



## **Compliance Testing, LLC**

Previously Flom Test Lab

EMI, EMC, RF Testing Experts Since 1963

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### **Test Report**

Prepared for: Nichols Electronics, Inc.

Model: YellowJacket

Description: Handheld radio control transmitter for industrial electrical and electronic systems

Serial Number: 63A5

FCC ID: QIA-YJPRO

IC:

To

FCC Part 15.231

Date of Issue: April 18, 2016

On the behalf of the applicant:

Nichols Electronics, Inc.  
187 Kennan Drive  
Greensburg, PA 15601

Attention of:

Ed Nichols, President  
Ph: (412)951-3972  
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Project No: p1640010

**Alex Macon**  
**Project Test Engineer**

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All results contained herein relate only to the sample tested.



## Test Report Revision History

Revision	Date	Revised By	Reason for Revision
1.0	5/11/2016	Alex Macon	Original document

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**ILAC / A2LA**

Compliance Testing, LLC, has been accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to the joint ISO-ILAC-IAF Communiqué dated January 2009).

The tests results contained within this test report all fall within our scope of accreditation, unless noted below.

Please refer to <http://www.compliancetesting.com/labscope.html> for current scope of accreditation.

Testing Certificate Number: **2152.01**



**FCC Site Reg. #349717**

**IC Site Reg. #2044A-2**

**Non-accredited tests contained in this report:**

**N/A**

**The applicant has been cautioned as to the following**

**15.21: Information to User**

The user's manual or instruction manual for an intentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

**15.27(a): Special Accessories**

Equipment marketed to a consumer must be capable of complying with the necessary regulations in the configuration in which the equipment is marketed. Where special accessories, such as shielded cables and/or special connectors are required to enable an unintentional or intentional radiator to comply with the emission limits in this part, the equipment must be marketed with, i.e. shipped and sold with, those special accessories. However, in lieu of shipping or packaging the special accessories with the unintentional or intentional radiator the responsible party may employ other methods of ensuring that the special accessories are provided to the consumer, without an additional charge.

Information detailing any alternative method used to supply the special accessories for a grant of equipment authorization or retained in the verification records, as appropriate. The party responsible for the equipment, as detailed in § 2.909 of this chapter, shall ensure that these special accessories are provided with the equipment. The instruction manual for such devices shall include appropriate instructions on the first page of text concerned with the installation of the device that these special accessories must be used with the device. It is the responsibility of the user to use the needed special accessories supplied with the equipment.

**Standard Test Conditions Engineering Practices**

Except as noted herein, the following conditions and procedures were observed during the testing:

In accordance with ANSI C63.10-2009 and unless otherwise indicated in the specific measurement results, the ambient temperature of the actual EUT was maintained within the range of 10° to 40°C (50° to 104°F) unless the particular equipment requirements specified testing over a different temperature range. Also, unless otherwise indicated, the humidity levels were in the range of 10% to 90% relative humidity.

Measurement results, unless otherwise noted, are worst-case measurements.

Environmental Conditions		
Temperature (°C)	Humidity (%)	Pressure (Mbar)
22.3 – 24.6	27.2 – 32.6	966.2 – 968.5

**EUT Description**

**Model:** YellowJacket

**Description:** Handheld radio control transmitter for industrial electrical and electronic systems

**Serial Number:** 63A5

**Additional Information:**

N/A

**EUT Operation during Tests**

EUT was in normal operating mode

**Accessories:** None

**Cables:** None

**Modifications:** None



## Test Results Summary

Specification	Test Name	Pass, Fail, N/A	Comments
15.231(a),(e)	Fundamental Field Strength	Pass	
15.231(d) 15.215 (b)	Out of Band Spurious Emissions	Pass	
15.231(c), RSS-210	99% Occupied Bandwidth	Pass	

## Fundamental Field Strength

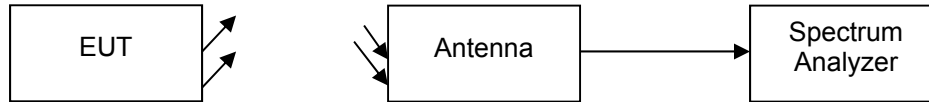
**Engineer:** Alex Macon

**Test Date:** 4/14/16

### Test Procedure

The EUT was tested in a semi-anechoic chamber at a distance of 3 meters from the receiving antenna. A spectrum analyzer was used to verify that the EUT met the requirements for Fundamental Field Strength.

### Test Setup



### Spectrum Analyzer Settings

Detector Settings	RBW	VBW	Span
Average	120 kHz	300 kHz	As Necessary

### Sample Calculations:

Correction Factors include Antenna and cable insertion loss.

Measured Level includes correction factors that were entered into the spectrum analyzer before recording test data.

All following limits were converted to dBuV/m by the calculation stated below:

$20 \cdot \text{LOG}(\mu\text{V/m})$

Fundamental Frequency (MHz)	Field Strength of Fundamental ( $\mu\text{V/m}$ )	Field Strength of Spurious Emissions ( $\mu\text{V/m}$ )
260 - 470	3750 to 12500	375 to 1250

\*Linear interpolations

### Fundamental Field Strength

Tuned Frequency (MHz)	Avg. Measured Level (dBuV/m)	Avg. Limit (dBuV/m)	Result
434	74.56	80.8	Pass



## Radiated Spurious Emissions

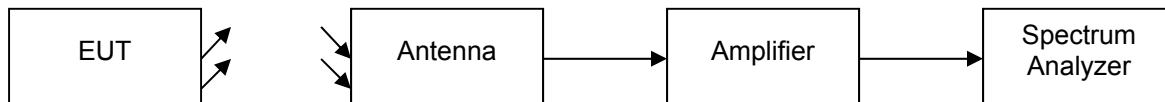
**Engineer:** Alex Macon

**Test Date:** 4/14/16

### Test Procedure

The EUT was tested in a semi-anechoic chamber set 3m from the receiving antenna. A spectrum analyzer was used to verify that the EUT met the limits for Radiated Spurious Emissions. The antenna, band reject filter, amplifier and cable correction factors were input into the spectrum analyzer before recording data. The spectrum for each tuned frequency was examined to the 10<sup>th</sup> harmonic.

### Test Setup



### Analyzer Settings

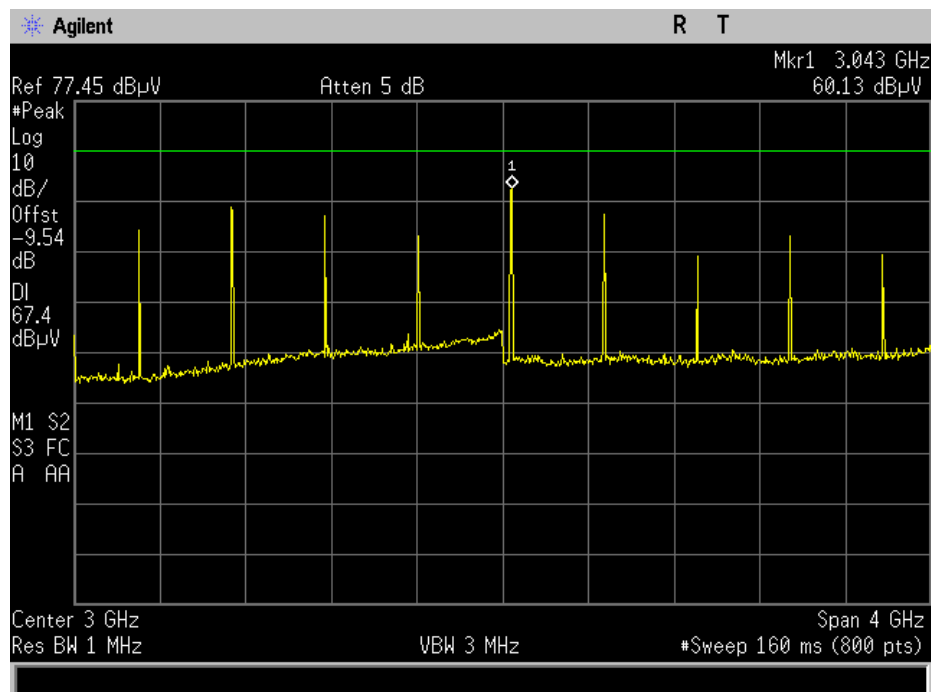
Detector Settings	RBW (MHz)	VBW (MHz)	Span
Peak	1	3	As Necessary
Average	1	3	As Necessary

### Sample Calculations:

Correction Factors include Antenna and cable insertion loss correction factors.

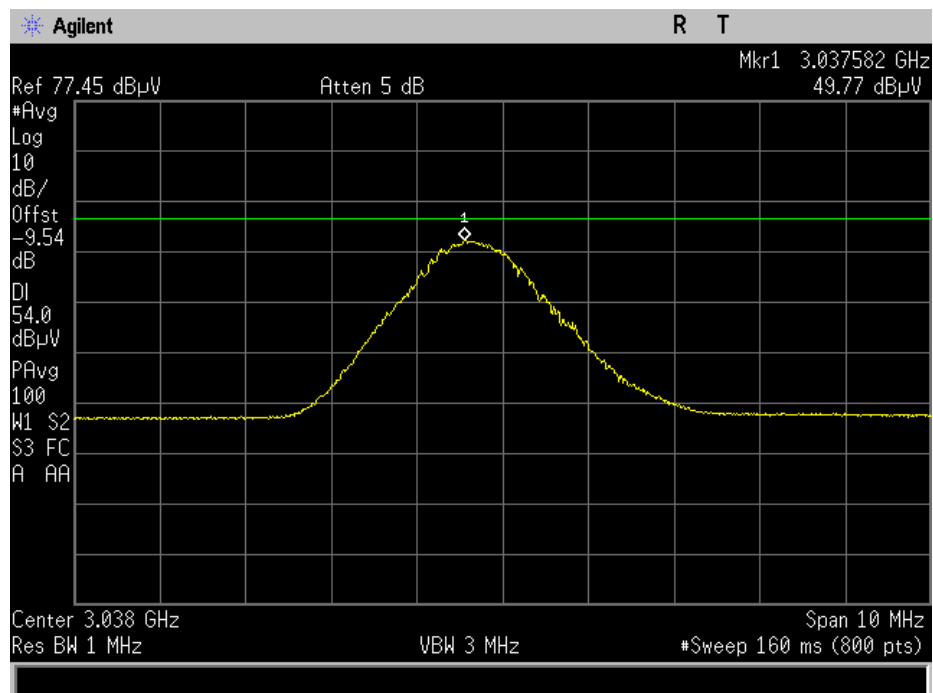
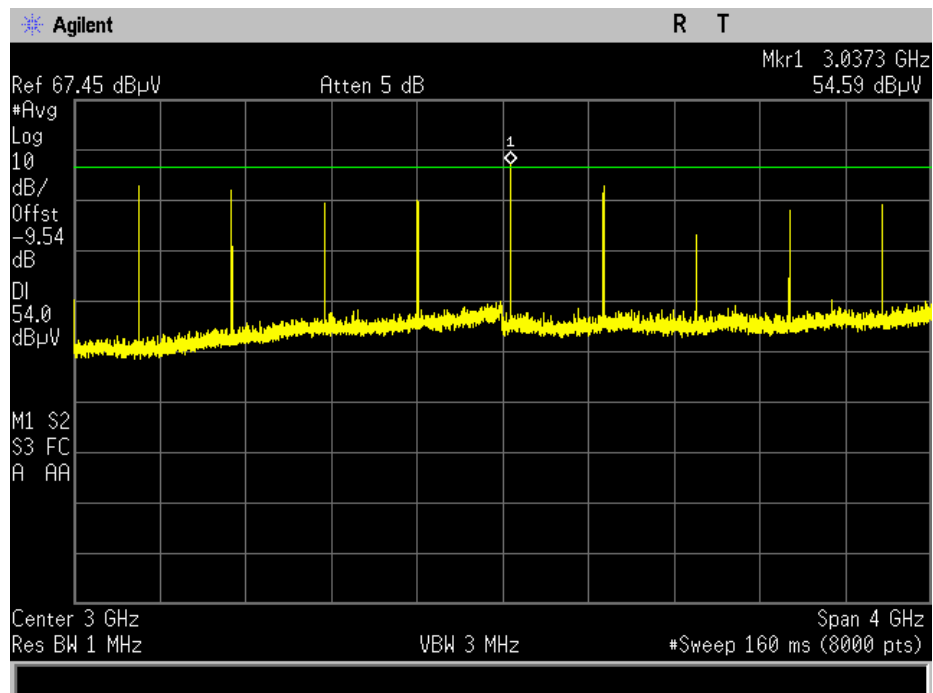
Measured Level includes correction factors that were input to the spectrum analyzer before recording test data

### 1 – 5 GHz peak





# 1 – 5 GHz Average



### Radiated Spurious 30 – 1000 MHz

Frequency	Peak	Limit	Margin
MHz	dBuV	dBuV	dBuV
36.017	36.037	40	-3.963
41.483	30.357	40	-9.643
121.352	34.221	41.9	-7.679
399.990	30.244	51.5	-21.256
516.889	28.087	61.9	-33.813
849.156	31.714	61.9	-30.186
868.2	53.1	61.9	-8.8

The limits are considered worst case limits. All peak readings were under the Quasi-Peak limits.

**99% Occupied Bandwidth****Engineer:** Alex Macon**Test Date:** 4/14/16**Test Procedure**

The EUT was tested in a semi-anechoic chamber at a distance of 3 meter from the receiving antenna. The Span was set wide enough to capture the entire transmit spectrum and the resolution bandwidth was set to at least 1% of the span. The analyzer was set to max hold while the 99% bandwidth was measured.

**Test Setup****Occupied Bandwidth Summary**

Frequency (MHz)	Recorded Measurement (kHz)	Result
434	146.2	Pass

## Test Equipment Utilized

Description	Manufacturer	Model #	CT Asset #	Last Cal Date	Cal Due Date
Horn Antenna, Amplified	ARA	MWH-1826/B	i00273	4/22/15	4/22/18
Bi-Log Antenna	Schaffner	CBL 6111D	i00349	10/19/15	10/19/17
EMI Analyzer	Agilent	E7405A	i00379	2/11/16	2/11/17
Thermo Hygrometer	Omega	RH81	i00408	4/15/13	4/15/15
3 Meter Semi-Anechoic Chamber	Panashield	3 Meter Semi-Anechoic Chamber	i00428	11/14/13	11/14/15

In addition to the above listed equipment standard RF connectors and cables were utilized in the testing of the described equipment. Prior to testing these components were tested to verify proper operation.

END OF TEST REPORT