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

Test Report

Product Name: BELTPACK TRANSMITTER

FCC ID: JFZT701

Applicant:

AUDIO TECHNICA CORPORATION
2206 NARUSE, MACHIDA
TOKYO 194
JAPAN

Date Receipt: 5/23/2006

Date Tested: 7/6/2006

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

TABLE OF CONTENTS LIST

TEST REPORT CONTAINING:

EXHIBITS CONTAINING:

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

GENERAL INFORMATION REQUIRED
FOR TYPE ACCEPTANCE

2.1033 AUDIO TECHNICA CORPORATION will manufacture the
2.1034 FCC ID: JFZT701 in quantity, for use under FCC RULES PART 74.801, LOW POWER AUXILIARY STATIONS.

2.1033 (C4) TECHNICAL DESCRIPTION

(1) Type of Emission: 96KF3E

Bn = 2M + 2DK
M = 10000
D = 28 kHz (Peak Deviation)
K = 1
Bn = 2(10K) + 2(28K)(1) = 76K

ALLOWED AUTHORIZED BANDWIDTH = 200 kHz.
74.861(e)(5)

(2) Frequency Range: Part 74: 542 – 561 MHz
TEST FREQ = 542, 552, 561.

(3) Power Range and Controls: Unit has no controls.

(4) Maximum Output Power Rating: PWR: ERP

High Power .006W ERP
Low Power .002W ERP

(5) DC Voltages and Current into Final Amplifier:

FINAL AMPLIFIER ONLY
3.0V BATTERY
Vce = 2.9 Volts
Ice = 28 mA.

2.1033 (C.10)(7) Complete Circuit Diagrams: The circuit diagram is included as Exhibit 4. The block diagram is included as an exhibit.

(8) Instruction book. The instruction manual is included as an exhibit.

(9) Tune-up procedure. The tune-up procedure is given in an exhibit.

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

APPLICANT: AUDIO TECHNICA CORPORATION

FCC ID: JFZT701

(10) Description of all circuitry and devices provided for determining and stabilizing frequency.

The transmitter frequency is controlled by a crystal, see the exhibits for specifications.

(11) Description of any circuits or devices employed For suppression of spurious radiation, for limiting modulation, and for limiting power.

This circuitry is described in the exhibits.

Limiting Modulation:
The transmitter audio circuitry is contained in circuit description exhibit.

Limiting Power:
There is no provision for limiting power.

(12) Digital modulation. This unit does not use digital modulation.

2.983(e) The data required by 2.1046 through 2.1057 is submitted below.

2.1046 RF Power Output.

RF power is measured as effective radiated power.

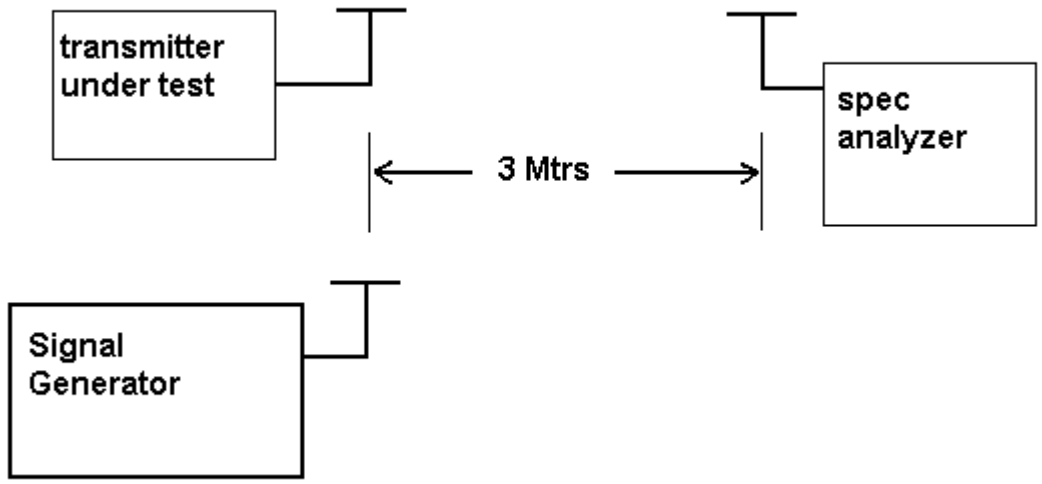
OUTPUT POWER: High Power .006W ERP
Low Power .002W ERP

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

APPLICANT: AUDIO TECHNICA CORPORATION

FCC ID: JFZT701

R.F. POWER OUTPUT TEST PROCEDURE



See EIA/TIA 603 substitution method.

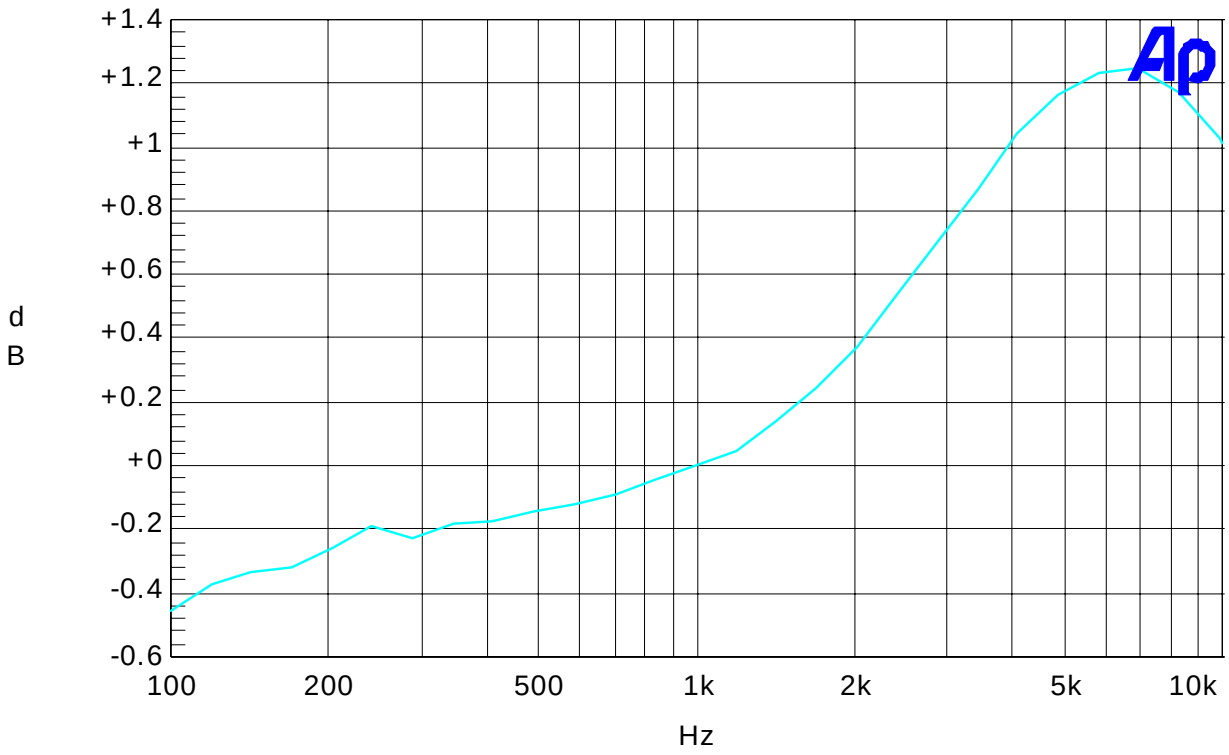
2.1047(a)(b) Modulation characteristics:

AUDIO_LOW_PASS_FILTER
The audio low pass filter is not required in this unit.

AUDIO_FREQUENCY_RESPONSE
The audio frequency response was measured in accordance with TIA/EIA Specification 603. The audio frequency response curve is shown on the next page.

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

Audio Frequency Response

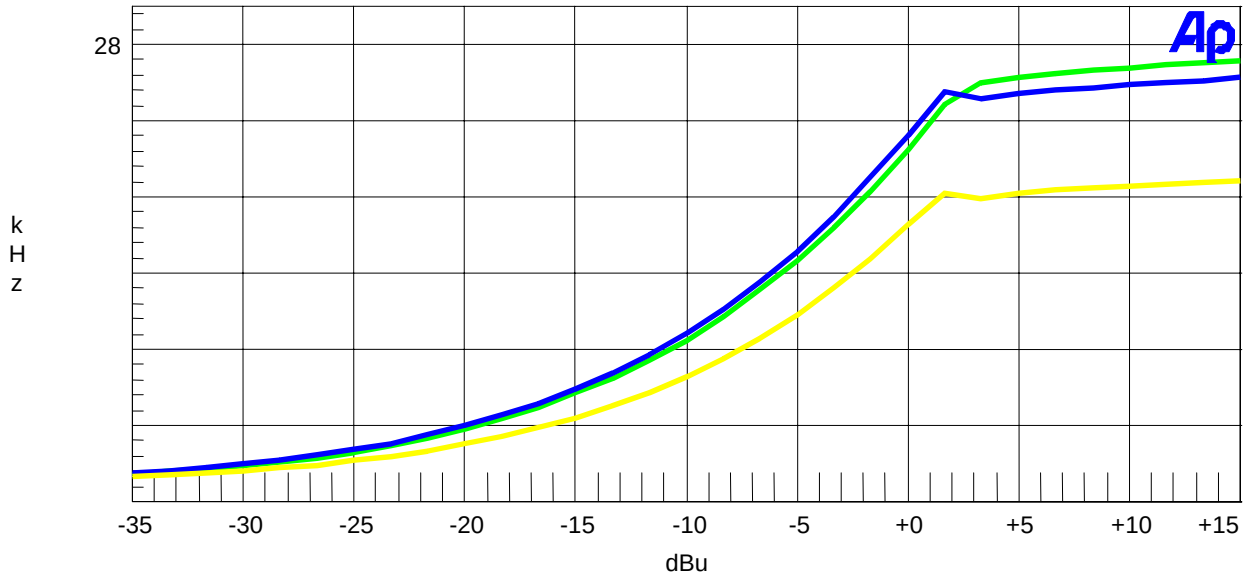


Color	Line Style	Thick	Data	Axis
Cyan	Solid	1	Anlr.Level A!Normalize	Left

MaxFreq.at1

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

Modulation Limiting Plots:
15 KHz (Green), 2.5 KHz (Blue), and 1 KHz (Yellow). Max deviation: 28 K



Color	Line Style	Thick	Data	Axis
Green	Solid	3	Anlr.Level A	Left
Blue	Solid	3	Anlr.Level A	Left
Yellow	Solid	3	Anlr.Level A	Left

modulation limiting.at1

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

APPLICANT: AUDIO TECHNICA CORPORATION

FCC ID: JFZT701

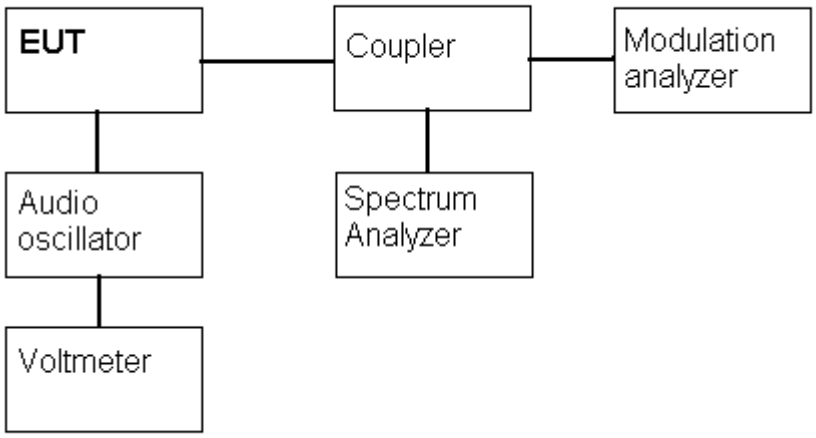
2.1049 Occupied Bandwidth:

Data in the plots show that all sidebands between 50 & 100% of the authorized bandwidth are attenuated by at least 25dB. From 100 to 250% of the authorized bandwidth they are attenuated by at least 35dB and beyond 250% 43 log(Po) dB. The plot shows the transmitter modulated with 15000 Hz(the highest modulation frequency), adjusted for 50% modulation plus 16 dB. The spectrum analyzer was set with the un-modulated carrier at the top of the screen. The test procedure diagram and occupied bandwidth plot follows.

Microphone transmitter

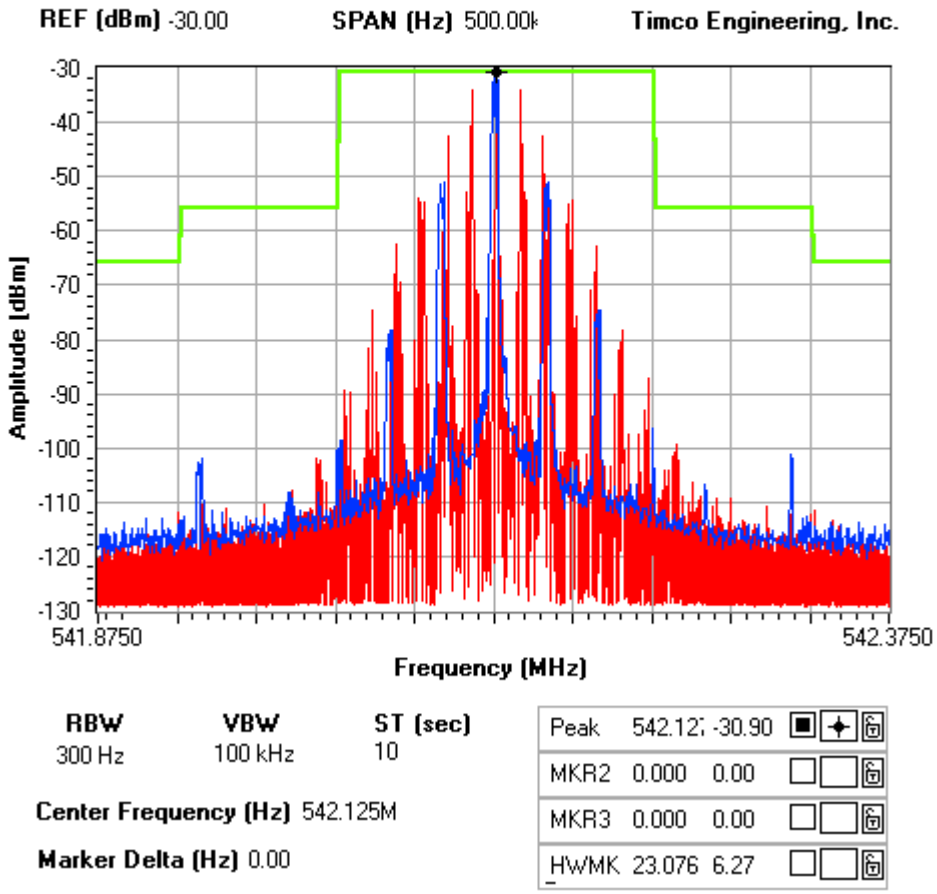
Test procedure diagram

OCCUPIED BANDWIDTH MEASUREMENT



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

NOTES:
AUDIO TECHNICA CORPORATION - FCC ID: JFZT701
OCCUPIED BANDWIDTH PLOT



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

2.1051 Spurious_emissions_at_antenna_terminals(conducted):
Not Applicable no antenna connector.

2.1053(a)(b) Field Strength of Radiated Spurious Emissions:

NAME OF TEST: RADIATED SPURIOUS EMISSIONS

REQUIREMENTS: Emissions must be 43 +10log(Po) dB below the mean power output of the transmitter.

43 + 10 log(.006) = 20.78 dB

HIGH POWER:

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
542.13	V	0
1084.26	V	67.37
1626.39	V	61.69
2168.52	V	47.92
2710.65	V	57.61
3252.78	V	47.17
3794.91	V	57.80
4337.04	V	58.85
4879.17	V	58.70
5421.30	V	57.65

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
552.00	V	0
1104.00	V	68.06
1656.00	V	59.05
2208.00	V	49.48
2760.00	V	59.05
3312.00	V	49.90
3864.00	V	51.97
4416.00	V	55.14
4968.00	V	58.79
5520.00	V	57.40

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

2.1053(a)(b) Field Strength of Radiated Spurious Emissions:

NAME OF TEST: RADIATED SPURIOUS EMISSIONS

REQUIREMENTS: Emissions must be 43 +10log(Po) dB below the mean power output of the transmitter.

HIGH POWER: 43 + 10log(.006) = 20.78 dB
LOW POWER: 43 + 10log(.002) = 16.01 dB

HIGH POWER:

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
561.26	V	0
1122.52	V	62.99
1683.78	V	57.13
2245.04	V	49.78
2806.30	V	58.22
3367.56	V	48.47
3928.82	V	52.47
4490.08	V	54.76
5051.34	V	56.78
5612.60	V	53.88

LOW POWER:

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
542.13	V	0
1084.26	V	64.77
1626.39	V	59.89
2168.52	V	49.42
2710.65	V	57.71
3252.78	V	49.67
3794.91	V	56.20
4337.04	V	58.65
4879.17	V	56.20
5421.30	V	55.75

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

2.1053(a)(b) Field_Strength_of_Radiated Spurious_Emissions:

NAME OF TEST: RADIATED SPURIOUS EMISSIONS

REQUIREMENTS: Emissions must be 43 +10log(Po) dB below the mean power output of the transmitter.

HIGH POWER: 43 + 10log(.006) = 20.78 dB
LOW POWER: 43 + 10log(.002) = 16.01 dB

LOW POWER:

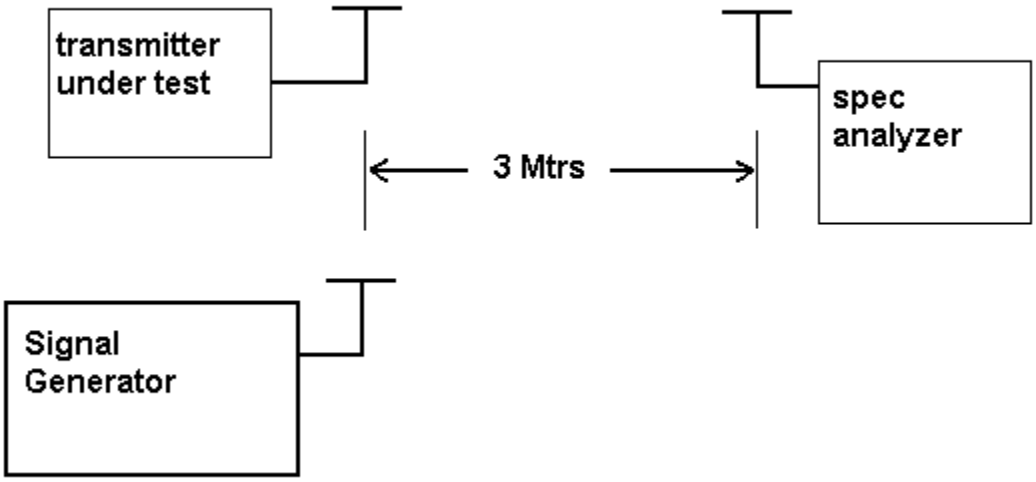
Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
552.00	V	0
1104.00	V	66.56
1656.00	V	60.35
2208.00	V	48.78
2760.00	V	60.35
3312.00	V	54.10
3864.00	V	53.17
4416.00	V	54.34
4968.00	V	56.59
5520.00	V	56.10

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
561.26	V	0
1122.52	V	62.19
1683.78	V	57.53
2245.04	V	48.78
2806.30	V	57.42
3367.56	V	55.17
3928.82	V	51.87
4490.08	V	52.56
5051.34	V	55.18
5612.60	V	52.68

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

METHOD OF MEASUREMENT: The tabulated data shows the results of the radiated field strength 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 N.W. State Road 45, Newberry, FL 32669.

Method of Measuring Radiated Spurious Emissions



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

2.1055 Frequency_Stability:
S74.861(e)(4)

Temperature and voltage tests were performed to verify that the frequency remains within the .0050%,(50 ppm)(74.861 e.4) 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.

MEASUREMENT DATA:

Ref. Freq. 542.124610

TEMPERATURE °C	FREQUENCY MHz	PPM
-30°C	542.129470	8.96
-20°C	542.130650	11.14
-10°C	542.130573	11.00
-0°C	542.129563	9.14
10°C	542.127840	5.96
20°C	542.125824	2.24
30°C	542.123921	-1.27
40°C	542.121826	-5.14
50°C	542.120502	-7.58

Batt. Volts	Batt. Data	PPM
-15%	542.124506	-0.19
+15%	542.124578	-0.06

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

2.1033 (c.11) Photo or drawing of label:
See exhibits

2.1033 (c.12) Photos of device under test:
See exhibits

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

TEST EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
3/10-Meter OATS	TEI	N/A	N/A	Listed 3/27/04	3/26/07
3-Meter OATS	TEI	N/A	N/A	Listed 1/11/06	1/10/09
AC Voltmeter	HP	400FL	2213A14499	CAL 7/19/04	7/19/06
Analyzer	HP	85650A	2811A01279	CAL 4/13/05	4/13/07
Blue Tower Quasi-Peak Adapter					
Analyzer Blue Tower RF Preselector	HP	85685A	2926A00983	CAL 9/5/05	9/5/07
Analyzer Blue Tower Spectrum Analyzer	HP	8568B	2928A04729 2848A18049	CAL 4/13/05	4/13/07
Coaxial Cable #64	Semflex Inc.	60637	Timco #64	CHAR 11/28/05	11/28/07
Antenna: Dipole Kit	Electro-Metrics	TDA-30/1-4	152	CAL 3/3/06	3/3/09
Antenna: Dipole Kit	Electro-Metrics	TDA-30/1-4	153		Out for Repair and Char
Frequency Counter	HP	5385A	2730A03025	CAL 4/15/05	4/15/07
Hygro-Thermometer	Extech	445703	0602	CAL 8/1/05	8/1/07
Antenna: Log-Periodic	Electro-Metrics	LPA-25	1122	CAL 8/26/04	8/26/06
Measuring Tape-7.5M	Kraftixx	7.5M PROFI		CHAR 12/16/05	12/16/07
Modulation Analyzer	HP	8901A	3435A06868	CAL 11/4/04	11/4/06
Digital Multimeter	Fluke	FLUKE-77-3	79510405	CAL 4/15/05	4/15/07
Analyzer Open-Frame Tower	HP	8449B	3008A01075	CAL 8/8/05	8/8/07
Preamplifier Analyzer Silver Tower	HP	85650A	3303A01844	CAL 12/8/04	12/8/06
Quasi-Peak Adapter Analyzer Silver Tower	HP	85685A	2620A00294	CAL 4/27/04	12/8/06

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

RF Preselector					
Analyzer	HP	8566B Opt 462	3552A22064 3638A08608	CAL 12/8/04	12/8/06
Silver Tower Spectrum Analyzer					
System One	Audio Precision	System One	SYS1-45868	CHAR 3/27/06	3/27/08
Analyzer Tan Tower Preamplifier	HP	8449B-H02	3008A00372	CAL 12/8/05	12/8/07
Analyzer Tan Tower Quasi-Peak Adapter	HP	85650A	3303A01690	CAL 12/8/05	12/8/07
Analyzer Tan Tower RF Preselector	HP	85685A	3221A01400	CAL 12/7/05	12/7/07
Analyzer Tan Tower Spectrum Analyzer	HP	8566B Opt 462	3138A07786 3144A20661	CAL 12/7/05	12/7/07
Temperature Chamber	Tenney Engineering	TTRC	11717-7	CHAR 3/23/06	3/23/08