



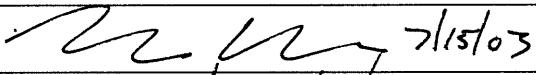
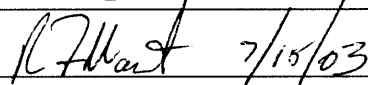
FCC Part 15 Test Report
for
Aura Communications, Inc.
on the
Wireless Headset Unit
Model: AD688H-X

FCC ID: P6YAD688H

Test Report #: 3044870
Date of Report: July 10, 2003

Project #: 3044870
Dates of Test: July 1-2, 2003

Total No of Pages Contained in this Report: 10 + Data Sheets

 7/15/03	Nicholas Abbondante, Test Engineer
 7/15/03	Robert F. Martin, Senior Technical Manager

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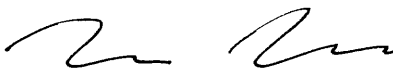
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1.0 Summary of Tests**FCC ID: P6YAD688H
Model No.: AD688H-X**

FCC RULE	DESCRIPTION OF TEST	RESULTS	REPORT PAGE
2.1046, 15.209(a)	RF Power Output	Passed	7
2.1049, 15.205	Occupied Bandwidth, Restricted Band Emissions	Passed	8
2.1053, 15.205, 15.209	Field Strength of Spurious Radiation	Passed	9

Test Engineer:


Nicholas AbbondanteDate: 7/15/03

Senior Technical Manager:


Robert F. MartinDate: 7/15/03

2.0 General Description**2.1 Product Description**

The EUT is a transceiver operating at 13.56 and 13.96 MHz. It is intended to provide hands-free functionality for cell phone users. To achieve this, a Base Unit is connected to a cell phone headset output via a cable. When a call is initiated, the audio signal is carried by the cable from the phone to the Base Unit. The base unit then transmits the signal to the Wireless Headset Unit, mounted on the user's ear, where it is converted back to audio. Both the Wireless Headset Unit and the Base Unit are transceivers. This report represents testing of the Wireless Headset Unit. A production version of the EUT arrived on July 1, 2003, in Good condition. The EUT was assigned serial number 0001. Note that the EUT is battery powered and therefore line-conducted emissions testing was not required.

The EUT has been tested at the request of

Company:	Aura Communications, Inc. 187 Ballardvale Street Wilmington, MA, 01887
Name of contact:	Aron Viner
Telephone:	(978) 527-4130
Fax:	(978) 988-3977

During testing, the EUT was activated from a fresh battery and was transmitting continuously. The EUT was manipulated in 3 orthogonal axes to determine a worst case orientation, and was rotated through 360 degrees to maximize emissions.

2.2 Related Submittal(s) Grants

An application for the Base Unit was filed at the same time as this application, under the FCC ID: P6YAD688B.

2.3 Test Facility

Site 2C (Middle Site) is a 3m and 10m sheltered EMI measurement range located in a light commercial environment in Buxborough, Massachusetts. It meets the technical requirements of ANSI C63.4-1992 and CISPR 22:1993/EN 55022:1994 for radiated and conducted emission measurements. The shelter structure is entirely fiberglass and plastic, with outside dimensions of 33 ft x 57 ft. The structure resembles a quonset hut with a center ceiling height of 16.5 ft.

The testing floor is covered by a galvanized sheet metal groundplane that is earth-grounded via copper rods around the perimeter of the site. The joints between individual metal sheets are bridged with a 2 inch wide metal strips to provide low RF impedance contact throughout. The sheets of metal are screwed in place with stainless steel, round-head screws every three inches. Site illumination and HVAC are provided from beneath the ground reference plane through flush entry ports, the port covers are electrically bonded to the ground plane.

A flush metal turntable with 12 ft. diameter and 5000 lb. load capacity is provided for floor-standing equipment. A wooden table 80 cm high is used for table-top equipment. The turntable is electrically connected to the ground plane with three copper straps. The straps are connected to the turntable at the center of it with ground braid. It is copper strap is directly connected to the groundplane at the edges of the turntable. The turntable is located on the south end of the structure and the antennas are mounted 3 and 10 meters away to the north. The antenna mast is a non-conductive with remote control of antenna height and polarization. The antenna height is adjustable from 1 to 4 meters.

All final radiated emission measurements are performed with the testing personnel and measurement equipment located below the ground reference plane. The site has a full basement underneath the turntable where support equipment may be remotely located. Operation of the antenna, turntable and equipment under test is controlled by remote controls that manipulate the antenna height and polarization and with a turntable control. Test personnel are located below the elipse when measurements are performed, however the site maintains the ability of having personnel manipulate cables while monitoring test equipment. Ambient radiated emissions are 6 dB or more below the relevant FCC emission limits.

AC mains power is brought to the equipment under test through a power line filter, to remove ambient conducted noise. 50 Hz (240 VAC single phase), 60 Hz power (120 VAC single phase, 208 VAC three phase), and 60 Hz (480 VAC three phase) are available. Conducted emission measurements are performed with a Line Impedance Stabilization Network (LISN) or Artificial Mains Network (AMN) bonded to the ground reference plane. A removable vertical groundplane (2 meter X 2 meter area) is used for line-conducted measurements for table top equipment. The vertical groundplane is electrically connected to the reference groundplane.

2.4 Test Equipment and Support Equipment

The following equipment was used to make measurements for emissions testing:

Description	Manufacturer	Model	Serial #	Cal Due
Report # 3044870		5		FCC Part 15.209

Aura Communications, Inc., Model No. AD688H-X
FCC ID: P6YAD688H

Date of Test: July 1-2, 2003

PREAMPLIFIER	COMPLIANCE DESIGN	P950	1844	10/28/2003
Cable, BNC - BNC, 10m	Alpha	RG-58C/U	CBL10MS1	09/10/2003
Cable, BNC - BNC, 2'	Pomona	RG-58C/U	CBL018	09/10/2003
Spectrum Analyzer	Hewlett Packard	8593A	3009A00659	04/09/2004
LOOP ANTENNA	EMPIRE DEVICES	LP-105	905	06/02/2004
ANTENNA	EMCO	3142	9711-1223	11/05/2003
EMI Receiver Set	Hewlett Packard	8542E	3520A00125	12/05/2003
RF FILTER	Hewlett Packard	85420E	3427A00126	12/05/2003

Cables					
Quantity	Type	Length (m)	Shielding	Ferrite	Connector Type
1	Phone Cable	.5	No	No	Metal/360

Aura Communications, Inc., Model No. AD688H-X
FCC ID: P6YAD688H

Date of Test: July 1-2, 2003

3.0 RF Power Output

FCC § 2.1046, § 15.209(a)

3.1 Test Procedure

The transmitter output was set to transmit continuously. The readings were taken while manipulating the EUT in three orthogonal axes and rotating to maximize emissions. An extrapolation factor of 40 dB/decade was used. Data was taken at a 6m distance to avoid near field effects yet still be close enough to detect emissions. Testing was done without a ground plane. Only the worst case data for each frequency is shown.

Requirement: The RF Power Output must be below 30 uV/m (29.5 dBuV/m) at 30 meters.

3.2 Test Results

Results: Passed

Company:	Aura Communications	Model #:	AD688H-X (Headset)
Engineer:	Nicholas Abbondante	Location:	Site 2
Project #:	3044870	Pressure:	1006mB
Date:	07/01/03	Temp:	33c
Standard:	FCC Part 15.209 Subpart C	Humidity:	27%
Class:	None	Group:	None
Limit Distance:	30 meters	Test Distance:	6 meters
Voltage/Frequency:	Battery	Frequency Range:	Fundamental 13.56 & 13.96 MHz
		Serial #:	0001
		Receiver:	HP 8593A
		Antenna:	LOOP2-E 6-02-04 V1.ant None
		PreAmp:	PRE4 10-28-03.amp
		Cable(s):	CBL018 9-10-03.cbl CBL10MS1 9-10-03.cbl

	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB
X-PEAK	V	13.560	23.2	41.8	0.7	16.3	28.0	21.5	29.5	-8.1
X-PEAK	V	13.960	13.3	41.8	0.7	16.3	28.0	11.6	29.5	-18.0



4.0 Emission Bandwidth and Restricted Band Emissions

FCC §2.1049, FCC §15.205

4.1 Test Procedure

The transmitter output was set to transmit continuously with an actual audio signal input, and the fundamental waveform was plotted using a max hold trace on the spectrum analyzer and a 3 kHz resolution bandwidth. The peak of the fundamental was located, and using the marker delta functions, points at least 20 dB down from the peak to the left and right were located. The distance between these two points is the 20 dB bandwidth. There is no bandwidth requirement, but the fundamental waveform must not fall in a restricted band. The closest restricted bands listed in 15.205 that fall above and below the fundamental frequencies are 13.36-13.41 MHz, and 16.42-16.423 MHz. The bandwidth shown in the plot is 238 kHz, which would not place any of the waveform in a restricted band, regardless of which frequency the EUT is transmitting at. Emissions located outside the markers are ambient signals.

4.2 Test Results

Frequency (MHz)	Emission Bandwidth (kHz)
13.56	238

Results: Passed

15:40:25 01 JUL 2003

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR Δ 238 kHz
-4.21 dB

LOG REF 50.0 dB μ V

10
dB/
#ATN
0 dB

VA SB
SC FC
CORR

CENTER 13.555 MHz SPAN 1.000 MHz
#IF BW 3.0 kHz AVG BW 3 kHz SWP 333 msec

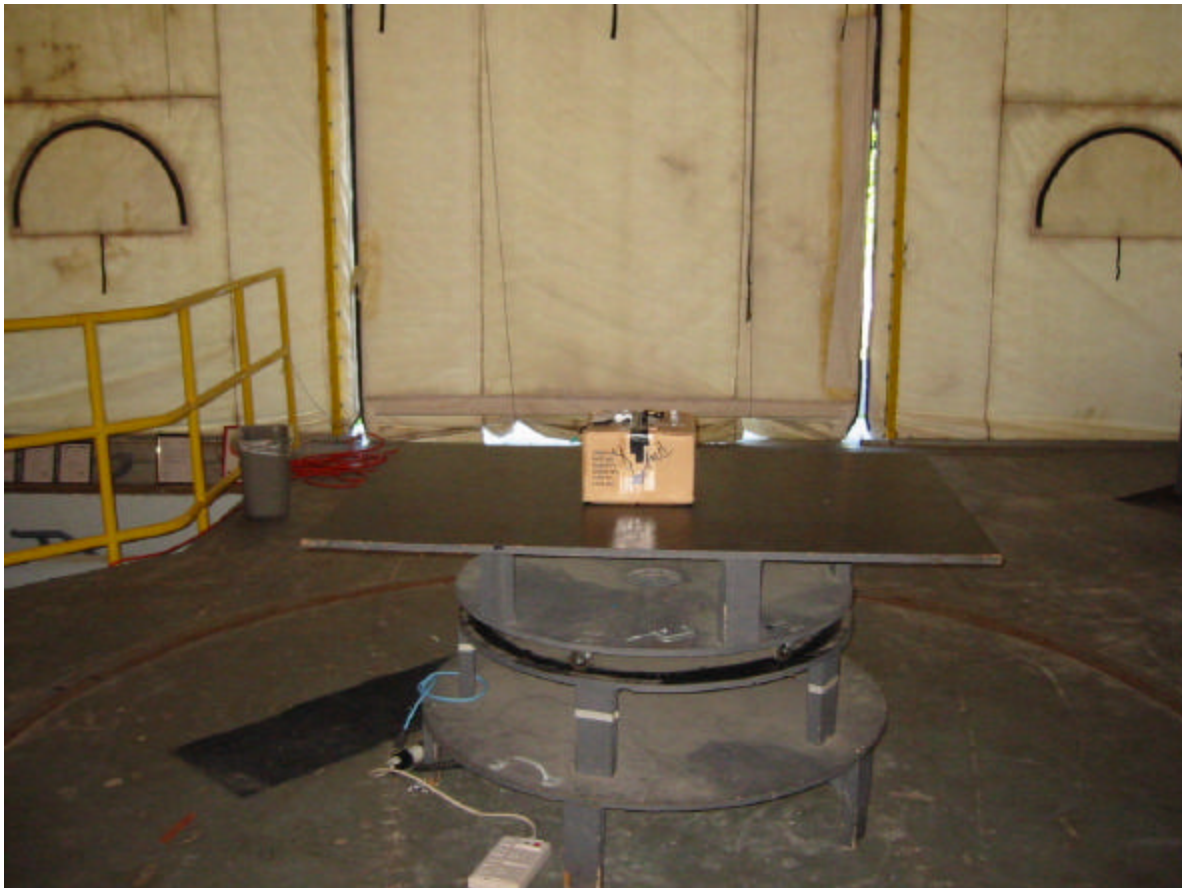
5.0 Field Strength of Spurious Radiation

FCC §2.1053, §15.205, §15.209(a)

5.1 Test Procedure

The transmitter was placed on a wooden turntable. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The Field Strength (FS) in the frequency range up to tenth harmonic of the fundamental frequency was measured. Photographs of the test setup used to test for radiated emissions from the EUT chassis are below.

Requirement: The emissions must be below the levels specified in 15.209(a), and must be below the level of the fundamental. Emissions falling within the restricted bands of 15.205 must meet the limits of 15.209(a).



Radiated Spurious Test Setup

5.2 Test Results

Results: Pass

Aura Communications, Inc., Model No. AD688H-X
FCC ID: P6YAD688H

Date of Test: July 1-2, 2003

Company: Aura Communications Model #: AD688H-X (Headset)
Engineer: Nicholas Abbondante Location: Site 2 Serial #: 0001
Project #: 3044870 Pressure: 1005mB Receiver: HP 8542E
Date: 07/02/03 Temp: 22c Antenna: LOOP2-E 6-02-04 V1.ant None
Standard: FCC Part 15 Subpart B Humidity: 62% PreAmp: PRE4 10-28-03.amp
Class: B Group: None Cable(s): CBL018 9-10-03.cbl CBL10MS1 9-10-03.cbl
Limit Distance: 30 meters Test Distance: 3 meters
Voltage/Frequency: Battery Frequency Range: Fundamental - 30 MHz

Transmit Mode									
Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB
No Emissions Were Detected Above the Noise Floor									

Company: Aura Communications Model #: AD688H-X (Headset)
Engineer: Nicholas Abbondante Location: Site 2 Serial #: 0001
Project #: 3044870 Pressure: 1005mB Receiver: HP 8542E
Date: 07/02/03 Temp: 22c Antenna: LOG2 11-5-03 V3.ant LOG2 11-5-03 H3.ant
Standard: FCC Part 15 Subpart B Humidity: 60% PreAmp: None
Class: B Group: None Cable(s): CBL018 9-10-03.cbl None
Limit Distance: 3 meters Test Distance: 3 meters
Voltage/Frequency: Battery Frequency Range: 30 MHz - 1 GHz

Charging Mode									
Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB
V	41.440	5.4	11.4	0.0	0.0	0.0	16.8	40.0	-23.2
H	87.030	7.3	8.4	0.2	0.0	0.0	15.9	40.0	-24.1
V	97.200	12.8	8.2	0.1	0.0	0.0	21.2	43.5	-22.3
H	122.400	5.8	7.9	0.1	0.0	0.0	13.8	43.5	-29.7
H	136.100	16.1	8.0	0.1	0.0	0.0	24.2	43.5	-19.3
H	149.700	14.3	9.1	0.1	0.0	0.0	23.5	43.5	-20.0
V	163.400	14.5	9.1	0.1	0.0	0.0	23.8	43.5	-19.7
H	191.700	16.1	10.1	0.2	0.0	0.0	26.4	43.5	-17.1
H	217.800	15.5	10.9	0.2	0.0	0.0	26.6	46.0	-19.4
H	231.400	13.4	11.5	0.3	0.0	0.0	25.1	46.0	-20.9
H	245.000	13.2	12.0	0.3	0.0	0.0	25.5	46.0	-20.5
H	272.200	9.6	12.8	0.3	0.0	0.0	22.7	46.0	-23.3
V	435.600	8.2	17.2	0.3	0.0	0.0	25.7	46.0	-20.3
V	449.300	9.8	17.9	0.3	0.0	0.0	28.0	46.0	-18.0
V	490.100	12.6	18.5	0.2	0.0	0.0	31.3	46.0	-14.7

Headset