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FCC PT 74, PT 90, PT 22 AMPLIFIER TEST REPORT

APPLICANT	CRESCEND TECHNOLOGIES, LLC
ADDRESS	920 EAST STATE PARKWAY SCHAUMBURG IL 60173 USA
FCC ID	CWWUHFP10XXUL1
IC LABEL	7291A-UHFP10XXUL1
MODEL NUMBER	P SERIES UHF-L
PRODUCT DESCRIPTION	UHF Amplifier
DATE SAMPLE RECEIVED	July 16, 2008
DATE TESTED	August 5, 2008
TESTED BY	Richard Block
APPROVED BY	Mario de Aranzeta
TIMCO REPORT NO.	1588AUT8TestReport.PDF
TEST RESULTS	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL

**THE ATTACHED REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL
WITHOUT THE WRITTEN APPROVAL OF TIMCO ENGINEERING, INC.**



Certificate # 0955-01

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ATTESTATION STATEMENT

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



Certificate #0955-01

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 by me or under my supervision, at Timco Engineering, Inc. located at 849 N.W. State Road 45, Newberry, Florida 32669 USA.

Authorized by: Mario de Aranzeta



Signature:

Function: Test Lab Supervisor / Engineer

Date: 8/1/08

REPORT SUMMARY

Disclaimer	The test results relate only to the items tested.
Purpose of Test	To show the DUT in compliance with FCC CFR 47, Part 90, Part 74, and Part 22 requirements.
Test Procedures	ANSI/TIA 603-C: 2004, FCC CFR 47 Part 90, Part 74, Part 22 ANSI C63.4: 2003
Related Approval	N/A

TEST ENVIRONMENT AND TEST SETUP

Test Facility	All tests were conducted by Timco Engineering Inc. located at 849 NW State Road 45, Newberry, FL 32669 USA
Laboratory Test Condition	Temperature: 26°C Relative humidity: 50%.
Deviation from the standards	No deviation
Modification to the DUT	No modification was made.
Test Exercise (software etc.)	The DUT was placed in continuous transmitting mode of operation.
System Setup	Stand alone device.

DUT DESCRIPTION

Manufactured by	Crescend Technologies, LLC
Product Description	UHF Amplifier
FCC ID	CWWUHFP10XXUL1
IC Label	7291A-UHFP10XXUL1
M/N	P SERIES UHF-L
Operating Freq	403 – 470 MHz
Max. Output Pwr	100 W
Modulation	FM
Power Source	13.8 VDC DC Power
Test Item	Preproduction
Type of DUT	Fixed Amplifier

TEST EQUIPMENT

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
3-Meter Semi-Anechoic Chamber	Panashield	N/A	N/A	Listed 5/11/07	5/10/10
AC Voltmeter	HP	400FL	2213A14499	CAL 12/29/06	12/29/08
Coaxial Cable #64	Semflex Inc.	60637	Timco #64	CHAR 3/30/07	3/30/09
Antenna: Dipole Kit	Electro-Metrics	TDA-30/1-4	152	CAL 3/3/06	3/3/09
Antenna: Dipole Kit	Electro-Metrics	TDA-30/1-4	153	CHAR 4/5/06	4/5/09
Frequency Counter	HP	5385A	2730A03025	CAL 7/6/07	7/6/09
Hygro-Thermometer	Extech	445703	0602	CAL 11/15/07	11/15/09
Antenna: Log-Periodic	Electro-Metrics	LPA-25	1122	CAL 12/1/06	12/1/08
Measuring Tape-7.5M	Kraftixx	7.5M PROFI		CHAR 11/13/07	11/13/09
Modulation Analyzer	HP	8901A	3435A06868	CAL 5/9/07	5/9/09
Digital Multimeter	Fluke	FLUKE-77-3	79510405	CAL 5/14/07	5/14/09
System One	Audio Precision	System One	SYS1-45868	CHAR 2/27/08	2/27/10
Analyzer Tan Tower Preamplifier	HP	8449B-H02	3008A00372	CAL 11/30/07	11/30/09
Analyzer Tan Tower Quasi-Peak Adapter	HP	85650A	3303A01690	CAL 11/30/07	11/30/09
Analyzer Tan Tower RF Preselector	HP	85685A	3221A01400	CAL 11/30/07	11/30/09
Analyzer Tan Tower Spectrum Analyzer	HP	8566B Opt 462	3138A07786 3144A20661	CAL 11/30/07	11/30/09
Temperature Chamber	Tenney Engineering	TTRC	11717-7	CHAR 4/25/08	4/25/10

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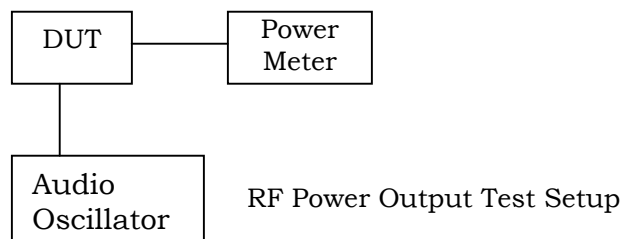
TEST PROCEDURE

Power Line Conducted Interference

The procedure used was ANSI 63.4-2003 using a 50uH LISN. Both lines were observed with the DUT transmitting. The bandwidth of the spectrum analyzer was 10 kHz with an appropriate sweep speed.

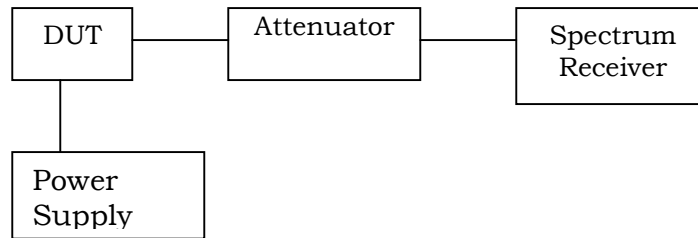
RF Power Output

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:



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



Radiation Interference

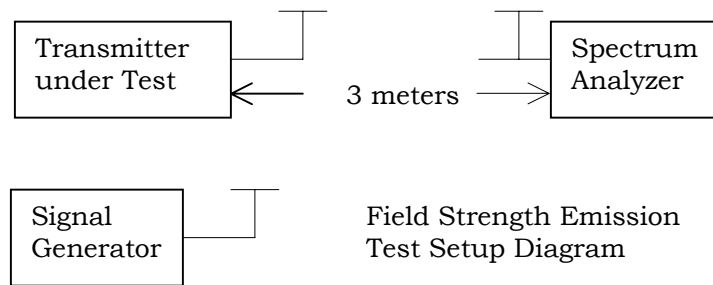
The test procedure used was ANSI/TIA-603-C: 2004 and ANSI C63.4-2003 using an Agilent spectrum receiver with pre-selector. The bandwidth (RBW) of the spectrum receiver was 100 kHz up to 1 GHz and 1 MHz above 1 GHz with an appropriate sweep speed. The VBW above 1 GHz was 3 MHz. The analyzer was calibrated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

Frequency Stability

The frequency stability was measured per ANSI/TIA 603-C: 2004.

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.



TEST RESULT

RF POWER OUTPUT

Rule Part No.: Pt 2.1046(a), Pt 90, Pt 74, Pt 22

Requirements: Pt 2.1046

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:

Test Data: 100 W

DC Power Consumption

Vdc = 13.8 V

Ic = 20 Amps

OCCUPIED BANDWIDTH

Rule Parts No: Pt 2.1049, Pt 90, Pt 74, Pt 22

Test Requirement:

Part 90.210(b) 25kHz Channel Spacing

Data in the plots show that on any frequency removed from the assigned frequency by more than 50%, but not more than 100%: At least 25dB. On any frequency removed from the assigned frequency by more than 100%, but not more than 250%: At least 35 dB. On any frequency removed from the assigned frequency by more than 250%, of the authorized bandwidth: At least $43 + 10\log(P)$ dB.

Part 90.210(c) 12.5kHz Channel Spacing Not Equipped with a Low Pass Filter

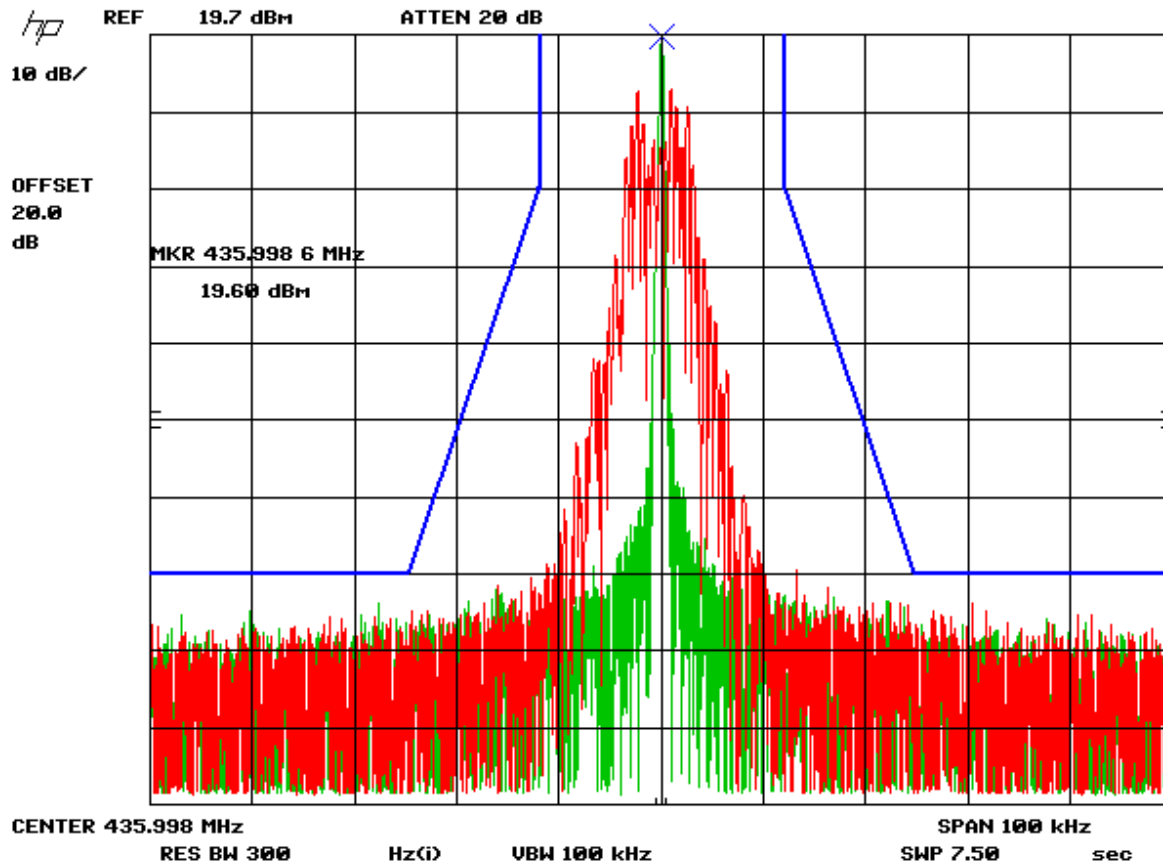
For transmitters that are not equipped with an audio low pass filter pursuant to S90.211 (b), the power of any emission must be attenuated below the un-modulated carrier output power as follows; (1) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 5 kHz but not more than 10 kHz: At least $83 \log(f_d/5)$ dB; (2) ON any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 10 kHz, but not more than 250% of the authorized bandwidth: At least $29 \log(f_d^2/11)$ dB or 50 dB, whichever is the lesser attenuation; (3) On any frequency removed from the center of the authorized bandwidth by more than 250% of the authorized bandwidth: At least $43+10 \log(P_0)$ dB.

Part 90.210(d) Emission Mask D - 12.5 kHz channel BW equipment.

For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

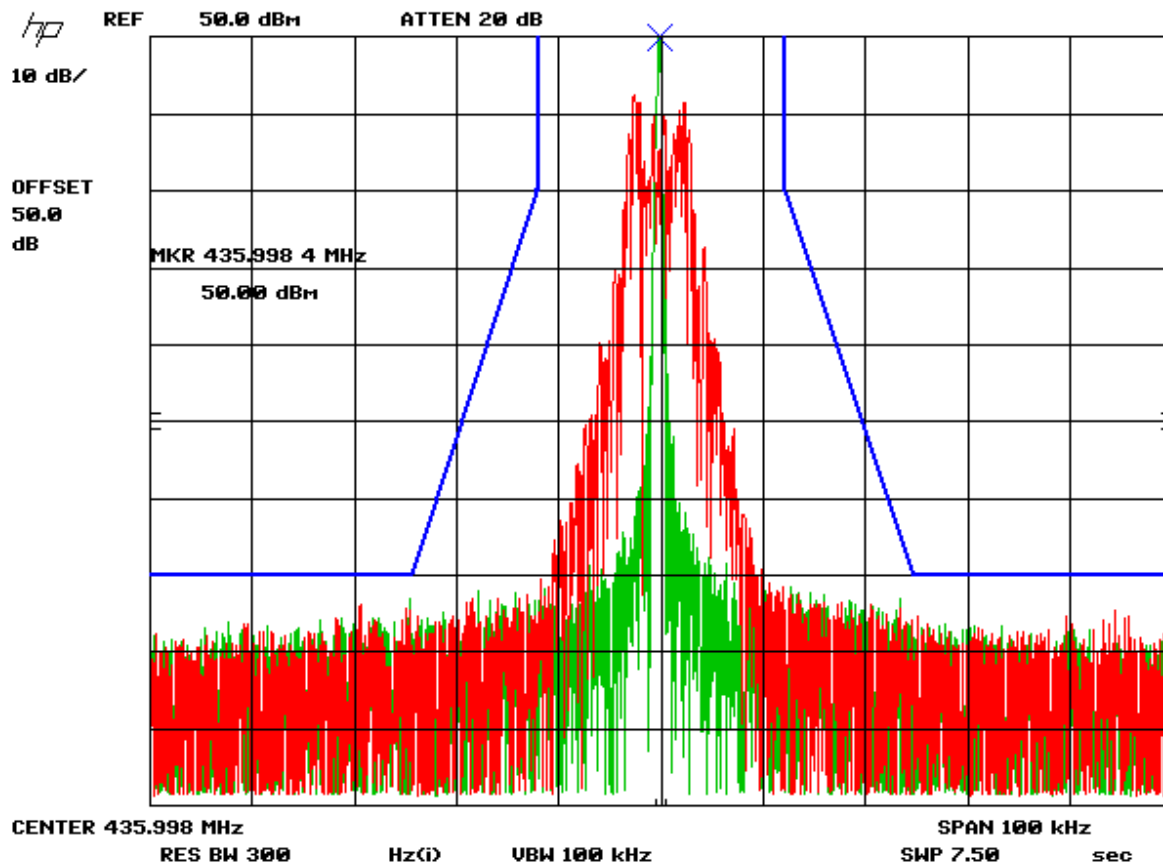
- (1) On any frequency from the center of the authorized bandwidth f_0 to 5.625 kHz removed from f_0 : Zero dB.
- (2) On any frequency from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 5.625 kHz but no more than 12.5 kHz: At least $7.27 (f_d - 2.88 \text{ kHz})$ dB.
- (3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 12.5 kHz: At least $50 + 10\log(P)$ dB or 70 dB, whichever is the lesser attenuation.

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INPUT SIGNAL

Plot 1 – 436 MHz Emission Mask D – 12.5 kHz Channel Spacing - Input



OUTPUT SIGNAL RESPONSE

Plot 2 – 436 MHz Emission Mask D – 12.5 kHz Channel Spacing - Output

SPURIOUS EMISSIONS AT ANTENNA TERMINALS (CONDUCTED)

Rule Part No.: Part 2.1051(a)

Requirements: 12.5 kHz Spacing = $50 + 10 \log(P_o) = 50 + 10 \log(100) = 70$ dB

Test Data: CONDUCTED SUPRIOUR EMISSIONS

Emission Frequency MHz	dB Below Carrier (dBc)	Emission Frequency MHz	dB Below Carrier (dBc)	Emission Frequency MHz	dB Below Carrier (dBc)	Emission Frequency MHz	dB Below Carrier (dBc)
403	0.0	436	0.0	454	0.0	466	0.0
806	80.6	872	89.3	908	95.9	932	96.6
1209	90.6	1308	93.1	1362	97.1	1398	98.7
1612	90.5	1744	95.7	1816	99.0	1864	98.0
2015	97.9	2180	96.6	2270	96.1	2330	95.5
2418	104.2	2616	105.2	2724	100.2	2796	101.6
2821	96.6	3052	91.3	3178	94.9	3262	91.1
3224	99.7	3488	101.6	3632	104.4	3728	105.0
3627	106.3	3924	103.6	4086	106.6	4194	106.4
4030	104.5	4360	100.8	4540	101.1	4660	101.5

SPURIOUS EMISSIONS (RADIATED)

Rule Part No.: Part 2.1051(a)

Requirements: 12.5 kHz Spacing =50+10log(Po)=50+10log(100)= 70 dB

Test Data: RADIATED SPURIOUS EMISSIONS

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
403	0	0.0
806	H	93.3
1209	V	102.6
1612	H	102.1
2015	H	99.0
2418	H	104.8
2821	H	101.7
3224	H	106.1
3627	H	109.6
4030	H	103.7

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
436	0	0.0
872	H	105.0
1308	V	101.9
1744	H	101.3
2180	V	91.0
2616	H	94.2
3052	H	97.6
3488	V	103.9
3924	V	102.8
4360	V	102.0

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
454	0	0.0
908	H	101.8
1362	V	99.4
1816	H	101.9
2270	H	97.5
2724	V	101.0
3178	V	99.0
3632	H	109.6
4086	V	106.7
4540	H	103.9

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
466	0	0.0
932	V	105.5
1398	V	103.9
1864	H	104.0
2330	H	110.4
2796	V	105.7
3262	H	101.6
3728	H	107.5
4194	H	107.6
4660	H	106.0

POWER LINE CONDUCTED INTERFERENCE

Rules Part No.: Part 15.207

Requirements:

Frequency (MHz)	Quasi Peak Limits (dBuV)	Average Limits (dBuV)
0.15 – 0.5	66 – 56 *	56 – 46 *
0.5 – 5.0	56	46
5.0 – 30	60	50
* Decreases with logarithm of frequency		

Test Data: Not applicable DUT is DC operated exclusively.

RADIATED EMISSIONS TEST SET UP PHOTO



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