RHEIN TECH LABORATORIES, INC.

Engineering Solutions & Electromagnetic Compatibility Services

FCC Part 15.231 Test Data

345 MHz 360PIR

Model: 56-0092-02 RevB00

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: 2017246

January 3, 2018

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 **345 MHz Sensor (RTL Bar Code 22676)**.

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)	Test Detector	Antenna Polarity (H/V)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pass/ Fail
345.0	Peak	H	67.4	29.4	96.8	97.3	-0.5	Pass
690.0	Peak	V	73.9	0.4	74.3	77.3	-3.0	Pass
1035.0	Peak	H	41.1	7.5	48.6	74.0	-25.4	Pass
1380.0	Peak	H	39.3	14.5	53.8	74.0	-20.2	Pass
1725.0	Peak	H	34.6	21.9	56.5	77.3	-20.8	Pass
2070.0	Peak	V	10.2	24.8	35.0	77.3	-42.3	Pass
2415.0	Peak	H	21.2	25.4	46.6	77.3	-30.7	Pass
2760.0	Peak	V	13.3	25.9	39.2	74.0	-34.8	Pass
3105.0	Peak	V	19.1	26.6	45.7	77.3	-31.6	Pass
3450.0	Peak	H	9.0	27.2	36.2	77.3	-41.1	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
900913	Hewlett Packard	85462A	EMI Receiver RF Section (9 KHz – 6.5 GHz)	3325A00159	4/4/19
900914	Hewlett Packard	8546OA	RF Filter Section, 100 kHz to 6.5 GHz	3330A00107	4/4/19
900905	Rhein Tech Laboratories, Inc.	PR-1040	Amplifier (20 MHz – 2 GHz)	900905	8/18/18
901592	Insulated Wire Inc.	KPS-1503-3600-KPR	SMK RF Cables 20’	NA	8/18/18
900791	Chase	CBL6112	Antenna (30 MHz – 2 GHz)	2099	10/4/20
900772	EMCO	3161-02	Horn Antenna 2 - 4 GHz	9804-1044	4/9/18
901581	Rohde & Schwarz	FSU	Spectrum Analyzer	1166.1660.50	3/22/18

Test Personnel:

Dan Baltzell		November 16, 2017
Test Engineer	Signature	Date of Test

FCC/IC Cross Reference

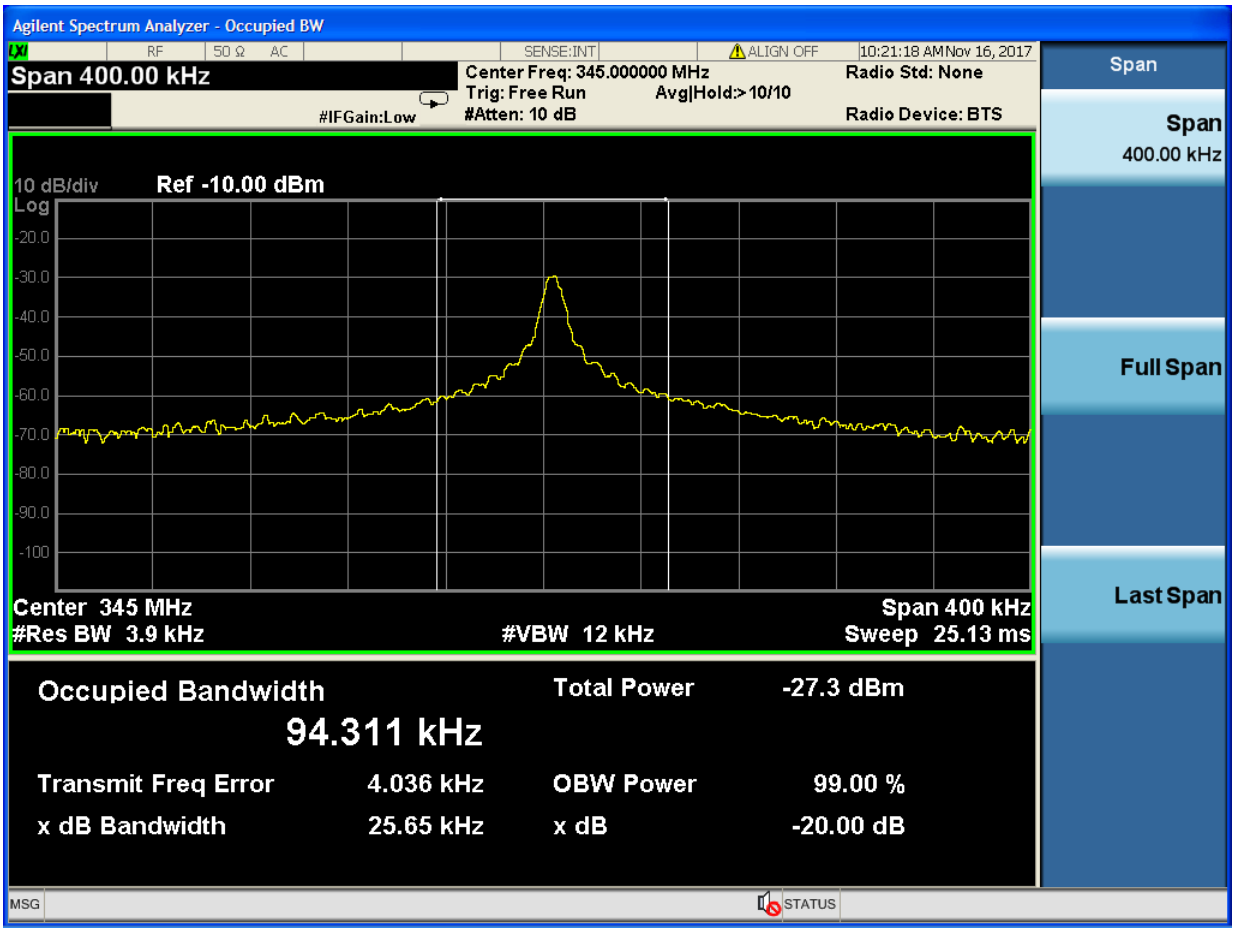
FCC 15.231(a)	RSS-210 Issue 9 A1.1
FCC 15.231(b)(2)	RSS-210 Issue 9 A1.2
FCC 15.35(b)	RSS-Gen Issue 4 6.10
FCC 15.205	RSS-Gen Issue 4 8.10
FCC 15.209	RSS-Gen Issue 4 8.9
FCC 15.231(c)	RSS-210 Issue 9 A1.3

Occupied Bandwidth

15.231(c) 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

345 MHz * 0.25% = 863 kHz = Limit

99% Bandwidth is 94.3 kHz
20 dB Bandwidth is 25.7 kHz



Occupied Bandwidth 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:

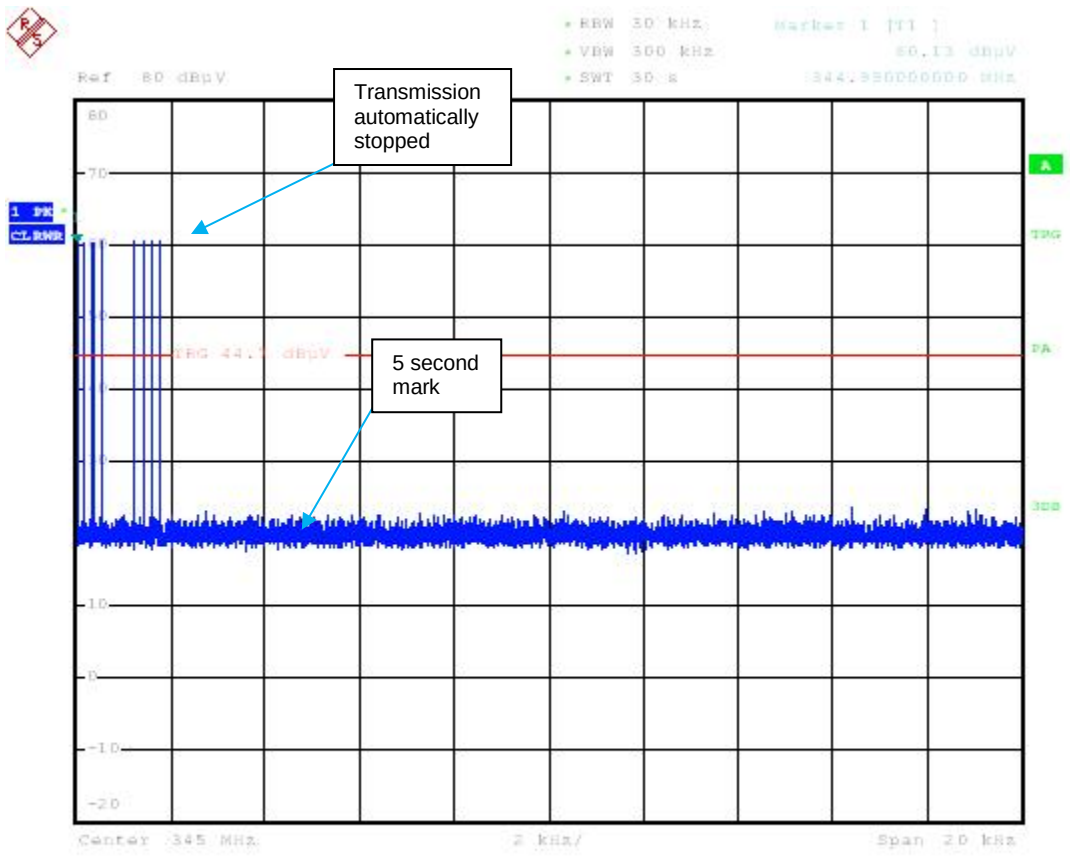
Khue Do		November 16, 2017
Test Engineer	Signature	Date of Test

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
901581	Rohde & Schwarz	FSU	Spectrum Analyzer	1166.1660.50	3/22/18



Test Personnel:

Dan Baltzell		December 14, 2017
Test Engineer	Signature	Date of Test