



849 NW STATE ROAD 45  
NEWBERRY, FL 32669 USA  
PH: 888.472.2424 OR 352.472.5500  
FAX: 352.472.2030  
EMAIL: [INFO@TIMCOENGR.COM](mailto:INFO@TIMCOENGR.COM)  
[HTTP://WWW.TIMCOENGR.COM](http://WWW.TIMCOENGR.COM)

**FCC PT 90 AMPLIFIER  
AND IC RSS-119, RSS-GEN  
TEST REPORT**

<b>APPLICANT</b>	CRESCEND TECHNOLOGIES, LLC
<b>ADDRESS</b>	140 EAST STATE PARKWAY SCHAUMBURG IL 60173 USA
<b>FCC ID</b>	CWWP10XXUL1
<b>IC LABEL</b>	7291A-P10XXUL1
<b>MODEL NUMBER</b>	P10 SERIES UHF-L
<b>PRODUCT DESCRIPTION</b>	Amplifier
<b>DATE SAMPLE RECEIVED</b>	9/1/2010
<b>DATE TESTED</b>	9/9/2010
<b>TESTED BY</b>	Nam Nguyen
<b>APPROVED BY</b>	Mario de Aranzeta
<b>TIMCO REPORT NO.</b>	2089AUT10TestReport.pdf
<b>TEST RESULTS</b>	<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.**





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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.



Test 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:** 9/10/11

Applicant: Crescend Technolgoies LLC  
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MODEL #: P10 SERIES UHF-L  
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## 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 and IC RSS-131 requirements for amplifiers
Test Procedures	ANSI/TIA 603-C: 2004 FCC CFR 47 Part 90 IC RSS-131 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.

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## DUT DESCRIPTION

<b>Manufactured by</b>	Crescend Technologies, LLC
<b>Product Description</b>	Amplifier
<b>FCC ID</b>	CWWP10XXUL1
<b>IC Label</b>	7291A-P10XXUL1
<b>M/N</b>	P10 SERIES UHF-L
<b>Family M/Ns</b>	N/A
<b>S/N</b>	N/A
<b>Operating Freq</b>	(403 - 470) MHz
<b>Rated Output Power</b>	100W
<b>Modulation</b>	N/A Amplifier
<b>Power Source</b>	13.8 VDC DC Power
<b>Test Item</b>	Preproduction
<b>Type of DUT</b>	Fixed/Mobile Amplifier

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## TEST EQUIPMENT

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
3-Meter Semi-Anechoic Chamber	Panashield	N/A	N/A	Listed 5/10/10	5/10/12
AC Voltmeter	HP	400FL	2213A14499	CAL 3/23/09	3/23/11
Antenna: Dipole Kit	Electro-Metrics	TDA-30/1-4	153	CHAR 6/10/09	6/10/11
Antenna: Passive Loop	EMC Test Systems	EMCO 6512	9706-1211	CAL. 6/1/09	6/2/11
Frequency Counter	HP	5385A	2730A03025	CAL 8/4/09	8/4/11
Hygro-Thermometer	Extech	445703	0602	CAL 1/30/10	1/30/12
Modulation Analyzer	HP	8901A	3435A06868	CAL 5/26/09	5/26/11
Digital Multimeter	Fluke	FLUKE-77	35053830	CAL 11/18/09	11/18/11
Analyzer Tan Tower Preamplifier	HP	8449B-H02	3008A00372	CAL 11/21/09	11/21/11
Analyzer Tan Tower Quasi-Peak Adapter	HP	85650A	3303A01690	CAL 11/22/09	11/22/11
Analyzer Tan Tower RF Preselector	HP	85685A	3221A01400	CAL 11/21/09	11/21/11
Analyzer Tan Tower Spectrum Analyzer	HP	8566B Opt 462	3138A07786 3144A20661	CAL 11/24/09	11/24/11
Temperature Chamber	Tenney Engineering	TTRC	11717-7	CHAR 4/25/10	4/25/12

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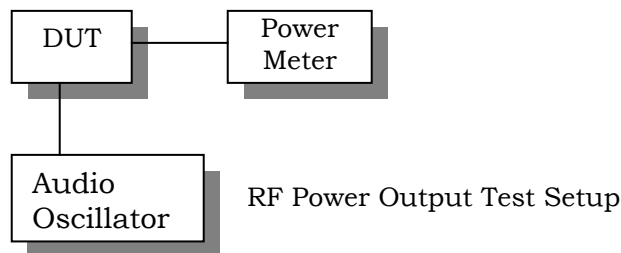
## TEST PROCEDURES

### 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.

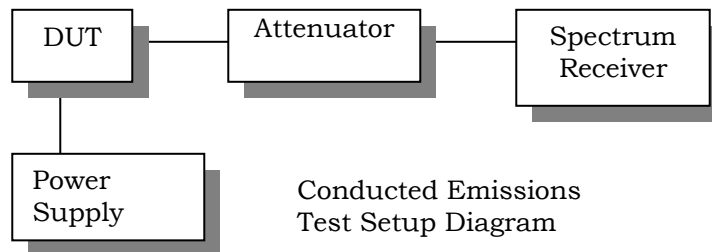
### RF Power Output

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.

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**Modulation Characteristic**

**Audio frequency response**

The audio frequency response was measured in accordance with ANSI/TIA 603-C: 2004.

**Audio Low Pass Filter**

The audio low pass filter for voice-modulated equipment was measured in accordance with ANSI/TIA 603-C: 2004.

**Audio Input versus modulation**

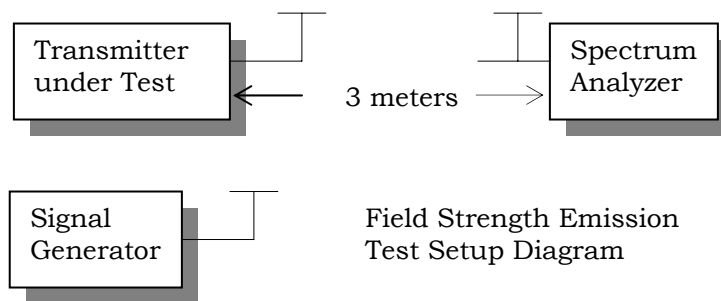
The audio input level needed for a particular percentage of modulation was measured in accordance with ANSI/TIA 603-C: 2004. Curves are provided for audio input frequencies of 300, 1000, and 3000 Hz.

**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 RESULTS**

**RF POWER OUTPUT**

**Rule Part No.:** Pt 2.1046(a), Pt 90, Pt 90.210, RSS-119

**Requirements:** Pt 2.1046(a), Pt 90, Pt 90.210, RSS-119

**Test Data:** RF Power = 102.3 W

DC Power Consumption

Vdc = 13.8 V

Ic = 22.3 Amps

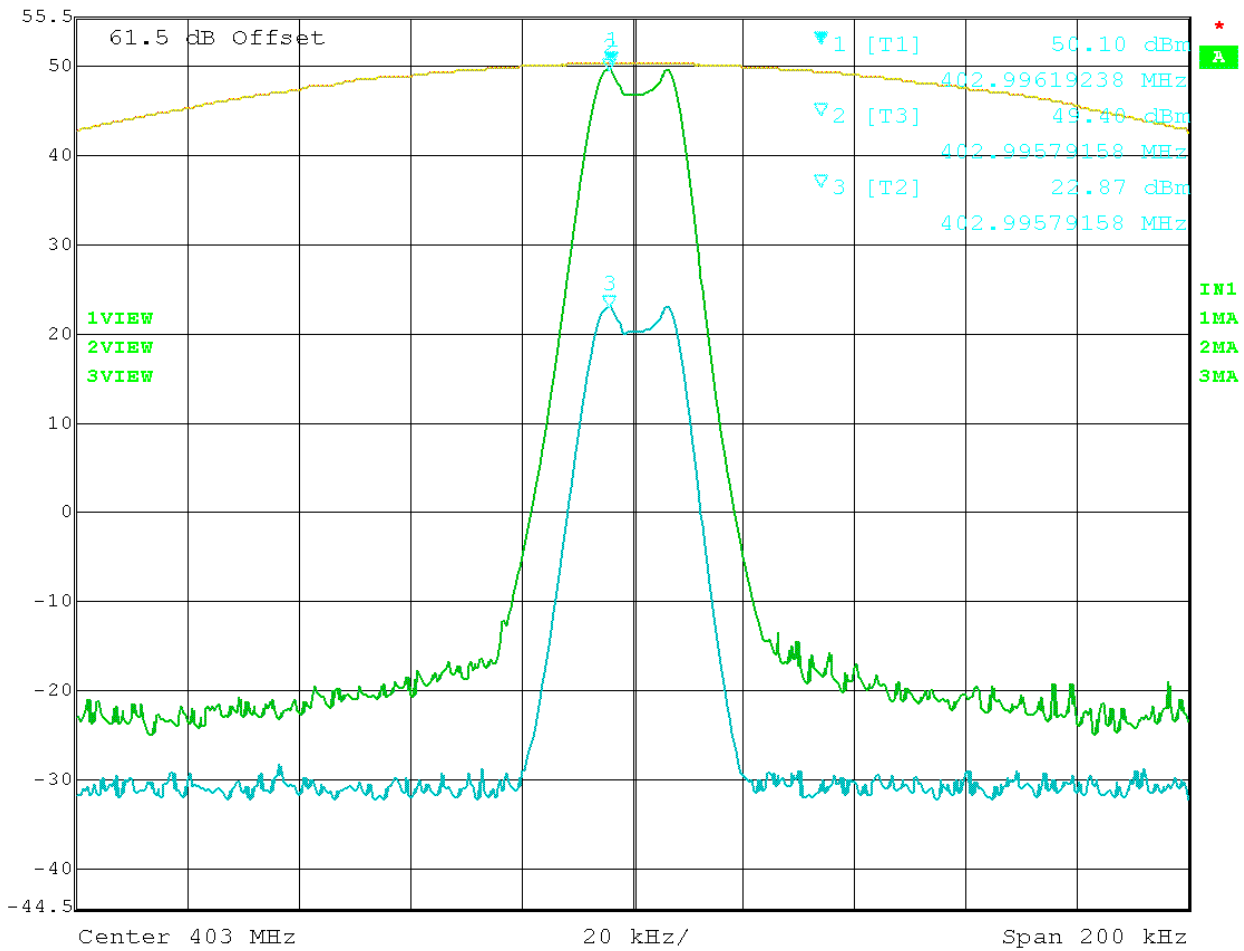
Test Frequency (MHz)	Input (dBm)	Output (dBm)	Output (W)
403.00	22.87	50.1	102.3
436.50	22.8	50.09	102.1
470.00	23.67	50.04	100.9

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INPUT/OUTPUT COMPARISON:



Marker 1 [T1]      RBW    3 kHz    RF Att    20 dB  
 Ref Lvl                    50.10 dBm    VBW    3 kHz  
 55.5 dBm                    402.99619238 MHz    SWT    56 ms    Unit            dBm

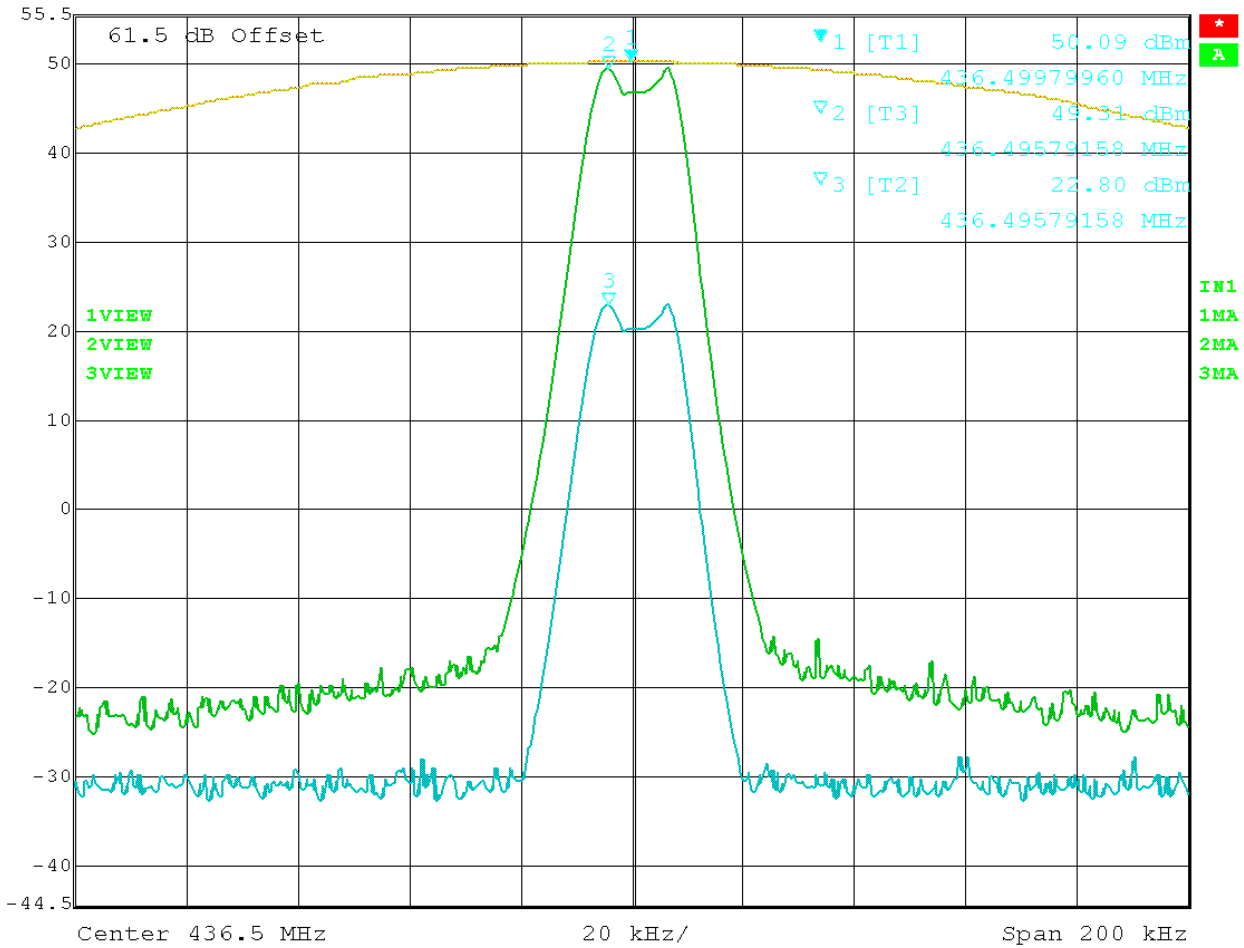


Date: 10.SEP.2010 14:28:25

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Marker 1 [T1] RBW 3 kHz RF Att 20 dB  
 Ref Lvl 50.09 dBm VBW 3 kHz  
 55.5 dBm 436.49979960 MHz SWT 56 ms Unit dBm

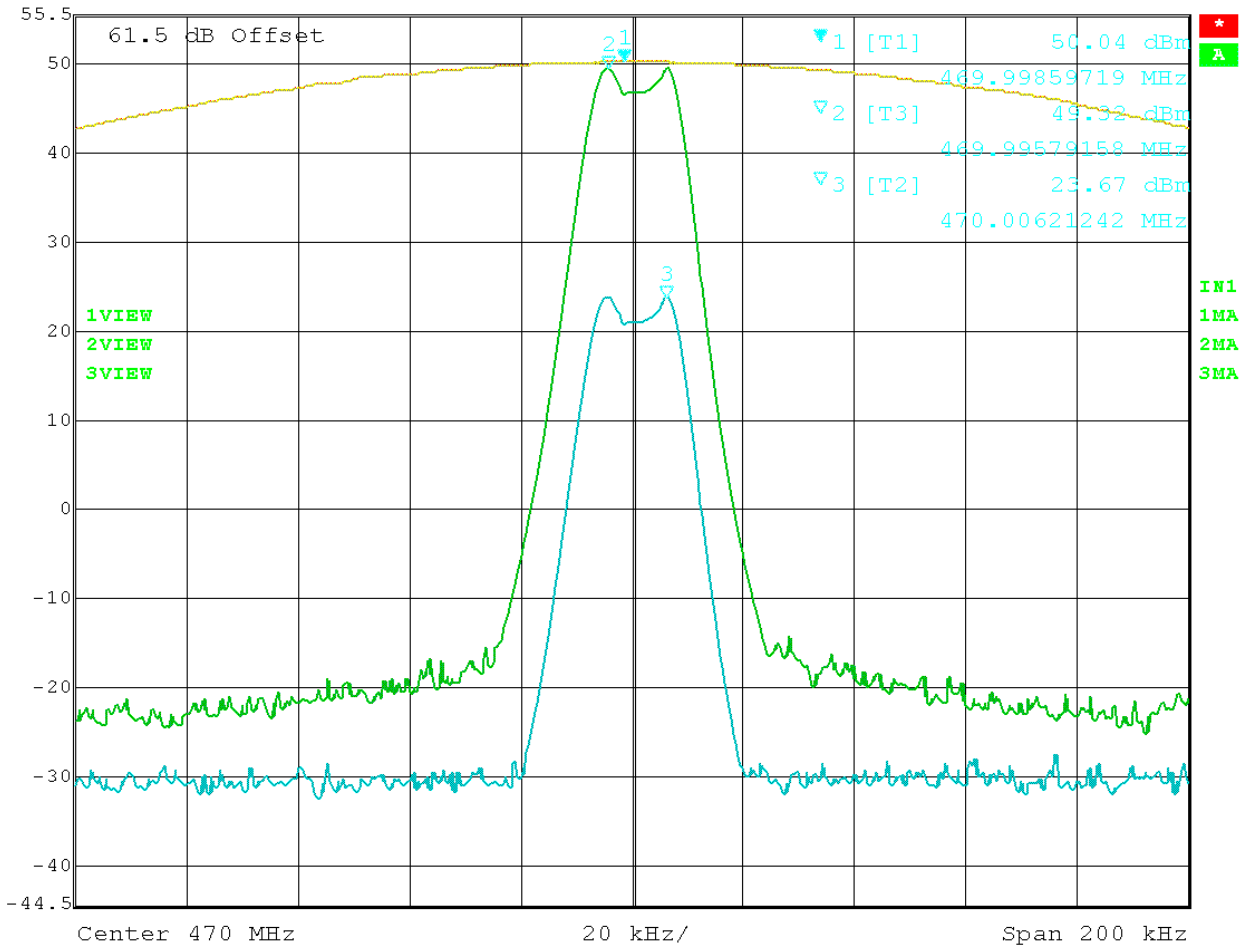


Date: 10.SEP.2010 14:24:33

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 MODEL #: P10 SERIES UHF-L  
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Marker 1 [T1] RBW 3 kHz RF Att 20 dB  
 Ref Lvl 50.04 dBm VBW 3 kHz  
 55.5 dBm 469.99859719 MHz SWT 56 ms Unit dBm



Date: 10.SEP.2010 14:34:33

Applicant: Crescend Technolgoies LLC  
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 MODEL #: P10 SERIES UHF-L  
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## OCCUPIED BANDWIDTH

**Rule Parts No:** Pt 2.1049, Pt 90.210(b), RSS-119

### **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  $43+10 \log(P_o)$ dB.

#### Part 90.210(i) Emission Mask I - 15 kHz channel BW equipment.

For transmitters that are equipped with an audio low pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) of the transmitter as follows:

- (1) On any frequency from the center of the authorized bandwidth by a displacement frequency of more than 6.8 kHz, but less than 9.0 kHz: At least 25 dB;
- (2) On any frequency from the center of the authorized bandwidth by a displacement frequency ( $f_d$  in kHz) of more than 9.0 kHz but no more than 15 kHz: At least 35 dB.
- (3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $f_d$  in kHz) of more than 15 kHz: At least  $43 + 10\log(P)$  dB or 70 dB, whichever is the lesser attenuation.

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**SPURIOUS EMISSIONS AT ANTENNA TERMINALS (CONDUCTED)**

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

**Requirements:**  $50+10\log(P_o) = 50+10\log(100) = 70 \text{ dB}$   
 $55+10\log(100) = 75 \text{ dB}$

**Test Data:**

Emission MHz	dBc	Emission MHz	dBc	Emission MHz	dBc
403.00	0	436.50	0	470.00	0
806.00	88.0	873.00	100.6	940.00	102.8
1209.00	76.0	1309.50	75.1	1410.00	78.2
1612.00	90.8	1746.00	89.7	1880.00	85.7
2015.00	93.0	2182.50	94.9	2350.00	95.3
2418.00	95.0	2619.00	95.8	2820.00	93.3
2821.00	*	3055.50	*	3290.00	*
3224.00	*	3492.00	*	3760.00	*
3627.00	*	3928.50	*	4230.00	*
4030.00	*	4365.00	*	4700.00	*

\* Emissions are in the noise level and not reported.

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 MODEL #: P10 SERIES UHF-L  
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**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)
403.00	0	0
806.00	H	105.6
1209.00	H	110.9
1612.00	V	112.7
2015.00	V	109.8
2418.00	V	108.3
2821.00	V	110.9
3224.00	H/V	*
3627.00	H/V	*
4030.00	H/V	*

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
436.50	0	0
873.00	H	108.8
1309.50	H	111.2
1746.00	H	110.1
2182.50	V	110.2
2619.00	H	107.5
3055.50	V	103.3
3492.00	H/V	*
3928.50	H/V	*
4365.00	H/V	*

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
470.00	0	0
940.00	H	115.8
1410.00	H	110.6
1880.00	H	108.3
2350.00	V	110.4
2820.00	V	111.2
3290.00	H	105.3
3760.00	H/V	*
4230.00	H/V	*
4700.00	H/V	*

\* Emissions are in the noise level and not reported.

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**POWER LINE CONDUCTED INTERFERENCE**

**Rules Part No.:** FCC Pt 15.207, IC RSS-GEN

**Requirements:**

Frequency (MHz)	Quasi Peak Limits (dBµV)	Average Limits (dBµV)
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 battery operated exclusively.