

# TIMCO ENGINEERING INC.

849 NW State Road 45

Newberry, Florida 32669

<http://www.timcoengr.com>

888.472.2424 F 352.472.2030 email: [sid@timcoengr.com](mailto:sid@timcoengr.com)



## Test Report

Product Name: TRANSMITTER

FCC ID: BZB31LTH

Applicant:

**AZDEN CORPORATION  
147 NEW HYDE PARK ROAD  
FRANKLIN SQUARE, NY 11010**

**Date Receipt: MARCH 12, 2004**

**Date Tested: APRIL 8, 2004**

APPLICANT: AZDEN CORPORATION

FCC ID: BZB31LTH

REPORT #: A\AZDEN\335YUT4\335YUT4TestReport.doc

COVER SHEET

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### EXHIBITS CONTAINING:

BLOCK DIAGRAM  
SCHEMATIC  
PARTS LIST  
USERS MANUAL  
LABEL SAMPLE  
LABEL LOCATION  
EXTERNAL PHOTOGRAPHS  
INTERNAL PHOTOGRAPHS  
ALIGNMENT PROCEDURE  
CIRCUIT DESCRIPTION  
TEST SET UP PHOTOGRAPH

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## GENERAL INFORMATION REQUIRED FOR TYPE ACCEPTANCE

2.1033(c)(1)(2) AZDEN CORPORATION will manufacture the FCCID:  
BZB31LTH LPRS RADIO in quantity, for use under  
FCC RULES PART 95.

AZDEN CORPORATION  
147 NEW HYDE PARK ROAD  
FRANKLIN SQUARE NY 11010

2.1033(c) **TECHNICAL DESCRIPTION**

2.1033(c)(3) Instruction book. A draft copy of the instruction  
manual is included in the exhibits.

2.1033(c)(4) Type of Emission: 4K0F3E  
95.631

Bn = 2M + 2DK  
M = 1 kHz  
D = 1 kHz  
Bn = 2(1) + 2(1k) = 4 K

Authorized Bandwidth 4 kHz

2.1033(c)(5) Frequency Range: 216.0025 - 216.9975 MHz  
95.629

2.1033(c)(6)(7) Power Output shall not exceed 100 mW effective  
95.639 radiated power. There can be no provisions for  
95.649 increasing the power or varying the power.

95.1013(c) The antenna is an integral part to the unit it cannot  
be removed without rendering the unit inoperative.  
In order to remove the antenna the case must  
unscrewed, then the PCB assemblies must be removed  
then the antenna can be removed.

2.1033(c)(8) DC Voltages and Current into Final Amplifier:

### **FINAL AMPLIFIER ONLY**

Vce = 9.0 Volts  
Ice = 0.035 A.

Pin = .0315 Watts

2.1033(c)(9) Tune-up procedure. The tune-up procedure is included  
in the exhibits.

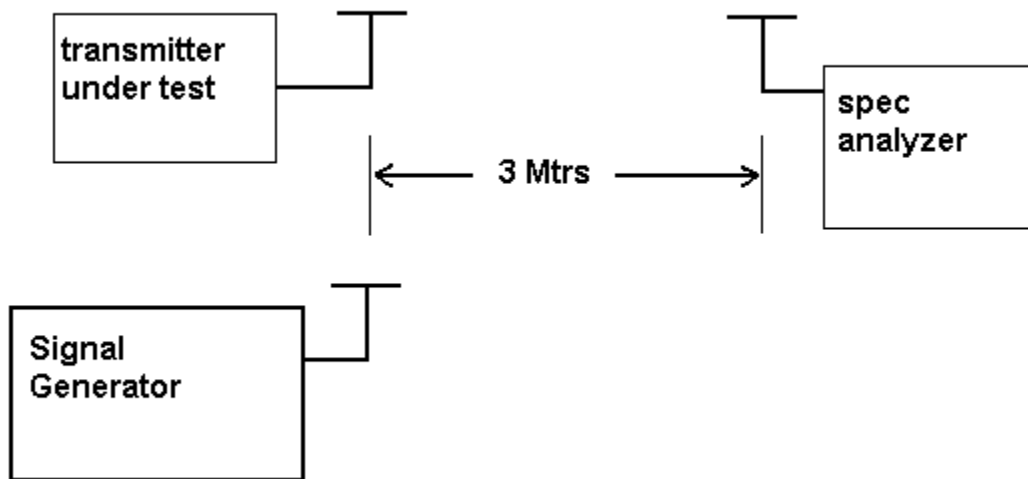
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- 2.1033(c)(10) Complete Circuit Diagrams: The circuit diagram and block diagram are included in the exhibits.
- 2.1033(c)(11) A photograph or a drawing of the equipment identification label is included in the exhibits.
- 2.1033(c)(12) Photographs(8"X10") of the equipment of sufficient clarity to reveal equipment construction and layout, including meters, labels for controls, including any view under shields - See the Exhibits.
- 2.1033(c)(13) Digital modulation is not allowed.
- 2.1033(c)(14) The data required by 2.1046 through 2.1057 is submitted below.
- 2.1046(a) **RF power output**
- 95.1013(a) RF power is measured by measuring the radiated power at 3 meters and then replacing the transmitter with a signal generator to determine the effective radiated power. The ERP shall not exceed 100 mW ERP.

OUTPUT POWER: .042 Watts



Equipment placed 80 cm above ground  
on a rotatable platform.

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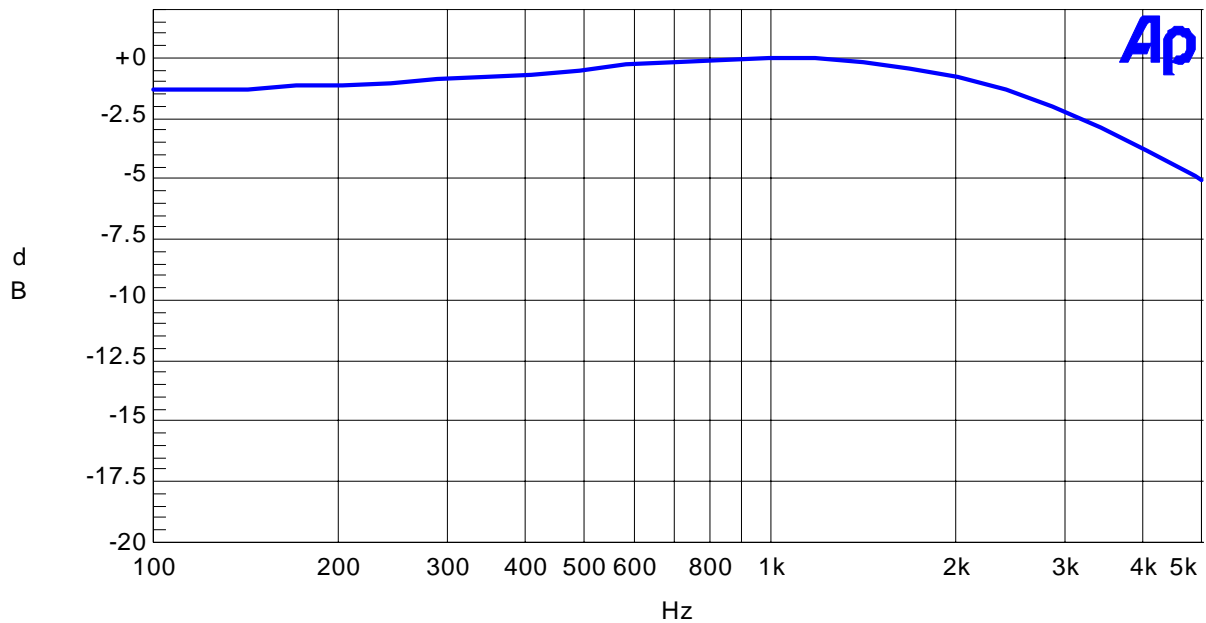
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2.1047(a)(b) Modulation characteristics:

## AUDIO FREQUENCY RESPONSE

The audio frequency response was measured in accordance with TIA/EIA Specification 603. The audio frequency response curve is shown below. The audio signal was fed into a dummy microphone circuit and into the microphone connector. The input required to produce 30 percent modulation level was measured.

### Audio Frequency Response Plot



Color	Line Style	Thick	Data	Axis
Blue	Solid	2	AnIr.Level A!Normalize	Left

MaxFreq.at1

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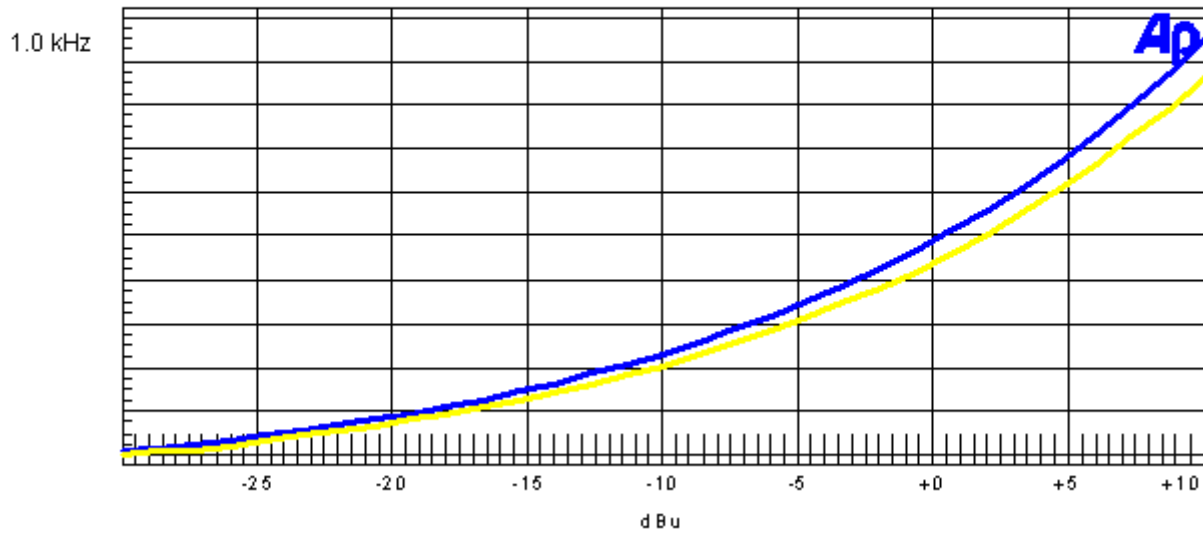
2.1047(b)

## Audio input versus modulation

The audio input level needed for a particular percentage of modulation was measured in accordance with TIA/EIA Specification 603. The audio input curves versus modulation are shown below. Curves are provided for audio input frequencies of 300 and 1000 Hz.

Modulation Limiting Plots:

1 KHz (Blue), and 300 Hz (Yellow)



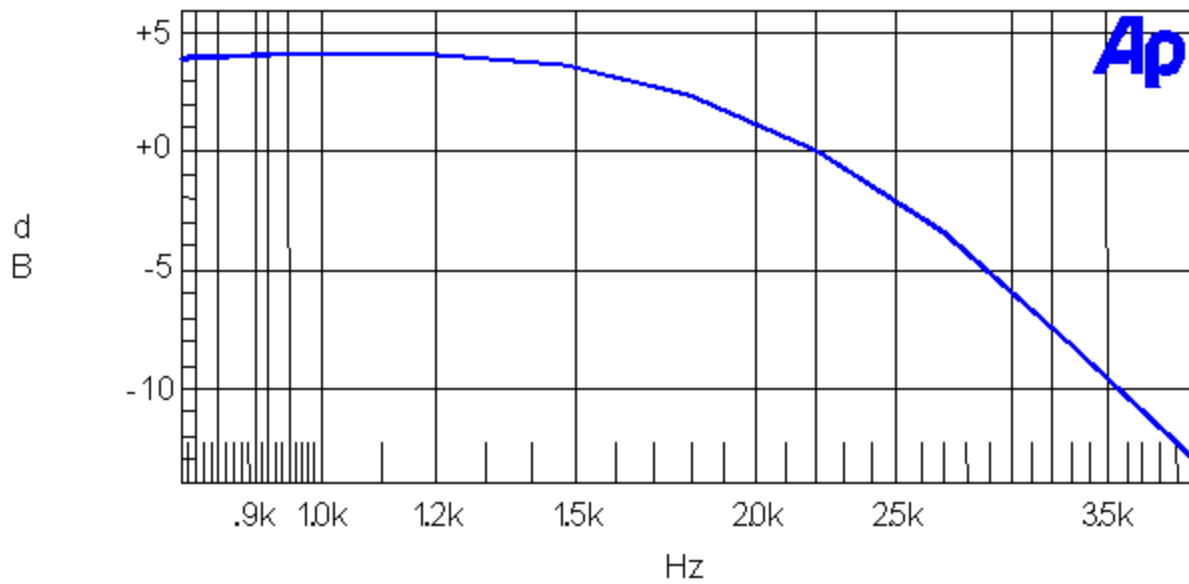
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## Post Limiter Filter

See the plot below.

### Audio Low Pass Filter



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2.1049(c) EMISSION BANDWIDTH:

95.635(c)

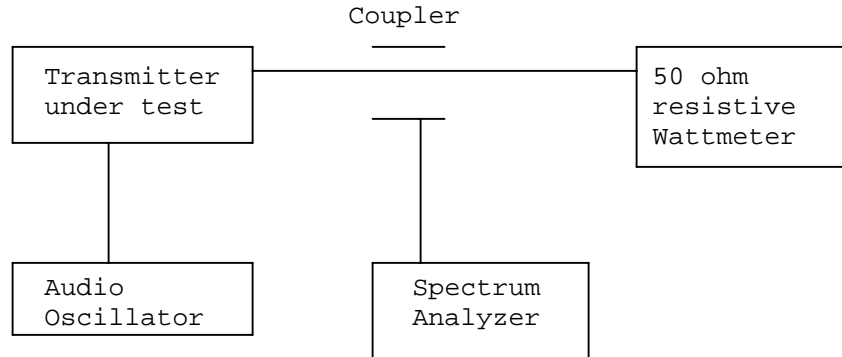
(3) Emissions for LPRS transmitters operating on narrowband channels (5 kHz) shall be attenuated below the power (P) of the highest emission, measured in peak values, contained within the authorized bandwidth (4 kHz) in accordance with the following:

- (i) On any frequency within the authorized bandwidth: Zero dB;
- (ii) On any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $f_d$  in kHz) of more than 2 kHz up to and including 3.75 kHz: The lesser of  $30 + 20(f_d - 2)$  dB, or  $55 + 10\log(P)$ , or 65 dB; and
- (iii) On any frequency beyond 3.75 kHz removed from the center of the authorized bandwidth: At least  $55 + 10\log(P)$  dB.

Radiotelephone transmitter with modulation limiter.

Test procedure diagram

## OCCUPIED BANDWIDTH MEASUREMENT



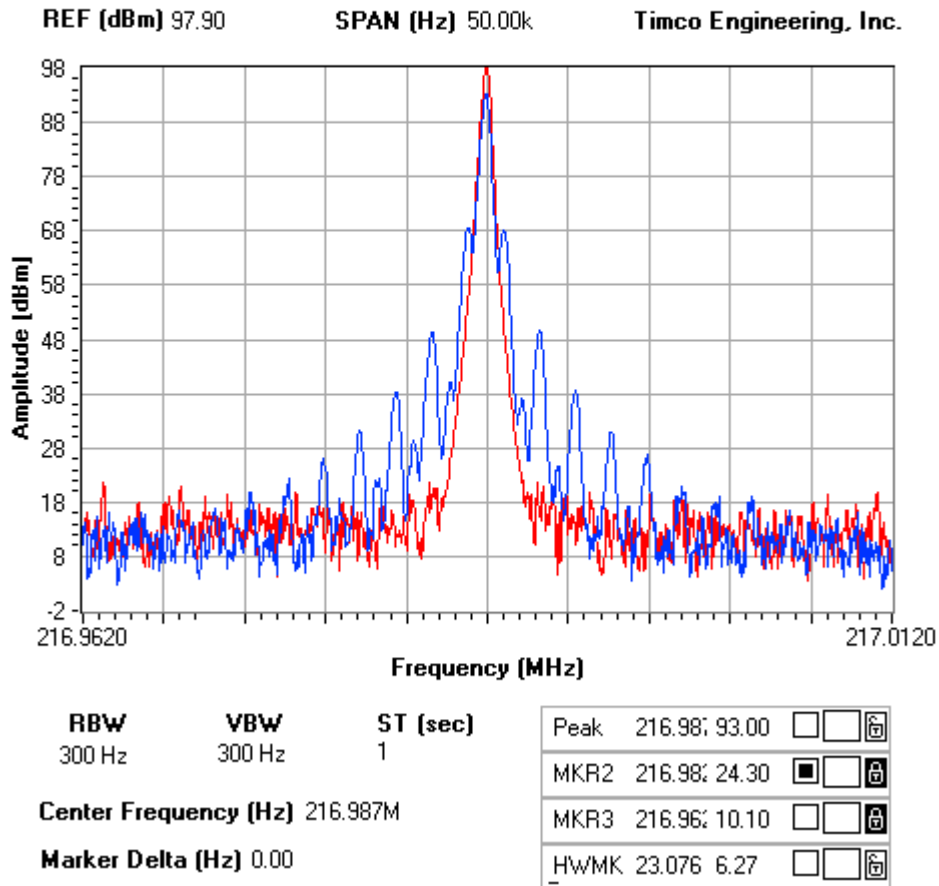


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## OCCUPIED BANDWIDTH

### NOTES:



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2.1051 SPURIOUS EMISSIONS AT ANTENNA TERMINALS  
NOT APPLICABLE, NO antenna port. This UUT has a permanently attached antenna.

2.1053 UNWANTED RADIATION 216.01 MHz:  
95.635(c)(1)

**REQUIREMENTS:** Emissions must be attenuated by at least the following below the output of the transmitter.

$$55 + 10\log(.042) = 41 \text{ dB}$$

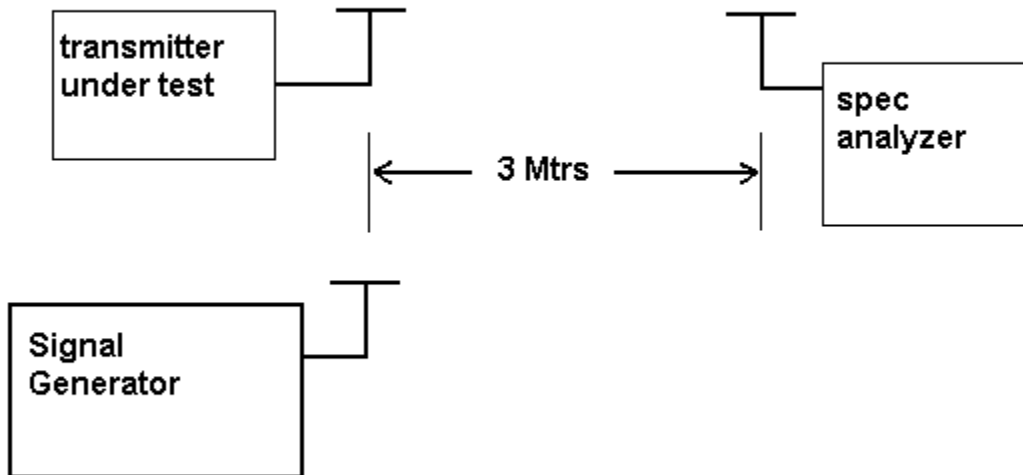
**TEST DATA:**

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
216.01	H	0
432.02	H	69.95
648.03	H	69.35
864.04	H	68.94
1080.05	V	43.75
1296.06	V	44.83
1512.07	H	58.54
1728.08	V	45.52
1944.09	V	41.98
2160.10	V	41.63

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## Method of Measuring Radiated Spurious Emissions



**METHOD OF MEASUREMENT:** The tabulated data shows the results of the radiated field strength of emissions test. The spectrum was scanned from 30 to at least the tenth harmonic of the fundamental. This test was conducted per TIA/EIA STANDARD 603 using the substitution method. Measurements were made at the open field test site of TIMCO ENGINEERING, INC. located at 849 NW State Road 45, Newberry, FL 32669.

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## 2.1055 Frequency stability:

Temperature and voltage tests were performed to verify that the frequency remains within the 0.0050%, 50 ppm specification limit. The test was conducted as follows: The transmitter was placed in the temperature chamber at 25 degrees C and allowed to stabilize for one hour. The transmitter was keyed ON for one minute during which four frequency readings were recorded at 15 second intervals. The worse case number was taken for temperature plotting. The assigned channel frequency was considered to be the reference frequency. The temperature was then reduced to -30 degrees C after which the transmitter was again allowed to stabilize for one hour. The transmitter was keyed ON for one minute, and again frequency readings were noted at 15 second intervals. The worst-case number was recorded for temperature plotting. This procedure was repeated in 10 degree increments up to + 50 degrees C.

Readings were also taken at plus and minus 15% of the battery voltage of 9 VDC.

### MEASUREMENT DATA:

Assigned Frequency (Ref. Frequency): 216.011 816 MHz

<u>TEMPERATURE_C</u>	<u>FREQUENCY_MHz</u>	<u>PPM</u>
REFERENCE	216.011 816	0.0
-30	216.010 062	-8.12
-20	216.011 532	-1.31
-10	216.013 159	6.22
0	216.013 008	5.52
+10	216.012 714	4.16
+20	216.011 406	-1.90
+30	216.010 194	-7.51
+40	216.009 725	-9.68
+50	216.007 702	-19.05

	<u>VOLTS</u>	<u>Batt. Data</u>	<u>Batt. PPM</u>
End-Point	7.65	216.012 133	1.47

**RESULTS OF MEASUREMENTS:** The test results indicates that the EUT meets the requirements.

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## EMC Equipment List

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
3/10-Meter OATS	TEI	N/A	N/A	Listed 3/26/01	3/26/04
3-Meter OATS	TEI	N/A	N/A	Listed 1/13/03	1/13/06
Biconnical Antenna	Eaton	94455-1	1057	CAL 3/18/03	3/18/05
Biconnical Antenna	Eaton	94455-1	1096	CAL 10/1/01	10/1/03
Biconnical Antenna	Electro- Metrics	BIA-25	1171	CAL 4/26/01	4/26/03
Blue Tower Quasi-Peak Adapter	HP	85650A	2811A01279	CAL 4/15/03	4/15/05
Blue Tower RF Preselector	HP	85685A	2926A00983	CAL 4/15/03	4/15/05
Blue Tower Spectrum Analyzer	HP	8568B	2928A04729 2848A18049	CAL 4/15/03	4/15/05
LISN	Electro- Metrics	ANS-25/2	2604	CAL 10/9/01	10/9/03
LISN	Electro- Metrics	EM-7820	2682	CAL 3/12/03	3/12/05
Log-Periodic Antenna	Eaton	96005	1243	CAL 5/8/03	5/8/05

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