



Engineering Solutions & Electromagnetic Compatibility Services

FCC Part 15.231 Test Data

433.92 MHz Smoke Detector

**Model: 56-0083-03 RevA00
for**

**Resolution Engineering, Inc.
1402 Heggen Street
Hudson, WI 54016
Contact: Josh Gathje**

Testing Conducted By:

**Rhein Tech Laboratories, Inc.
360 Herndon Parkway, Suite 1400
Herndon, VA 20170
RTL Test Engineer: Dan Baltzell**

RTL Project/Report Number: 2016235

November 29, 2017

This report may not be reproduced, except in full, without the full written approval of Rhein Tech Laboratories, Inc. and Resolution Engineering. Test results relate only to the item tested.

These tests are accredited and meet the requirements of ISO/IEC 17025 as verified by ANAB. Refer to certificate and scope of accreditation AT-1445.

Testing Represented in Report

The data and limits presented in this report are for radiated emissions per 15.231(b)(2) which references 15.35(b), and peak limiting for restricted bands per 15.209(e), which again references 15.35(b)(2), as procured by Resolution Engineering. No average data is presented in this report. Data is also presented for spurious, non-harmonic radiated emissions per 15.209. The Equipment Under Test (EUT) was the **433.92 MHz Smoke Detector (RTL Bar Code 22272, 22679)**.

Test Procedure

Radiated fundamental and spurious emissions were tested at three meters. The EUT was tested in the three orthogonal planes with the receive antenna in both polarities. The emissions were maximized; that is, the measurement antenna height was varied between 1 and 4 m, and the EUT was rotated through 360° on a rotating turntable until the maximum emissions were found. Both horizontal and vertical measurement antenna polarizations were used. A resolution bandwidth of 120 kHz was used for frequencies less than 1000 MHz, and a resolution bandwidth of 1 MHz was used for frequencies greater than or equal to 1000 MHz. The video bandwidth was set to a value at least three times greater than the resolution bandwidth.

EUT Disposition

The EUT was adapted to continuously transmit for testing purposes.

15.231 Radiated Spurious Harmonics Emissions Test Data – Peak

Emission Frequency (MHz)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pass/Fail
433.9	104.2	-7.4	96.8	100.8	-4.0	Pass
867.8	40.8	22.8	63.6	80.8	-17.2	Pass
1301.8	27.8	26.4	54.2	74.0	-19.8	Pass
1735.7	24.0	30.5	54.5	80.8	-26.3	Pass
2169.6	25.6	25.1	50.7	80.8	-30.1	Pass
2603.5	32.5	25.9	58.4	80.8	-22.4	Pass
3037.4	26.4	26.5	52.9	80.8	-27.9	Pass
3471.4	29.1	27.4	56.5	80.8	-24.3	Pass
3905.3	22.1	28.1	50.2	74.0	-23.8	Pass
4339.2	24.4	33.4	57.8	74.0	-16.2	Pass

All spurious emissions in the applicable frequency range were investigated; only harmonic emissions were present as noted above.

Radiated Emissions Test Equipment

RTL Bar Code	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901581	Rohde & Schwarz	FSU	Spectrum Analyzer	1166.1660.50	3/22/18
901592	Insulated Wire Inc.	KPS-1503-3600-KPR	SMK RF Cables 20'	NA	8/3/17
900791	Chase	CBL6112	Antenna (30 MHz – 2 GHz)	2099	6/11/17
900772	EMCO	3161-02	Horn Antenna 2 - 4 GHz	9804-1044	4/9/18
900321	EMCO	3161-03	Horn Antenna 4.0-8.2 GHz	9508-1020	4/9/18

Test Personnel:

Dan Baltzell		November 7, 2016
Test Engineer	Signature	Date of Test

FCC/IC Cross Reference

FCC 15.231(a)	RSS-210 Issue 9 A1.1
FCC 15.231(b)(2)	RSS-210 Issue 9 A1.2
FCC 15.35(b)	RSS-Gen Issue 4 6.10
FCC 15.205	RSS-Gen Issue 4 8.10
FCC 15.209	RSS-Gen Issue 4 8.9
FCC 15.231(c)	RSS-210 Issue 9 A1.3

Bandwidth

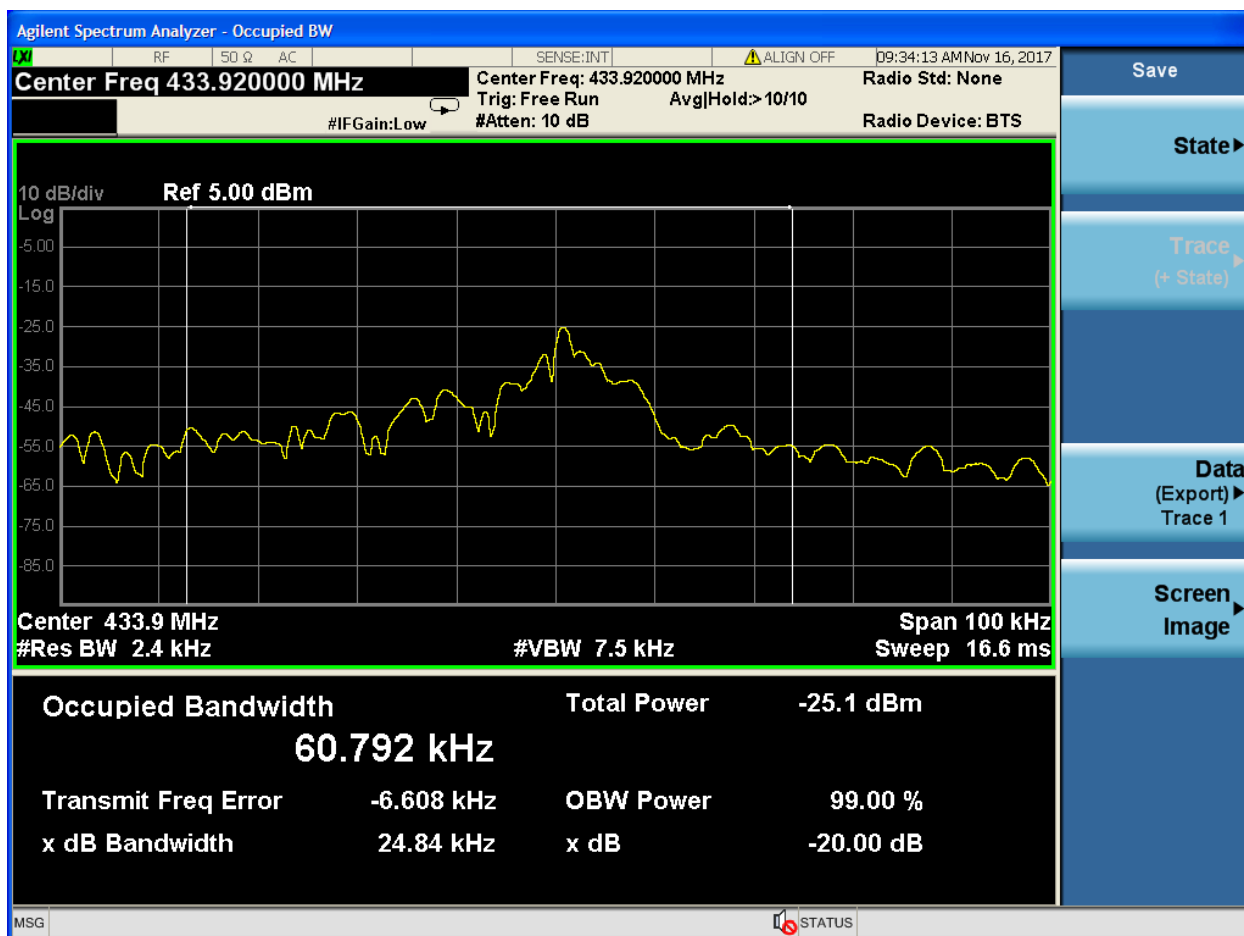
The 20 dB (FCC) and 99% (ISED) bandwidths were measured using a 50-ohm spectrum analyzer.

Bandwidth Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901583	Agilent	N9010A	EXA Signal Analyzer	MY51250846	4/21/18

Bandwidth Test Data

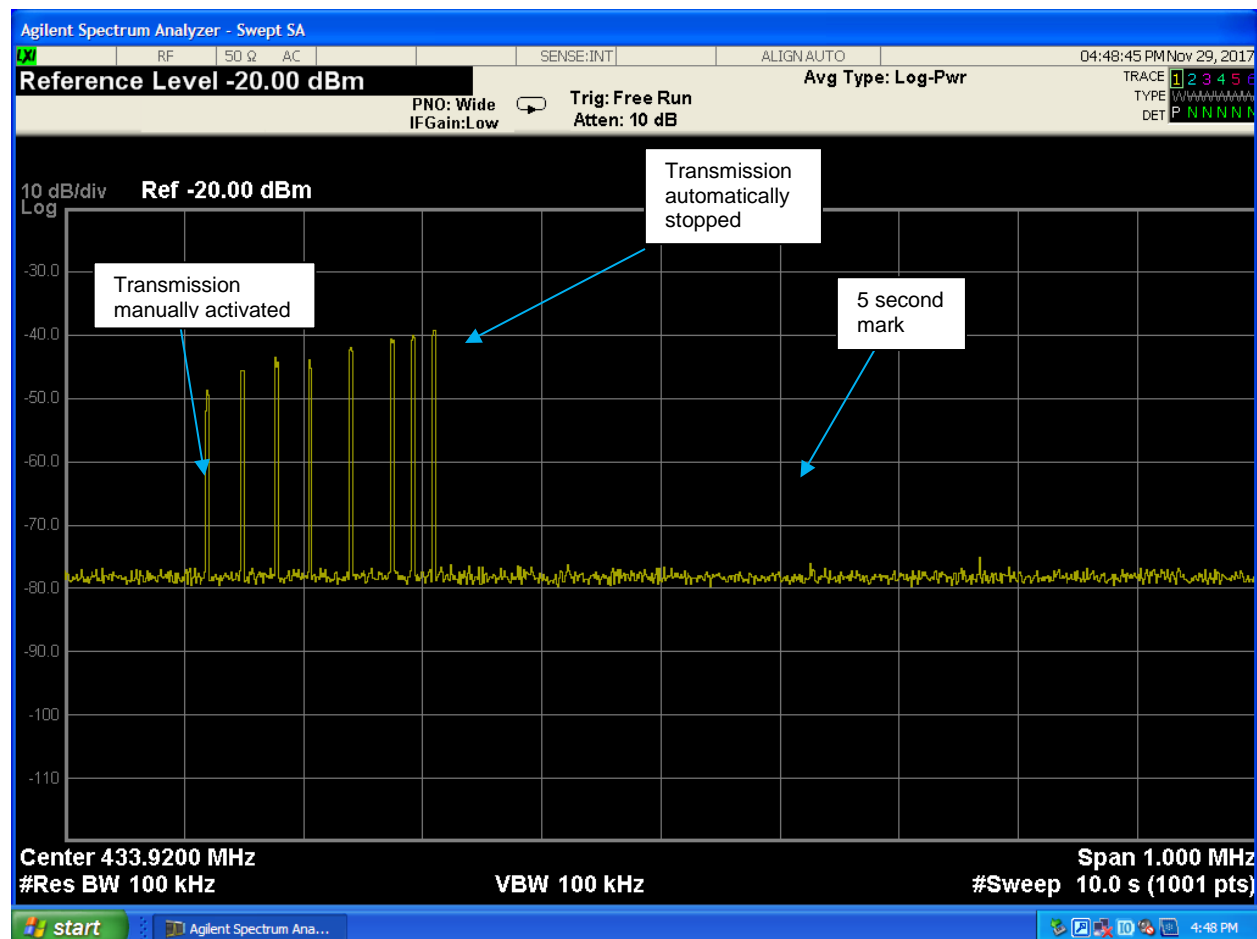
Frequency (MHz)	20 dB Bandwidth (kHz)	99% Bandwidth (kHz)	Limit (MHz)
433.92	24.8	60.8	1.08



Transmitter Deactivation

15.231(a)

- (1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.
- (2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.



Test Equipment

RTL Bar Code	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901583	Agilent Technologies	N9010A	EXA Signal Analyzer (10 Hz-26.5 GHz)	MY51250846	4/21/18

Test Personnel:

Richard B. McMurray	<i>Richard B. McMurray</i>	November 29, 2017
Test Engineer	Signature	Date of Test

Appendix A: Test Configuration Photographs



Radiated Emissions