TIMCO ENGINEERING, Inc.

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FCC PT 90 AMPLIFIER
AND IC RSS-131 (i2) , RSS-GEN (i3)
TEST REPORT

Applicant	CRESCEND TECHNOLOGIES, LLC
Address	140 E. State Parkway SCHAUMBURG IL 60173 USA
FCC ID	P5XXUL1
IC LABEL	7291A-P5XXUL1
Model Number	P5 Series UHF-L
Product Description	RF POWER AMPLIFIER
Standards Applied	CFR 47 Part 90 IC Standard RSS-131, Issue 2, July 2003 IC Standard RSS-GEN, Issue 3, December 2010
Date Sample Received	3/14/2014
Date Report Issued	3/17/2014
Date Tested	Joe Scoglio
Tested By	Joe Scoglio
Approved By	Joe Scoglio
Timco Report No.	322UT1414TestReport.docx
Test Results	☒ PASS ☐ FAIL

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GENERAL REMARKS

The attached report shall not be reproduced except in full without the written permission of Timco Engineering Inc.

Summary

The device under test does:
☒ fulfill the general approval requirements as identified in this test report
☐ not fulfill the general approval requirements as identified in this test report

Attestations

This equipment has been tested in accordance with the standards identified in this test report. To the best of my knowledge and belief, these tests were performed using the measurement procedures described in this report.

All instrumentation and accessories used to test products for compliance to the indicated standards are calibrated regularly in accordance with ISO 17025 requirements.

I attest that the necessary measurements were made, under my supervision, at:

Timco Engineering Inc.
849 NW State Road 45
Newberry, Fl 32669

Authorized Signatory Name:

Joe Scoglio
Engineering Project Manager

Date: 3/17/2013

EUT DESCRIPTION

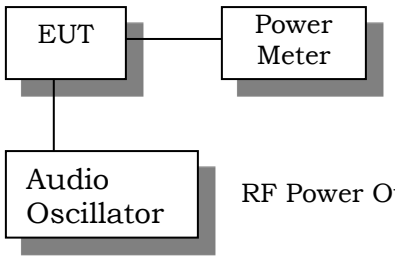
EUT Description	RF POWER AMPLIFIER
FCC ID	P5XXUL1
IC	7291A-P5XXUL1
Model Number	P5 Series UHF-L
Operating Frequency	470 MHz
Type of Emission	16K0F3E/11K0F3E
Modulation	FM
EUT Power Source	☐ 110–120Vac/50– 60Hz
	☒ DC Power 12V
	☐ Battery Operated Exclusively
Test Item	☐ Prototype
	☒ Pre-Production
	☐ Production
Type of Equipment	☒ Fixed
	☐ Mobile
	☐ Portable
Test Conditions	The temperature was 26°C with a relative humidity of 50%.
Revision History to the EUT	None
Test Exercise	The EUT was placed in continuous transmit mode.
Applicable Standards	ANSI/TIA 603-C:2004, FCC CFR 47 Part 90
Test Facility	Timco Engineering Inc. at 849 NW State Road 45 Newberry, FL 32669 USA.

TEST EQUIPMENT

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
3-Meter Semi-Anechoic Chamber	Panashield	N/A	N/A	12/31/11	03/31/14
Antenna: Biconnical	Eaton	94455-1	1096	05/10/13	05/10/15
Antenna: Double-Ridged Horn/ETS Horn 2	ETS-Lindgren	3117	00041534	10/05/12	10/05/14
Antenna: Log-Periodic	Electro-Metrics	LPA-25	1122	05/09/13	05/09/15
Broadband Preamplifier	A.H. Systems Inc.	PAM-0126	128	05/17/13	05/17/15
Coaxial Cable - Chamber 3 cable set	Semiflex	Unknown	Chamber 3 cable set	12/31/13	12/31/15
Digital Multimeter	Fluke	FLUKE-77-3	79510405	06/20/13	06/20/15
EMI Receiver System: Open Frame Tower	AGILENT TECHNOLOGIES	8572A	2627A03154	01/22/14	01/22/16
EMI Test Receiver	Rhode & Schwarz	ESIB 40	100274	03/13/12	03/16/14
High Pass Filter	Microlab	HA-10N		05/17/13	05/17/15
High Pass Filter	Microlab	HA-20N		05/17/13	05/17/15
Hygro-Thermometer	Extech	445703	0602	06/20/13	06/20/15
Measuring Tape-7.5M	Kraftixx	7.5M PROFI		05/20/13	05/20/15
RF Power Meter	Boonton	4531		01/19/13	01/19/15
Sensor	Boonton	51072A	34647	01/19/13	01/19/15
Signal Generator	HP	8648C	3847A04696	09/18/13	09/18/15
Software: Field Strength Program	Timco	N/A	Version 4.0		
EMI Test Receiver	Rhode & Schwarz	ESIB 40	100274	02/15/13	02/15/15

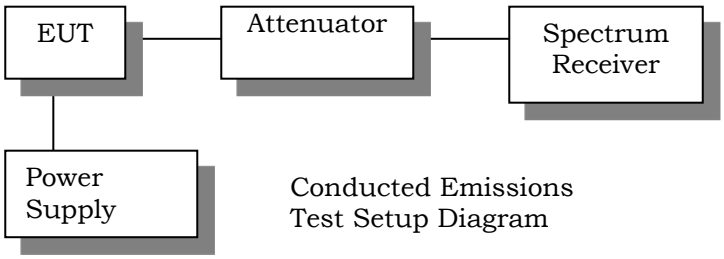
TEST PROCEDURES

RF Power Output
The RF power output was measured at the antenna feed point using a peak power meter. A 50-ohm, resistive wattmeter was connected to the RF output connector. With a nominal battery voltage, and the transmitter properly adjusted the RF output measures:



RF Power Output Test Setup

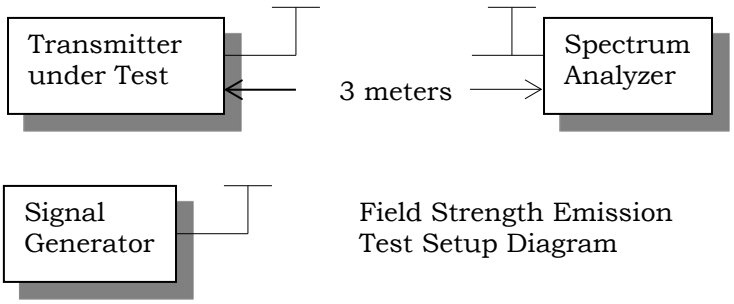
Spurious Emissions At Antenna Terminals (Conducted)
The carrier was modulated 100%. The spectrum was scanned from 0.4 to at least the 10th harmonic of the fundamental. Above 1 GHz the resolution bandwidth was 1 MHz and the VBW = 3 MHz and the span to 50 MHz. The measurements were made in accordance with standard ANSI/TIA-603-C: 2004



Conducted Emissions
Test Setup Diagram

Radiation Interference
The test procedure used was ANSI/TIA-603-C: 2004 and ANSI C63.4-2003 using an Agilent spectrum receiver with pre-selector. The bandwidth (RBW) of the spectrum receiver was 100 kHz up to 1 GHz and 1 MHz above 1 GHz with an appropriate sweep speed. The VBW above 1 GHz was 3 MHz. The analyzer was calibrated in dB above a microvolt at the output of the antenna.

Field Strength of Spurious Emissions
The spectrum was scanned from 30 MHz to at least the tenth harmonic of the fundamental. This test was conducted per ANSI/TIA 603-C: 2004 using the substitution method.



Field Strength Emission Test Setup Diagram

TEST RESULTS

RF POWER OUTPUT

Rule Part No.: Pt 2.1046(a), Pt 90, Pt 90.210, RSS-131

Requirements: Pt 2.1046(a), Pt 90, Pt 90.210, RSS-131

Test Data: Power =

DC Power Consumption
Vdc =13.8
Ic = 11.2

Test Frquency (MHz)	Input (dBm)	Output (dBm)	Output (W)
470	21	47	50

SPURIOUS EMISSIONS AT ANTENNA TERMINALS (CONDUCTED)

Rule Part No.: FCC Pt 2.1051(a), IC RSS-119

Requirements: 43+10log(Po)=43+10log(50)= 60.0 dB

Test Data:

Emission MHz	dBc
470	0
940	110.7
1410	85
1880	108.3
2350	118.5
2820	121.4
3290	121.7
3760	122.6
4230	121.9
4700	122.5

* Emissions are in the noise level and not reported.

FIELD STRENGTH OF SPURIOUS EMISSIONS (RADIATED)

Rule Parts. No.: FCC Pt 2.1053, IC RSS-119

Requirements: Same as conducted emissions

Test Data:

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
470.00	V	0
940.00	V	91.8
1410.00	H	91.1
1880.00	H	90.3
2350.00	H	91.1
2820.00	H	89.9
3290.00	V	84.8
3760.00	V	83.2
4230.00	H	83.7
4700.00	H	83.2

* Emissions are in the noise level and not reported.