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CERTIFICATION TEST REPORT

Manufacturer:	**Current Products Corp.** **1995 Hollywood Avenue** **Pensacola, Florida 32505 USA**
Product Name:	**E-Wand™**
Product Description:	A retrofit device used to automate vertical and horizontal window blinds.
Model:	**CP180335E_01**
FCC ID:	**2AJXX100619**
Testing Commenced:	2021-01-22
Testing Ended:	2021-08-18
Summary of Test Results:	**In Compliance** The EUT complies with the EMC requirements when manufactured identically as the unit tested in this report, including any required modifications. Any changes to the design or build of this unit subsequent to this testing may deem it non-compliant.

Standards:

- **FEDERAL REGISTER CFR 47, PART 15 – RADIO FREQUENCY DEVICES**
  - **Part 15 Subpart C, Section 15.231 - Periodic operation in the band 40.66–40.70 MHz and above 70 MHz**
  - **Part 15 Subpart C, Section 15.209 - Radiated emissions limits; general requirements**
  - **Part 15 Subpart C, Section 15.35 - Measurement detector functions and bandwidths**
  - **ANSI C63.10:2013**

Evaluation Conducted by:

Julius Chiller, EMC/Wireless Engineer

Report Reviewed by:

Ken Littell, Vice President of EMC

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1 ADMINISTRATIVE INFORMATION

1.1 Measurement Location:

F2 Labs in Middlefield, Ohio. Site description and attenuation data are on file with the FCC's Sampling and Measurement Branch at the FCC Laboratory in Columbia, MD.

1.2 Measurement Procedure:

All measurements were performed according to the 2013 version of ANSI C63.10 and recommended FCC procedure of measurement of DTS operating under Section 15.231. A list of the measurement equipment can be found in Section 6.

1.3 Uncertainty Budget:

- Radiated Emissions
  Combined Uncertainty (+ or -) 2.54 dB
  Expanded Uncertainty (+ or -) 5.07 dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

1.4 Document History

Document Number	Description	Issue Date	Approved By
F2P24669A-02E	First Issue	2021-08-18	K. Littell

2 SUMMARY OF TEST RESULTS

Standard(s)	Results
CFR 47 Part 15.231(a)(1)	Complies
CFR 47 Part 15.231(b) / Part 15.209	Complies
CFR 47 Part 15.231(b)(3)(c)	Complies
CFR 47 Part 15.35	Complies

Modifications Made to the Equipment
No modifications were made to the EUT

3 ENGINEERING STATEMENT

This report has been prepared on behalf of Current Products Corp., to provide documentation for the testing described herein. This equipment has been tested and found to comply with Part 15.231 of the FCC Rules, using ANSI C63.10 standards, with the modifications noted in Section 2 of this Test report. The test results found in this test report relate only to the items tested.

4 EUT INFORMATION AND DATA

4.1 Equipment Under Test:

Product: Window Controller
Model: CP180335E_01
Serial No.: None Specified
FCC ID: 2AJXX100619

4.2 Trade Name:

Current Products Corp.

4.3 Power Supply:

Battery-Operated (9VDC)

4.4 Applicable Rules:

CFR 47, Part 15.231, subpart C

4.5 Equipment Category:

Intermittent Transceiver

4.6 Antenna:

Internal 5.19dBi

4.7 Accessories:

Device	Manufacturer	Model Number	Serial Number
Laptop*	Dell	Latitude 7490	10075
Programmer	Silicon Labs	PCB4001	Rev. 03

**Indicates F2 Labs-supplied equipment.*

4.8 Test Item Condition:

The equipment to be tested was received in good condition.

4.9 Testing Algorithm:

The EUT was set to transmit a modulated signal on 433.875 MHz at 100% duty cycle.

5 LIST OF MEASUREMENT INSTRUMENTATION

Equipment Type	Asset Number	Manufacturer	Model	Serial Number	Calibration Due Date
Shielded Chamber 2014	CL166-E	AlbatrossProjects	B83117-DF435-T261	US140023	2022-03-09
Temp/Hum. Recorder	CL261	Extech	445814	04	2022-03-19
Receiver	CL151	Rohde & Schwarz	ESU40	100319	2022-07-08
Antenna, JB3 Combination	CL175	Sunol Sciences	JB3	A030315	2022-09-14
Horn Antenna	CL098	Emco	3115	9809-5580	2023-01-26
Amplifier w/Monopole & 18" Loop	CL163-Loop	AH Systems, Inc.	EHA-52B	100	2022-09-14
Pre-amplifier	CL285	AH Systems	PAM-0207	322	2022-07-08
Low Loss Cable Set	CL178, CL286	Pasternack	PE3C0666-252 / PE3C066-50CM	None Spec.	2023-10-12
Software:	EMC 32, Version 8.53.0		Software Verified: 2021-01-22 to 2021-01-25; 2021-07-28; 2021-08-18		

6 FCC PART 15.231(a)(1)

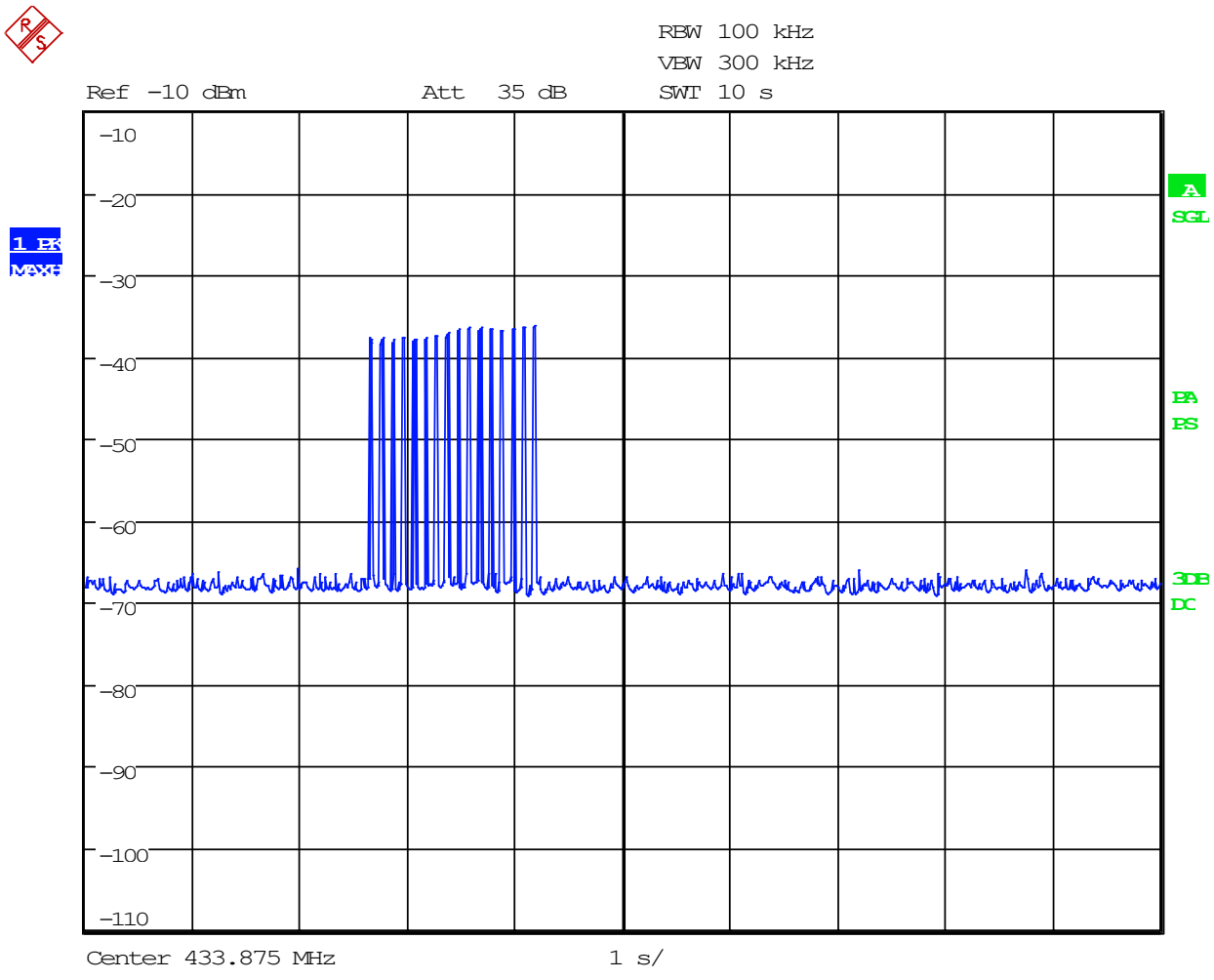
6.1 Requirements:

A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter with not more than 5 seconds of being released.

6.2 Test Data

Test Date:	2021-01-25 to 2021-01-26	**Test Engineers:**	J. Chiller
Standards:	CFR 47 Part 15.231(a)(1);	**Air Temperature:**	20.8ºC
		Relative Humidity:	35%

The following plot is of a single press and release of the manual push button, showing that the transmission ceased prior to 5 seconds of release.



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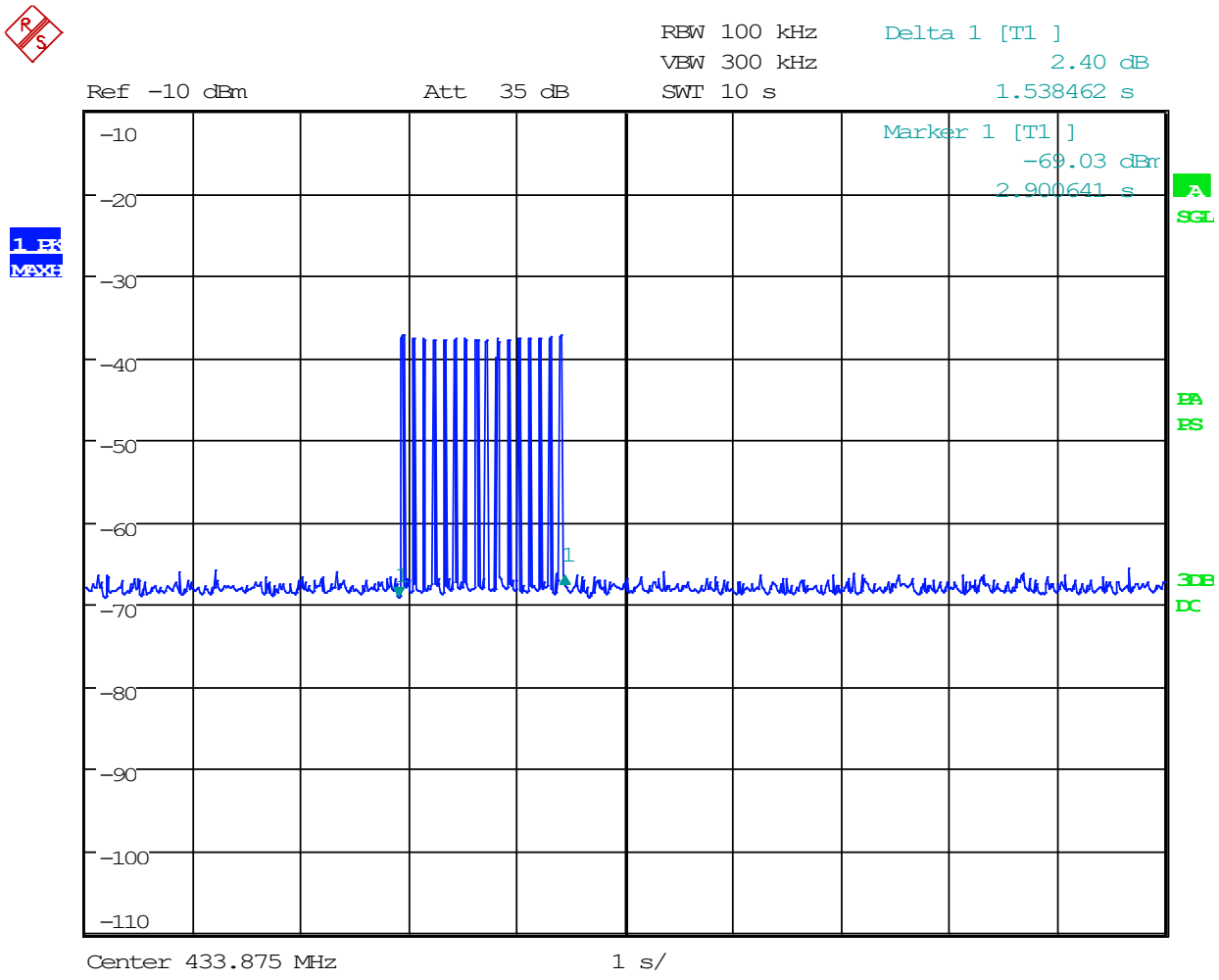
The following plot is of a single press and release of the manual push button, Packet Time 1.53 seconds.



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7 FCC PART 15.231(b)

7.1 Requirements:

Field strength of emissions, fundamental and spurious using average detector and a peak limit of 20dB was added above the average limit per 15.35(b).

Limit for fundamental frequency above 470 MHz is: 12,500 µV/m.

Limits for spurious emissions were those specified in 15.209.

While the equipment was energized, the receiving antenna was scanned from 1.0 meter to 4.0 meters in both vertical and horizontal polarities while the turntable was adjusted 360 degrees to determine the maximum field strength.

The equipment was fully exercised with all cabling attached to the EUT and was positioned for maximum emissions.

The limit for 433.875 MHz is 80.2 dBµV/m.

The Limit for spurious emissions of the fundamental 433.875 MHz, is 60.21 dBµV/m.

7.2 Test Data

Test Date(s):	2021-01-21; 2021-07-28; 2021-08-18	**Test Engineer:**	J. Chiller
Standards:	CFR 47 Part 15.231(b); 15.209; C63.10, Section 13.7	**Air Temperature:**	21.3ºC
		Relative Humidity:	38%

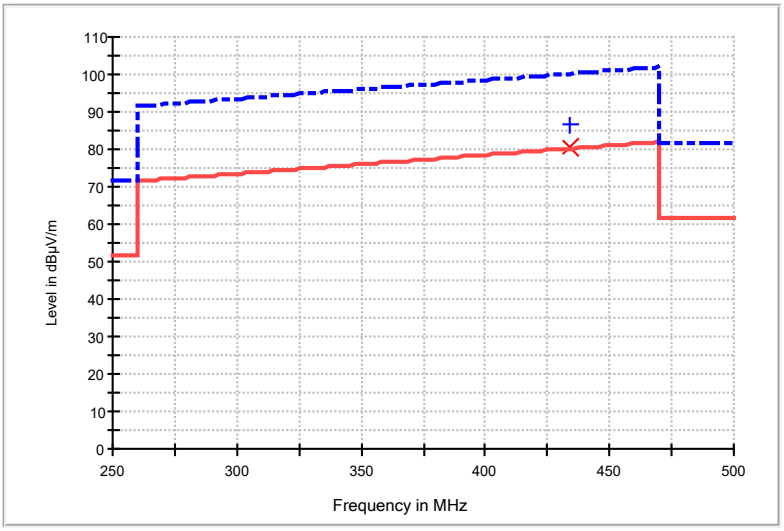
Results:

Modulation: FM				
Frequency (MHz)	**Field Strength**		**Limit**	
	dBµV/m	**mV/m**	**dBµV/m**	**mV/m**
433.875	67.24	2.3	80.2	10.2

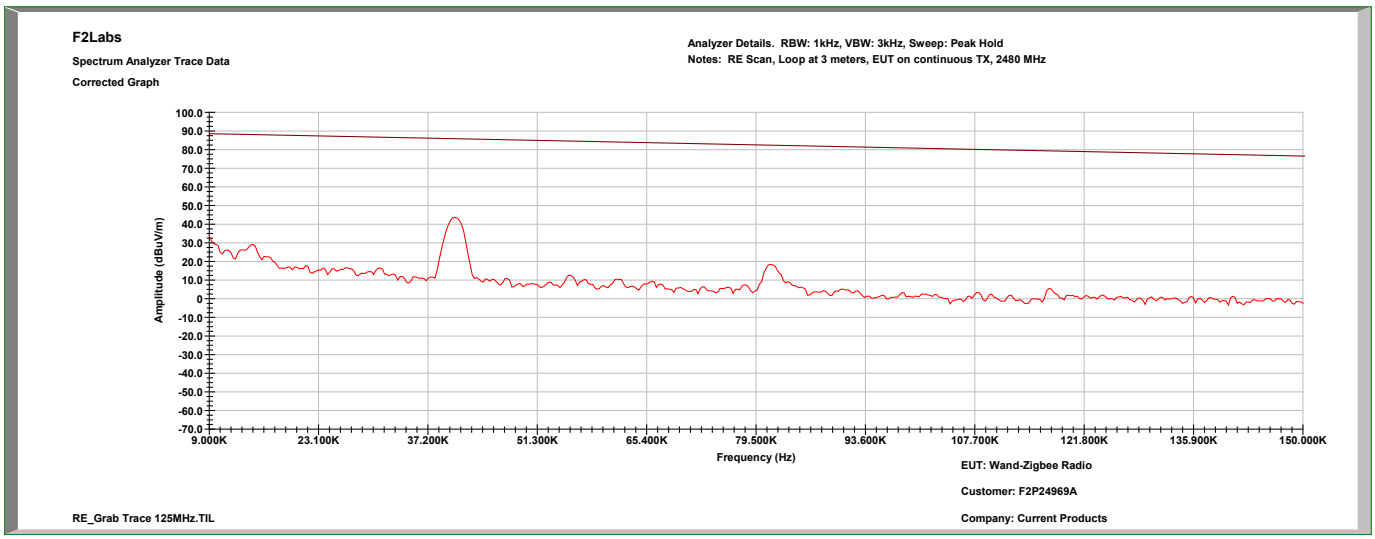
Note: A duty cycle correction of -13.46 was added to the average measurement of 80.7 dBµV/m.

Field Strength

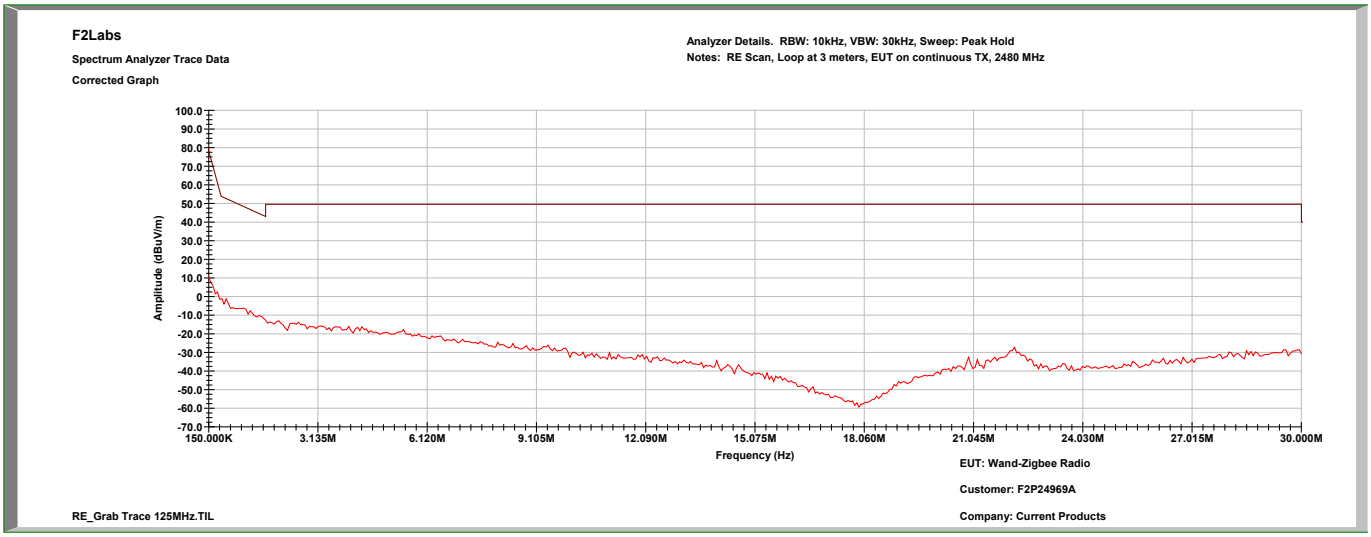
Frequency (MHz)	Peak (dBµV/m)	Average (dBµV/m)	Avg w/DCCF	Polarization	Azimuth (deg)	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Limit - PK (dBµV/m)
433.875000	86.5	80.7	67.24	H	201.0	-3.7	12.96	80.2	100.2



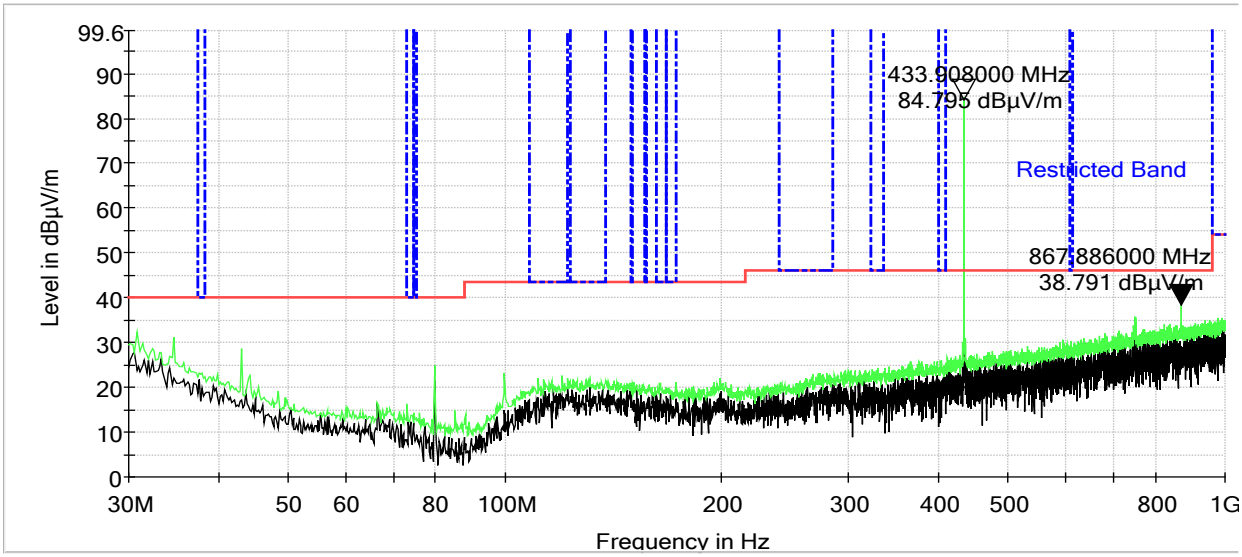
Radiated Spurs, 9 kHz to 150 kHz



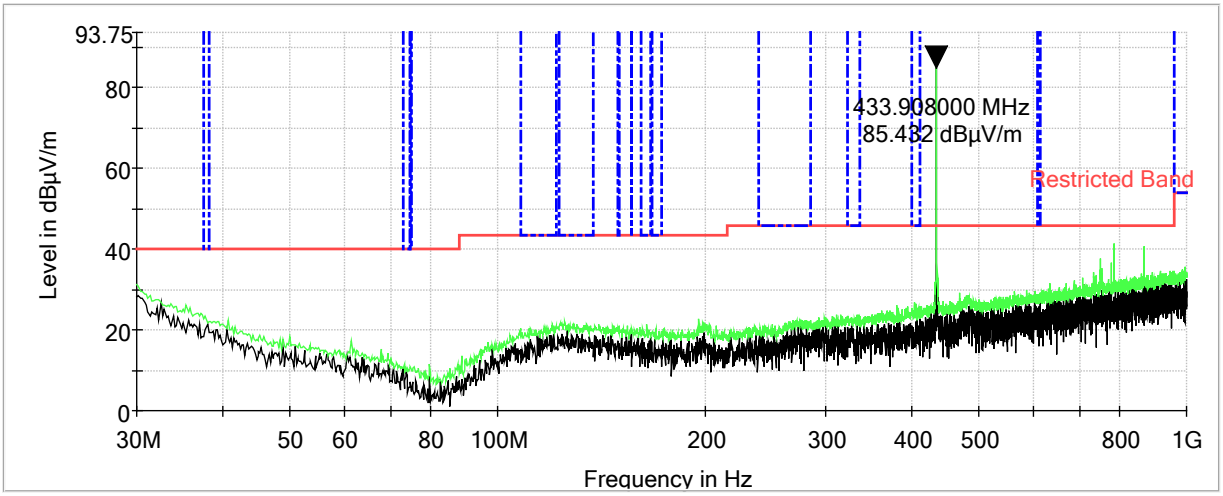
Radiated Spurs, 150 kHz to 30 MHz



Radiated Spurs, 30 MHz to 1000 MHz, Vertical



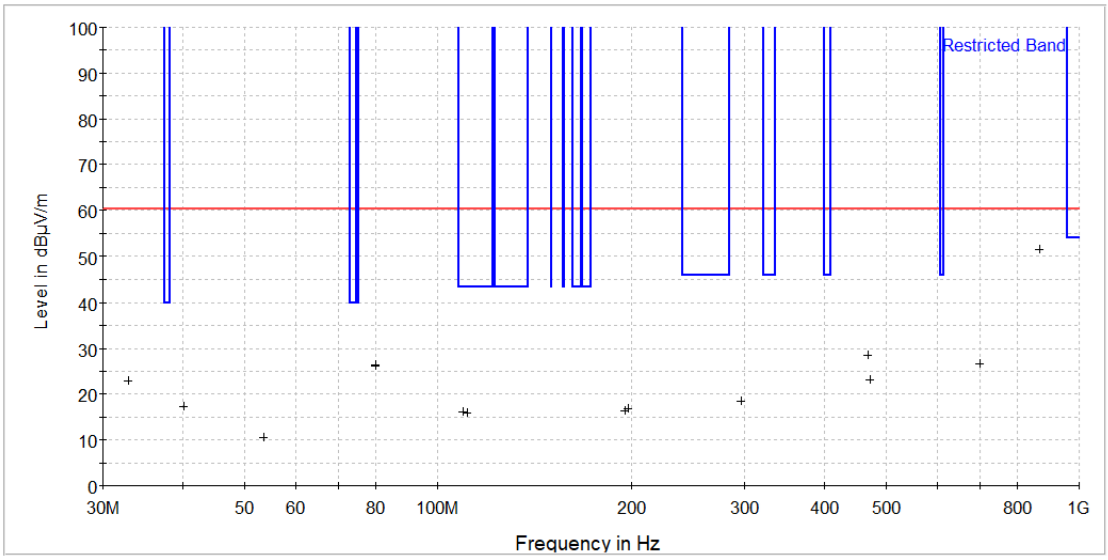
Radiated Spurs, 30 MHz to 1000 MHz, Horizontal



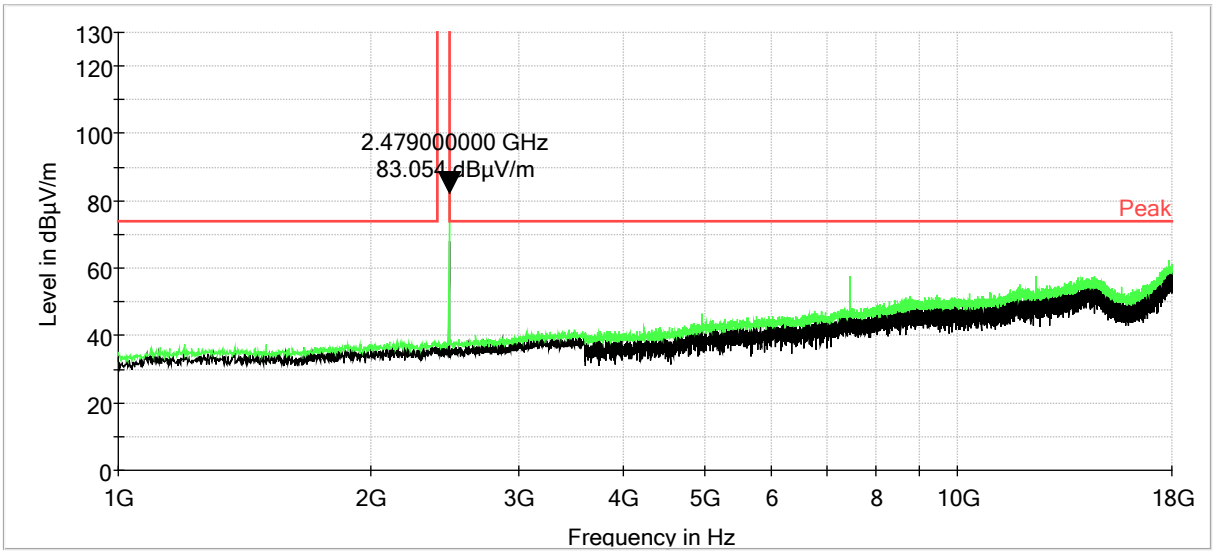
The Field Strength Limit of the Fundamental is 10,250 µV/m (80.2 dBµV/m). The spurious emissions limit is 1025 µV/m (60.2 dBµV/m).

Radiated Spurs

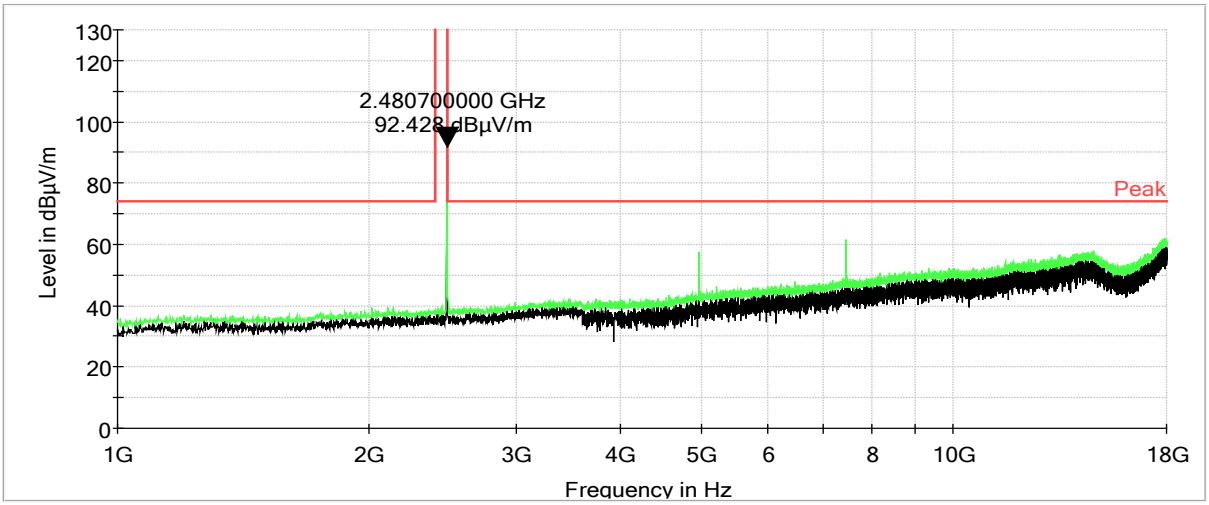
Frequency (MHz)	Antenna Polarization	Antenna Height (cm)	Azimuth (degrees)	Reading (dBµV)	Correcton Factors (dB)	Emission (dBµV/m)	Limit (dBµV/m)	Margin (dB)
32.920000	V	100.00	0.00	26.3	-3.3	23.00	60.2	-37.2
40.080000	V	100.00	0.00	26.1	-8.8	17.30	60.2	-42.9
53.480000	V	100.00	0.00	25.3	-14.7	10.60	60.2	-49.6
80.000000	V	210.00	45.00	41.0	-14.8	26.20	60.2	-34.0
80.000000	V	196.00	281.00	41.1	-14.8	26.30	60.2	-33.9
109.360000	H	162.00	21.00	25.8	-9.6	16.20	60.2	-44.0
111.280000	V	196.00	309.00	25.2	-9.4	15.80	60.2	-44.4
195.080000	V	100.00	294.00	25.7	-9.4	16.30	60.2	-43.9
197.600000	H	162.00	21.00	25.6	-8.9	16.70	60.2	-43.5
296.560000	V	100.00	0.00	26.1	-7.5	18.60	60.2	-41.6
296.560000	H	100.00	321.00	26.0	-7.5	18.50	60.2	-41.7
468.040000	H	100.00	205.00	31.1	-2.6	28.50	60.2	-31.7
471.360000	V	100.00	332.00	25.5	-2.5	23.00	60.2	-37.2
699.120000	V	100.00	352.00	24.9	1.7	26.60	60.2	-33.6
868.080000	H	100.00	321.00	47.8	3.6	51.40	60.2	-8.8



Radiated Spurs, 1 GHz to 18 GHz, Vertical



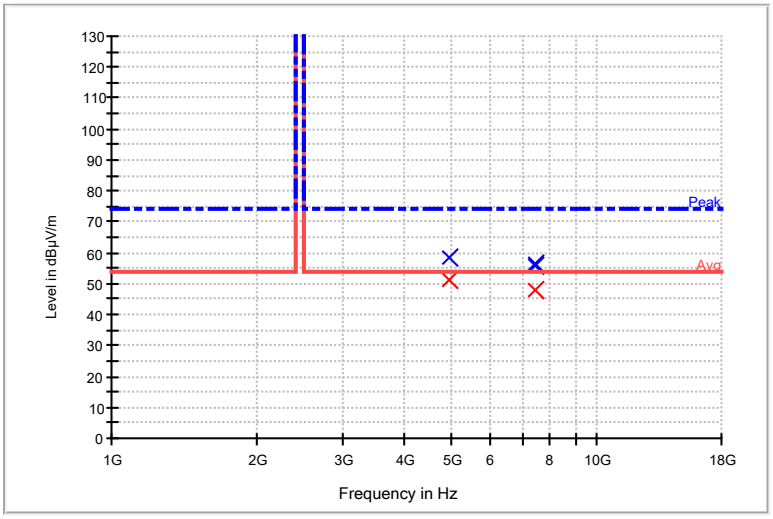
1 GHz to 18 GHz, Horizontal



NOTE: The signal at 2480 MHz in the graphs above is the signal from the Zigbee transmitter in the device.

Radiated Spurs

Frequency (MHz)	Polarity	Corr. (dB)	MaxPeak (dBµV/m)	MaxPeak (dBµV/m) Limit	MaxPeak Margin	Average (dBµV/m)	Average (dBµV/m) Limit	Average Margin	Bandwidth (kHz)
4959.000000	H	-2.6	58.6	74	-15.4	51.5	54	-2.5	1000.000
7441.000000	H	2.2	55.7	74	-18.3	48.1	54	-5.9	1000.000



8 FCC Part 15.231(b)(3)(c)

8.1 Requirements:

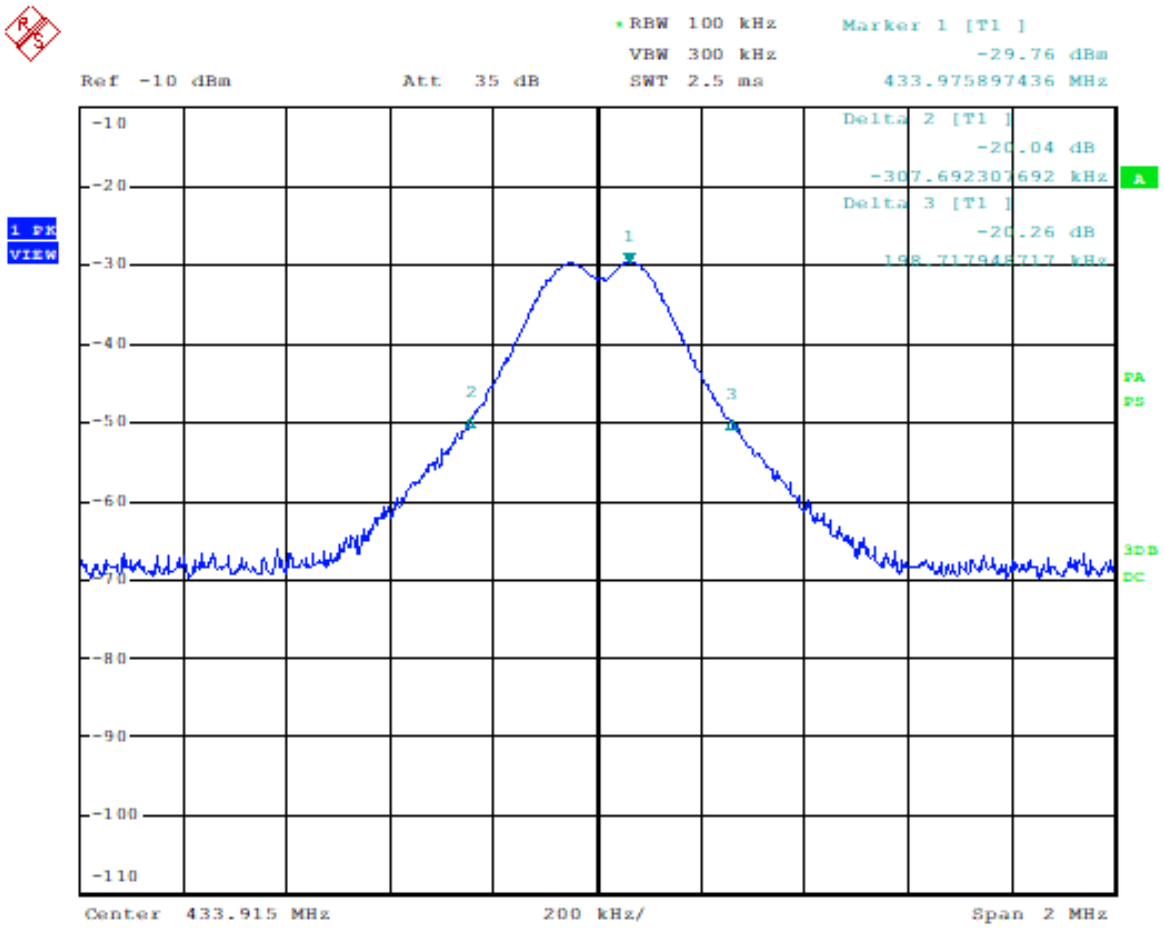
The bandwidth of the emission shall be no wider than 0.25% of the center frequency. Bandwidth is determined at the points 20dB down from the modulated carrier; therefore, single frequency unit, 433.875 MHz bandwidth must be no wider than 1.08 MHz.

8.2 Test Data – OCCUPIED BANDWIDTH

Test Date:	2021-01-25	Test Engineer:	J. Chiller
Standards:	CFR 47 Part 15.231(b)(3)(c)	Air Temperature:	20.8ºC
		Relative Humidity:	35%

-20dB (= 506.3 kHz)

.



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9 15.35(c) - DUTY CYCLE

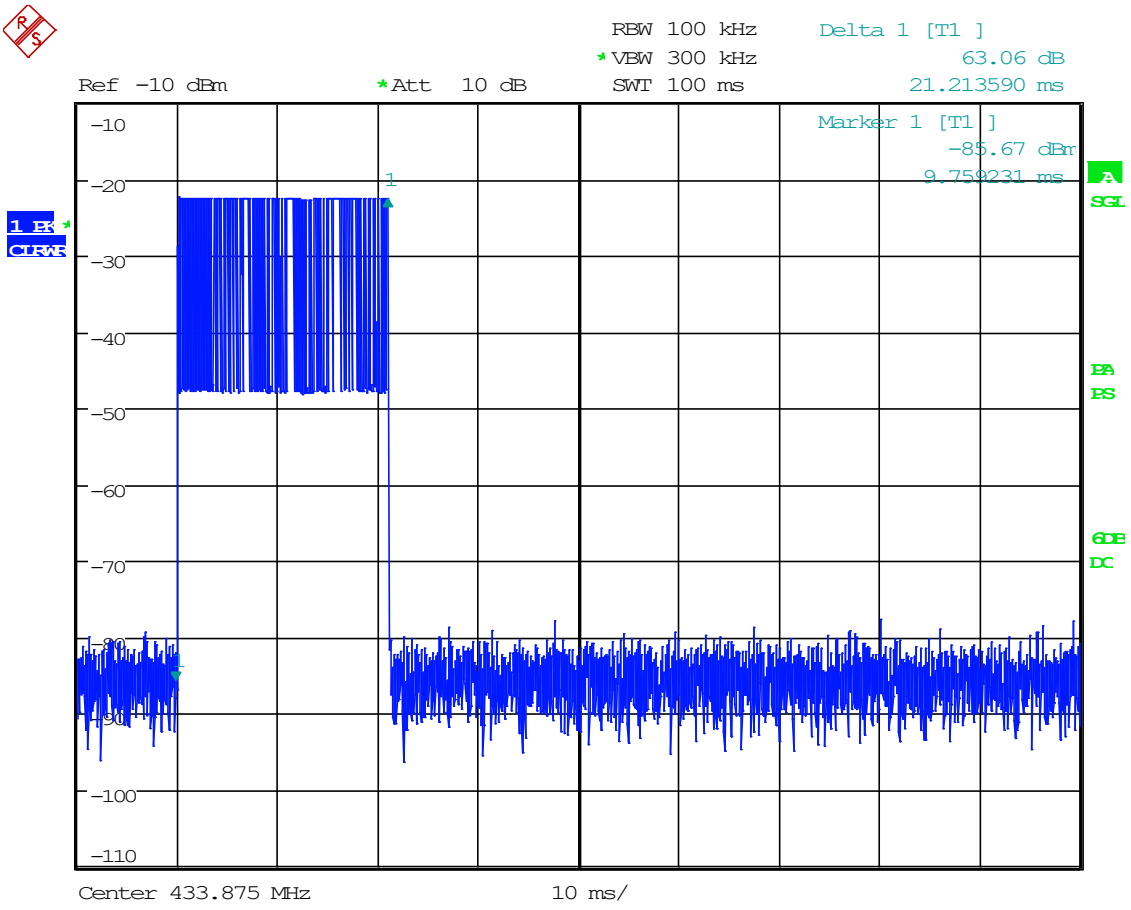
A duty cycle correction of -13.46dB was added to the field strength measured because the EUT has a 21.2% duty cycle.

The formula used was: DCCF = $20 \log\left(\frac{21.21ms}{100ms}\right) =$ -13.46

9.2 Test Data

Test Date(s):	2021-01-25	Test Engineers:	J. Chiller
Standards:	CFR 47 Part 15.231	Air Temperature:	20.8ºC
		Relative Humidity:	35%

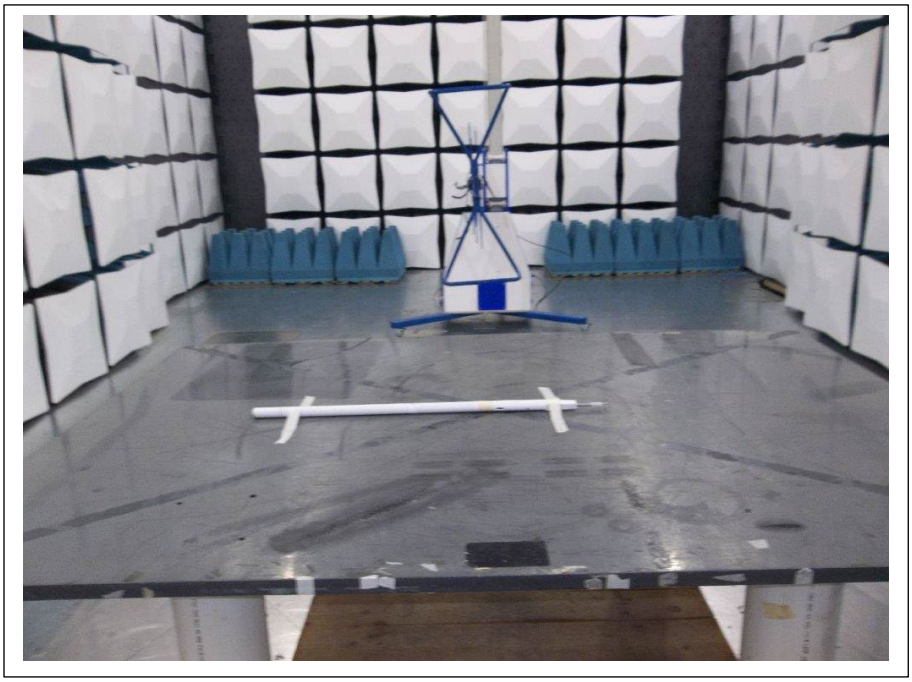
Tx Seq: 100ms
Tx On: 21.213ms
Duty Cycle: 21.21%



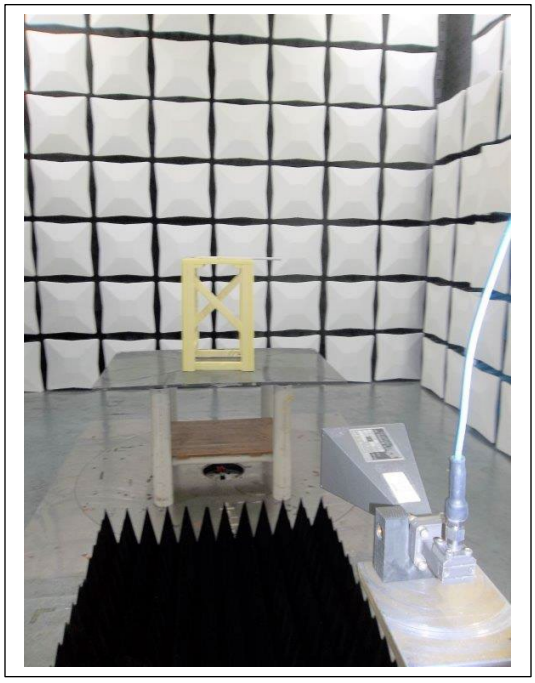
10.0 TEST SETUP PHOTOGRAPH(S)

Radiated Spurious Emissions: Loop Antenna

Radiated Spurious Emissions: Less Than 1 GHz



Radiated Spurious Emissions: Greater Than 1 GHz



Duty Cycle