

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: HANDHELD TRANSMITTER

FCC ID: JFZT702

Applicant:

AUDIO TECHNICA CORPORATION
2206 NARUSE, MACHIDA
TOKYO 194
JAPAN

Date Receipt: 5/23/2006

Date Tested: 7/6/2006

APPLICANT: AUDIO TECHNICA CORPORATION

FCC ID: JFZT702

REPORT #: A\AudioTechnica_JFZ\1080AUT6\1080AUT6TestReport.doc

COVER SHEET

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GENERAL INFORMATION REQUIRED FOR TYPE ACCEPTANCE

2.1033 AUDIO TECHNICA CORPORATION will manufacture the
2.1034 FCC ID: JFZT702 in quantity, for use under FCC RULES
PART 74.801, LOW POWER AUXILIARY STATIONS.

2.1033 (C4) TECHNICAL DESCRIPTION

(1) Type of Emission: 98KF3E

$B_n = 2M + 2DK$

$M = 10000$

$D = 29 \text{ kHz (Peak Deviation)}$

$K = 1$

$B_n = 2(10K) + 2(29K)(1) = 78K$

ALLOWED AUTHORIZED BANDWIDTH = 200 kHz.

74.861(e)(5)

(2) Frequency Range: Part 74: 542 - 561 MHz

(3) TEST FREQ = 542, 552, 561 MHz.

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

(4) Maximum Output Power Rating: PWR: ERP

Power Rating: .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 an exhibit. 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.

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

The transmitter frequency is controlled by a crystal, see the circuit description.

- (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 an exhibit.

Limiting Modulation:
The transmitter audio circuitry is contained in an 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 using the substitution method and measured as effective radiated power.

OUTPUT POWER: .002W ERP

2.1033 (c.11) Photo or Drawing of Label:
See the exhibits.

2.1033 (c.12) Photos of Equipment:
See the exhibits.

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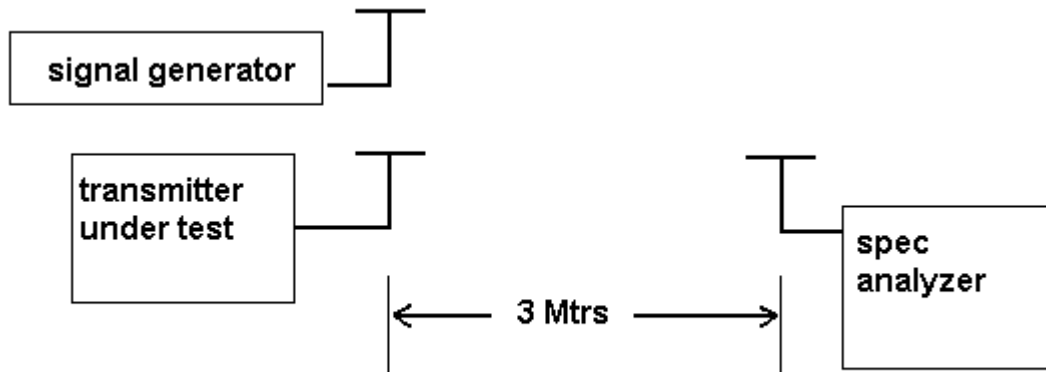
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R.F. POWER OUTPUT TEST PROCEDURE
See EIA/TIA 603 substitution method.



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.

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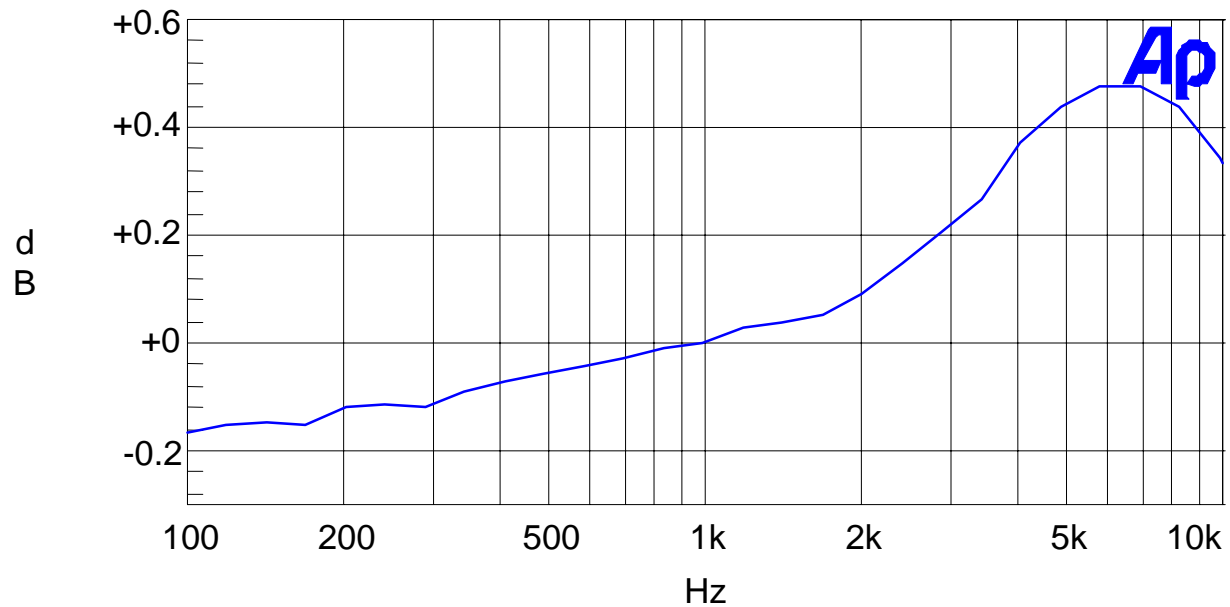
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AUDIO FREQUENCY RESPONSE PLOT



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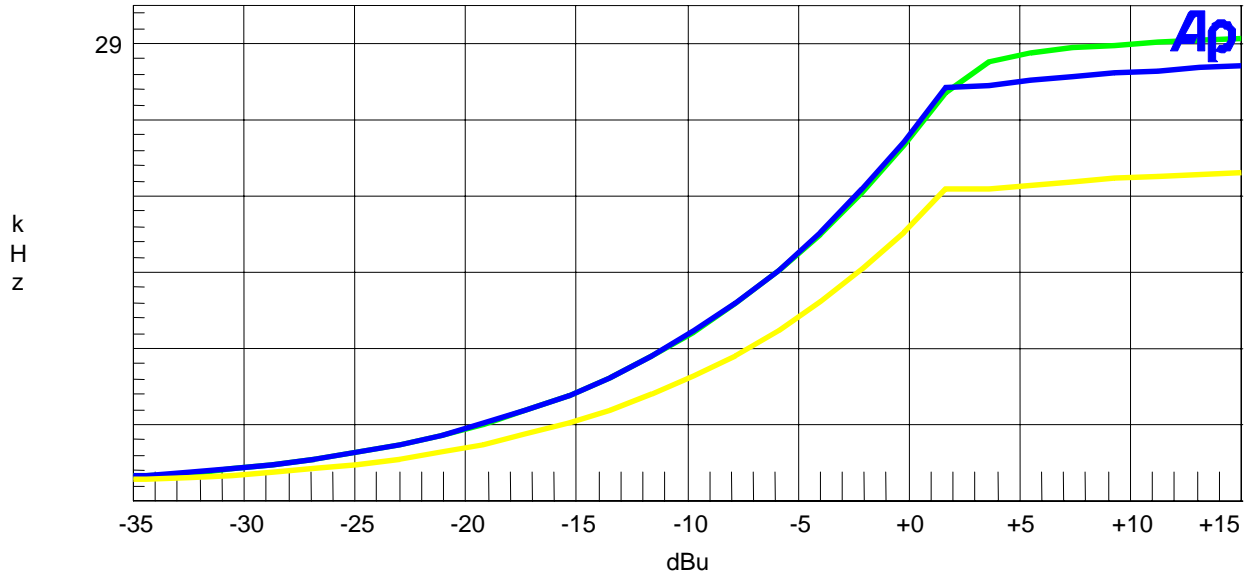
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Modulation Limiting Plots:

15 KHz (Green), 2.5 KHz (Blue), and 1 KHz (Yellow). Max deviation: 29 KHz



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2.1049

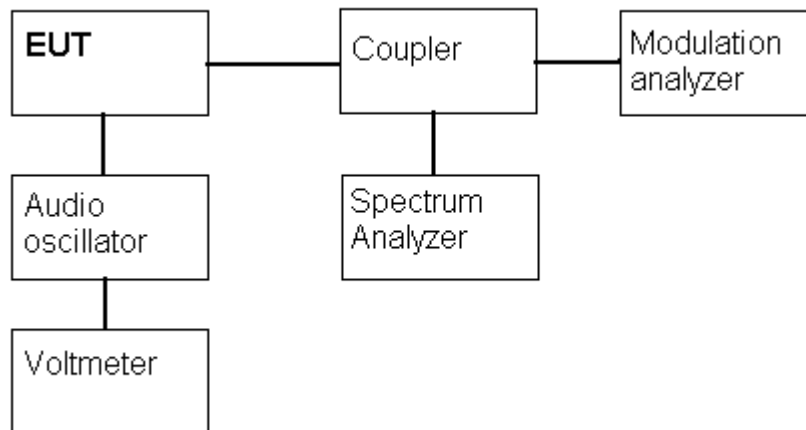
Occupied_bandwidth:

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% $43 \log(P_o)$ 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 unmodulated carrier at the top of the screen. The test procedure diagram and occupied bandwidth plots follow.

Microphone transmitter

Test procedure diagram

OCCUPIED BANDWIDTH MEASUREMENT



REQUIREMENT: PART 74: 200kHz EMISSION BANDWIDTH.

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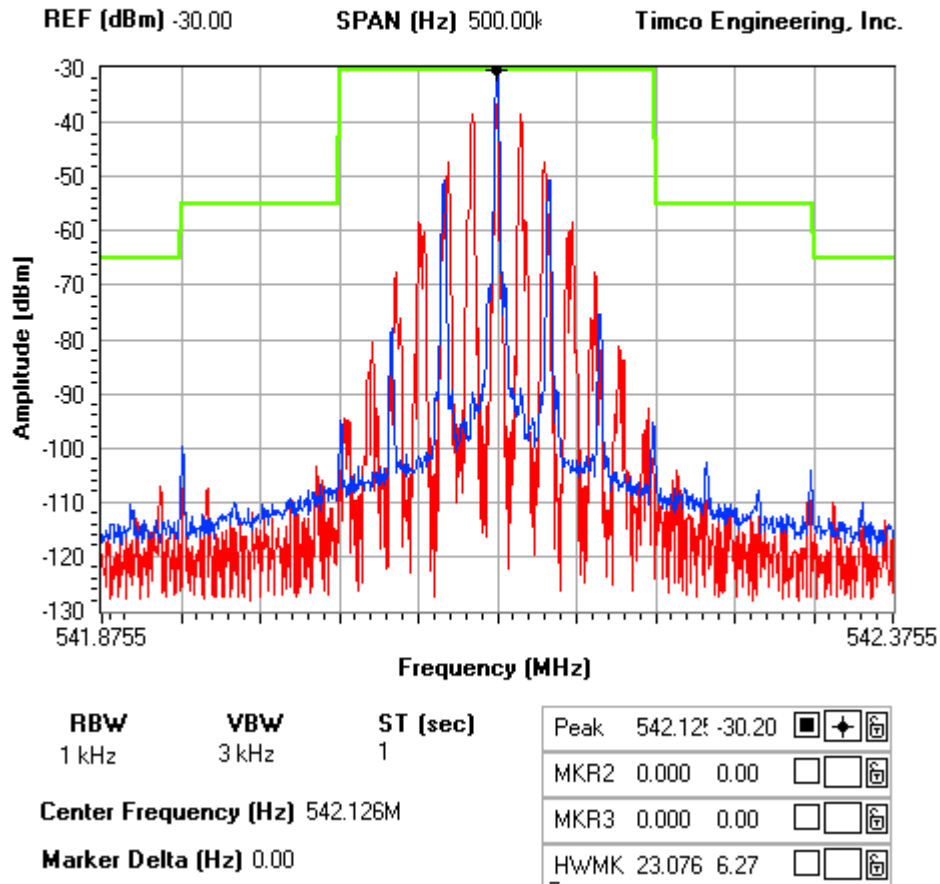
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NOTES:

AUDIO TECHNICA CORPORATION - FCC ID: JFZT702

OCCUPIED BANDWIDTH PLOT



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

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

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

$$43 + 10 \log(.002) = 16.01 \text{ dB}$$

TEST DATA:

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
542.14	V	0
1084.28	V	54.19
1626.42	V	58.02
2168.56	V	52.95
2710.70	V	55.55
3252.84	V	46.82
3794.98	H	53.66
4337.12	V	54.32
4879.26	H	52.28
5421.40	H	49.83

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
552.00	V	0
1104.00	V	52.58
1656.00	H	59.77
2208.00	V	48.71
2760.00	V	54.68
3312.00	V	40.64
3864.00	V	48.02
4416.00	H	53.79
4968.00	H	52.95
5520.00	H	50.863

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2.1053(a)(b) Field_strength_of_radiated_spurious_emissions:

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

$$43 + 10 \log(.002) = 16.01 \text{ dB}$$

TEST DATA:

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
561.23	V	0
1122.46	V	56.60
1683.69	V	49.05
2244.92	V	45.31
2806.15	V	48.25
3367.38	H	38.10
3928.61	V	49.01
4489.84	H	53.50
5051.07	H	47.92
5612.30	H	45.73

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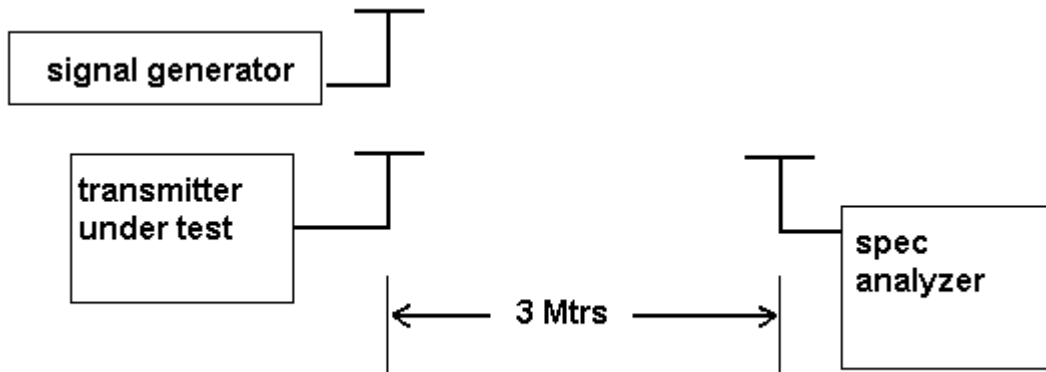
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METHOD OF MEASUREMENT: The tabulated data shows the results of the radiated field strength emissions test. The spectrum was scanned from 30 to at least the tenth harmonic of the fundamental. This test was conducted per TIA/EIA STANDARD 603 using the 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.



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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 °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 °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 °C.

MEASUREMENT DATA:

Ref. Freq. 542.126245		
TEMPERATURE °C	FREQUENCY MHz	PPM
-30°C	542.128826	4.76
-20°C	542.130149	7.20
-10°C	542.130231	7.35
-0°C	542.129272	5.58
10°C	542.127737	2.75
20°C	542.126245	0.00
30°C	542.124630	-2.98
40°C	542.122891	-6.19
50°C	542.121563	-8.64
Batt. Volts	Batt. Data	PPM
-15%	542.124933	-2.42
+15%	542.124875	-2.53

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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	HP	85685A	2926A00983	CAL 9/5/05	9/5/07
Blue Tower RF Preselector					
Analyzer	HP	8568B	2928A04729	CAL 4/13/05	4/13/07
Blue Tower Spectrum Analyzer			2848A18049		
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	HP	8449B	3008A01075	CAL 8/8/05	8/8/07
Open-Frame Tower Preamplifier					
Analyzer	HP	85650A	3303A01844	CAL 12/8/04	12/8/06
Silver Tower Quasi-Peak Adapter					
Analyzer	HP	85685A	2620A00294	CAL 4/27/04	12/8/06
Silver Tower RF					

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

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