

TIMCO ENGINEERING INC.

849 NW State Road 45
Newberry, Florida 32669
<http://www.timcoengr.com>
888.472.2424 F 352.472.2030 email: tei@timcoengr.com

A2LA ACCREDITED

A2LA CERT # 0955-01

APPLICANT: AUDIO TECHNICA CORPORATION
FCC ID: JFZT1802D

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EXHIBITS CONTAINING:

CONFIDENTIALITY REQUEST LETTER
FCC ID LABEL SAMPLE & ID LABEL LOCATION
BLOCK DIAGRAM
SCHEMATICS
TUNING PROCEDURE
CIRCUIT DESCRIPTION
USER'S MANUAL
EXTERNAL PHOTOGRAPHS
INTERNAL PHOTOGRAPHS
TEST SET UP PHOTOGRAPH

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GENERAL INFORMATION REQUIRED FOR TYPE ACCEPTANCE

- 2.1033(c)(1) AUDIO TECHNICA CORPORATION will manufacture the
JFZT1802D in quantity under FCC RULES PART 74.801,
2.1033(c)(2) LOW POWER AUXILIARY STATIONS.

AUDIO TECHNICA CORPORATION
2206 NARUSE, MACHIDA
TOKYO, 194
JAPAN

2.1033 TECHNICAL DESCRIPTION

- (c)(3) Instruction book. The instruction manual is included as an exhibit.

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

$B_n = 2M + 2DK$
 $M = 20000$
 $D = 45\text{kHz (Peak Deviation)}$
 $K = 1$
 $B_n = 2(20k) + 2(45k)(1) = 130k$

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

- (c)(5) Frequency Range: Part 74: 655.500 - 680.375 MHz
TEST FREQ = 655.50 MHz, 668.00MHz, and 680.375MHz

- (c)(6) Power Range and Controls: UNIT has no controls.

- (c)(7) Maximum Output Power Rating: .008 Watts ERP

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

FINAL AMPLIFIER ONLY
 $\text{INPUT POWER} - (3.0V)(0.0.09A) = 0.27 \text{ Watts}$

- (c)(9) Tune-up procedure. The tune-up procedure is included as an exhibit.

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- 2.1033 (c)(10) Complete Circuit Diagrams and Block Diagrams are included in the exhibits.
- 2.1033 (c)(11) Photo or Drawing of Label and sketch of location are included in the exhibits.
- 2.1033 (c)(12) Photos of Equipment are included in the exhibits.
- (c)(13) The circuit description is included in the exhibits.
- 2.1033 (c)(14) The data required by 2.1046 through 2.1057 is submitted below.

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2.1046

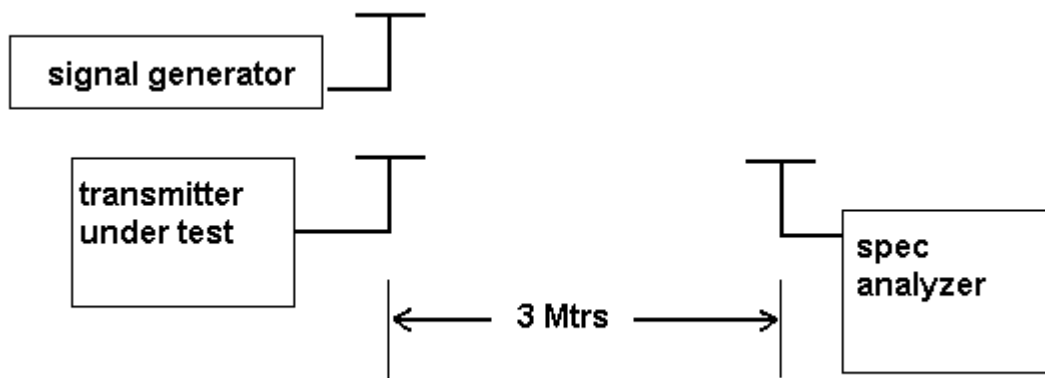
RF power output.

RF power measured is:

OUTPUT POWER: .008 WATTS

For a device with a fixed antenna, RF power is measured as ERP as the antenna is permanently attached. The substitution method was used as described in TIA-603-C.

R.F. POWER OUTPUT TEST PROCEDURE



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2.1047(a)(b) Modulation characteristics:

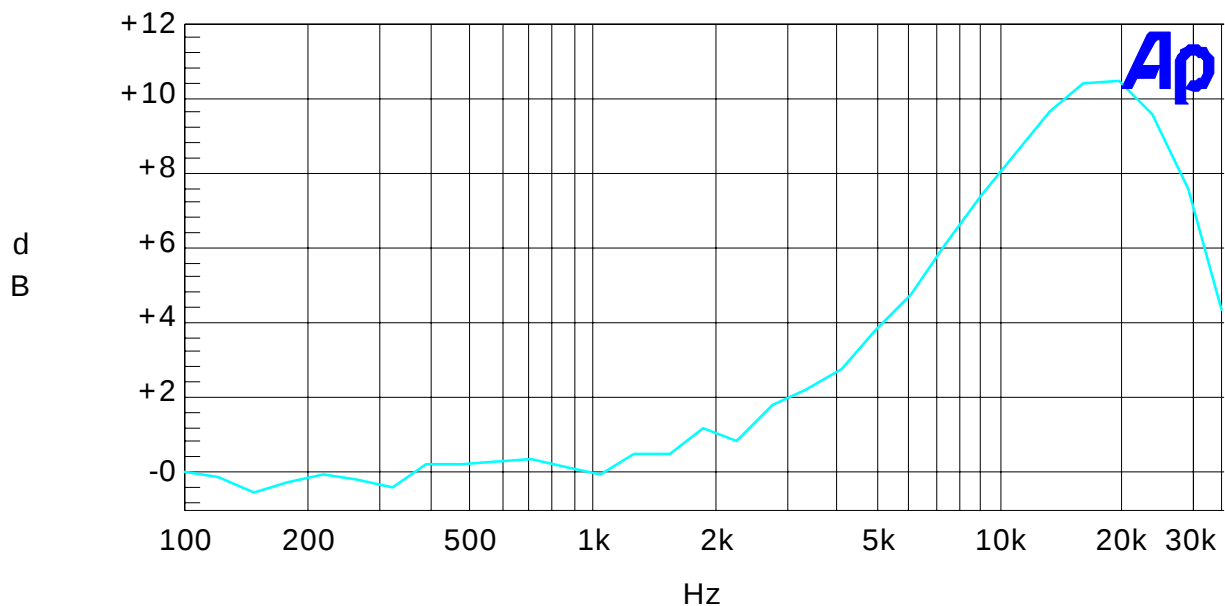
AUDIO FREQUENCY RESPONSE

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

AUDIO LOW PASS FILTER

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

Audio Frequency Response Plot



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

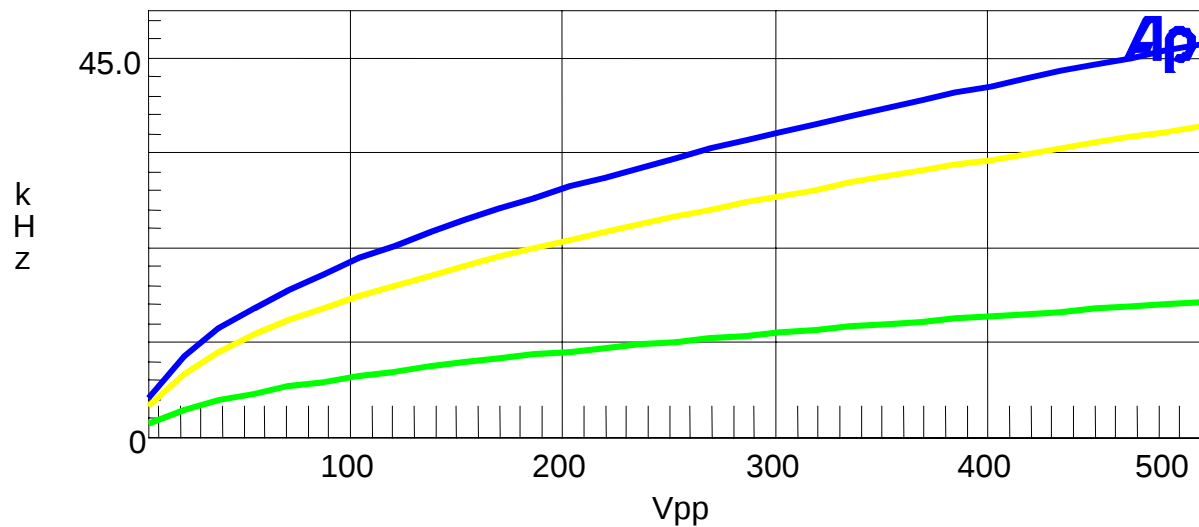
MaxFreq.at1

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Modulation Limiting Plots:
15 KHz (Green), 3.0 KHz (Blue), and 300 Hz (Yellow)



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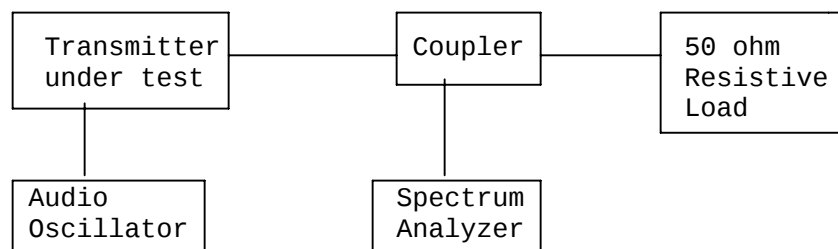
2.1049(c) Occupied Bandwidth:

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% $43 \log(P_o)$ 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 plot follow.

Wireless Microphone transmitter:

Test procedure diagram

OCCUPIED BANDWIDTH MEASUREMENT



REQUIREMENT: PART 74: 200kHz EMISSION BANDWIDTH.

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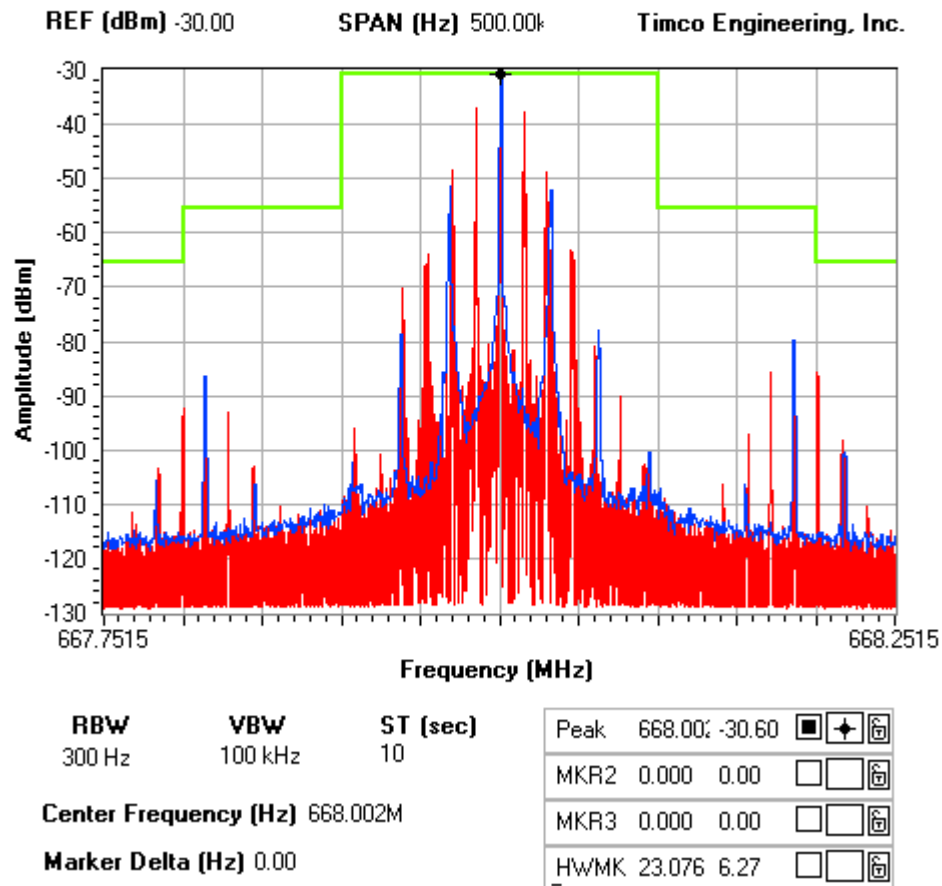
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NOTES:

AUDIO TECHNICA CORPORATION - FCC ID: JFZT1802D
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 spurious emissions:

NAME OF TEST: RADIATED SPURIOUS EMISSIONS

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

$$43 + 10 \log(0.008) = 22.03\text{dB (High power)}$$
$$43 + 10 \log(0.002) = 16.01\text{dB (Low power)}$$

TEST DATA:

High power:

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
655.50	V	0.00
1311.00	V	70.89
1966.50	V	67.47
2622.00	V	75.26
3277.50	V	59.65
3933.00	V	56.39
4588.50	V	52.80
5244.00	V	69.36
5899.50	V	63.45
6555.00	V	64.28

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
668.00	V	0.00
1336.00	V	65.75
2004.00	V	71.19
2672.00	V	75.38
3340.00	V	59.16
4008.00	V	60.23
4676.00	V	63.97
5344.00	V	67.49
6012.00	V	62.58
6680.00	V	60.90

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
680.38	V	0.00
1360.75	V	64.45
2041.13	V	69.89
2721.50	V	75.75
3401.88	V	60.72
4082.25	V	59.05
4762.63	V	64.98
5443.00	V	63.36
6123.38	V	63.04
6803.75	V	61.36

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Low power :

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
655.50	V	0
1311.00	V	70.95
1966.50	V	65.69
2622.00	V	72.38
3277.50	V	58.16
3933.00	V	53.33
4588.50	V	48.87
5244.00	V	65.89
5899.50	V	59.08
6555.00	V	62.80

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
668.00	V	0.00
1336.00	V	69.15
2004.00	V	69.69
2672.00	V	72.58
3340.00	V	60.76
4008.00	V	56.43
4676.00	V	60.97
5344.00	V	64.99
6012.00	V	62.38
6680.00	V	60.60

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
680.38	V	0.00
1360.75	V	67.15
2041.13	V	64.89
2721.50	V	73.05
3401.88	V	58.02
4082.25	V	54.75
4762.63	V	62.18
5443.00	V	63.26
6123.38	V	62.24
6803.75	V	62.86

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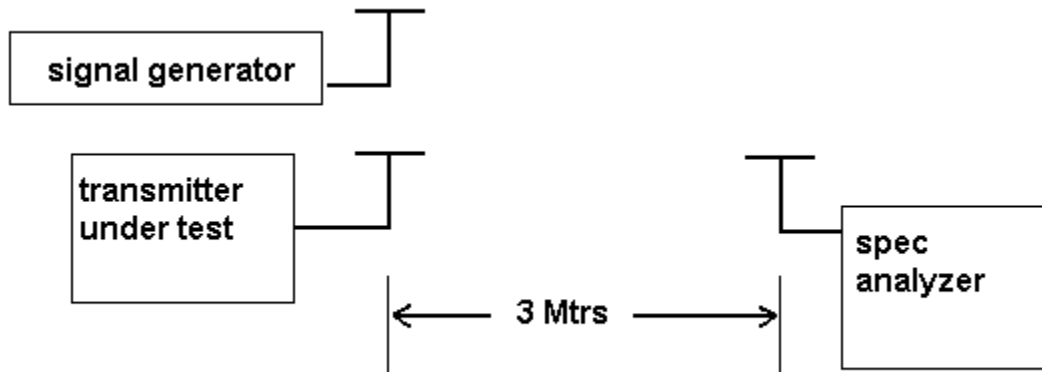
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Method of Measuring Radiated Spurious Emissions



METHOD OF MEASUREMENTS: The tabulated data shows the results of the radiated field strength emissions test. The spectrum was scanned from 30 MHz 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:
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): 668.004229

TEMPERATURE °C	FREQUENCY MHz	PPM
-30°C	668.005245	1.52
-20°C	668.007324	4.63
-10°C	668.008375	6.21
-0°C	668.007122	4.33
10°C	668.004875	0.97
20°C	668.004229	0.00
30°C	667.999480	-7.11
40°C	667.997427	-10.18
50°C	667.996439	-11.66

-15% BATT. Volt(2.55)=	2.55VDC	668.004 199	- 0.04
+15% BATT. Volt(3.45)=	3.45VDC	668.004 317	+ 0.13

RESULTS OF MEASUREMENTS: The maximum frequency variation over the temperature range was -11.66 to +6.21 ppm. The maximum frequency variation over the voltage range was +0.13 ppm.

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EMC Equipment List

Device 3/10-Meter OATS	Manufacturer TEI	Model N/A	Serial Number N/A	Cal/Char Date Listed 3/27/04	Due Date 3/26/07
3-Meter OATS Analyzer Blue	TEI HP	N/A 85650A	N/A 2811A01279	Listed 1/11/06 CAL 4/13/05	1/10/09 4/13/07
Tower Quasi- Peak Adapter Analyzer Blue	HP	85685A	2926A00983	CAL 9/5/05	9/5/07
Tower RF Preselector Analyzer Blue	HP	8568B	2928A04729 2848A18049	CAL 4/13/05	4/13/07
Tower Spectrum Analyzer	Semflex Inc.	60637	Timco #64	CHAR 11/28/05	11/28/07
Coaxial Cable #64	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 4/15/07
Antenna: Dipole Kit	HP	5385A	2730A03025	CAL 4/15/05	
Frequency Counter	Extech	445703	0602	CAL 8/1/05	8/1/07
Hygro- Thermometer	Kraftixx	7.5M PROFI		CHAR 12/16/05	12/16/07
Measuring Tape-7.5M	HP	8901A	3435A06868	CAL 11/4/04	11/4/06
Modulation Analyzer	Fluke	FLUKE-77-3	79510405	CAL 4/15/05	4/15/07
Digital Multimeter	HP	8449B	3008A01075	CAL 8/8/05	8/8/07
Analyzer Open- Frame Tower	HP	85650A	3303A01844	CAL 12/8/04	12/8/06
Preamplifier Analyzer Silver	HP	85685A	2620A00294	CAL 4/27/04	12/8/06
Tower Quasi- Peak Adapter Analyzer Silver	HP	8566B Opt 462	3552A22064 3638A08608	CAL 12/8/04	12/8/06
Tower RF Preselector Analyzer Silver					
Tower Spectrum Analyzer	Audio Precision	System One	SYS1-45868	CHAR 3/27/06	3/27/08
System One Analyzer Tan	HP	8449B-H02	3008A00372	CAL 12/8/05	12/8/07

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Tower Preamplifier Analyzer Tan	HP	85650A	3303A01690	CAL 12/8/05	12/8/07
Tower Quasi- Peak Adapter Analyzer Tan	HP	85685A	3221A01400	CAL 12/7/05	12/7/07
Tower RF Preselector Analyzer Tan	HP	8566B Opt 462	3138A07786 3144A20661	CAL 12/7/05	12/7/07
Tower Spectrum Analyzer Temperature Chamber	Tenney Engineering	TTRC	11717-7	CHAR 3/23/06	3/23/08

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