCI	EMC184045SE	980314	2020.06.10	2021.06.09
X	Filter	MICRO TRONICS	BRM50702	G251	2019.09.03	2020.09.02
	Filter	MICRO TRONICS	BRM50716	G188	2019.09.03	2020.09.02
X	EMI Test Receiver	R&S	ESR7	101602	2019.12.16	2020.12.15
X	Spectrum Analyzer	R&S	FSV40	101148	2020.03.16	2021.03.15
X	Coaxial Cable	SUHNER	SUCOFLEX 106	RF002	2020.07.03	2021.07.02
X	Mircoflex Cable	HUBER SUHNER	SUCOFLEX 102	MY3381/2	2020.06.10	2021.06.09

- 1. All equipments are calibrated every one year.
- 2. The test instruments marked with "X" are used to measure the final test results.
- 3. Test Software version : DEKRA Testing System V1.2



1.8. Uncertainty

Uncertainties have been calculated according to the DEKRA internal document, and is described in each test chapter of this report.

The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

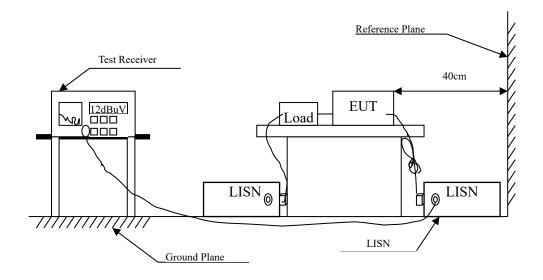
Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Test item	Uncertainty		
Conducted Emission	±3.42 dB		
Peak Power Output	Power Meter ±0.91 dB	Spectrum Analyzer ±2.53 dB	
Radiated Emission	Under 1GHz ±4.06 dB	Above 1GHz ±3.73 dB	
RF Antenna Conducted Test	±2.53 dB		
Band Edge	Under 1GHz ±4.06 dB	Above 1GHz ±3.73 dB	
6dB Bandwidth	±682.83 Hz		
Power Density ±2.		53 dB	
Duty Cycle	±2.31 ms		



2. Conducted Emission

2.1. Test Setup



2.2. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBuV) Limit							
Frequency	Limits						
MHz	QP	AV					
0.15 - 0.50	66-56	56-46					
0.50-5.0	56	46					
5.0 - 30	60	50					

Remarks: In the above table, the tighter limit applies at the band edges.



2.3. Test Procedure

The EUT and Peripherals are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement.

Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

The EUT was setup to ANSI C63.4, 2014; tested to DTS test procedure of FCC KDB-558074 for compliance to FCC 47CFR Subpart C requirements.

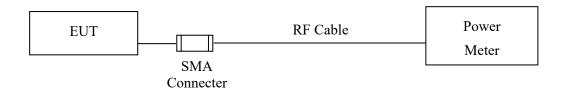
2.4. Test Result of Conducted Emission

Owing to the battery operation of EUT, this test item is not performed.



3. Peak Power Output

3.1. Test Setup



3.2. Limit

The maximum peak power shall be less 1Watt.

3.3. Test Procedure

The EUT was tested according to C63.10:2013 for compliance to FCC 47CFR 15.247 requirements. The maximum peak conducted output power using C63.10:2013 Section 11.9.1.3 PKPM1 Peak power meter method.



3.4. Test Result of Peak Power Output

Product : Wireless Remote Control

Test Item : Peak Power Output Test Mode : Mode 1: Transmit

Test Date : 2020/06/05

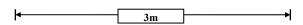
Channel No.	Frequency	Measurement	Required Limit	Result
	(MHz)	(dBm)		
Channel 02	2402.00	-5.73	1 Watt= 30 dBm	Pass
Channel 41	2441.00	-4.25	1 Watt= 30 dBm	Pass
Channel 80	2480.00	-6.53	1 Watt= 30 dBm	Pass

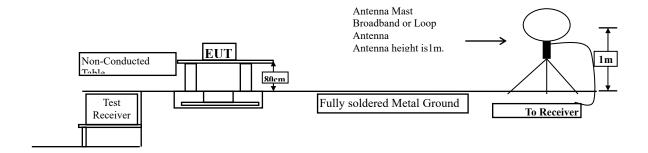


4. Radiated Emission

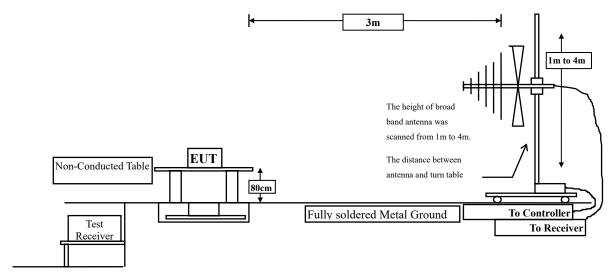
4.1. Test Setup

Radiated Emission Under 30MHz

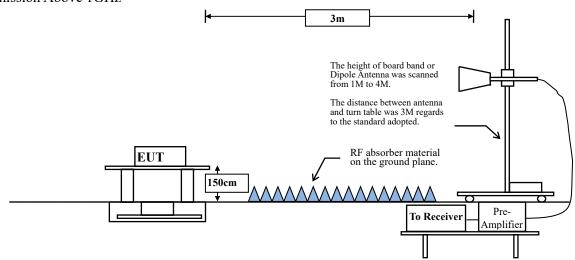




Radiated Emission Below 1GHz



Radiated Emission Above 1GHz





4.2. Limits

➤ General Radiated Emission Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209 Limits						
Frequency MHz	Field strength	Measurement distance				
TVITIZ	(microvolts/meter)	(meter)				
0.009-0.490	2400/F(kHz)	300				
0.490-1.705	24000/F(kHz)	30				
1.705-30	30	30				
30-88	100	3				
88-216	150	3				
216-960	200	3				
Above 960	500	3				

Remarks:

- 1. RF Voltage $(dBuV) = 20 \log RF \text{ Voltage } (uV)$
- 2. In the Above Table, the tighter limit applies at the band edges.
- 3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.



4.3. Test Procedure

The EUT was setup according to ANSI C63.10: 2013 and tested according to C63.10:2013 Section 11.12.1 for compliance to FCC 47CFR 15.247 requirements.

Measuring the frequency range below 1GHz, the EUT is placed on a turn table which is 0.8 meter above ground, when measuring the frequency range above 1GHz, the EUT is placed on a turn table which is 1.5 meter above ground.

The turn table is rotated 360 degrees to determine the position of the maximum emission level.

The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned between 1 meter and 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10: 2013 on radiated measurement.

The resolution bandwidth below 30MHz setting on the field strength meter is 9kHz and 30MHz~1GHz is 120kHz and above 1GHz is 1MHz.

Radiated emission measurements below 30MHz are made using Loop Antenna and 30MHz~1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna. The measurement frequency range form 9kHz - 10th Harmonic of fundamental was investigated.

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RBW and VBW Parameter setting:

According to C63.10 Section 11.12.2.4 Peak measurement procedure.

RBW = as specified in Table 1.

 $VBW \ge 3 \times RBW$.

Table 1 —RBW as a function of frequency

Frequency	RBW
9-150 kHz	200-300 Hz
0.15-30 MHz	9-10 kHz
30-1000 MHz	100-120 kHz
> 1000 MHz	1 MHz

According to C63.10 Section 11.12.2.5 Average measurement procedure.

RBW = 1MHz.

VBW = 10Hz, when duty cycle \geq 98 %

VBW \geq 1/T, when duty cycle \leq 98 %

(T refers to the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.)

2.4GHz band	Duty Cycle	T	1/T	VBW
	(%)	(ms)	(Hz)	(Hz)
2.4GHz wireless	25.25	3.1770	315	500

Note: Duty Cycle Refer to Section 9.

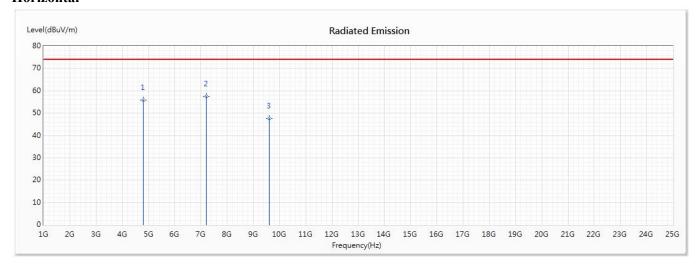


4.4. Test Result of Radiated Emission

Product : Wireless Remote Control
Test Item : Harmonic Radiated Emission
Test Mode : Mode 1: Transmit (2402MHz)

Test Date : 2020/06/05

Horizontal



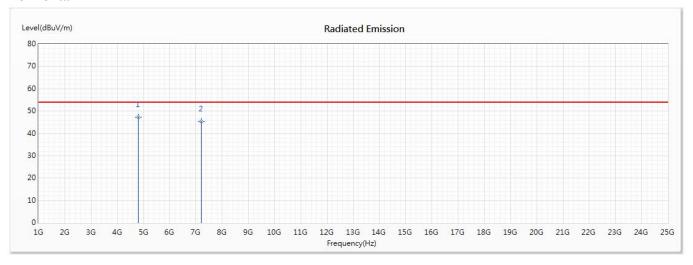
No	Frequency (MHz)	Emission Level	Limit (dBµV/m)	Margin (dB)	Reading Level (dBµV)	Correct Factor (dB/m)	Detector Type
1	4804	(dBµV/m) 55.83	74.00	-18.17	59.07	-3.24	PK
* 2	7206	57.44	74.00	-16.56	57.65	-0.21	PK
3	9608	47.44	74.00	-26.56	45.21	2.23	PK

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Measurement Level = Reading Level + Correct Factor.
- 3. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 4. The average measurement was not performed when the peak measured data under the limit of average detection.
- 5. The emission levels of other frequencies are very lower than the limit and not show in test report.



Test Date : 2020/06/05

Horizontal



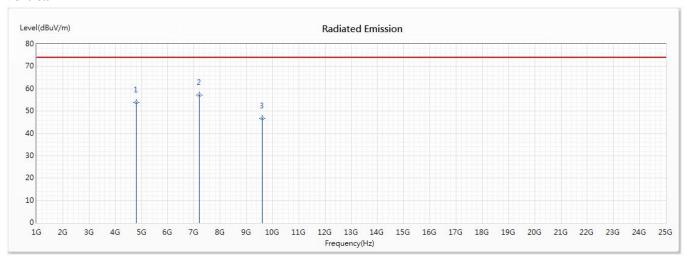
No	Frequency	Emission	Limit	Margin	Reading Level	Correct Factor	Detector
	(MHz)	Level	(dBµV/m)	(dB)	(dBµV)	(dB/m)	Туре
		$(dB\mu V/m)$					
* 1	4804	47.24	54.00	-6.76	50.48	-3.24	AV
2	7206	45.38	54.00	-8.62	45.59	-0.21	AV

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Measurement Level = Reading Level + Correct Factor.
- 3. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 4. The average measurement was not performed when the peak measured data under the limit of average detection.
- 5. The emission levels of other frequencies are very lower than the limit and not show in test report.



Test Date : 2020/06/05

Vertical



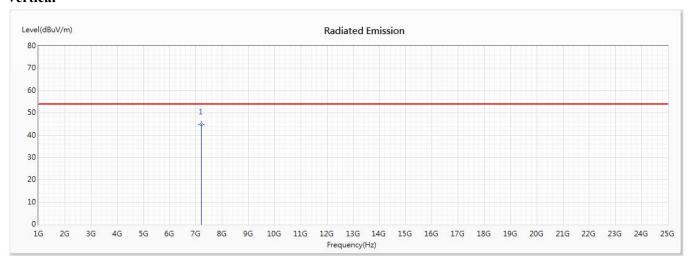
No	Frequency (MHz)	Emission Level	Limit (dBµV/m)	Margin (dB)	Reading Level (dBµV)	Correct Factor (dB/m)	Detector Type
		$(dB\mu V/m)$					
1	4804	53.75	74.00	-20.25	56.99	-3.24	PK
* 2	7206	57.30	74.00	-16.70	57.51	-0.21	PK
3	9608	46.80	74.00	-27.20	44.57	2.23	PK

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Measurement Level = Reading Level + Correct Factor.
- 3. Correct Factor = Antenna factor + Cable loss Amplifier gain.
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Test Date : 2020/06/05

Vertical



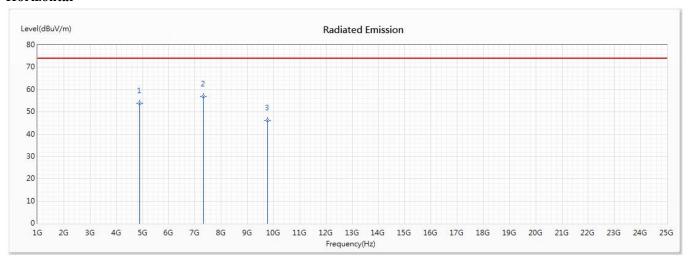
No	Frequency	Emission	Limit	Margin	Reading Level	Correct Factor	Detector
	(MHz)	Level	(dBµV/m)	(dB)	(dBµV)	(dB/m)	Туре
		(dBµV/m)					
* 1	7206	44.87	54.00	-9.13	45.08	-0.21	AV

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Measurement Level = Reading Level + Correct Factor.
- 3. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 4. The average measurement was not performed when the peak measured data under the limit of average detection.
- 5. The emission levels of other frequencies are very lower than the limit and not show in test report.



Test Date : 2020/06/05

Horizontal



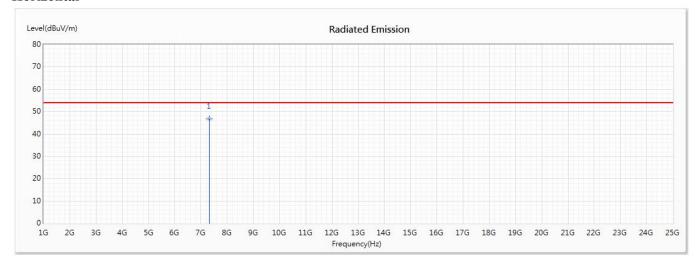
No	Frequency	Emission	Limit	Margin	Reading Level	Correct Factor	Detector
	(MHz)	Level	$(dB\mu V/m)$	(dB)	(dBµV)	(dB/m)	Туре
		(dBµV/m)					
1	4884	53.94	74.00	-20.06	57.25	-3.31	PK
* 2	7323	57.00	74.00	-17.00	57.25	-0.25	PK
3	9764	46.14	74.00	-27.86	43.70	2.44	PK

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
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Test Date : 2020/06/05

Horizontal



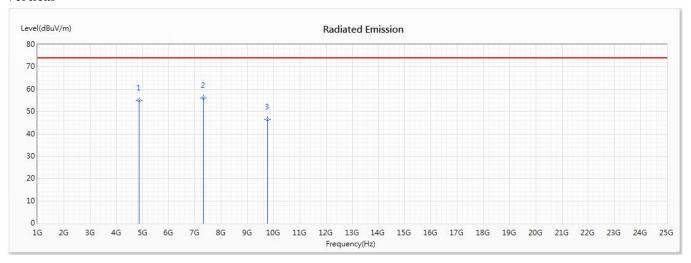
No	Frequency	Emission	Limit	Margin	Reading Level	Correct Factor	Detector
	(MHz)	Level	$(dB\mu V/m)$	(dB)	(dBµV)	(dB/m)	Туре
		(dBµV/m)					
* 1	7323	46.69	54.00	-7.31	46.94	-0.25	AV

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Measurement Level = Reading Level + Correct Factor.
- 3. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 4. The average measurement was not performed when the peak measured data under the limit of average detection.
- 5. The emission levels of other frequencies are very lower than the limit and not show in test report.



Test Date : 2020/06/05

Vertical



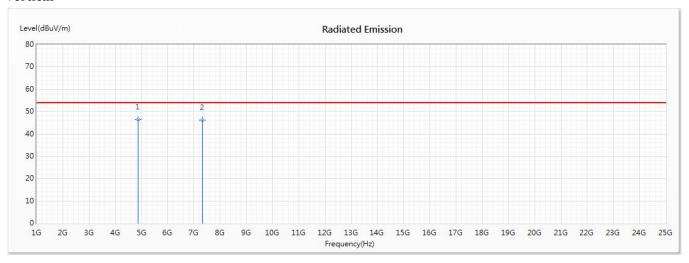
No	Frequency	Emission	Limit	Margin	Reading Level	Correct Factor	Detector
	(MHz)	Level	$(dB\mu V/m)$	(dB)	(dBµV)	(dB/m)	Type
		(dBµV/m)					
1	4882	54.89	74.00	-19.11	58.20	-3.31	PK
* 2	7323	56.14	74.00	-17.86	56.39	-0.25	PK
3	9764	46.42	74.00	-27.58	43.98	2.44	PK

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Measurement Level = Reading Level + Correct Factor.
- 3. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 4. The average measurement was not performed when the peak measured data under the limit of average detection.
- 5. The emission levels of other frequencies are very lower than the limit and not show in test report.



Test Date : 2020/06/05

Vertical



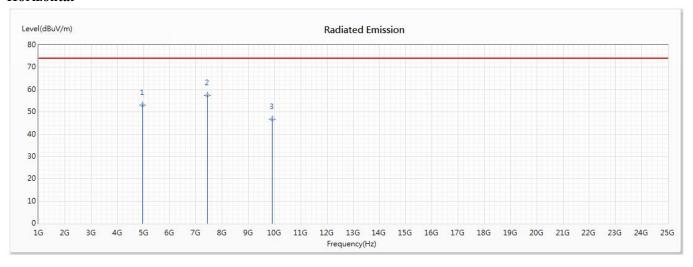
No	Frequency	Emission	Limit	Margin	Reading Level	Correct Factor	Detector
	(MHz)	Level	$(dB\mu V/m)$	(dB)	(dBµV)	(dB/m)	Type
		(dBµV/m)					
* 1	4882	46.38	54.00	-7.62	49.69	-3.31	AV
2	7323	46.19	54.00	-7.81	46.44	-0.25	AV

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Measurement Level = Reading Level + Correct Factor.
- 3. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 4. The average measurement was not performed when the peak measured data under the limit of average detection.
- 5. The emission levels of other frequencies are very lower than the limit and not show in test report.



Test Date : 2020/06/05

Horizontal



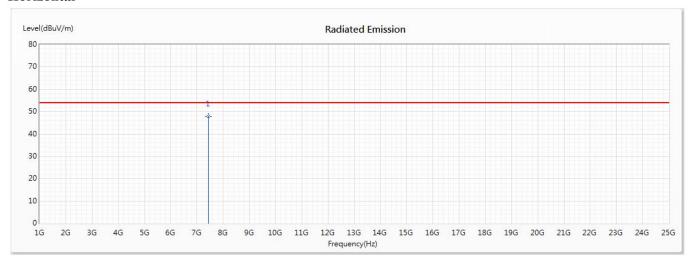
No	Frequency	Emission	Limit	Margin	Reading Level	Correct Factor	Detector
	(MHz)	Level	$(dB\mu V/m)$	(dB)	(dBµV)	(dB/m)	Type
		(dBµV/m)					
1	4960	52.96	74.00	-21.04	56.02	-3.06	PK
* 2	7440	57.36	74.00	-16.64	57.62	-0.26	PK
3	9920	46.85	74.00	-27.15	44.16	2.69	PK

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Measurement Level = Reading Level + Correct Factor.
- 3. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 4. The average measurement was not performed when the peak measured data under the limit of average detection.
- 5. The emission levels of other frequencies are very lower than the limit and not show in test report.



Test Date : 2020/06/05

Horizontal



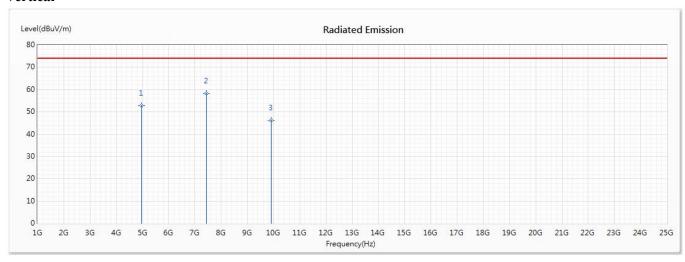
No	Frequency	Emission	Limit	Margin	Reading Level	Correct Factor	Detector
	(MHz)	Level	(dBµV/m)	(dB)	(dBµV)	(dB/m)	Type
		$(dB\mu V/m)$					
* 1	7440	47.96	54.00	-6.04	48.22	-0.26	AV

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Measurement Level = Reading Level + Correct Factor.
- 3. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 4. The average measurement was not performed when the peak measured data under the limit of average detection.
- 5. The emission levels of other frequencies are very lower than the limit and not show in test report.



Test Date : 2020/06/05

Vertical



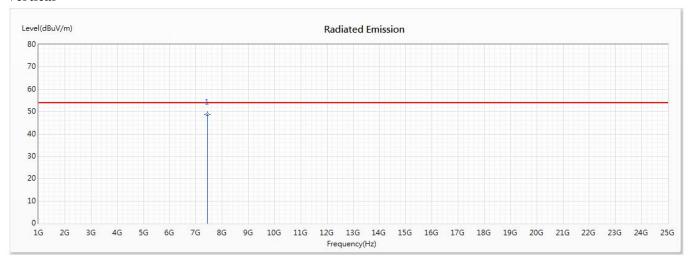
No	Frequency	Emission	Limit	Margin	Reading Level	Correct Factor	Detector
	(MHz)	Level	$(dB\mu V/m)$	(dB)	(dBµV)	(dB/m)	Type
		(dBµV/m)					
1	4960	52.91	74.00	-21.09	55.97	-3.06	PK
* 2	7440	58.23	74.00	-15.77	58.49	-0.26	PK
3	9920	46.18	74.00	-27.82	43.49	2.69	PK

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Measurement Level = Reading Level + Correct Factor.
- 3. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 4. The average measurement was not performed when the peak measured data under the limit of average detection.
- 5. The emission levels of other frequencies are very lower than the limit and not show in test report.



Test Date : 2020/06/05

Vertical



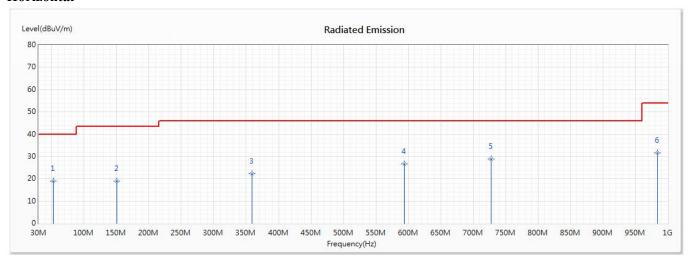
No	Frequency	Emission	Limit	Margin	Reading Level	Correct Factor	Detector
	(MHz)	Level	(dBµV/m)	(dB)	(dBµV)	(dB/m)	Type
		$(dB\mu V/m)$					
* 1	7440	48.70	54.00	-5.30	48.96	-0.26	AV

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Measurement Level = Reading Level + Correct Factor.
- 3. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 4. The average measurement was not performed when the peak measured data under the limit of average detection.
- 5. The emission levels of other frequencies are very lower than the limit and not show in test report.



Test Date : 2020/06/05

Horizontal



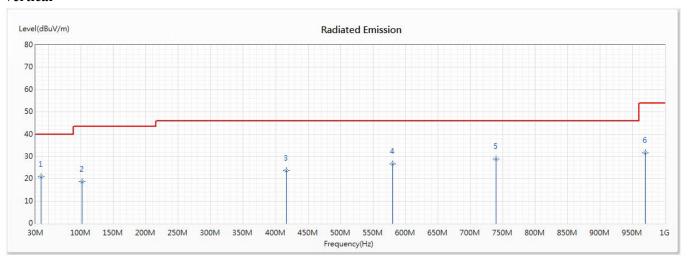
No	Frequency	Emission	Limit	Margin	Reading Level	Correct Factor	Detector
	(MHz)	Level	(dBµV/m)	(dB)	(dBµV)	(dB/m)	Type
		(dBµV/m)					
1	52.31	19.02	40.00	-20.98	29.72	-10.70	QP
2	150.28	19.07	43.50	-24.43	29.82	-10.75	QP
3	358.83	22.29	46.00	-23.71	30.61	-8.32	QP
4	593.57	26.66	46.00	-19.34	29.79	-3.13	QP
* 5	727.43	28.79	46.00	-17.21	30.22	-1.43	QP
6	983.51	31.51	54.00	-22.49	29.65	1.86	QP

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Measurement Level = Reading Level + Correct Factor.
- 3. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 4. The emission levels of other frequencies are very lower than the limit and not show in test report.
- 5. No emission found between lowest internal used/generated frequency to 30MHz.



Test Date : 2020/06/05

Vertical



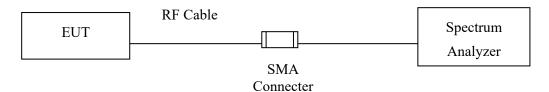
No	Frequency	Emission	Limit	Margin	Reading Level	Correct Factor	Detector
	(MHz)	Level	(dBµV/m)	(dB)	(dBµV)	(dB/m)	Type
		(dBµV/m)					
1	38.73	20.98	40.00	-19.02	32.06	-11.08	QP
2	101.78	18.73	43.50	-24.77	34.14	-15.41	QP
3	416.06	23.60	46.00	-22.40	30.55	-6.95	QP
4	580.96	26.60	46.00	-19.40	29.99	-3.39	QP
* 5	740.04	28.74	46.00	-17.26	30.00	-1.26	QP
6	969.93	31.72	54.00	-22.28	30.09	1.63	QP

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Measurement Level = Reading Level + Correct Factor.
- 3. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 4. The emission levels of other frequencies are very lower than the limit and not show in test report.
- 5. No emission found between lowest internal used/generated frequency to 30MHz.



5. RF Antenna Conducted Test

5.1. Test Setup



5.2. Limits

According to FCC Section 15.247(d). In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

5.3. Test Procedure

The EUT was tested according to C63.10:2013 Section 11.11 for compliance to FCC 47CFR 15.247 requirements.

Set RBW = 100 kHz, Set VBW> RBW, scan up through 10th harmonic.



5.4. Test Result of RF Antenna Conducted Test

Product : Wireless Remote Control
Test Item : RF Antenna Conducted Test

Test Mode : Mode 1: Transmit

Test Date : 2020/06/05

Figure Channel 02:

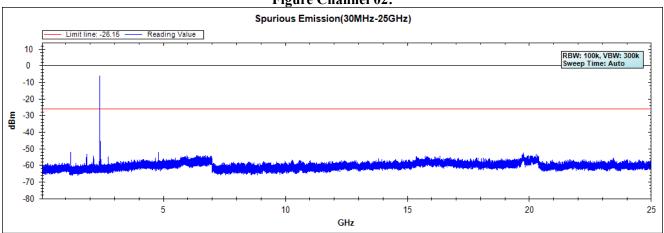


Figure Channel 41:

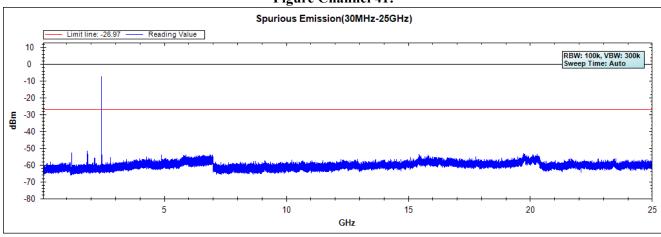
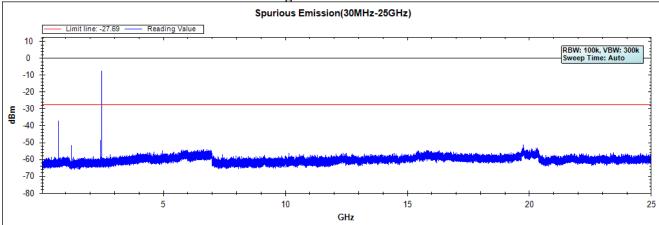


Figure Channel 80:



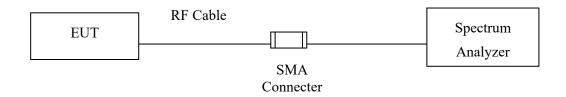
Note: The above test pattern is synthesized by multiple of the frequency range.



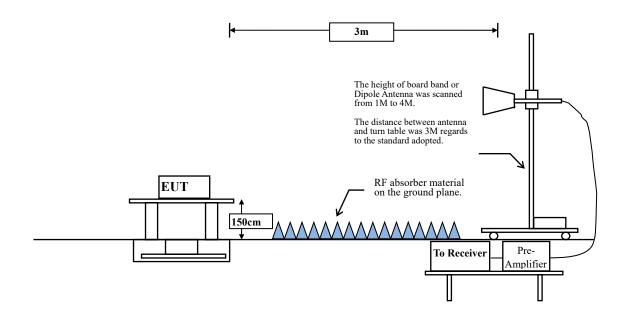
6. Band Edge

6.1. Test Setup

RF Conducted Measurement



RF Radiated Measurement:





6.2. Limit

According to FCC Section 15.247(d). In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

6.3. Test Procedure

The EUT was setup according to ANSI C63.10, 2013 and tested according to C63.10:2013 Section 11.12.1 for compliance to FCC 47CFR 15.247 requirements.

The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2013 on radiated measurement.



RBW and VBW Parameter setting:

According to C63.10 Section 11.12.2.4 Peak measurement procedure.

RBW = as specified in Table 1.

 $VBW \ge 3 \times RBW$.

Table 1 —RBW as a function of frequency

Frequency	RBW
9-150 kHz	200-300 Hz
0.15-30 MHz	9-10 kHz
30-1000 MHz	100-120 kHz
> 1000 MHz	1 MHz

According to C63.10 Section 11.12.2.5 Average measurement procedure.

RBW = 1MHz.

VBW = 10Hz, when duty cycle \geq 98 %

VBW \geq 1/T, when duty cycle \leq 98 %

(T refers to the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.)

2.4GHz band	Duty Cycle	T	1/T	VBW
	(%)	(ms)	(Hz)	(Hz)
2.4GHz wireless	25.25	3.1770	315	500

Note: Duty Cycle Refer to Section 9.



6.4. Test Result of Band Edge

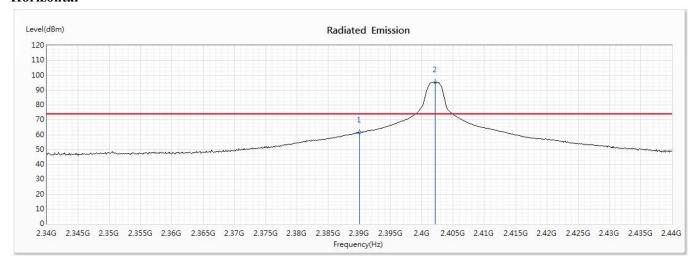
Product : Wireless Remote Control

Test Item : Band Edge

Test Mode : Mode 1: Transmit (2402MHz)

Test Date : 2020/06/05

Horizontal



No	Frequency	Emission	Limit	Margin	Reading Level	Correct Factor	Detector
	(MHz)	Level	(dBm)	(dB)	(dBm)	(dB/m)	Type
		(dBm)					
1	2390	61.49	74.00	-12.51	50.50	10.99	PK
2	2402.1	95.32			84.26	11.06	PK

- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Measurement Level = Reading Level + Correct Factor.
- 3. The average measurement was not performed when the peak measured data under the limit of average detection.

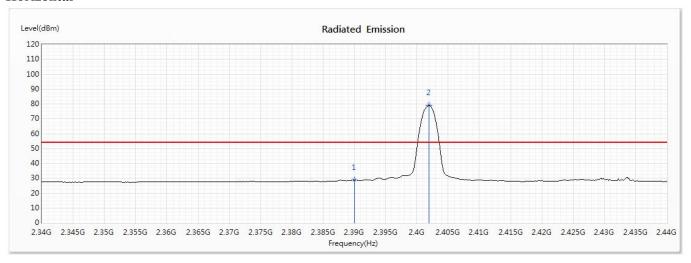


Test Item : Band Edge

Test Mode : Mode 1: Transmit (2402MHz)

Test Date : 2020/06/05

Horizontal



No	Frequency (MHz)	Emission Level	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	2390	(dBm) 28.90	54.00	-25.10	17.91	10.99	AV
2	2401.9	79.11			68.05	11.06	AV

- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Measurement Level = Reading Level + Correct Factor.
- 3. The average measurement was not performed when the peak measured data under the limit of average detection.

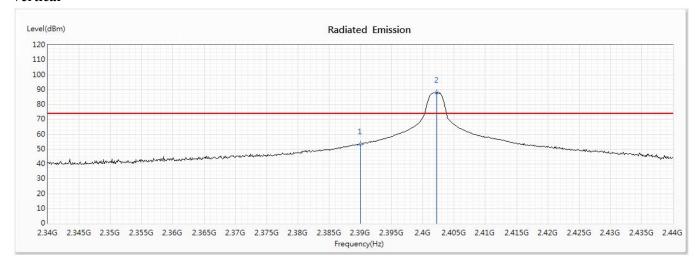


Test Item : Band Edge

Test Mode : Mode 1: Transmit (2402MHz)

Test Date : 2020/06/05

Vertical



	No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
٠	1	2390	53.22	74.00	-20.78	42.23	10.99	PK
	2	2402.2	87.92			76.86	11.06	PK

- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Measurement Level = Reading Level + Correct Factor.
- 3. The average measurement was not performed when the peak measured data under the limit of average detection.

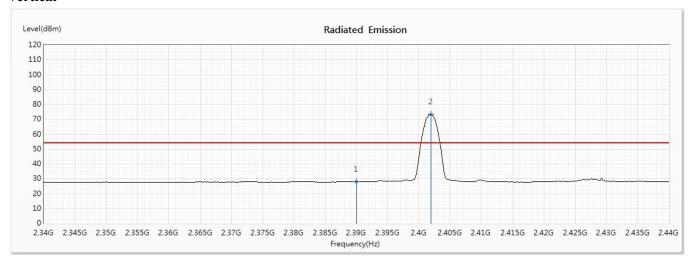


Test Item : Band Edge

Test Mode : Mode 1: Transmit (2402MHz)

Test Date : 2020/06/05

Vertical



No	Frequency	Emission	Limit	Margin	Reading Level	Correct Factor	Detector
	(MHz)	Level	(dBm)	(dB)	(dBm)	(dB/m)	Type
		(dBm)					
1	2390	28.10	54.00	-25.90	17.11	10.99	AV
2	2401.9	73.34			62.28	11.06	AV

- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Measurement Level = Reading Level + Correct Factor.
- 3. The average measurement was not performed when the peak measured data under the limit of average detection.

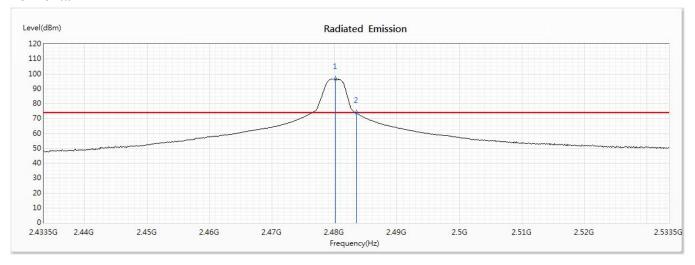


Test Item : Band Edge

Test Mode : Mode 1: Transmit (2480MHz)

Test Date : 2020/06/05

Horizontal



No	Frequency (MHz)	Emission Level	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
		(dBm)					
1	2480.2	96.48			84.79	11.69	PK
2	2483.5	73.67	74.00	-0.33	61.96	11.71	PK

- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Measurement Level = Reading Level + Correct Factor.
- 3. The average measurement was not performed when the peak measured data under the limit of average detection.

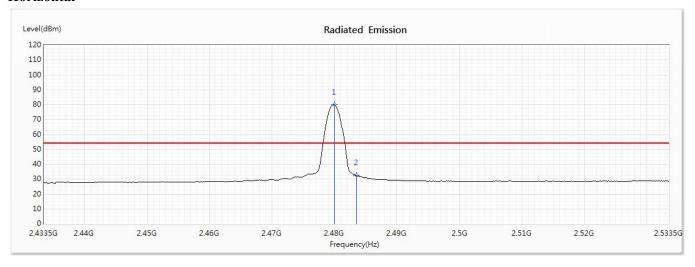


Test Item : Band Edge

Test Mode : Mode 1: Transmit (2480MHz)

Test Date : 2020/06/05

Horizontal



No	Frequency (MHz)	Emission Level	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
		(dBm)					
1	2480	80.08			68.39	11.69	AV
2	2483.5	32.53	54.00	-21.47	20.82	11.71	AV

- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Measurement Level = Reading Level + Correct Factor.
- 3. The average measurement was not performed when the peak measured data under the limit of average detection.

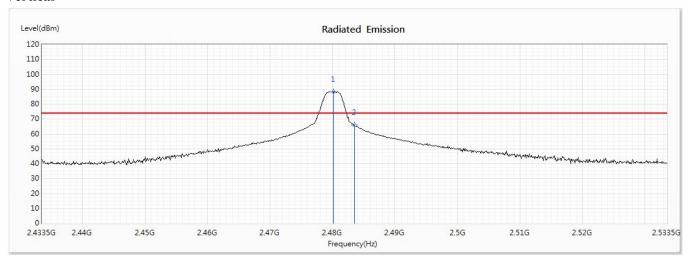


Test Item : Band Edge

Test Mode : Mode 1: Transmit (2480MHz)

Test Date : 2020/06/05

Vertical



No	Frequency	Emission	Limit	Margin	Reading Level	Correct Factor	Detector
	(MHz)	Level	(dBm)	(dB)	(dBm)	(dB/m)	Type
		(dBm)					
1	2480.2	88.38			76.69	11.69	PK
2	2483.5	65.96	74.00	-8.04	54.25	11.71	PK

- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Measurement Level = Reading Level + Correct Factor.
- 3. The average measurement was not performed when the peak measured data under the limit of average detection.

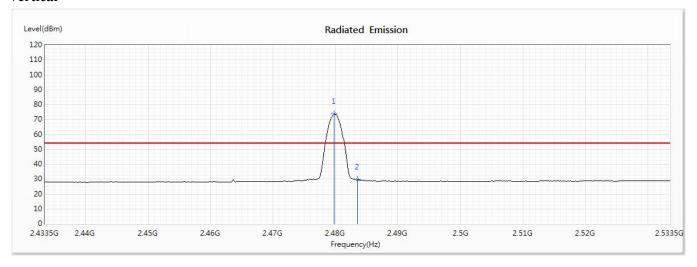


Test Item : Band Edge

Test Mode : Mode 1: Transmit (2480MHz)

Test Date : 2020/06/05

Vertical



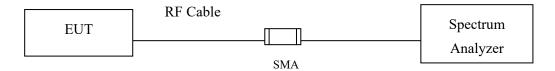
1	No	Frequency	Emission	Limit	Margin	Reading Level	Correct Factor	Detector
		(MHz)	Level	(dBm)	(dB)	(dBm)	(dB/m)	Type
			(dBm)					
	1	2479.8	73.75			62.06	11.69	AV
	2	2483.5	29.53	54.00	-24.47	17.82	11.71	AV

- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Measurement Level = Reading Level + Correct Factor.
- 3. The average measurement was not performed when the peak measured data under the limit of average detection.



7. 6dB Bandwidth

7.1. Test Setup



7.2. Limits

The minimum bandwidth shall be at least 500 kHz.

7.3. Test Procedure

The EUT was setup according to ANSI C63.4, 2014; tested according to ANSI C63.10 Section 11.8 for compliance to FCC 47CFR 15.247 requirements.

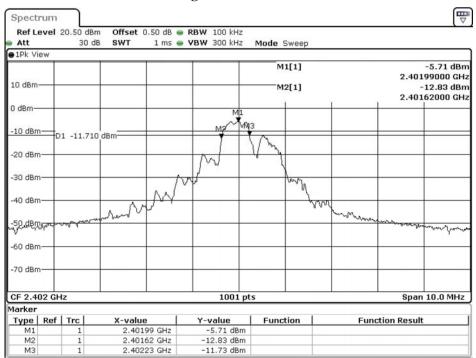


7.4. Test Result of 6dB Bandwidth

Product : Wireless Remote Control
Test Item : 6dB Bandwidth Data
Test Mode : Mode 1: Transmit

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
02	2402	610	>500	Pass
41	2441	700	>500	Pass
80	2480	770	>500	Pass

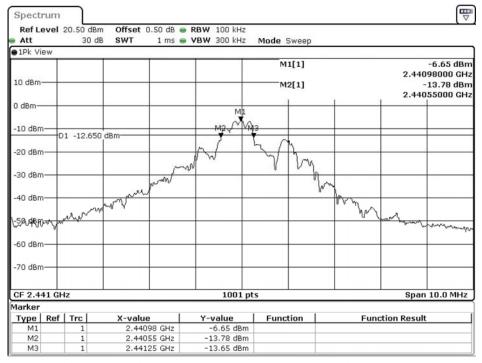
Figure Channel 02:



Date: 5.JUN.2020 13:30:49

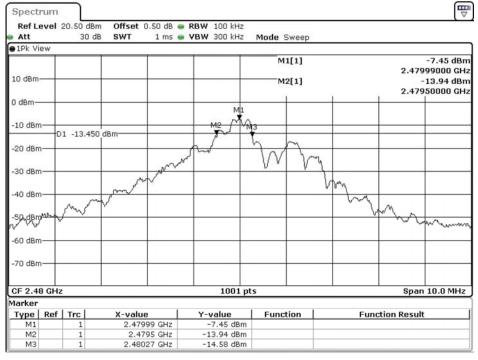


Figure Channel 41:



Date: 5.JUN.2020 13:36:02

Figure Channel 80:

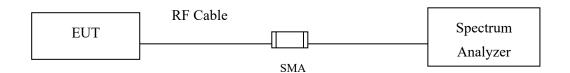


Date: 5.JUN.2020 13:43:16



8. Power Density

8.1. Test Setup



8.2. Limits

The transmitted power density averaged over any 1 second interval shall not be greater +8dBm in any 3kHz bandwidth.

8.3. Test Procedure

The EUT was setup according to ANSI C63.10, 2013; tested according to DTS test procedure of KDB 558074 for compliance to FCC 47CFR 15.247 requirements.

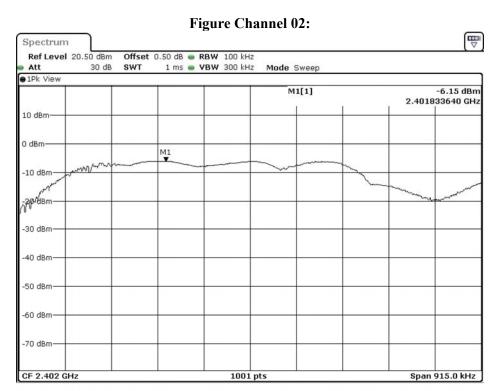
The maximum power spectral density using C63.10 Section 11.10.2 Method PKPSD (peak PSD)



8.4. Test Result of Power Density

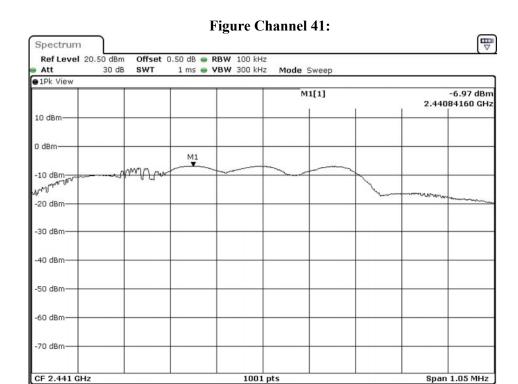
Product : Wireless Remote Control
Test Item : Power Density Data
Test Mode : Mode 1: Transmit

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
02	2402	-6.15	≦8dBm	Pass
41	2441	-6.97	≦8dBm	Pass
80	2480	-7.69	≦8dBm	Pass



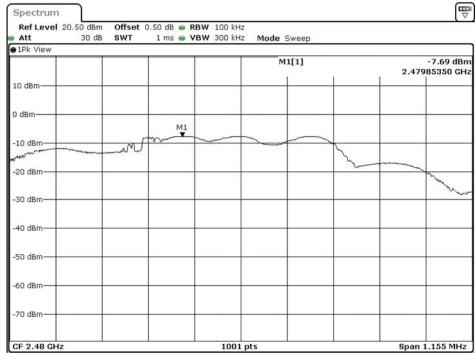
Date: 5.JUN.2020 13:31:11





Date: 5.JUN.2020 13:36:23

Figure Channel 80:

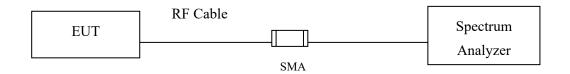


Date: 5.JUN.2020 13:43:38



9. Duty Cycle

9.1. Test Setup



9.2. Test Procedure

The EUT was setup according to ANSI C63.10 2013; tested according to ANSI C63.10 2013 for compliance to FCC 47CFR 15.247 requirements.



9.3. Test Result of Duty Cycle

Product : Wireless Remote Control

Test Item : Duty Cycle

Test Mode : Mode 1: Transmit

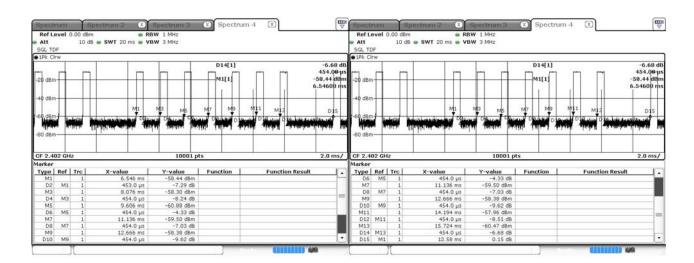
Duty Cycle Formula:

Duty Cycle = Ton / (Ton + Toff)

Duty Factor = 10 Log (1/Duty Cycle)

Results:

2.4GHz band	Ton	Ton + Toff	Duty Cycle	Duty Factor
	(ms)	(ms)	(%)	(dB)
2.4GHz wireless	3.1770	12.5800	25.25	5.98





10. EMI Reduction Method During Compliance Testing

No modification was made during testing.