



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)

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## FCC PART 90 CLASS II PERMISSIVE CHANGE TEST REPORT

<b>APPLICANT</b>	MIDLAND RADIO CORPORATION
	5900 PARRETTA DRIVE KANSAS CITY MISSOURI 64120 USA
<b>FCC ID</b>	MMA914100B
<b>MODEL NUMBER</b>	914100B
<b>PRODUCT DESCRIPTION</b>	BASE STATION
<b>DATE SAMPLE RECEIVED</b>	10/6/2011
<b>DATE TESTED</b>	10/10/2011
<b>TESTED BY</b>	Joe Scoglio
<b>APPROVED BY</b>	Mario R. de Aranzeta
<b>TIMCO REPORT NO.</b>	2312UT11TestReport.doc
<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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## 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

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

**Date:** 10/10/2011

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

<b>DUT Description</b>	BASE STATION
<b>FCC ID</b>	MMA914100B
<b>Model Number</b>	914100B
<b>Serial Number</b>	N/A
<b>DUT Power Source</b>	<input type="checkbox"/> 110–120Vac/50– 60Hz
	<input checked="" type="checkbox"/> DC Power 12V
	<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 a nominal battery voltage and the transmitter properly adjusted the RF output measures:

### Test Setup Diagram:



### Test Data:

OUTPUT POWER:

LOW – 2Watts

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## SPURIOUS EMISSIONS AT ANTENNA TERMINALS (CONDUCTED)

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

**Requirements:** 25 kHz Channel Spacing = 46.0 dBc (for 2 Watts)

**Method of Measurement:** The carrier was modulated 100% using a 2500 Hz tone. 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.

FCC Limit for:

25 kHz Channel Spacing = 46.0  
 12.5 kHz Spacing = 53.0  
 6.25 kHz Channel Spacing = N/A

### Test Data:

<b>TF LOW POWER</b>	<b>EF</b>	<b>dB below carrier</b>
440.1	440.1	0
	880.2	66.7
	1320.3	97.2
	1760.4	101
	2200.5	103.6
	2640.6	106.9
	3080.7	109.7
	3520.8	104.6
	3960.9	114.6
	4401	112.2

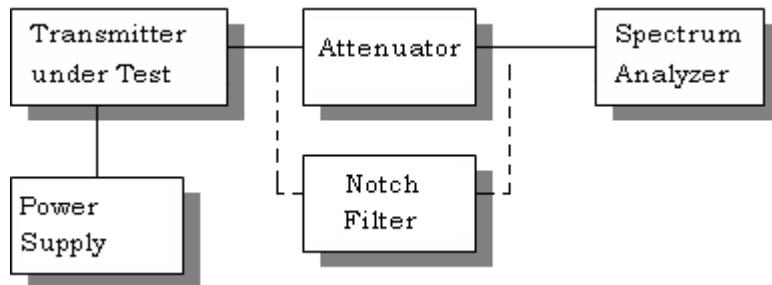
<b>TF LOW POWER</b>	<b>EF</b>	<b>dB below carrier</b>
457.5	457.5	0
	915	74
	1372.5	89
	1830	103.4
	2287.5	101.2
	2745	112.1
	3202.5	108.7
	3600	118.9
	4117.5	117.2
	4575	118.4

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<b>TF LOW POWER</b>	<b>EF</b>	<b>dB below carrier</b>
474.9	474.9	0
	949.9	89.3
	1424.8	89.9
	1899.8	89.9
	2374.7	103.2
	2849.7	99.9
	3324.6	113.8
	3799.6	114.9
	4274.5	113.6
	4749.5	109

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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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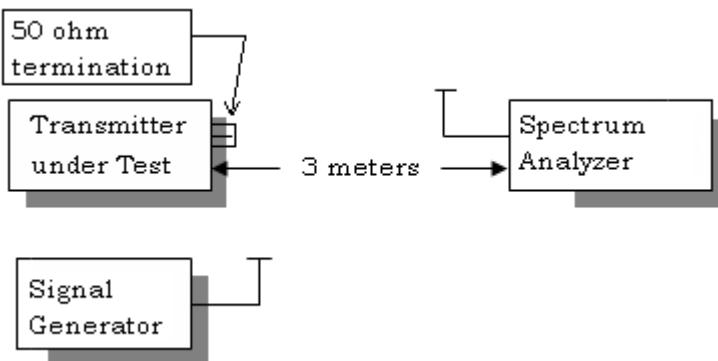
## FIELD STRENGTH OF SPURIOUS EMISSIONS

**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:



Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
440.10	0	0
880.20	V	78.21
1320.30	V	86.88
1760.40	H	83.77
2200.50	V	79.83
2640.60	V	84.27
3080.70	V	81.47
3520.80	V	86.79
4401.00	H	84.73

**Test Data Contd.**

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
457.50	0	0
915.00	V	91.99
1372.50	V	85.96
1830.00	V	78.79
2287.50	V	84.69
2745.00	H	93.20
3202.50	V	81.41
3660.00	H	90.43
4117.50	H	82.87
4575.00	V	86.94

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
474.90	0	0
949.90	V	95.67
1424.80	V	81.43
1899.80	V	71.43
2374.70	V	76.93
2849.70	V	83.93
3324.60	V	80.82
4274.50	H	86.69

**EMC EQUIPMENT LIST**

<b>Device</b>	<b>Manufacturer</b>	<b>Model</b>	<b>Serial Number</b>	<b>Cal/Char Date</b>	<b>Due Date</b>
3-Meter Semi-Anechoic Chamber	Panashield	N/A	N/A	Listed 5/10/10	5/10/12
AC Voltmeter	HP	400FL	2213A14499	CAL 6/12/11	6/12/13
Antenna: Active Loop	ETS-Lindgren	6502	00062529	CAL 9/23/10	9/23/12
Antenna: Passive Loop	EMC Test Systems	EMCO 6512	9706-1211	CAL 10/1/09	10/2/11
Frequency Counter	HP	5385A	2730A03025	CAL 8/17/11	8/17/13
Hygro-Thermometer	Extech	445703	0602	CAL 6/15/11	6/15/13
Modulation Analyzer	HP	8901A	3435A06868	CAL 7/18/11	7/18/13
Digital Multimeter	Fluke	FLUKE-77	35053830	CAL 9/9/11	9/9/13
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
Antenna	ETS	3117	41534	9/22/2010	9/22/2012
Antenna	Electro metrics	LPA-25	1122	5/04/2011	5/04/2013
Antenna	Electro metrics	BIA-25	1171	1/15/2010	1/15/2012

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