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: LICENSED BROADCAST TRANSMITTER

FCC ID: JFZT310C

Applicant:

AUDIO TECHNICA CORPORATION
2206 NARUSE MACHIDA
TOKYO 194
JAPAN

Date Receipt: JANUARY 21, 2004

Date Tested: FEBRUARY 16, 2004

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TEST REPORT CONTAINING:

EXHIBITS CONTAINING:

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GENERAL INFORMATION REQUIRED
FOR TYPE ACCEPTANCE

2.1033(c)(1)(2) AUDIO TECHNICA CORPORATION will manufacture the T310C in quantity, for use under FCC RULES PART 74.801, LOW POWER AUXILIARY STATIONS.

AUDIO TECHNICA CORPORATION
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2.1033 **TECHNICAL DESCRIPTION**

(c)(3) Instruction book. The instruction manual is included in the exhibits.

(c)(4) Type of Emission: 130K0F3E

Bn = 2M + 2DK
M = 20000
D = 45 kHz(Peak Deviation)
K = 1
Bn = 2(20k) + 2(45k)(1) = 130k

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

(c)(6) Frequency Range: Part 74: 541.5 – 566.375 MHz

(c)(7) Power Range and Controls: UNIT has no controls.

(c)(8) Maximum Output Power Rating: .020 Watts into 50 ohms resistive load.

(c)(9) DC Voltages and Current into Final Amplifier:

FINAL AMPLIFIER ONLY - 9.0V BATTERY

Vce = 3.0 Volts
Ice = 0.2 mA.

(c)(10) Tune-up procedure. The tune-up procedure is included in the exhibits.

(c)(11) Complete Circuit Diagrams: The circuit diagram and block diagram are in the exhibits.

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2.1033(c)(12) Photo or Drawing of Label and sketch of location:
Included in the exhibits.

2.1033(c)(13) Photos of Equipment:
Included in the exhibits.

(c)(14) Description of all circuitry and devices provided for determining and stabilizing frequency.

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

This circuitry is in the exhibits.

Limiting Modulation:
The transmitter audio circuitry is contained in IC101, IC102 and IC103.

Limiting Power:
There is no provision for limiting power.

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

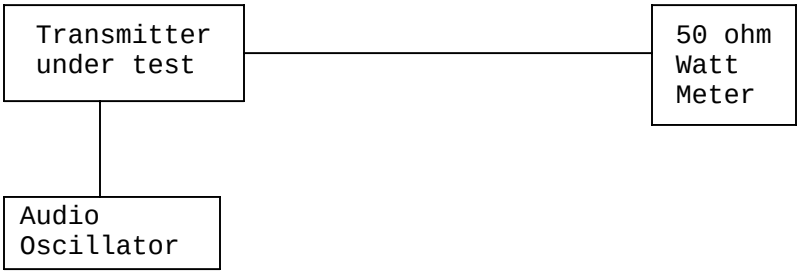
2.1033(c)(16) The data required by 2.1046 through 2.1057 is submitted below.

2.1046 **RF power output**

RF power measured is:

OUTPUT POWER: .008 WATTS

R.F. POWER OUTPUT TEST PROCEDURE



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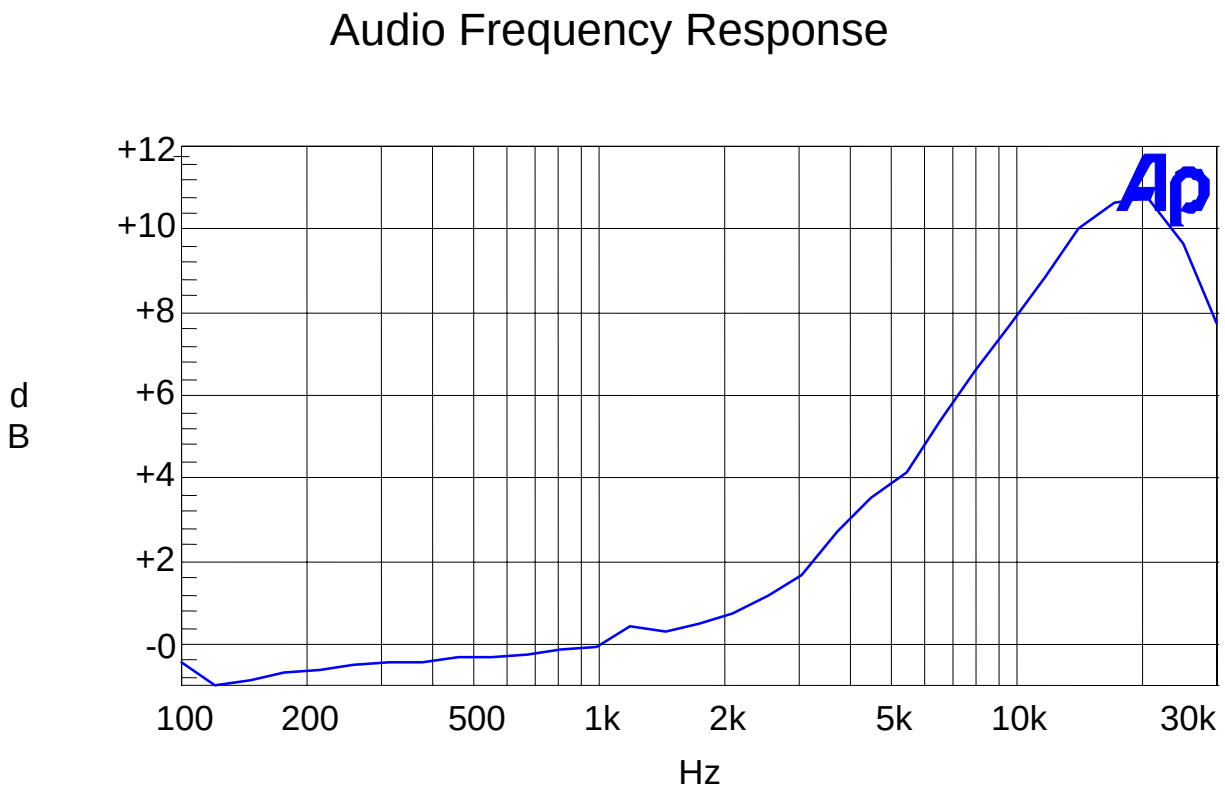
2.1047(a)(b) **Modulation characteristics**:

AUDIO FREQUENCY RESPONSE
The audio frequency response was measured in accordance with TIA/EIA Specification 603. The audio frequency response curve is shown below.



AUDIO LOW PASS FILTER
The audio low pass filter is not required in this unit.

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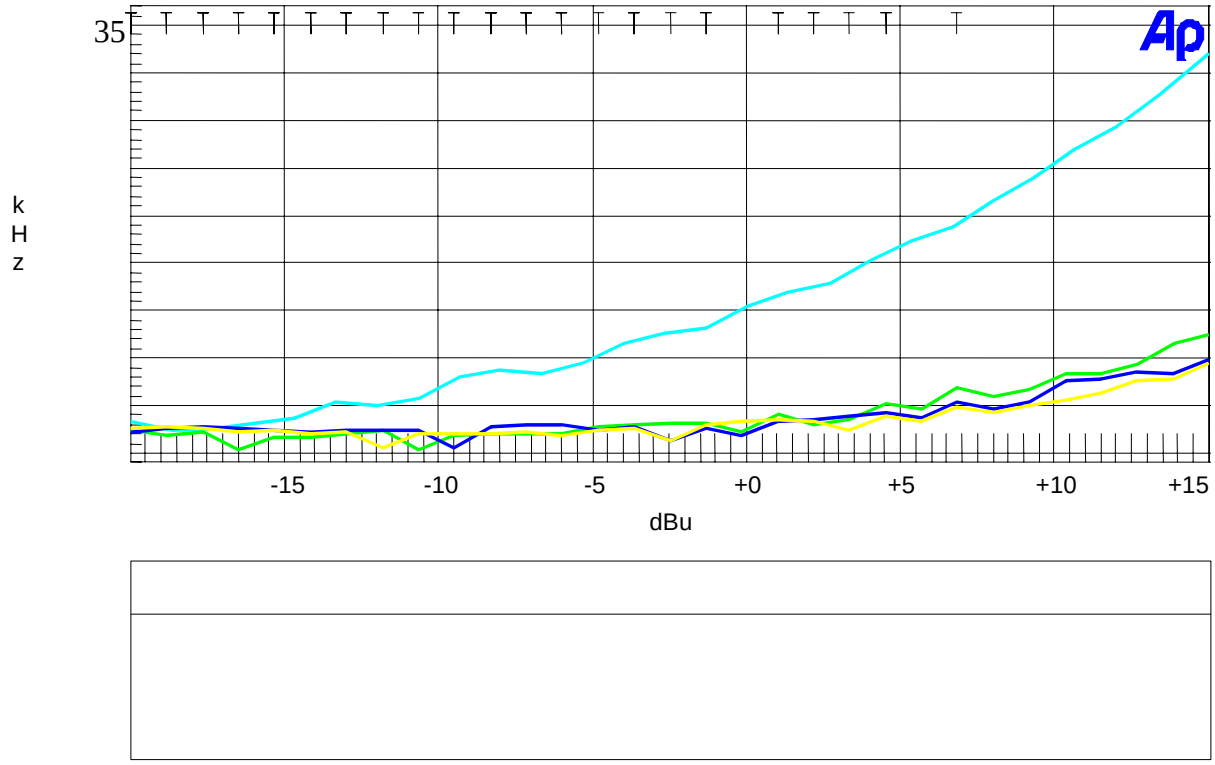
0 2.1047(b) Audio_input_versus_modulation
80.213 (d) A plot of the audio input versus deviation is shown in the following plot.

Modulation Limiting Plots:
15KHz (Cyan), 2.5KHz (Green), 1.0KHz (Blue), and 300Hz



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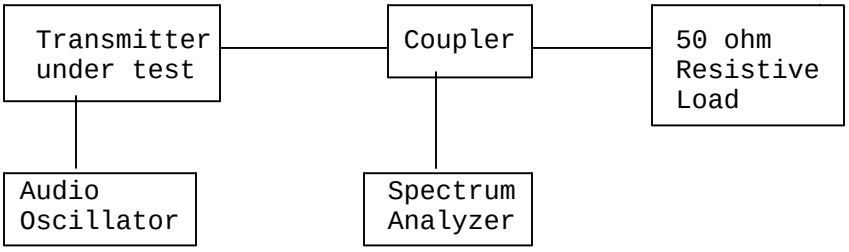
2.1049(c) **Occupied Bandwidth:**

Data in the plots show that all sidebands between 50 & 100% for 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 plots follow.

Wireless Microphone transmitter:

Test procedure diagram

OCCUPIED BANDWIDTH MEASUREMENT



REQUIREMENT: PART 74: 200kHz EMISSION BANDWIDTH.

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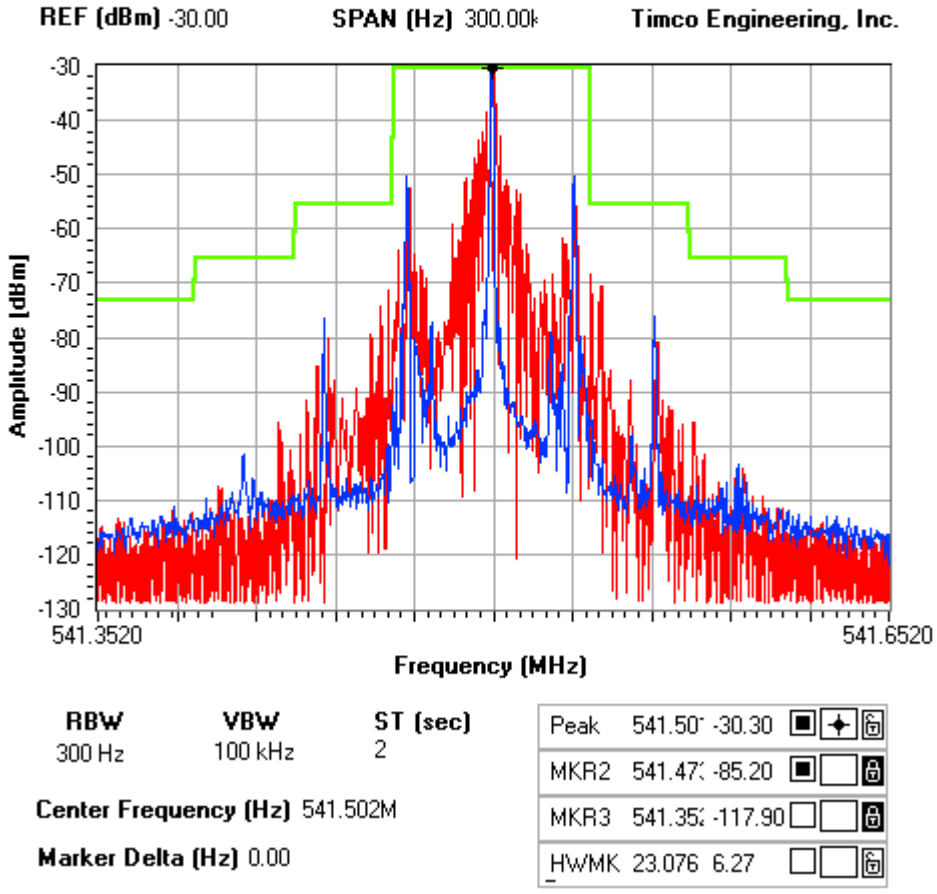
OCCUPIED BANDWIDTH

NOTES:
AUDIO TECHNICA CORPORATION - FCC ID: JFZT310C
OCCUPIED BANDWIDTH PLOT

FCC 74.535 Mask A



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2.1051 **Spurious emissions at antenna terminals (conducted):** Not Applicable no antenna connector.

2.1053(a)(b) **Field strength of spurious emissions**:

NAME OF TEST: RADIATED SPURIOUS EMISSIONS (541.5 MHz)

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

43 + 10log(0.01) = 23.00 dB

TEST DATA:

Emission Frequency MHz	Ant. Polarity	Corrected EUT Signal Reading	Coax Loss (dB)	Substitution Antenna (dBd)	dB Below Carrier (dBc)
541.50	V	9.00	0	0	0
1083.00	V	-43.50	1.02	3.28	50.23
1624.50	V	-46.60	1.12	5.05	51.68
2166.00	V	-46.70	1.23	5.81	51.12
2707.50	V	-46.00	1.32	6.92	49.40
3249.00	V	-47.10	1.37	7.35	50.13
3790.50	V	-37.30	1.43	7.61	40.12
4332.00	V	-43.60	1.48	8.05	46.03
4873.50	V	-52.00	1.57	7.80	54.77
5415.00	V	-50.30	1.68	8.23	52.75

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2.1051 **Spurious emissions at antenna terminals (conducted):** Not Applicable no antenna connector.

2.1053(a)(b) **Field strength of spurious emissions**:

NAME OF TEST: RADIATED SPURIOUS EMISSIONS (553.875 MHz)

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

43 + 10log(0.01) = 23.00 dB

TEST DATA:

Emission Frequency MHz	Ant. Polarity	Corrected EUT Signal Reading	Coax Loss (dB)	Substitution Antenna (dBd)	dB Below Carrier (dBc)
553.88	V	9.50	0	0	0
1107.75	V	-44.30	1.02	3.38	51.44
1661.63	V	-49.10	1.14	5.08	54.66
2215.50	V	-48.30	1.24	5.95	53.09
2769.38	V	-45.50	1.33	6.97	49.36
3323.25	V	-44.60	1.38	7.41	48.07
3877.13	V	-37.30	1.44	7.63	40.61
4431.00	V	-44.70	1.49	8.17	47.53
4984.88	V	-46.70	1.60	7.67	50.13
5538.75	V	-54.00	1.72	8.40	56.81

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2.1051 **Spurious emissions at antenna terminals (conducted):** Not Applicable no antenna connector.

2.1053(a)(b) **Field strength of spurious emissions**:

NAME OF TEST: RADIATED SPURIOUS EMISSIONS (566.375 MHz)

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

43 + 10log(0.01) = 23.00 dB

TEST DATA:

Emission Frequency MHz	Ant. Polarity	Corrected EUT Signal Reading	Coax Loss (dB)	Substitution Antenna (dBd)	dB Below Carrier (dBc)
566.38	V	8.80	0	0	0
1132.75	V	-46.60	1.03	3.48	52.95
1699.13	V	-52.60	1.14	5.11	57.43
2265.50	V	-51.00	1.25	6.09	54.96
2831.88	H	-43.40	1.33	7.02	46.52
3398.25	V	-37.70	1.39	7.47	40.42
3964.63	V	-30.50	1.45	7.64	33.10
4531.00	H	-49.90	1.51	8.21	51.99
5097.38	V	-45.80	1.62	7.79	48.43
5663.75	H	-56.20	1.77	8.58	58.19

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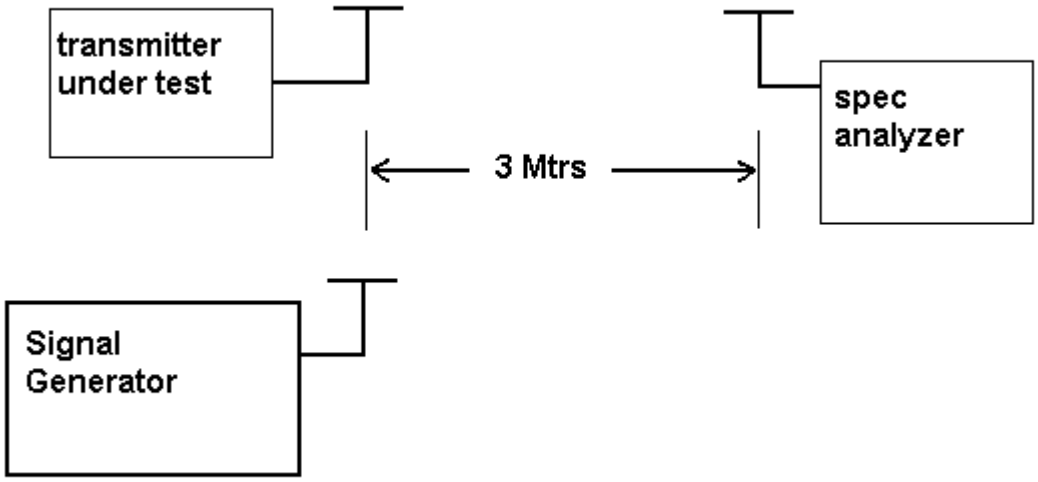
Method of Measuring Radiated Spurious Emissions



METHOD OF MEASUREMENT: The procedure used was TIA/EIA STANDARD 603. The spectrum was scanned from 30 to at least the tenth harmonic of the fundamental using a HP model 8566B spectrum analyzer and an appropriate antenna. Measurements were made at the open field test site of TIMCO ENGINEERING INC. located at 849 NW SR 45 Newberry, Florida 32669.

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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:

Assigned Frequency (Ref. Frequency): 541.501 582

TEMPERATURE °C	FREQUENCY MHz	PPM
-30	541.510 503	16.48
-20	541.510 338	16.17
-10	541.508 919	13.55
0	541.507 067	10.13
10	541.504 788	5.92
20	541.502 318	1.36
30	541.499 746	-3.39
40	541.497 922	-6.76
50	541.496 623	-9.16

	VOLTS	Batt. Data	Batt. PPM
-15%	2.55	541.502 306	1.34

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
AC Voltmeter	HP	400FL	2213A14499	CAL 10/9/01	10/9/03
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
Coaxial Cable #64	Semflex Inc.	60637	Timco #64	CHAR 1/24/02	1/24/04
Dipole Antenna Kit	Electro-Metrics	TDA-30/1-4	152	CAL 3/21/01	3/21/04
Dipole Antenna Kit	Electro-Metrics	TDA-30/1-4	153	CAL 9/26/02	9/26/05
Frequency Counter	HP	5385A	2730A03025	CAL 3/7/03	3/7/05
Hygro-Thermometer	Extech	445703	0602	CAL 10/4/02	10/4/04
Log-Periodic Antenna	Electro-Metrics	LPA-25	1122	CAL 10/2/01	10/2/03
Measuring Tape-7.5M	Kraftixx	7.5M PROFI		CHAR 2/1/02	2/1/04
Modulation Analyzer	HP	8901A	3435A06868	CAL 9/5/01	9/5/03
Multimeter	Fluke	FLUKE-77-3	79510405	CHAR 9/26/01	9/26/03
Silver Tower Preamplifier	HP	8449B	3008A01075	CHAR 1/28/02	1/28/04
Silver Tower Quasi-Peak Adapter	HP	85650A	3303A01844	CAL 10/14/02	10/14/04
Silver Tower RF Preselector	HP	85685A	2620A00294	CAL 10/14/02	10/14/04

Silver Tower Spectrum Analyzer	HP	8566B Opt 462	3552A22064 3638A08608	CAL 10/14/02	10/14/04
System One	Audio Precision	System One	SYS1-45868	CHAR 4/25/02	4/25/04
Tan Tower Preamplifier	HP	8449B-H02	3008A00372	CAL 9/23/03	9/23/05
Tan Tower Quasi-Peak Adapter	HP	85650A	3303A01690	CAL 9/23/03	9/23/05
Tan Tower RF Preselector	HP	85685A	3221A01400	CAL 9/23/03	9/23/05
Tan Tower Spectrum Analyzer	HP	8566B Opt 462	3138A07786 3144A20661	CAL 9/23/03	9/23/05
Temperature Chamber	Tenney Engineering	TTRC	11717-7	CHAR 1/22/02	1/22/04