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## FCC PART 90

### PERMISSIVE CHANGE TEST REPORT

APPLICANT	MIDLAND RADIO CORP.
	1120 CLAY STREET NORTH
	KANSAS CITY, MISSOURI 64116 USA
FCC ID	O7KPL5164
MODEL NUMBER	PL5164
PRODUCT DESCRIPTION	Handheld UHF RADIO
DATE SAMPLE RECEIVED	9/20/2006
DATE TESTED	9/26/06
TESTED BY	Richard Block
APPROVED BY	Mario de Aranzeta
TIMCO REPORT NO.	2677UT6TestReport
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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## STATEMENT OF COMPLIANCE

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 and demonstrate that the equipment complies with the appropriate standards. No modifications were made to the equipment during testing in order to demonstrate compliance with these standards.

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.



Certificate #0955-01

**Authorized by:** Mario de Aranzeta

**Signature:** on file

**Function:** Engineer

**Date:** 9/28/06

**Tested by:** Richard Block

**Signature:** on file

**Date:** 9/28/06

## **REPORT SUMMARY**

Purpose of Report: The tests were performed on a sample of the equipment to demonstrate compliance with FCC Part 90.

Radiated emissions and frequency stability tests were performed based upon a qualified permissive change request made on previously certificated equipment.

Applicable Standard(s): FCC Part 90, Part 2, ANSI C63.4: 2003, EIA/TIA 603

Test Result: The test results relate only to the items tested.

## **TEST ENVIRONMENT**

Test Facilities: All measurements were made at one or more of the test sites of TIMCO ENGINEERING INC. located at 849 N.W. State Road 45, Newberry, FL 32669.

The test site information is on file with FCC.

Test Conditions: Temperature - 78°F, Relative humidity -55%

Deviation to the procedures: No deviation

## **TEST SYSTEM**

Description of certified system: Handheld UHF Transceiver

Support Equipment: N/A

Test Exercise: The EUT was set in continuous transmit mode of operation.

Modification: No modification was made to ensure the equipment in compliance with applicable requirements.

## **EQUIPMENT UNDER TEST**

Manufacturer: Midland Radio Corp.  
FCC ID: O7KPL5164  
Model Number: PL5164  
Serial Number: N/A  
Product Description: UHF Handheld transceiver  
Operating Frequency: 450 ~ 490 MHz  
Type of Modulation: FM  
Emission Designator(s): 16K0F3E  
11K0F3E  
Power Source: Battery operated exclusively  
Test Item: Pre-Production  
Type of Equipment: Handheld  
Antenna: flexible removable helical whip

## TEST PROCEDURE

(as applicable)

**Bandwidth 20 dB:** The measurements were made with the spectrum analyzer's resolution bandwidth (RBW) = 300 Hz and the video bandwidth (VBW)  $\geq$  RBW 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 span was changed to 50 MHz.

**Radiation Interference:** The test procedure used was ANSI standard C63.4-2003 using an Agilent spectrum receiver with preselector. 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 was always set to be  $\geq$  RBW. The analyzer was calibrated in dB above a microvolt at the output of the antenna.

## FIELD STRENGTH OF SPURIOUS EMISSIONS

**Rule Parts. No.:** Part 2.1053

**Requirements:** 25 kHz Channel Spacing =  $43 + 10\log(P_o)$   
 12.5 kHz Spacing =  $50 + 10\log(P_o) = 57$  dB

### Test Data:

High Power – 5 W								
Low Channel			Mid Channel			High Channel		
Emission Frequency MHz	Ant. Polarity V/H	dB Below Carrier (dBc)	Emission Frequency MHz	Ant. Polarity V/H	dB Below Carrier (dBc)	Emission Frequency MHz	Ant. Polarity V/H	dB Below Carrier (dBc)
450.00	0	0.0	470.00	0	0.0	490.00	0	0.0
900.00	V	57.9	940.00	V	59.5	980.00	V	57.1
1350.00	V	57.1	1410.00	V	62.9	1470.00	V	65.9
1800.00	V	60.0	1880.00	V	58.5	1960.00	H	77.0
2250.00	H	73.9	2350.00	H	74.0	2450.00	H	70.3
2700.00	H	76.9	2820.00	H	78.6	2940.00	H	79.3
3150.00	H	86.5	3290.00	V	81.1	3430.00	V	87.6
3600.00	V	77.4	3760.00	V	77.2	3920.00	V	78.7
4050.00	H	81.3	4230.00	H	77.6	4410.00	V	78.4
4500.00	V	74.3	4700.00	V	77.6	4900.00	V	85.8

Low Power – 1W								
Low Channel			Mid Channel			High Channel		
Emission Frequency MHz	Ant. Polarity V/H	dB Below Carrier (dBc)	Emission Frequency MHz	Ant. Polarity V/H	dB Below Carrier (dBc)	Emission Frequency MHz	Ant. Polarity V/H	dB Below Carrier (dBc)
450.00	0	0.0	470.00	0	0.0	490.00	0	0.0
900.00	V	59.2	940.00	V	61.2	980.00	V	61.9
1350.00	V	69.0	1410.00	V	67.9	1470.00	V	72.7
1800.00	V	59.3	1880.00	H	61.5	1960.00	H	71.3
2250.00	H	73.9	2350.00	H	74.4	2450.00	H	73.5
2700.00	H	77.0	2820.00	H	79.0	2940.00	H	82.5
3150.00	H	80.3	3290.00	V	73.5	3430.00	V	80.7
3600.00	V	77.0	3760.00	V	75.4	3920.00	V	73.4
4050.00	V	69.0	4230.00	V	69.1	4410.00	V	73.9
4500.00	V	75.9	4700.00	H	76.7	4900.00	V	79.1



## FREQUENCY STABILITY

**Rule Parts. No.:** Part 2.1055, Part 90.213

**Requirements:** Temperature range requirements: -30 to +50° C.  
Voltage Variation -15%

### Test Data:

Assigned Frequency (Ref. Frequency) (MHz): 470.013175 MHz		
Temperature (°C)	Frequency (MHz)	Frequency Stability (PPM)
-30	470.012588	-1.25
-20	470.013620	0.95
-10	470.013747	1.22
0	470.013493	0.68
+10	470.013319	0.31
+20	470.013175	0.00
+30	470.012974	-0.43
+40	470.012771	-0.86
+50	470.012558	-1.31

Assigned Frequency (Ref. Frequency) (MHz): 470.013175 MHz		
% Battery	Frequency (MHz)	Frequency Stability (PPM)
-15%	470.013135	-0.09
0	470.013175	0.00
+15%	470.013184	0.02

## **RADIATED EMISSIONS TEST SETUP PHOTOS**

