



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 PART 90 CLASS II PERMISSIVE CHANGE TEST REPORT

APPLICANT	TELTRONIC, S.A.U
	POLIGONO MALPICA CALLE F PARCELA 12 ZARAGOZA 50057 SPAIN
FCC ID	WT7PTRUNK25RF800
MODEL NUMBER	PTRUNK25RF800
PRODUCT DESCRIPTION	RF UNIT P25 BASE STATION RADIO/REPEATER
DATE SAMPLE RECEIVED	7/12/2010
DATE TESTED	7/20/2010
TESTED BY	Mario de Aranzeta
APPROVED BY	Mario de Aranzeta
TIMCO REPORT NO.	T\TELTRONIC S.A.U\1679AT10\1679AT10TestReport.doc
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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**GENERAL REMARKS**

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

The test results relate only to the items tested.

**Summary**

**This Class II change adds:**

- 1. APCO 25 phase II modulation to this already certificated product.**
- 2. low power radiated and conducted spurious emission data so that the following can be added to the grant: Output power can be adjusted in 2dB steps to 0.6 W from the value listed.**

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: 2005 requirements.



Testing Certificate # 0955-01

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:**

Mario de Aranzeta C.E.T.  
Compliance Engineer/ Lab. Supervisor

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**GENERAL INFORMATION**  
**DUT Specification**

<b>DUT Description</b>	RF UNIT P25 BASE STATION RADIO/REPEATER
<b>FCC ID</b>	WT7PTRUNK25RF800
<b>IC Certification</b>	-PTRUNK25RF800
<b>Operating Frequency Range</b>	851.01 to 868.99 MHz
<b>DUT Power Source</b>	<input type="checkbox"/> 110-120Vac/50- 60Hz
	<input checked="" type="checkbox"/> DC Power 26.4V
	<input type="checkbox"/> Battery Operated Exclusively
<b>Test Item</b>	<input type="checkbox"/> Prototype
	<input checked="" type="checkbox"/> Pre-Production
	<input type="checkbox"/> Production
<b>Type of Equipment</b>	<input checked="" type="checkbox"/> Fixed
	<input type="checkbox"/> Mobile
	<input type="checkbox"/> Portable
<b>Test Conditions</b>	The temperature was 26°C with a relative humidity of 50%.
<b>Modification to the DUT</b>	None
<b>Test Exercise</b>	The DUT was placed in continuous transmit mode.
<b>Applicable Standards</b>	ANSI/TIA 603-C:2004, FCC CFR 47 Part 90, IC RSS-119, RSS-GEN
<b>Test Facility</b>	Timco Engineering Inc. at 849 NW State Road 45 Newberry, FL 32669 USA.

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## TEST PROCEDURES

**Power Line Conducted Interference:** The procedure used was ANSI/TIA 603-C:2004 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.

**Bandwidth 20 dB:** The measurements were made with the spectrum analyzer's resolution bandwidth (RBW) = 1 MHz and the video bandwidth (VBW) = 3 MHz and the span set as shown on plot.

**Power Output:** The RF power output was measured at the antenna feed point using a peak power meter.

**Antenna Conducted Emissions:** The RBW = 100 kHz, VBW = 300 kHz and the span set to 10 MHz and the spectrum was scanned from 30 MHz to the 10<sup>th</sup> harmonic of the fundamental. Above 1 GHz the resolution bandwidth was 1 MHz and the VBW = 3 MHz and the span to 50 MHz.

**Radiation Interference:** The test procedure used was ANSI/TIA 603-C:2004 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 micro volt at the output of the antenna.

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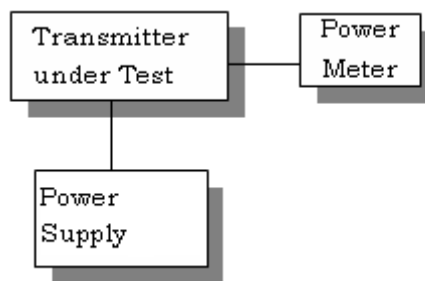
## RF POWER OUTPUT

**Rule Part No.:** FCC Part 2.1046(a), IC RSS-119 4.1 and 5.4, RSS-GEN 4.8

### Test Requirements:

**Method of Measurement:** RF power is measured by connecting a 50-ohm, resistive wattmeter to the RF output connector. With the voltage, and the transmitter properly adjusted the RF output measures:

### Test Setup Diagram:



### Test Data:

OUTPUT POWER: LOW - 0.6 Watts

### Part 2.1033 (C)(8) DC Input into the final amplifier

FOR LOW POWER SETTING INPUT POWER:  $(24.0V)(1.A) = 24 \text{ Watts}$

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## **MODULATION CHARACTERISTICS**

**Part 2.1033(c)**

**Part 2.1033(c) (4)**

**FCC Part 90.209, IC RSS-119 5.5**

**FCC Part 90.207**

Type of Emission: 8K70D7W, 8K70D7E, and 8K70D7D

This report adds APCO 25 (also named P25) phase 2 modulation to the already listed and granted modulations.

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## OCCUPIED BANDWIDTH

### **FCC Part 2.1049(c), RSS-GEN 4.6 EMISSION BANDWIDTH FCC Part 90.210(b) RSS-119 4.2 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(g) Emission Mask G Not Equipped with a Low Pass Filter**

For transmitters that are not equipped with an audio low pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) 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 10 kHz, but not more than 250% of the authorized bandwidth: At least  $116 \log(f_d/6.1)$ dB or  $50 + 10\log(P)$  dB, or 70 dB, whichever is the lesser attenuation;
- (2) 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(h) Emission Mask H - Not Equipped with a Low Pass Filter**

For transmitters that are not equipped with an audio low pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as follows;

- (1) On any frequency from the center of the authorized bandwidth ( $f_d$  in kHz) of 4 kHz or less: Zero dB.
- (2) On any frequency from the center of the authorized bandwidth by a displacement frequency ( $f_d$  in kHz) of more than 4 kHz but no more than 8.5 kHz: At least  $107 \log(f_d/4)$  dB.
- (3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $f_d$  in kHz) of more than 8.5 kHz, but no more than 15 kHz: At least  $40.5 \log(f_d/1.16)$  dB;
- (4) On any frequency from the center of the authorized bandwidth by a displacement frequency ( $f_d$  in kHz) of more than 15 kHz, but no more than 25 kHz: At least  $116 \log(f_d/6.1)$  dB.
- (5) On any frequency from the center of the authorized bandwidth by a displacement frequency ( $f_d$  in kHz) of more than 25 kHz: At least  $43 + \log(P)$  dB.

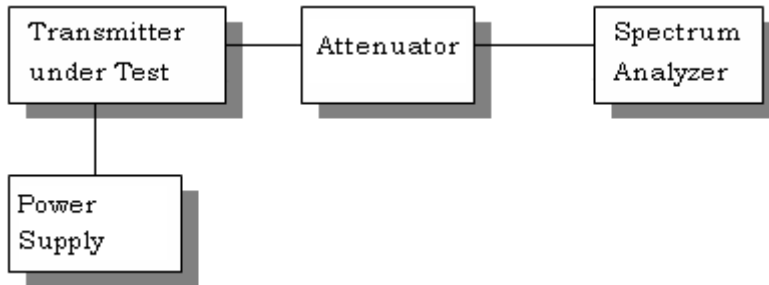


**OCCUPIED BANDWIDTH MEASUREMENT**

**Test procedure:** ANSI/TIA-603-C:2004 para 2.2.11.

**Test Setup Diagram:**

**OCCUPIED BANDWIDTH MEASUREMENT**

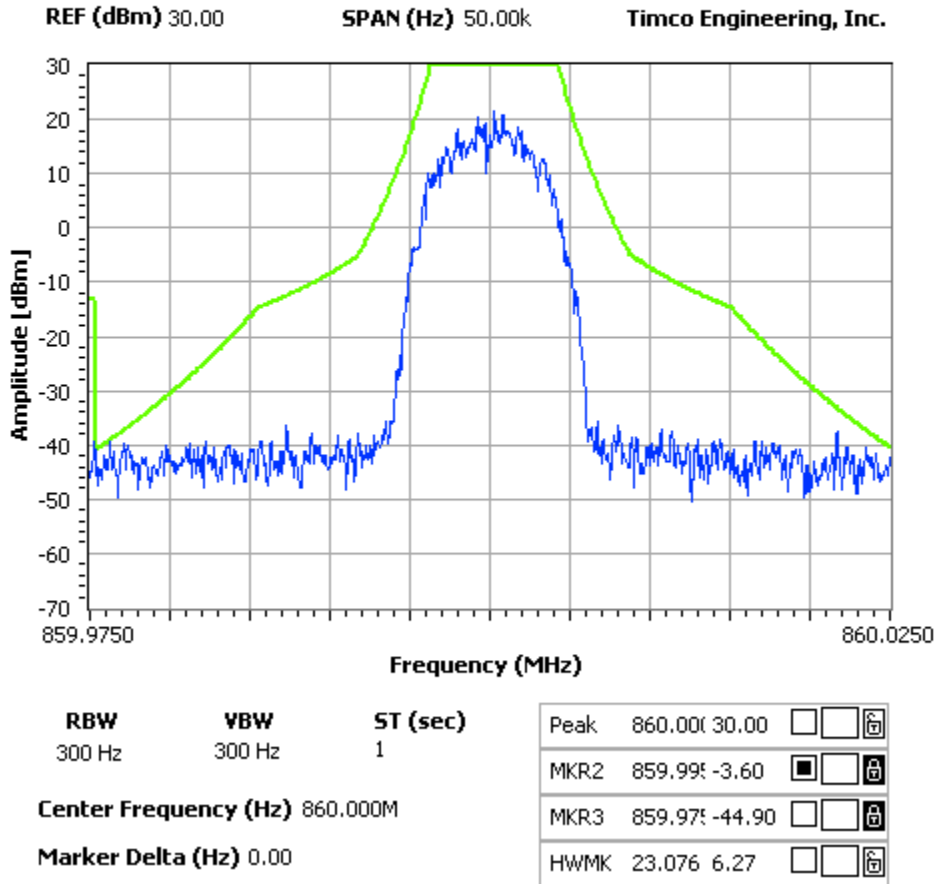


**Test Data:** See the plots below

Mask H Low Power

NOTES:

FCC 90.210 Mask H

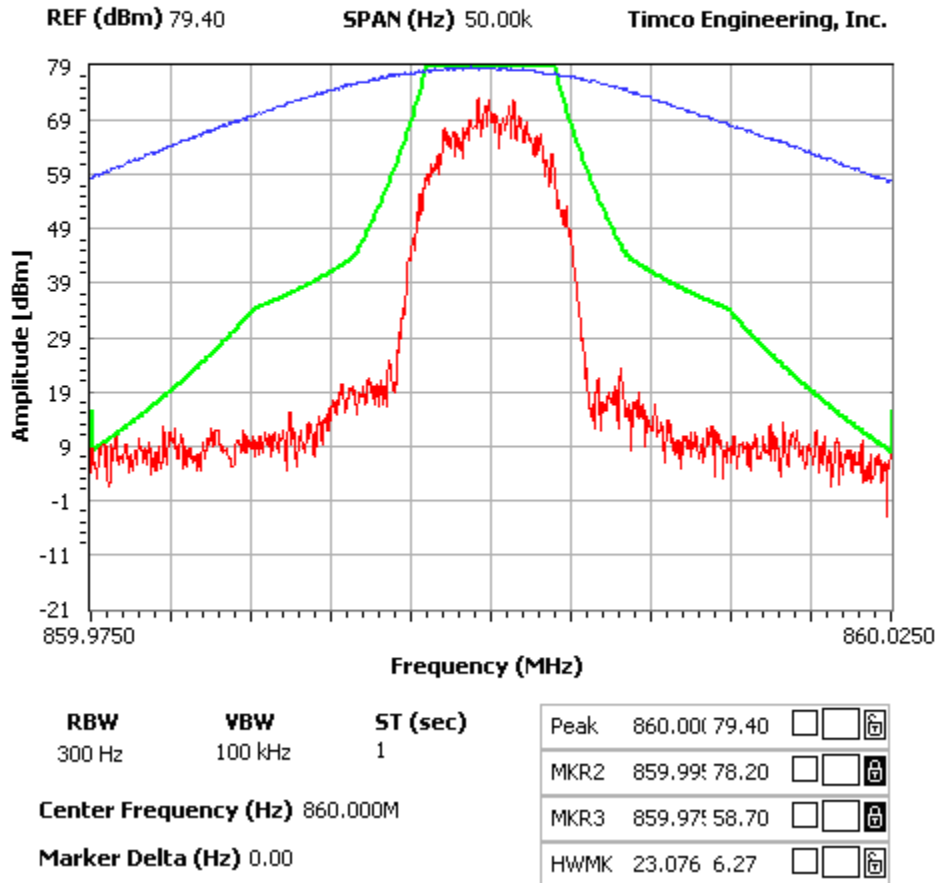


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Mask H High Power

NOTES:

FCC 90.210 Mask H

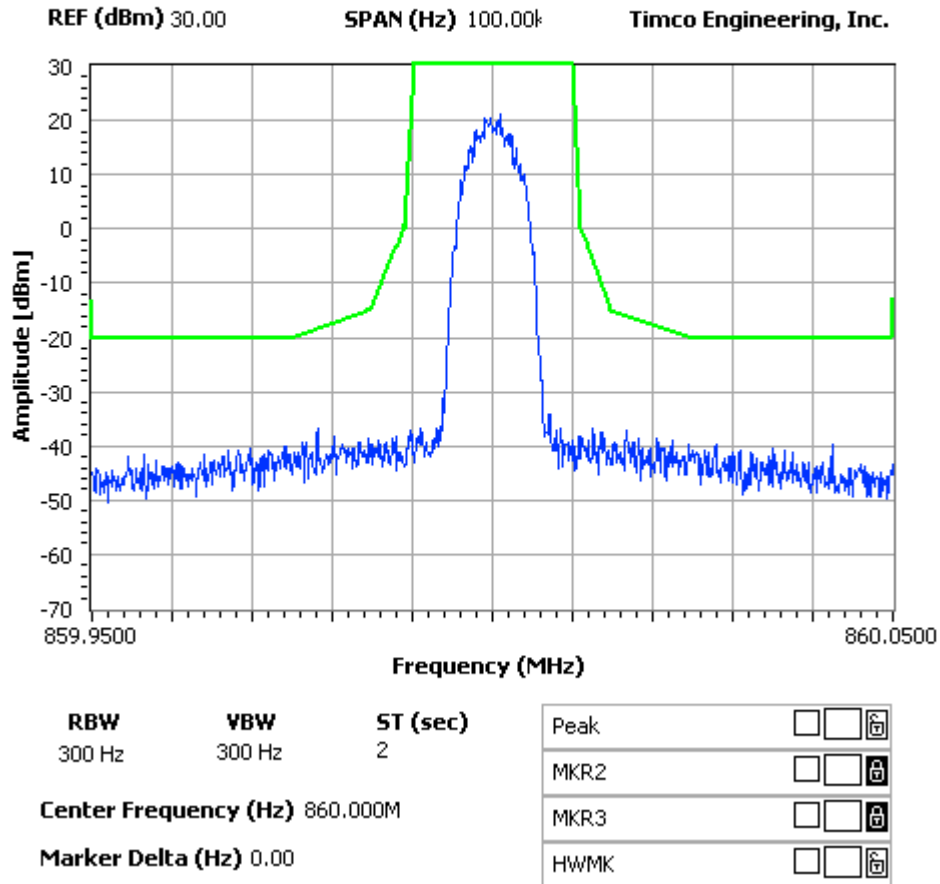


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Mask G Low Power

NOTES:

**Mask G**

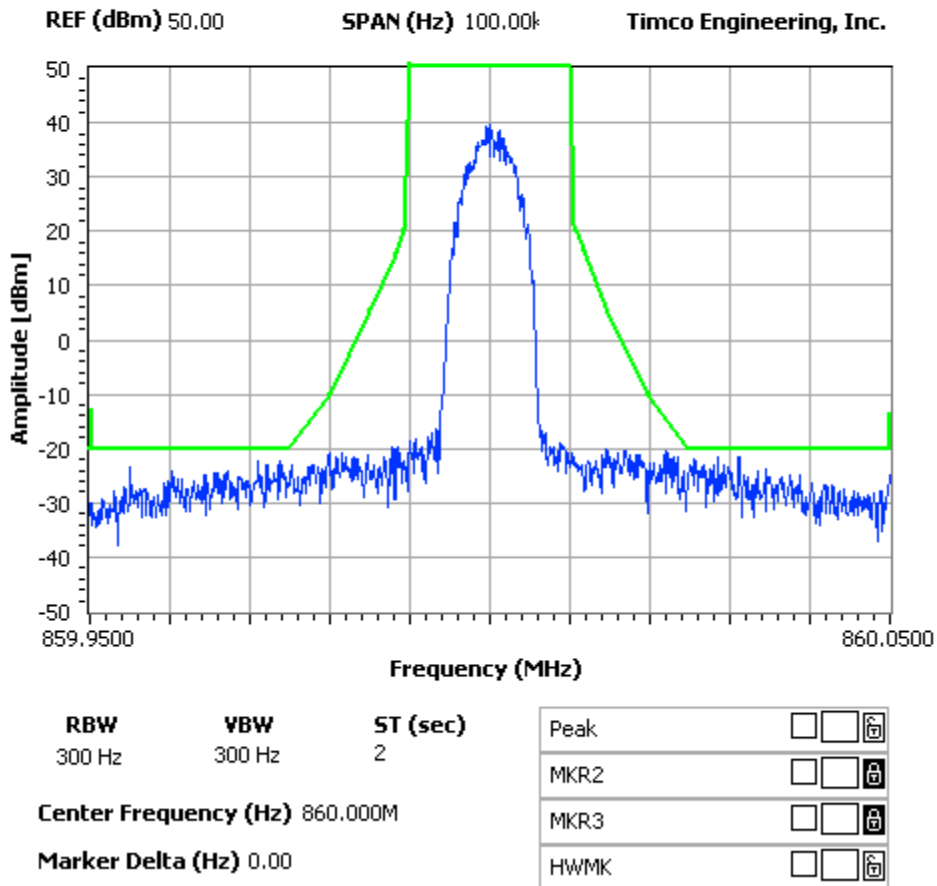


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Mask G High Power

NOTES:

Mask G



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

**Rule Part No.:** FCC Part 2.1051(a), RSS-GEN 7.1.4

**Requirements:**

25kHz Channel Spacing = - 13 dBm  
 12.5kHz Spacing = N/A  
 6.25kHz Channel Spacing = N/A

**Method of Measurement:** The spectrum was scanned from 0.4 to at least the 10th harmonic of the fundamental. The measurements were made in accordance with standard ANSI/TIA 603-C:2004.

The measurement has been carried out with the equipment operating with low power output mode: 0.6W = +28dBm.

According to the limits of the D mask for the aforementioned power, the reference level for the spurious conducted emissions is: -40.78dBc.

Focusing on the specific value of the carrier, that is -28dBm, the absolute limit turns into: - 12.78dBm (≈-13dBm)

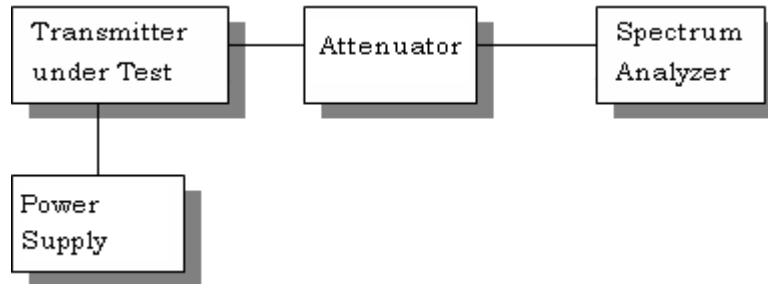
**Test Data:**

<b>TF LOW POWER</b>	<b>EF</b>	<b>dB below carrier</b>
851	851	0
	1704	73
	2556	80
860	860	0
	1720	70
	2580	80
	3440	77
868.9	868.9	0
	1738	71
	2607	76

Harmonics not listed were not seen.

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### Method of Measuring Conducted Spurious Emissions



**METHOD OF MEASUREMENT:** The procedure used was ANSI/TIA 603-C:2004. The measurements were made at TIMCO ENGINEERING INC. 849 N.W. State Road 45, Newberry, Florida 32669.

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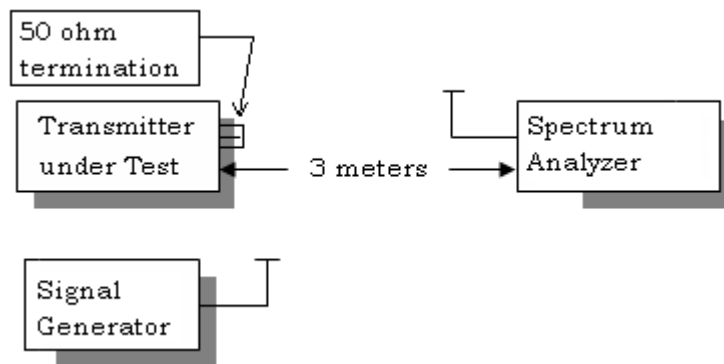
**FIELD STRENGTH OF SPURIOUS EMISSIONS**

**Rule Parts. No.:** FCC Part 2.1053, RSS-GEN 4.9

**Requirements:** The FCC limits for radiated emissions are the same as previously stated for the conducted emissions.

**METHOD OF MEASUREMENT:** The tabulated data shows the results of the radiated field strength emissions test. 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. Measurements were made at the test site of TIMCO ENGINEERING, INC. located at 849 NW State Road 45, Newberry, FL 32669.

**Test Setup Diagram:**





**Test Data:**

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
852.00	0	0
1704.00	H	82.0
2556.00	V	70.54
3408.00	V	68.4
4260.00	H	68.8
5112.00	H	70.6
5964.00	H	73.8
6816.00	H	74.2
7668.00		NF
8520.00		NF

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
860.00	0	0
1720.00	H	80.4
2580.00	V	67.9
3440.00	H	68.6
4300.00	V	69.8
5160.00	V	75.5
6020.00	H	71
6880.00	H	73.1
7740.00		NF
8600.00		NF

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Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
868.95	0	0
1737.90	H	77.6
2606.85	V	65.50
3475.80	V	71.3
4344.75	H	73.4
5213.70	V	74.9
6082.65	H	68.7
6951.60		NF
7820.55		NF
8689.50		NF

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## EMC EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
3-Meter Semi-Anechoic Chamber	Panashield	N/A	N/A	Listed 3/10/10	3/10/12
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
Frequency Counter	HP	5385A	3242A07460	CAL 5/26/09	5/26/11
Hygro-Thermometer	Extech	445703	0602	CAL 1/30/09	1/30/11
Modulation Analyzer	HP	8901A	3435A06868	CAL 5/26/09	5/26/11
Digital Multimeter	Fluke	FLUKE-77-3	79510405	CAL 5/18/09	5/18/11
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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