

PCTEST ENGINEERING LABORATORY, INC.

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CERTIFICATE OF COMPLIANCE

MANUFACTURER NAME & ADDRESS:

Uniden Engineering Services
181 N. Country Club Road, P.O. Box 580
Lake City, SC 92560-0580

DATE & LOCATION OF TESTING:

Date(s) of Tests: December 23-24, 2003
Test Report S/N: 15.231208606.AMW
Test Site: PCTEST Lab, Columbia, MD

FCC ID: AMWUP737

APPLICANT: UNIDEN ENGINEERING SERVICES

SUMMARY:

Model No.: TRU8885
Equipment EUT Type: 5.8 GHz Cordless Phone
Max. Output Power: 0.137 W (21.38 dBm) - HS
0.378 W (25.78 dBm) - Base
Frequency Range: 5741 -5828 MHz
FCC Classification: FCC Part 15 Digital Transmission System (DTS)
FCC Rule Part(s): Parts 15.247; ANSI C-63.4-2001
Test Device Serial No.: S/N: 2

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C-63.4-2001.

Grant Conditions: Output power is EIRP. This transmitter has been tested for SAR compliance for head and body-worn configurations. SAR compliance for body-worn operating configurations is limited to the specific belt-clip tested for this filing. Users must be informed of the operating requirements for satisfying body-worn RF exposure compliance.

I authorize and attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

PCTEST certifies that no party to this application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 862.


Alfred Cirwithian
Vice President Engineering

230924532. AMW



TABLE OF CONTENTS

ATTESTATION STATEMENTS.....1

FCC PART 15.247 MEASUREMENT REPORT COVER PAGE2

1.0 INTRODUCTION3

 1.1 EVALUATION PROCEDURE3

 1.2 SCOPE3

 1.3 PCTEST TEST LOCATION3

2.0 PRODUCT INFORMATION.....4

 2.1 EQUIPMENT DESCRIPTION.....4

 2.2 ENCLOSURE4

 2.3 EMI SUPPRESSION DEVICE(S)/MODIFICATIONS4

3.0 DESCRIPTION OF TEST5

 3.1 CONDUCTED EMISSIONS.....5

 3.2 RADIATED EMISSIONS.....6

4.0 ANTENNA REQUIREMENTS.....7

5.0 TEST EQUIPMENT CALIBRATION DATA.....8

EXHIBIT A. SUMMARY OF TEST RESULTS9

EXHIBIT A. 6dB BANDWIDTH MEAUREMENT10-13

EXHIBIT A. OUTPUT POWER MEASUREMENT.....14-17

EXHIBIT A. POWER SPECTRAL DENSITY18-21

EXHIBIT A. BANDEDGE.....22-23

EXHIBIT A. RADIATED FUNDAMENTAL & HARMONIC MEASUREMENTS24-29

EXHIBIT A. RADIATED SPURIOUS MEASUREMENTS30

EXHIBIT A. LINE CONDUCTED.....31

EXHIBIT B. LABELING REQUIREMENTS.....32

EXHIBIT C. BLOCK DIAGRAM/SCHEMATICS33

EXHIBIT D. PART LIST.....34



EXHIBIT E. OPERATIONAL DESCRIPTION35

EXHIBIT F. TEST SETUP PHOTOGRAPHS.....36



EXHIBIT G. EUT EXTERNAL/INTERNAL PHOTOGRAPHS37

EXHIBIT H. USER'S MANUAL38

EXHIBIT I. MPE DATA39

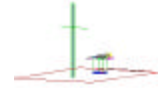
PCTEST LAB TEST REPORT 15.247		FCC CERTIFICATION REPORT 	Reviewed by: Quality Manager
Filename: 15.231208606.AMW	Test Dates: Dec. 23-24, 2003	EUT Type: 5.8 GHz Cordless Phone	FCC ID: AMWUP737
			Page i of i

Attestation Statements

PCTEST LAB TEST REPORT 15.247		FCC CERTIFICATION REPORT 		Reviewed by: Quality Manager
Filename: 15.231208606.AMW	Test Dates: Dec. 23-24, 2003	EUT Type: 5.8 GHz Cordless Phone	FCC ID: AMWUP737	Page 1 of 39



MEASUREMENT REPORT





A. General Information

APPLICANT	Uniden Engineering Services
APPLICANT ADDRESS	216 John Street P.O. Box 580 Lake City, SC 29560-0580
TEST SITE	PCTEST ENGINEERING LABORATORY, INC.
TEST SITE ADDRESS	6660-B Dobbin Road, Columbia, MD 21045 USA
FCC RULE PART(S)	Parts 15.247; ANSI C-63.4-2001
MODEL NAME	TRU8886
FCC ID	AMWUP737
Test Device Serial No.:	S/N: 2 <input type="checkbox"/> Production <input checked="" type="checkbox"/> Pre-Production <input type="checkbox"/> Engineering
FCC CLASSIFICATION	FCC Part 15 Digital Transmission System (DTS)
DATE(S) OF TEST	December 23-24, 2003
TESTS REPORT S/N:	15.231208606.AMW

A.1 Test Facility / NVLAP Accreditation

Measurements were performed at PCTEST Engineering Lab in Columbia, MD 21045, U.S.A.

- PCTEST facility is an FCC registered (PCTEST Reg. No. 90864) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules and Industry Canada (IC 2451).
- PCTEST Lab is accredited by U.S. National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP) in EMC, Telecommunication, and FCC for satisfactory compliance with criteria established in Title 15, Part 285 Code of Federal Regulations. (NVLAP Lab code: 100431-0).
- PCTEST Lab is a recognized U.S. Conformity Assessment Body (CAB) in EMC and R&TTE (n.b. 0982) under the U.S.-EU Mutual Recognition Agreement (MRA).
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC Guide 65 by the American National Standards Institute (ANSI) in all scopes of FCC Rules.
- PCTEST facility is an IC registered (IC-2451) test laboratory with the site description on file at Industry Canada.

PCTEST LAB TEST REPORT 15.247		FCC CERTIFICATION REPORT 	Reviewed by: Quality Manager
Filename: 15.231208606.AMW	Test Dates: Dec. 23-24, 2003	EUT Type: 5.8 GHz Cordless Phone	FCC ID: AMWUP737
			Page 2 of 39

1.0 INTRODUCTION

1.1 Evaluation Procedure

The measurement procedure described in the American National Standard for Methods of Measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz (ANSI C63.4-2001) and FCC Public Notice dated July 12, 1995 entitled "Guidance on Measurement for Direct Sequence Spread Spectrum System" were used in the measurement of **Uniden 5.8 GHz Cordless Phone**.

1.2 Scope

Measurement & determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission.

1.3 PCTEST Test Location

The map at the right shows the location of the PCTEST LABORATORY, its proximity to the FCC Laboratory, the Columbia vicinity area, the Baltimore-Washington Intern't'l (BWI) airport, the city of Baltimore and the Washington, DC area. (see Figure 1.2-1).

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility in New Concept Business Park, Guilford Industrial Park, Columbia, Maryland. The site address is 6660-B Dobbin Road, Columbia, MD 21045. The test site is one of the highest points in the Columbia area with an elevation of 390 feet above mean sea level. The site coordinates are 39° 11'15" N latitude and 76° 49'38" W longitude. The facility is 1.5 miles North of the FCC laboratory, and the ambient signal and ambient signal strength are approximately equal to those of the FCC laboratory. There are no FM or TV transmitters within 15 miles of the site. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4 on October 19, 2002.

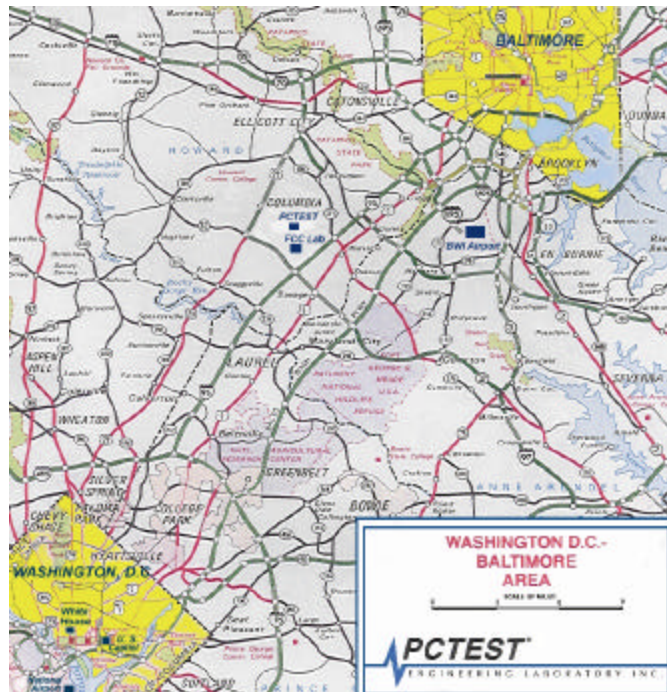



Figure 1.3-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

PCTEST LAB TEST REPORT 15.247		FCC CERTIFICATION REPORT 	Reviewed by: Quality Manager
Filename: 15.231208606.AMW	Test Dates: Dec. 23-24, 2003	EUT Type: 5.8 GHz Cordless Phone	FCC ID: AMWUP737
			Page 3 of 39

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Uniden 5.8 GHz Cordless Phone**. The EUT consisted of the following component(s):

Table 2-1. EUT Equipment Description

Manufacturer / Model / Description	Serial Number
Uniden / 5.8 GHz Cordless Phone/ Model: TRU8885	2

2.2 Enclosure



The EUT incorporates the following enclosure:

- Plastic Enclosure

2.3 EMI Suppression Device(s)/Modifications

EMI suppression device(s) added and/or modifications made during testing.

- none

PCTEST LAB TEST REPORT 15.247	 FCC CERTIFICATION REPORT 	Reviewed by: Quality Manager
Filename: 15.231208606.AMW	Test Dates: Dec. 23-24, 2003	EUT Type: 5.8 GHz Cordless Phone
	FCC ID: AMWUP737	Page 4 of 39

3.0 DESCRIPTION OF TEST

3.1 Conducted Emissions

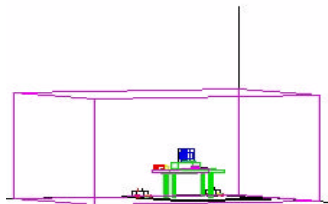


Figure 3.1-1. Shielded Enclosure Line-Conducted Test Facility

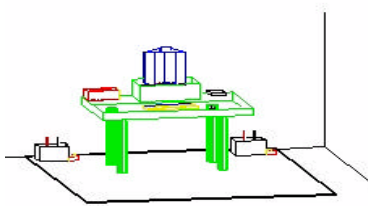


Figure 3.1-2. Line Conducted Emission Test Set-Up

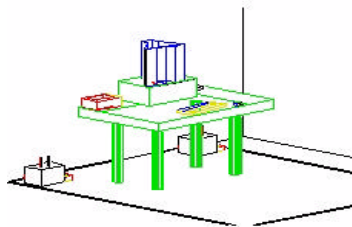


Figure 3.1-3. Wooden Table & Bonded LISNs

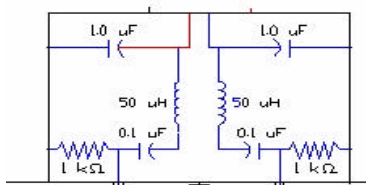




Figure 3.1-4. LISN Schematic Diagram

The line-conducted facility is located inside a 16'x20'x10' shielded enclosure. It is manufactured by Ray Proof Series 81 (see Figure 3.1-1). The shielding effectiveness of the shielded room is in accordance with MIL-Std-285 or NSA 65-5. A 1m x 1.5m wooden table 80cm high is placed 40cm away from the vertical wall and 1.5m away from the sidewall of the shielded room (see Figure 3.1-2). Solar Electronics and EMCO Model 3725/2 (10kHz-30MHz) 50Ω/50μH Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room (See Figure 3.1-3). The EUT is powered from the Solar LISN and the support equipment is powered from the EMCO LISN. Power to the LISNs are filtered by a high-current high-insertion loss Ray Proof power line filters (100dB 14Hz-10GHz). The purpose of the filter is to attenuate ambient signal interference and this filter is also bonded to the shielded enclosure. All electrical cables are shielded by braided tinned copper zipper tubing with an inner diameter of ½". If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and this supply line(s) will be connected to the Solar LISN. The LISN schematic diagram is shown (See Figure 3.1-4). All interconnecting cables more than 1 meter were shortened by non-inductive bundling (serpentine fashion) to a 1-meter length. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the spectrum analyzer to determine the frequency producing the maximum EME from the EUT. The spectrum was scanned from 150kHz to 30MHz with a 20msec. sweep time. The frequencies producing the maximum level were re-examined using an EMI/Field Intensity Meter and Quasi-Peak adapter. The detector function was set to CISPR quasi-peak and average mode. The bandwidth of the receiver was set to 10kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each EME emission. Each emission was maximized by: switching power lines; varying the mode of operation or resolution; clock or data exchange speed; scrolling H pattern to the EUT and/or support equipment, and powering the monitor from the floor mounted outlet box and the computer aux AC outlet, if applicable; whichever determined the worst-case emission. Photographs of the worst-case emission can be seen in Exhibit M. Each EME reported was calibrated using the HP8640B signal generator.

PCTEST LAB TEST REPORT 15.247	 FCC CERTIFICATION REPORT 	Reviewed by: Quality Manager
Filename: 15.231208606.AMW	Test Dates: Dec. 23-24, 2003	EUT Type: 5.8 GHz Cordless Phone
	FCC ID: AMWUP737	Page 5 of 39

3.2 Radiated Emissions

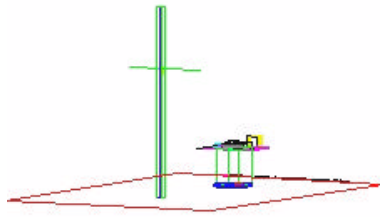


Figure 3.2-1. Meter Test Site

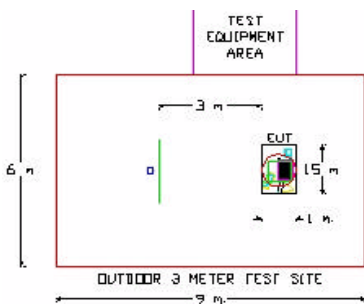


Figure 3.2-2. Dimensions of Outdoor Test Site

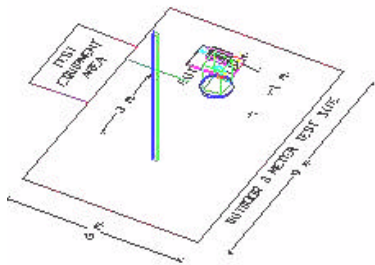


Figure 3.2-3. Turntable and System Setup

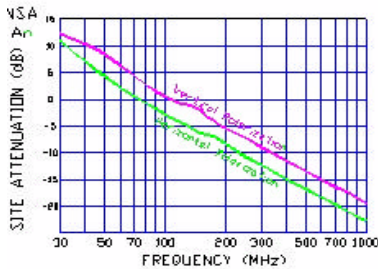




Figure 3.2-4. Normalized Site Attenuation Curves (H&V)

Preliminary measurements were made indoors at 1 meter using broadband antennas, broadband amplifier, and spectrum analyzer to determine the frequency producing the maximum EME. Appropriate precaution was taken to ensure that all EME from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, turntable azimuth with respect to the antenna was noted for each frequency found. The spectrum was scanned from 30 to 200 MHz using biconical antenna and from 200 to 1000 MHz using log-spiral antenna. Above 1 GHz, linearly polarized double ridge horn antennas were used.

Final measurements were made outdoors at 3meter test range using Roberts™ Dipole antennas or horn antenna (see Figure 3.2-1). The test equipment was placed on a wooden and plastic bench situated on a 1.5 x 2 meter area adjacent to the measurement area (see Figure 3.2-2). Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. Each frequency found during pre-scan measurements was re-examined and investigated using EMI/Field Intensity Meter and Quasi-Peak Adapter. The detector function was set to CISPR quasi-peak mode and the bandwidth of the receiver was set to 100kHz or 1 MHz depending on the frequency or type of signal. Above 1GHz the detector function was set to CISPR average mode (RBW = 1MHz, VBW = 10Hz).

The half-wave dipole antenna was tuned to the frequency found during preliminary radiated measurements. The EUT, support equipment and interconnecting cables were re-configured to the set-up producing the maximum emission for the frequency and were placed on top of a 0.8-meter high non-metallic 1 x 1.5 meter table (see Figure 3.2-3). The EUT, support equipment, and interconnecting cables were re-arranged and manipulated to maximize each EME emission. The turntable containing the system was rotated; the antenna height was varied 1 to 4 meters and stopped at the azimuth or height producing the maximum emission. Each emission was maximized by: varying the mode of operation or resolution; clock or data exchange speed; scrolling H pattern to the EUT and/or support equipment, and powering the monitor from the floor mounted outlet box and the computer aux AC outlet, if applicable; and changing the polarity of the antenna, whichever determined the worst-case emission. Photographs of the worst-case emission can be seen in Exhibit E-G. Each EME reported was calibrated using the HP8640B signal generator. The Theoretical Normalized Site Attenuation Curves for both horizontal and vertical polarization are shown in Figure 3.2-4.

PCTEST LAB TEST REPORT 15.247		FCC CERTIFICATION REPORT 	Reviewed by: Quality Manager
Filename: 15.231208606.AMW	Test Dates: Dec. 23-24, 2003	EUT Type: 5.8 GHz Cordless Phone	FCC ID: AMWUP737
			Page 6 of 39

4.0 ANTENNA REQUIREMENTS

An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the applicant can be used with the device. The use of a permanently attached antennas or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with this requirement. Professional installation is required for model with external antenna



The antennas are **permanently attached antenna**. There are no provisions for connection to an external antenna.

Conclusion:

The **Uniden 5.8 GHz Cordless Phone** unit complies with the requirement of §15.203.

CH.	Frequency	CH.	Frequency	CH.	Frequency
1	5741.056 MHz	14	5774.336 MHz	27	5807.616 MHz
2	5743.616 MHz	15	5776.896 MHz	28	5810.176 MHz
3	5746.176 MHz	16	5779.456 MHz	29	5812.736 MHz
4	5748.736 MHz	17	5782.016 MHz	30	5815.296 MHz
5	5751.296 MHz	18	5784.576 MHz	31	5817.856 MHz
6	5753.856 MHz	19	5787.136 MHz	32	5820.416 MHz
7	5756.416 MHz	20	5789.696 MHz	33	5822.976 MHz
8	5758.976 MHz	21	5792.256 MHz	34	5825.536 MHz
9	5761.536 MHz	22	5794.816 MHz	35	5828.096 MHz
10	5764.096 MHz	23	5797.376 MHz		
11	5766.656 MHz	24	5799.936 MHz		
12	5769.216 MHz	25	5802.496 MHz		
13	5771.776 MHz	26	5805.056 MHz		

5.0 Frequency/ Channel Operations

PCTEST LAB TEST REPORT 15.247		FCC CERTIFICATION REPORT 	Reviewed by: Quality Manager
Filename: 15.231208606.AMW	Test Dates: Dec. 23-24, 2003	EUT Type: 5.8 GHz Cordless Phone	FCC ID: AMWUP737
			Page 7 of 39

5.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST).

TYPE	MODEL	CAL. DUE DATE	CAL. INTERVAL	SERIAL No.
Microwave Spectrum Analyzer	HP 8566 (100Hz-22GHz)	12/05/04	Annual	3638A08713
Microwave Spectrum Analyzer	HP 8566 (100Hz-22GHz)	04/17/04	Annual	2542A11898
Spectrum Analyzer/Tracking Generator	HP 8591A (9kHz-1.8GHz)	06/02/04	Annual	3144A02458
Spectrum Analyzer	HP 8591A (9kHz-1.8GHz)	10/15/04	Annual	3108A02053
Spectrum Analyzer	HP 8594A (9kHz-2.9GHz)	11/02/04	Annual	3051A00187
Signal Generator	HP 8650B (500Hz-1GHz)	06/02/04	Annual	2232A19558
Signal Generator	HP 8640B (500Hz-1GHz)	06/02/04	Annual	1851A09816
Signal Generator	Rohde & Schwarz (0.1-1GHz)	09/22/04	Annual	894215/012
Ailtech/Eaton Receiver	NM 37/57A-SL (30MHz-1GHz)	04/12/04	Annual	0792-03271
Ailtech/Eaton Receiver	NM 37/57A (30MHz-1GHz)	03/11/04	Annual	0805-03334
Ailtech/Eaton Receiver	NM 17/27A (0.1-32MHz)	09/17/04	Annual	0608-03241
Quasi-Peak Adapter	HP 85650A	08/09/04	Annual	2043A00301
Ailtech/Eaton Adapter	CCA-7 CISPR/ANSI QP Adapter	03/11/04	Annual	0194-04082
RG58 Coax Test Cable	No.167			n/a
Harmonic/Flicker Test System	HP 6841A (IEC 555-2/3)			3531A00115
Broadband Amplifier (2)	HP 8447D			1145A00470, 1937A03348
Broadband Amplifier	HP 8447F			2443A03784
Transient Limiter	HP 11947A (9kHz-200MHz)			2820A00300
Horn Antenna (2)	EMCO Model 3115 (1-18GHz)			9704-5182, 9205-3874
Horn Antenna	EMCO Model 3116 (18-40GHz)			9203-2178
Biconical Antenna (3)	Eaton 94455-1			1295, 1332, 1277
Log-Spiral Antenna (2)	Ailtech/Eaton 93490-1			0227, 1104
Log-Spiral Antenna	Singer 93490-1			147
Roberts Dipoles	Compliance Design (1 set) A100			5118
Ailtech Dipoles	DM-105A (1set)			33448-111
EMCO LISN (3)	3816/2, 3816/2, 3725/2			1077, 1079, 2099
50-ohm Terminator	n/a			n/a
Microwave Preamp 40dB Gain	HP 83017A (0.5-26.5GHz)			3123A00181
Microwave Cables	MicroCoax (1.0-26.5GHz)			n/a
Ailtech/Eaton Receiver	NM37/57A-SL			0792-03271
Spectrum Analyzer	HP 8591A			3034A01395
Modulation Analyzer	HP 8901A			2432A03467
NTSC Pattern Generator	Leader 408			0377433
Noise Figure Meter	HP 8970B, Ailtech 7510			3106A02189, TE31700
Noise Generator	Ailtech 7010			1473
Microwave Survey Meter	Holiday Model 1501 (2.45GHz)			80931
Digital Thermometer	Extech Instruments 421305			426966
Attenuator	HP 8495A (0-70dB) DC-4GHz			
Bi-Directional Coax Coupler	Narda 3020A (50-1000MHz)			
Shielded Screen Room	RF Lindgren Model 26-2/2-0			6710 (PCT270)
Shielded Semi-Anechoic Chamber	Ray Proof Model S81			R2437 (PCT278)
Environmental Chamber	Associated Systems 1025			PCT285
OATS	n/a	12/31/2004	Tri-annual	

Table 5-1. Annual Test Equipment Calibration Schedule



PCTEST LAB TEST REPORT 15.247		FCC CERTIFICATION REPORT 	Reviewed by: Quality Manager
Filename: 15.231208606.AMW	Test Dates: Dec. 23-24, 2003	EUT Type: 5.8 GHz Cordless Phone	FCC ID: AMWUP737
			Page 8 of 39

EXHIBIT A – Test Results

Summary

The intentional radiator has been tested in a simulated typical installation to demonstrate compliance with the relevant FCC performance and procedural standards.

The radio was transmitting at full power on the specified channels and at a data rate(s) specified above. The channels tested are high, middle and low of the allocated bands.

Final system data was gathered in a mode that tended to maximize emissions by varying the orientation of the EUT, orientation of power and I/O cabling, antenna search height, and antenna polarization.

Test Date(s):	December 23-24, 2003
Test Engineer:	AI Cirwithian
Method/System:	TDD/ TDMA
Data Rate(s) Tested:	1 Slot 25% Duty Cycle HS /2 Slot Base

FCC Part Section(s)	RSS 210 Section	Test Description	Test Limit	Test Condition
TRANSMITTER MODE (TX)				
15.247(a)(2)	5.9.1	6dB Bandwidth	> 500kHz	CONDUCTED
15.247(b)	6.22(o)(a3)	Transmitter Output Power	< 1 Watt	
15.247(d)	6.2.2(o)(b)	Transmitter Power Spectral Density	< 8dBm / 3kHz	
15.247(c)	5.9.1 6.2.2(o) (e1)	Occupied Band Width Out-of-Band Emissions (Band Width at 20dB below)	Radiated <20dBc. Emissions in restricted bands must meet the radiated limits detailed in 15.209	
15.205 15.209	6.2.1 6.3	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	< FCC 15.209 limits or < RSS-210 table 3 limits Emissions in restricted bands must meet the radiated limits detailed in 15.209	RADIATED (30MHz-1GHz) (1-25 GHz)
15.207	6.6	AC Conducted Emissions 150kHz – 30MHz	EN55022	Line Conducted
RECEIVER MODE (RX)				
15.207	7.4	AC Conducted Emissions 150kHz – 30MHz	EN55022	Line Conducted
15.209	7.3	General Field Strength Limits (Restricted Bands and Radiated Emissions Limits)	< FCC 15.209 limits or < RSS-210 table 3 limits	Radiated (30MHz-1GHz) (1-25 GHz)
RF EXPOSURE (SAR or MPE)				
2.1093/2.1091	RSS-102	SAR Test or MPE	1.6 W/kg or mw/cm ²	3 Channels

Table A-1. Summary of Test Results


PCTEST LAB TEST REPORT 15.247		FCC CERTIFICATION REPORT 	Reviewed by: Quality Manager
Filename: 15.231208606.AMW	Test Dates: Dec. 23-24, 2003	EUT Type: 5.8 GHz Cordless Phone	FCC ID: AMWUP737
			Page 9 of 39

EXHIBIT A – Test Results (Cont.)

6dB Bandwidth Measurement

§15.247(a)(2)

The bandwidth at 6dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating in transmission mode at the appropriate frequencies.

Minimum Standard – The transmitter shall have a minimum 6dB bandwidth of 500kHz (0.5MHz)

The spectrum analyzer is set to:

RBW = 100 kHz (10dB/div)
 VBW = 100 kHz
 Span = 10 MHz
 Sweep = 4.0 ms

Frequency (MHz)	Channel No.	Test Results HS	
		6dB Bandwidth (MHz)	Pass/Fail
5741	1	1.47	Pass
5782	17	1.54	Pass
5828	35	1.43	Pass

– See next pages for actual measured spectrum plots

Table A-2. Bandwidth Measurements 6dB (HS)

Frequency (MHz)	Channel No.	Test Results Base	
		6dB Bandwidth (MHz)	Pass/Fail
5741	1	1.43	Pass
5782	17	1.61	Pass
5828	35	1.54	Pass

– See next pages for actual measured spectrum plots

Table A-2. Bandwidth Measurements 6dB (Base)

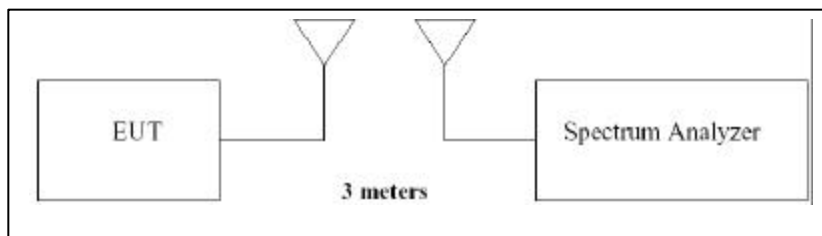


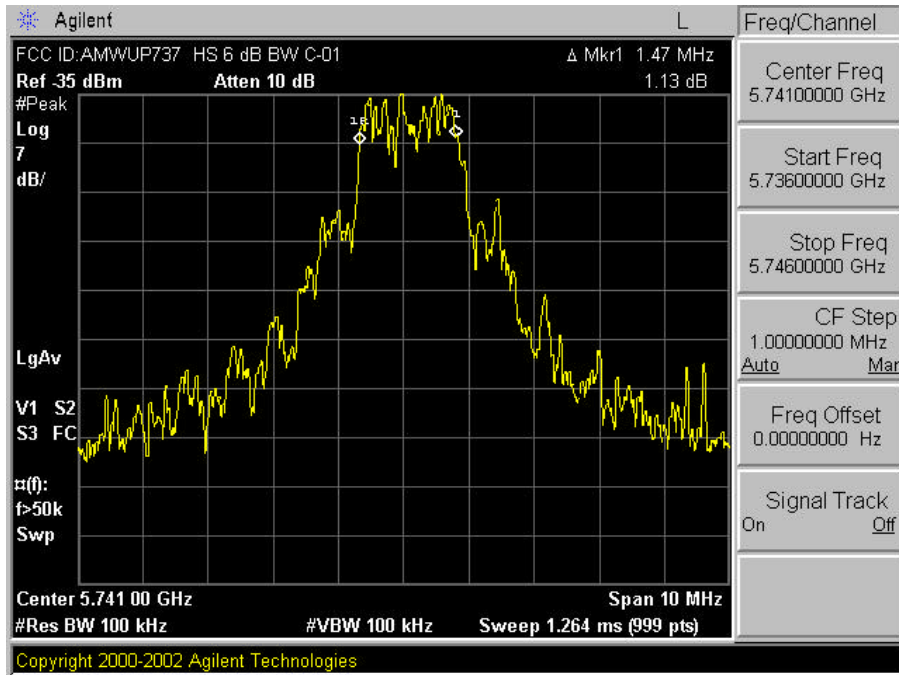
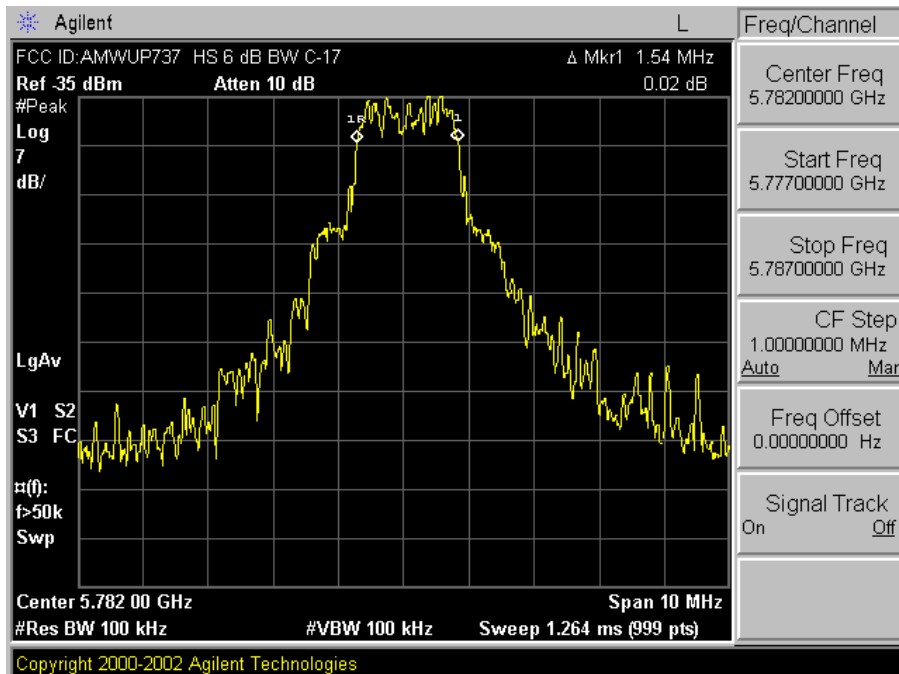


Figure A-1. Test Instrument & Measurement Setup



PCTEST LAB TEST REPORT 15.247		FCC CERTIFICATION REPORT 	Reviewed by: Quality Manager
Filename: 15.231208606.AMW	Test Dates: Dec. 23-24, 2003	EUT Type: 5.8 GHz Cordless Phone	FCC ID: AMWUP737
			Page 10 of 39

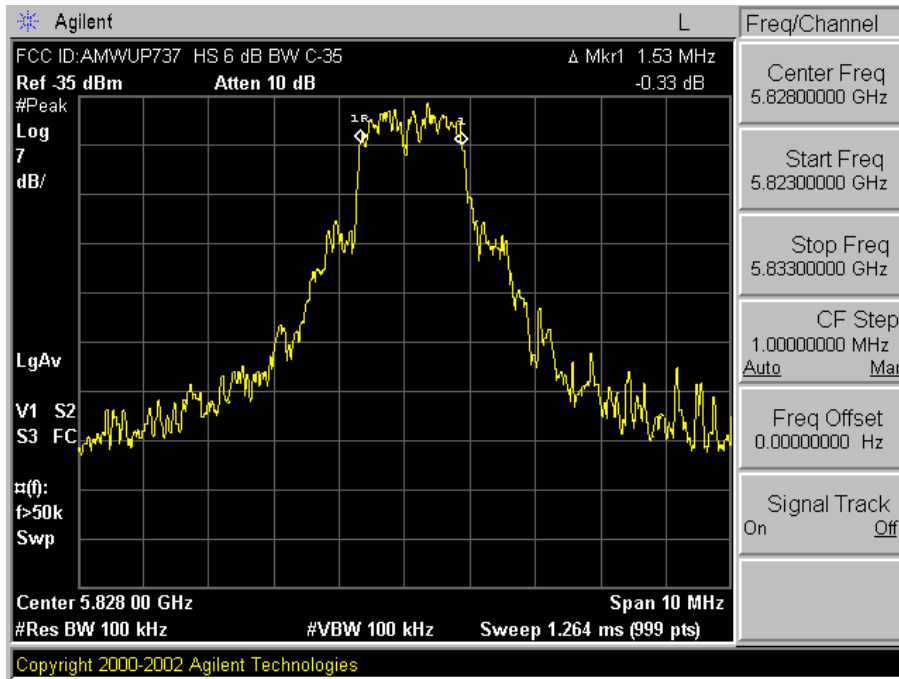


Plot A-1. 6dB Bandwidth Plot – Ch. 01 (HS)

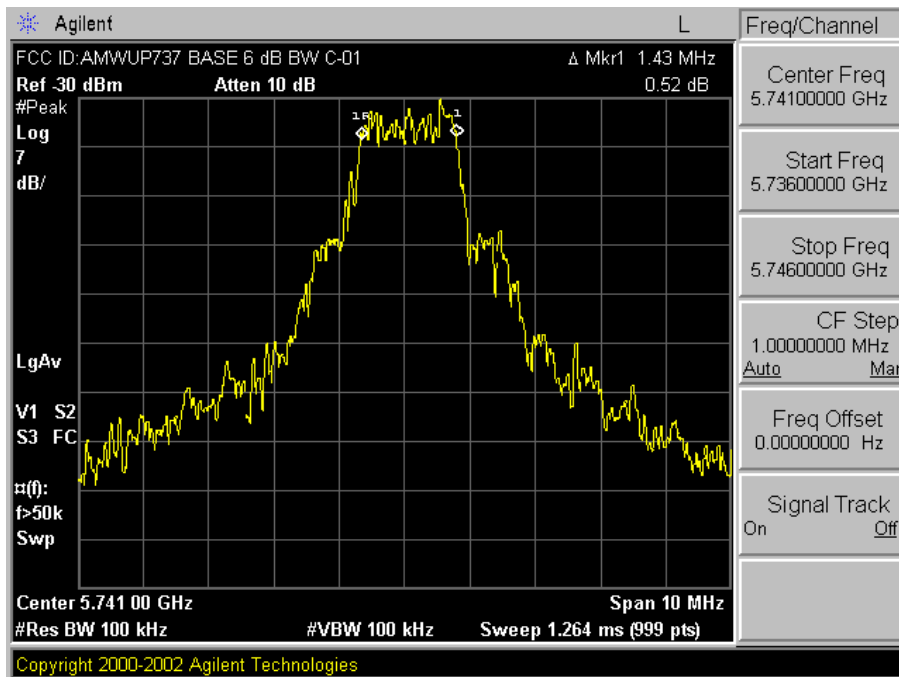


Plot A-2. 6dB Bandwidth Plot – Ch. 17 (HS)



PCTEST LAB TEST REPORT 15.247		FCC CERTIFICATION REPORT 	Reviewed by: Quality Manager
Filename: 15.231208606.AMW	Test Dates: Dec. 23-24, 2003	EUT Type: 5.8 GHz Cordless Phone	FCC ID: AMWUP737
			Page 11 of 39

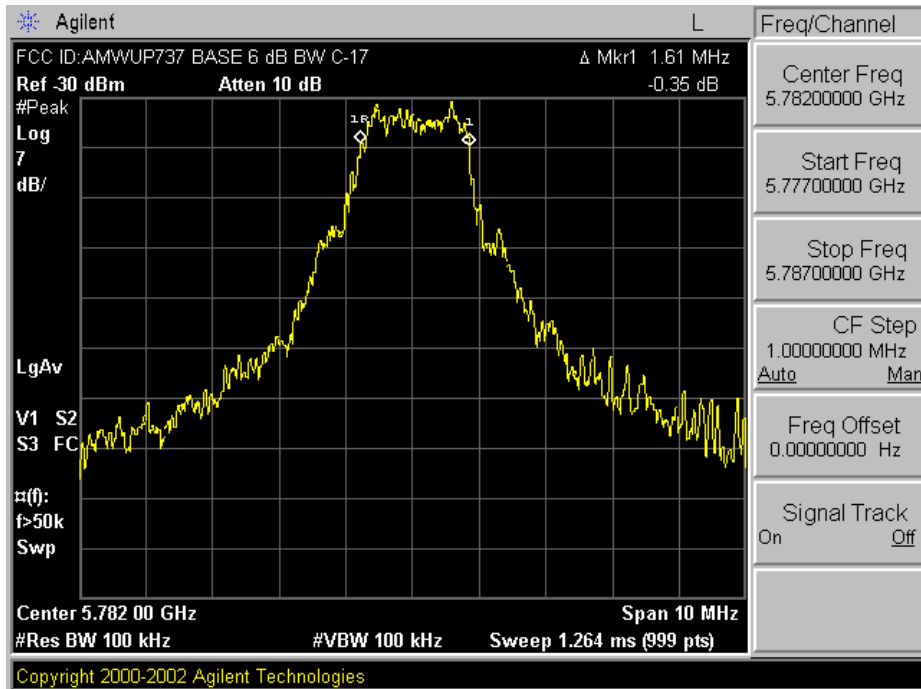


Plot A-3. 6dB Bandwidth Plot – Ch. 35 (HS)

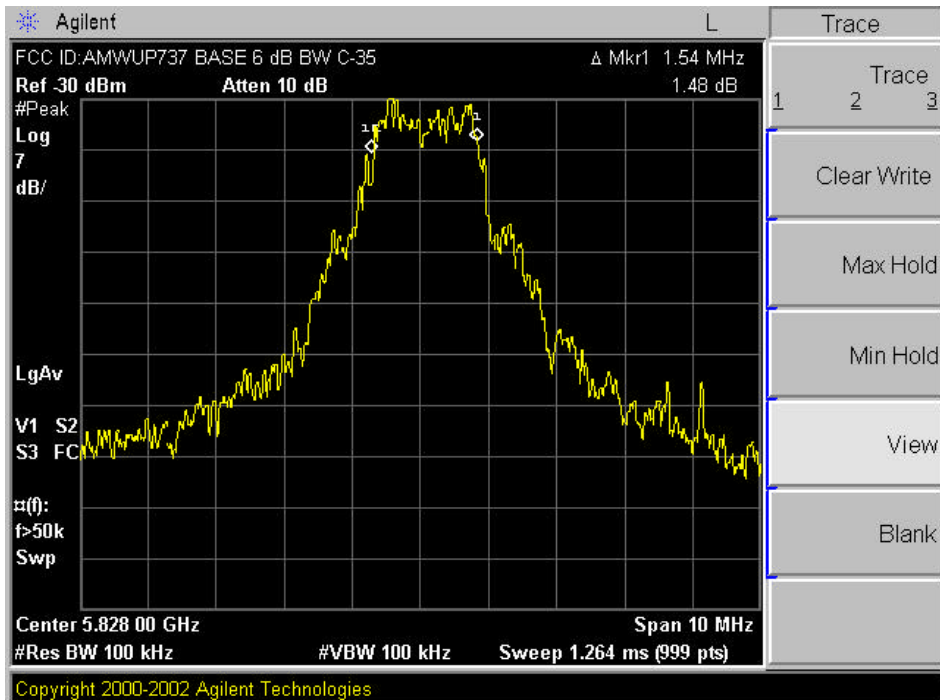


Plot A-1. 6dB Bandwidth Plot – Ch. 01 (BASE)

PCTEST LAB TEST REPORT 15.247		FCC CERTIFICATION REPORT 	Reviewed by: Quality Manager
Filename: 15.231208606.AMW	Test Dates: Dec. 23-24, 2003	EUT Type: 5.8 GHz Cordless Phone	FCC ID: AMWUP737
			Page 12 of 39



Plot A-2. 6dB Bandwidth Plot – Ch. 17 (BASE)



Plot A-3. 6dB Bandwidth Plot – Ch. 35 (BASE)

PCTEST LAB TEST REPORT 15.247	PCTEST ENGINEERING LAB., INC.	FCC CERTIFICATION REPORT	Reviewed by: Quality Manager
Filename: 15.231208606.AMW	Test Dates: Dec. 23-24, 2003	EUT Type: 5.8 GHz Cordless Phone	FCC ID: AMWUP737
			Page 13 of 39

EXHIBIT A – Test Results (Cont.)

Output Power Measurement

§15.247(b)

The antenna conducted tests cannot be performed on this device, radiated tests to show compliance with the peak output power limit specified in Section 15.247(b) and the spurious RF conducted emission limit specified in Section 15.247(c) are acceptable.

Minimum Standard – The transmitter peak output power shall not exceed 1 watt.

Spectrum Analyzer plots are for reference only actual Conducted power measurements were taken with a power meter.

Power out Calculation Example:

The 3 meter Handset meter reading at 5741.056 MHz = -33 dBm or 74.00 dBuV/m AFCL = 43.9 dB. FS in dBuV/m or 785,236 uV/m. The Handset antenna gain = 4 dBi which yields a numerical gain of 2.51.

Using the Equation $P = (E \cdot d)^2 / (30 \cdot G)$ Output Power = $(785,236 \cdot 3)^2 / (30 \cdot 2.51) = 0.0734$ Watts

Frequency (MHz)	Channel No.	Test Results (HS)			
		Power Output (dBm)	Margin (dB)	Limit	Power Output (W)
5741	1	21.38	- 8.62	+ 30 dBm	0.137
5782	17	21.32	- 8.68	+ 30 dBm	0.136
5828	35	19.86	- 10.14	+ 30 dBm	0.0970

See next pages for spectrum plots (Reference Only). Actual data is taken with a peak power meter.
Max. Peak Power + Attenuation = dBm ⇒ Watts.

Table A-3. Output Power Measurements (HS)

Frequency (MHz)	Channel No.	Test Results (Base)			
		Power Output (dBm)	Margin (dB)	Limit	Power Output (W)
5741	1	25.14	- 4.86	+ 30 dBm	0.326
5782	17	25.52	- 4.48	+ 30 dBm	0.356
5828	35	25.78	- 4.22	+ 30 dBm	0.378

See next pages for spectrum plots (Reference Only). Actual data is taken with a peak power meter.
Max. Peak Power + Attenuation = dBm ⇒ Watts.

Table A-3. Output Power Measurements (BASE)

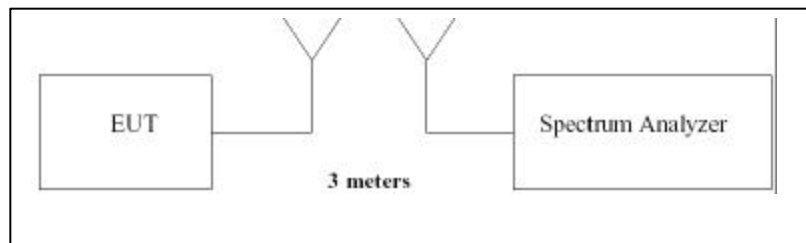
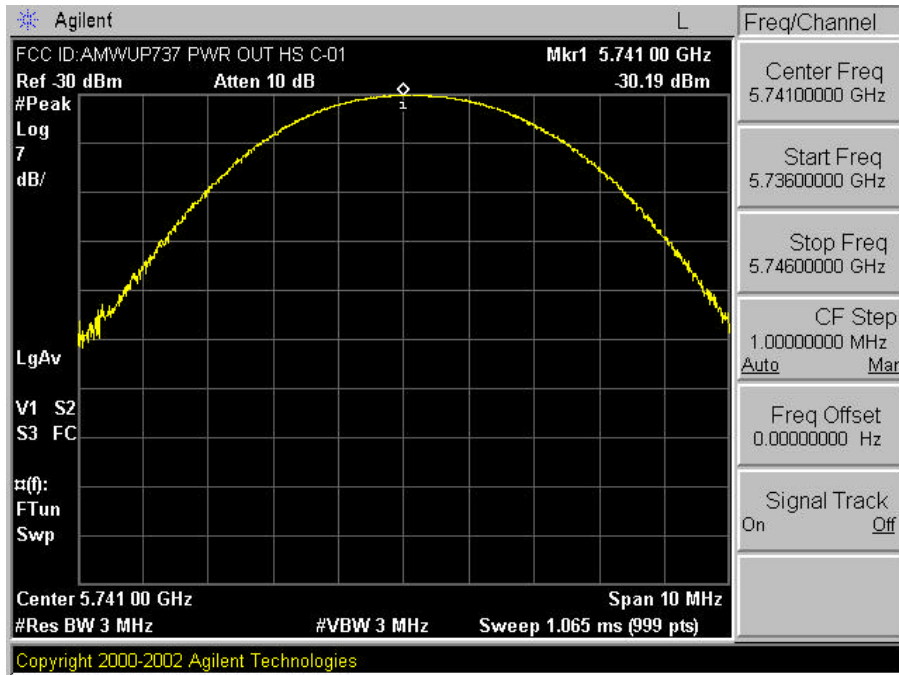
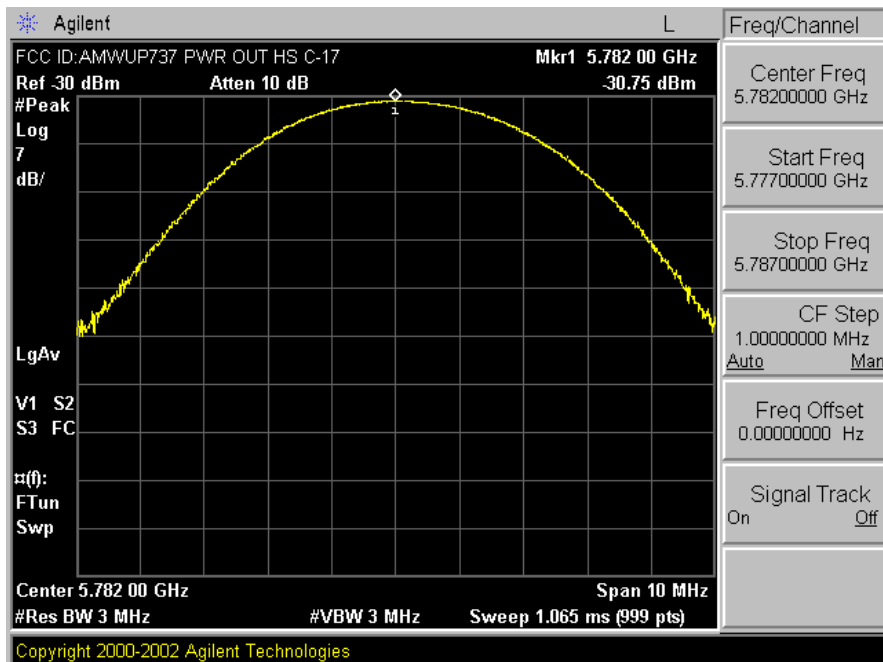


Figure A-2. Test Instrument & Measurement Setup



PCTEST LAB TEST REPORT 15.247	PCTEST	FCC CERTIFICATION REPORT	Reviewed by: Quality Manager
Filename: 15.231208606.AMW	Test Dates: Dec. 23-24, 2003	EUT Type: 5.8 GHz Cordless Phone	FCC ID: AMWUP737
			Page 14 of 39

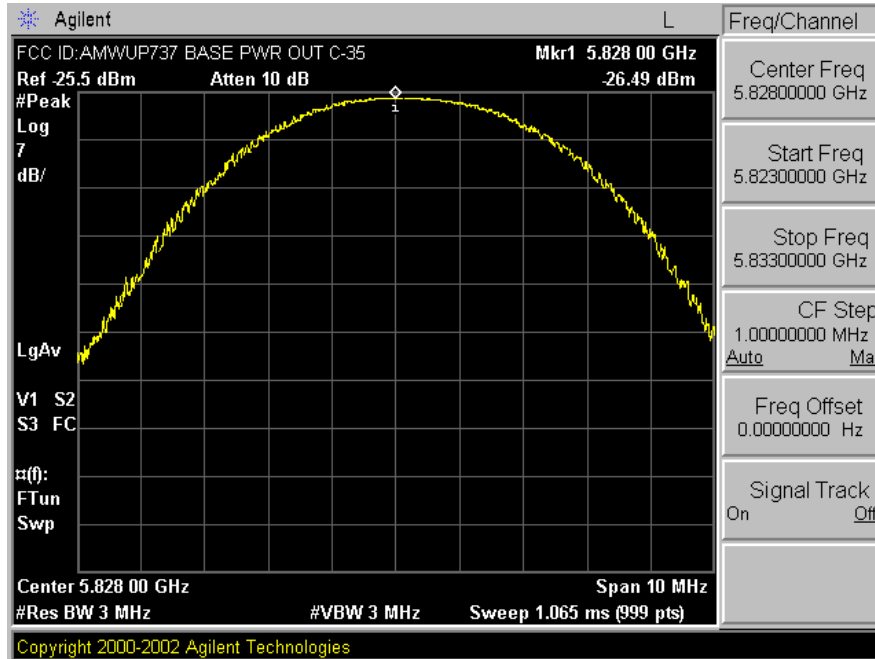


Plot A-4. Max. Output Power Plot – Ch. 01 (HS)

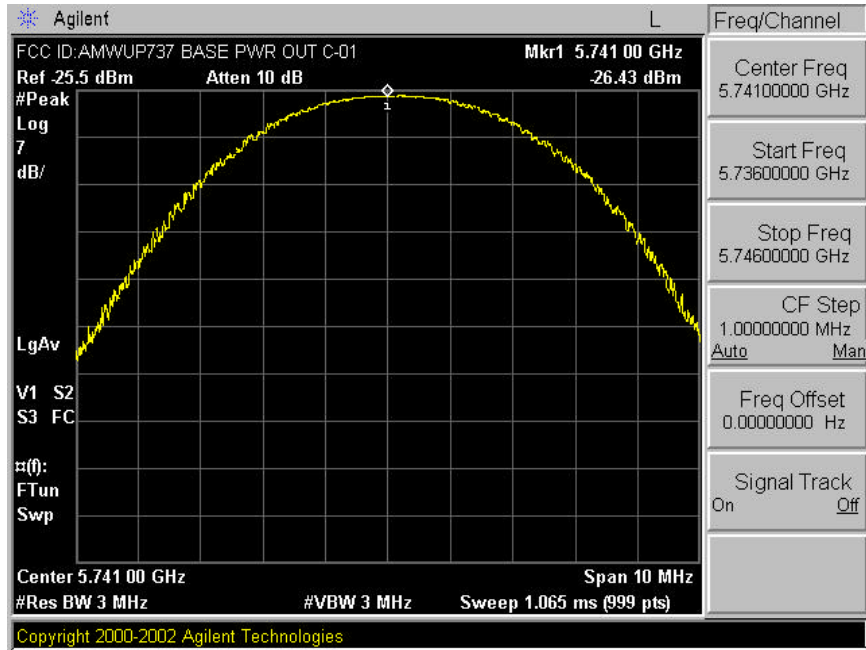


Plot A-5. Max. Output Power Plot – Ch. 17 (HS)



PCTEST LAB TEST REPORT 15.247		FCC CERTIFICATION REPORT 	Reviewed by: Quality Manager
Filename: 15.231208606.AMW	Test Dates: Dec. 23-24, 2003	EUT Type: 5.8 GHz Cordless Phone	FCC ID: AMWUP737
			Page 15 of 39

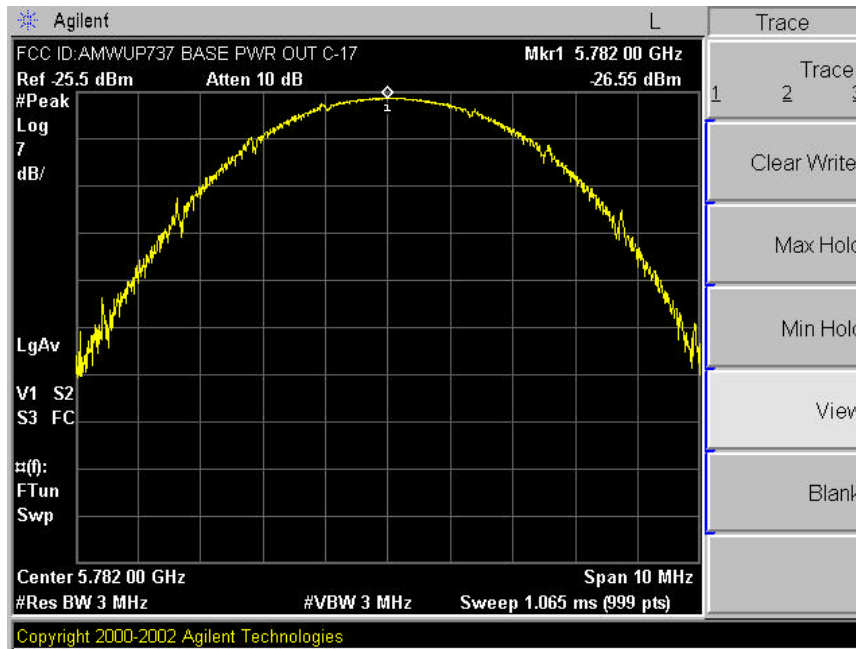


Plot A-6. Max. Output Power Plot – Ch. 35 (HS)

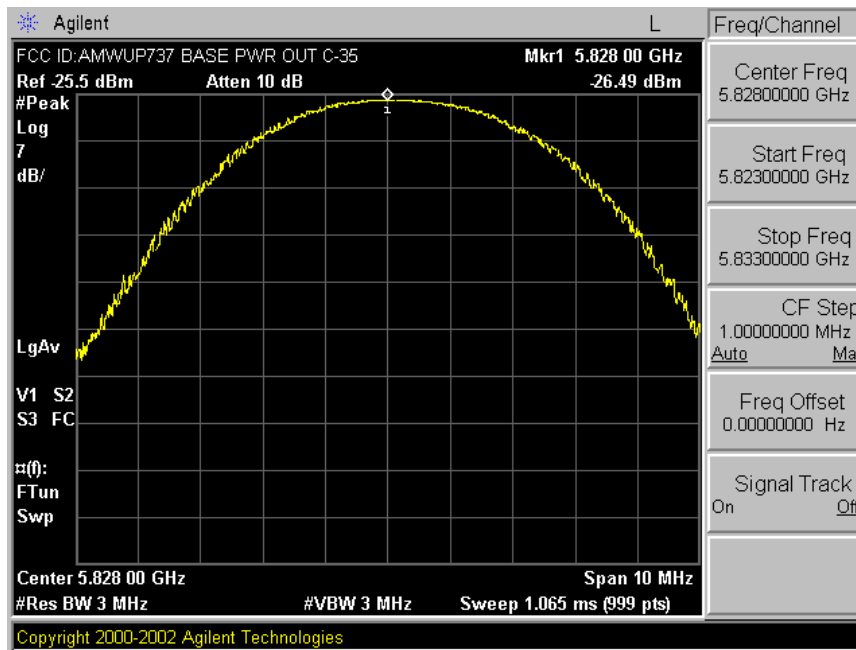


Plot A-7. Max. Output Power Plot – Ch. 01 (BASE)

PCTEST LAB TEST REPORT 15.247		FCC CERTIFICATION REPORT 	Reviewed by: Quality Manager
Filename: 15.231208606.AMW	Test Dates: Dec. 23-24, 2003	EUT Type: 5.8 GHz Cordless Phone	FCC ID: AMWUP737
			Page 16 of 39



Plot A-8. Max. Output Power Plot – Ch. 17 (BASE)



Plot A-9. Max. Output Power Plot – Ch. 35 (BASE)



PCTEST LAB TEST REPORT 15.247		FCC CERTIFICATION REPORT 	Reviewed by: Quality Manager
Filename: 15.231208606.AMW	Test Dates: Dec. 23-24, 2003	EUT Type: 5.8 GHz Cordless Phone	FCC ID: AMWUP737
			Page 17 of 39

EXHIBIT A – Test Results (Cont.)

Power Spectral Density

§15.247(d)

The antenna conducted tests cannot be performed on this device, radiated tests to show compliance with the peak power density limit specified in Section 15.247(b) and the RF conducted emission limit specified in Section 15.247(c) are acceptable.

Minimum Standard – The transmitter power density average over 1-second interval shall not be greater than 8dBm in any 3kHz BW.

The spectrum analyzer is set to:

RBW = 3 kHz (7dB/div)
 VBW = 3 kHz
 Span = 30 MHz
 Ref. Level = -33 dBm
 Sweep = >1000 sec

Power Density Calculation Example:

The 3 meter Handset meter reading at 5741.056 MHz = -49.5 dBm or 57.5 dBuV/m AFCL = 43.9 dB. FS in dBuV/m = 101.4 dBuV/m or 117,490 uV/m. The Handset antenna gain = 4 dBi which yields a numerical gain of 2.51.

Using the equation $P_d = (E \cdot d)^2 / (30 \cdot G) = \text{Output Power} = (117,490 \cdot 3)^2 / (30 \cdot 2.51) = 0.00165 \text{ Watts}$ or 2.17 dBm.

Frequency (MHz)	Channel No.	Test Results (HS)		
		Power Density (dBm)	Limit	Margin
5741	1	3.79	+ 8 dBm	- 4.21
5782	17	6.74	+ 8 dBm	- 1.26
5828	35	6.44	+ 8 dBm	- 1.56

See next pages for actual measured spectrum plots
 Peak Power Density + Attenuation = dBm

Table A-4. Power Density Measurements (HS)

Frequency (MHz)	Channel No.	Test Results (Base)		
		Power Density (dBm)	Limit	Margin
5741	1	2.15	+ 8 dBm	- 5.85
5782	17	2.19	+ 8 dBm	- 5.81
5828	35	1.54	+ 8 dBm	- 6.46

See next pages for actual measured spectrum plots
 Peak Power Density + Attenuation = dBm

Table A-4. Power Density Measurements (BASE)

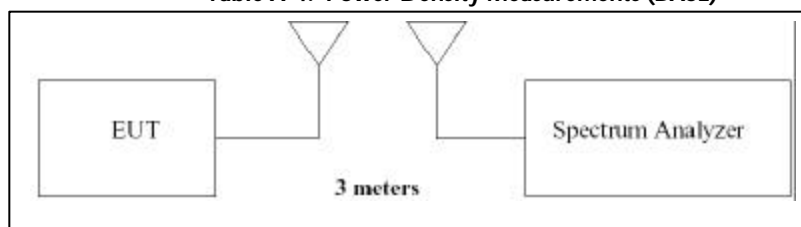
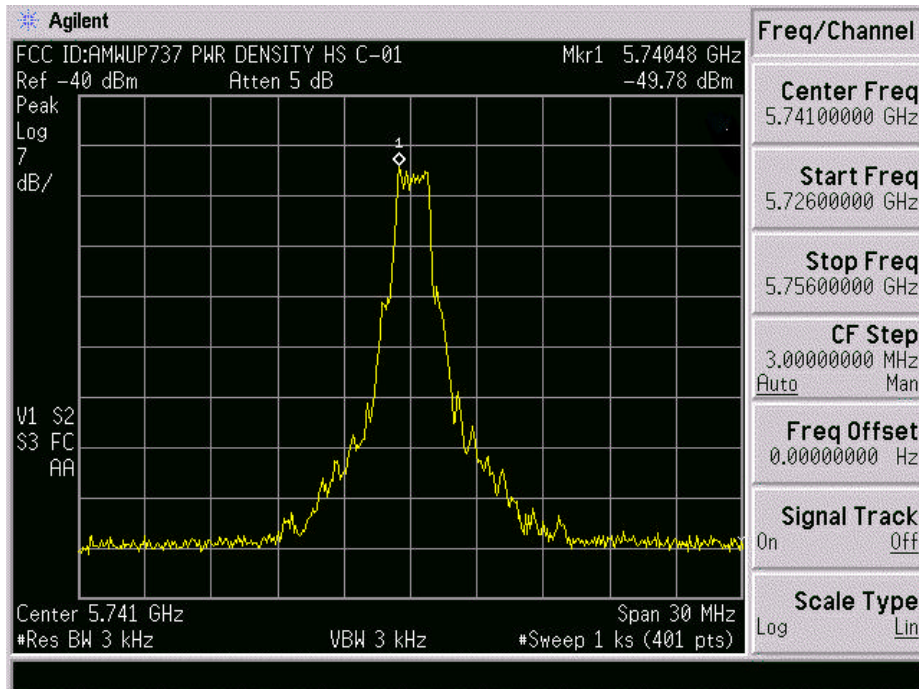
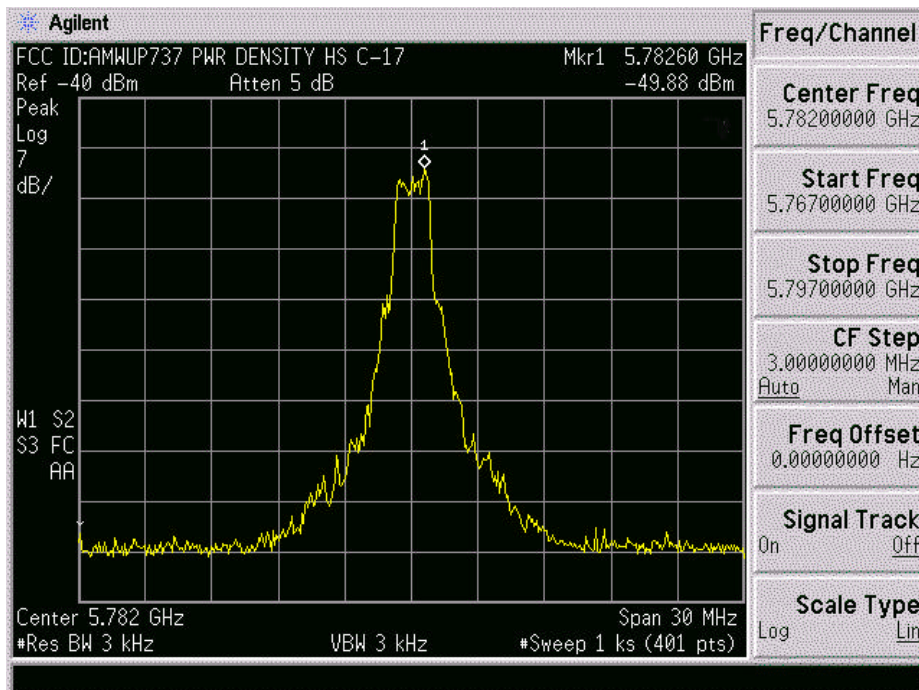


Figure A-3. Test Instrument & Measurement Setup



PCTEST LAB TEST REPORT 15.247	PCTEST	FCC CERTIFICATION REPORT	Reviewed by: Quality Manager
Filename: 15.231208606.AMW	Test Dates: Dec. 23-24, 2003	EUT Type: 5.8 GHz Cordless Phone	FCC ID: AMWUP737
			Page 18 of 39

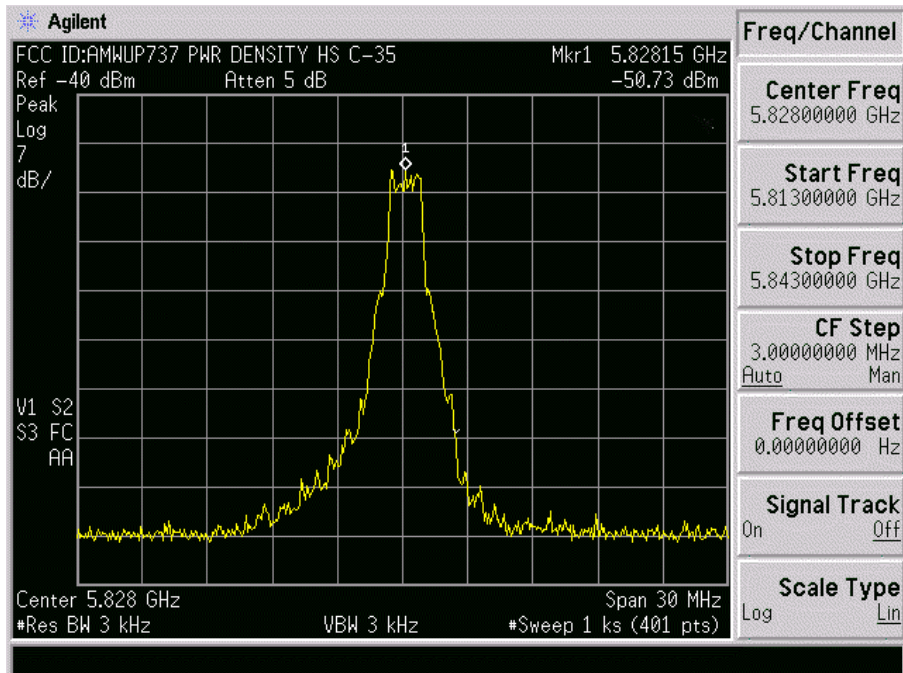


Plot A-10. Max. Power Density Plot – Ch. 01 (HS)

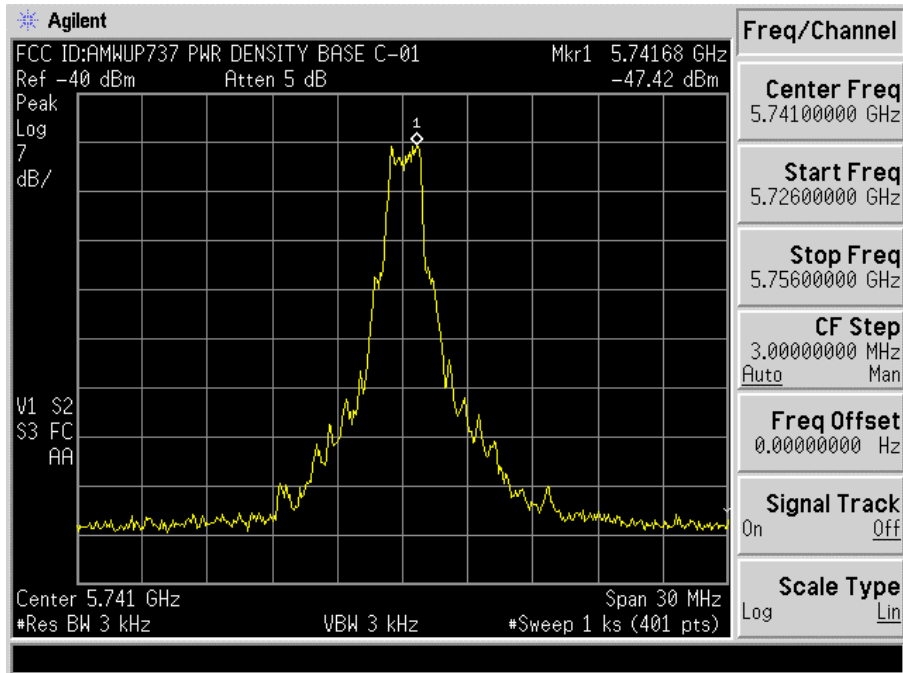


Plot A-11. Max. Power Density Plot – Ch. 17(HS)



PCTEST LAB TEST REPORT 15.247		FCC CERTIFICATION REPORT 	Reviewed by: Quality Manager
Filename: 15.231208606.AMW	Test Dates: Dec. 23-24, 2003	EUT Type: 5.8 GHz Cordless Phone	FCC ID: AMWUP737
			Page 19 of 39

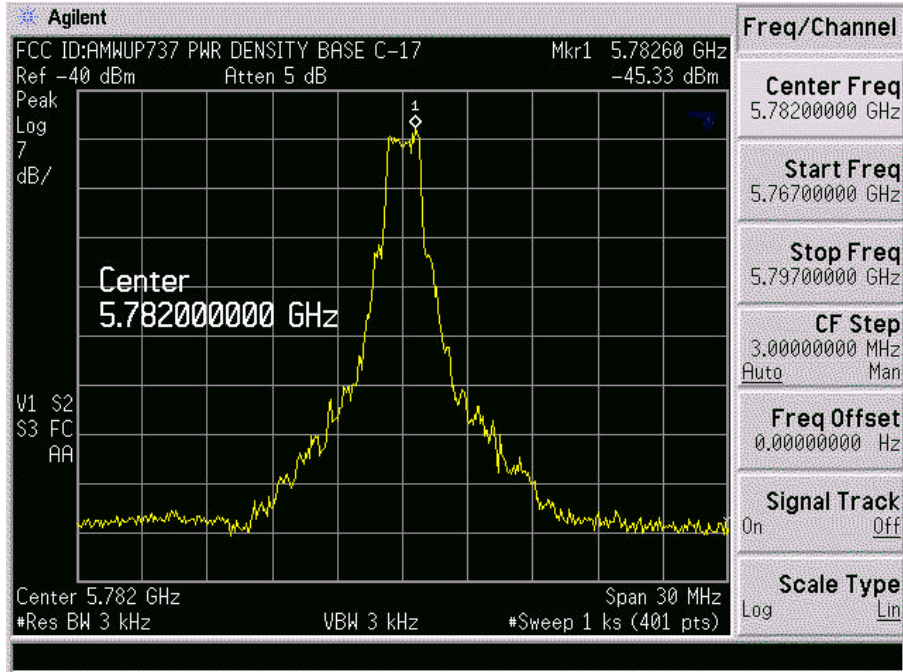


Plot A-12. Max. Power Density Plot – Ch. 35 (HS)

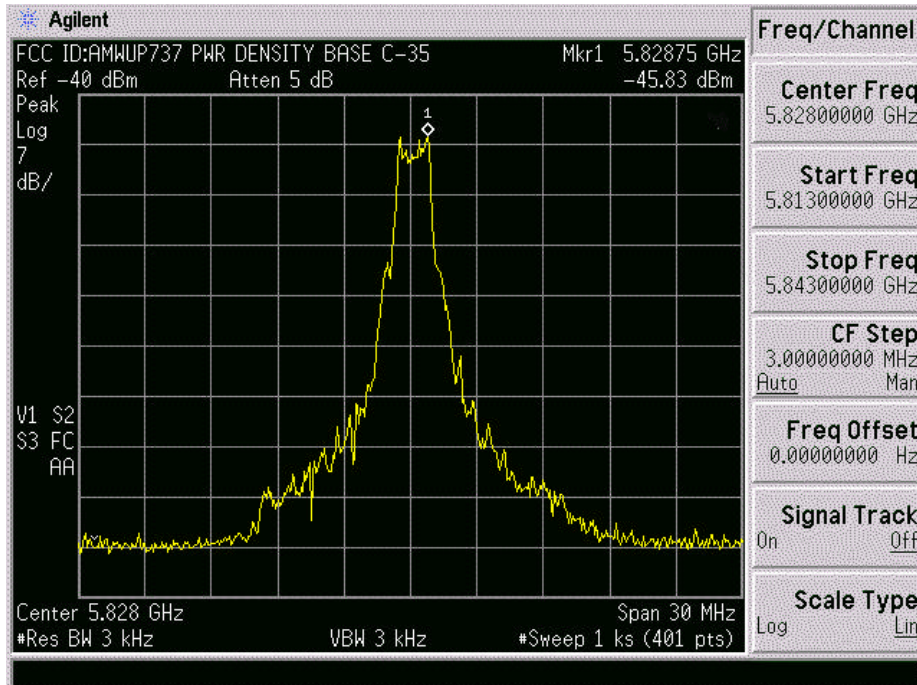


Plot A-13. Max. Power Density Plot – Ch. 01 (BASE)

PCTEST LAB TEST REPORT 15.247		FCC CERTIFICATION REPORT 	Reviewed by: Quality Manager
Filename: 15.231208606.AMW	Test Dates: Dec. 23-24, 2003	EUT Type: 5.8 GHz Cordless Phone	FCC ID: AMWUP737
			Page 20 of 39



Plot A-14. Max. Power Density Plot – Ch. 17 (BASE)



Plot A-15. Max. Power Density Plot – Ch. 35 (BASE)



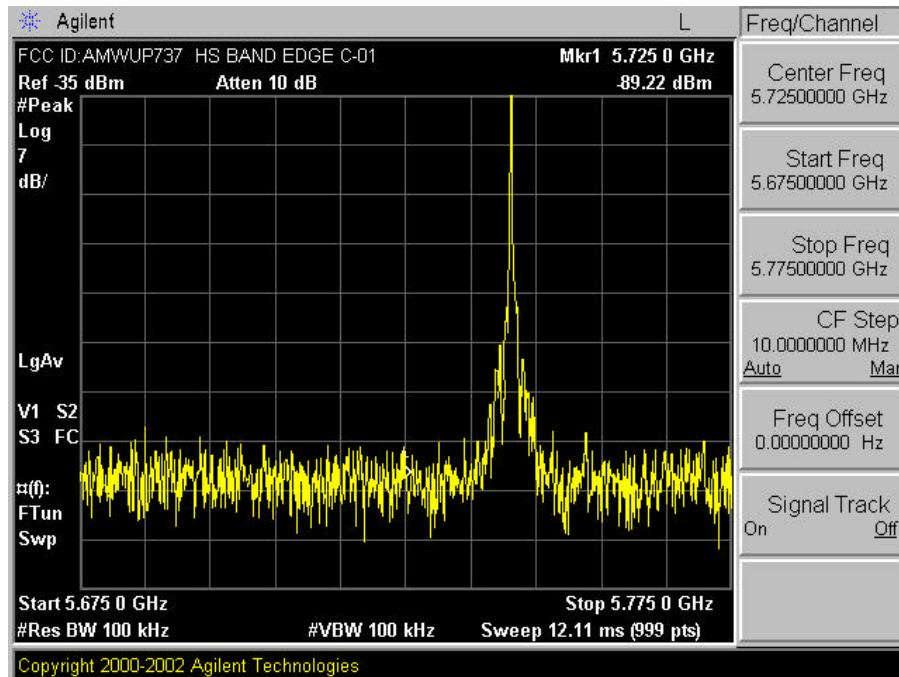
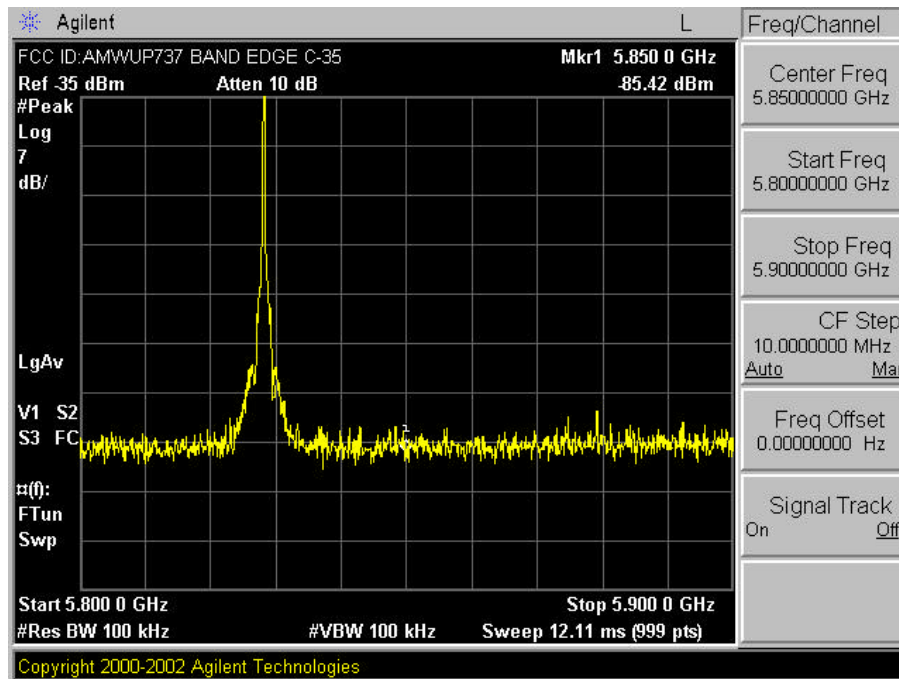
PCTEST LAB TEST REPORT 15.247		FCC CERTIFICATION REPORT 	Reviewed by: Quality Manager
Filename: 15.231208606.AMW	Test Dates: Dec. 23-24, 2003	EUT Type: 5.8 GHz Cordless Phone	FCC ID: AMWUP737
			Page 21 of 39

EXHIBIT A – Test Results (Cont.)

Occupied BandEdge /BandEdge at 20dB below, & Out of Band Emissions



Plot A-16. Occupied Band Edge Plot – Ch. 01 (HS)



Plot A-17. Occupied Band Edge Plot – Ch. 35 (HS)



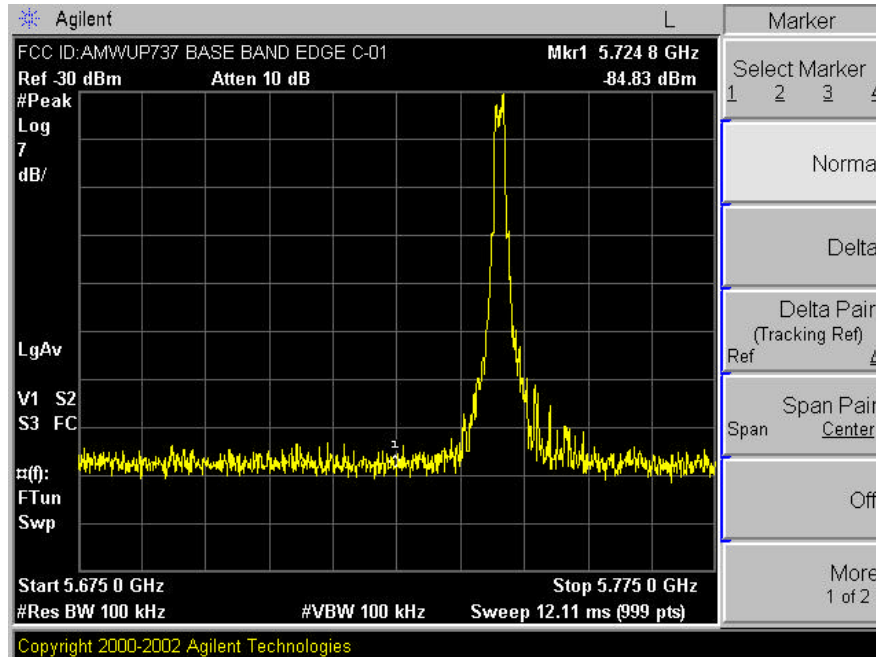
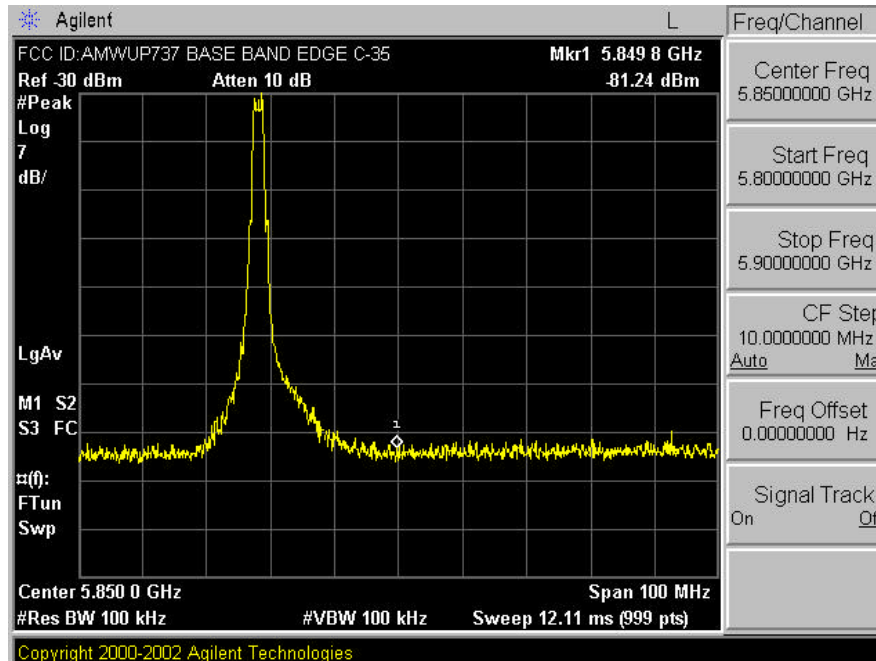
PCTEST LAB TEST REPORT 15.247		FCC CERTIFICATION REPORT 	Reviewed by: Quality Manager
Filename: 15.231208606.AMW	Test Dates: Dec. 23-24, 2003	EUT Type: 5.8 GHz Cordless Phone	FCC ID: AMWUP737
			Page 22 of 39

EXHIBIT A – Test Results (Cont.)

Occupied BandEdge /BandEdge at 20dB below, & Out of Band Emissions



Plot A-18. Occupied Band Edge Plot – Ch. 01 (BASE)



Plot A-19. Occupied Band Edge Plot – Ch. 35 (BASE)



PCTEST LAB TEST REPORT 15.247		FCC CERTIFICATION REPORT 	Reviewed by: Quality Manager
Filename: 15.231208606.AMW	Test Dates: Dec. 23-24, 2003	EUT Type: 5.8 GHz Cordless Phone	FCC ID: AMWUP737
			Page 23 of 39

EXHIBIT A – Test Results (Cont.)

Radiated Fundamental & Harmonic Measurements (Cont.)

§15.247(b) / §15.205 & §15.209

Hanset/ Base: Handset
 Distance of Measurements: 3 Meters
 Channel: 01

Frequency (MHz)	Level (dBm)	AFCL (dB)	POL (H/V)	F/S (dBmV/m)	F/S (mV/m)	Margin (dB)
11482.11	-111.0	52.8	V	48.8	275.423	-5.2
17223.17	-124.3	62.3	V	45.0	177.828	-9.0
22964.22	-135.0	66.0	V	38.0	79.4328	-16.0
28705.28	-135.0	69.0	V	41.0	112.202	-13.0

Table A-5. Radiated Measurements @ 3 meters

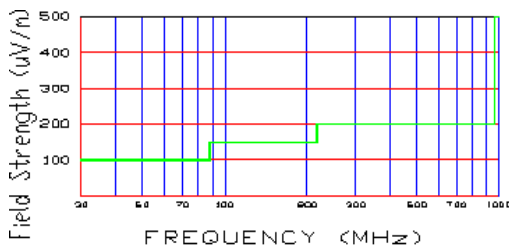


Figure A-4. Radiated limits at 3 meters.

NOTES:

1. All harmonics in the restricted bands specified in §15.205 are below the limit shown in Table G-1. (Note: * = Restricted Band measured frequency)
2. All harmonics/spurs are at least 20 dB below the highest emission in the authorized band using RBW = 100kHz
3. Average Measurements > 1GHz using RBW = 1 MHz VBW = 10 Hz
4. The peak emissions above 1 GHz are not more than 20 dB above the average limit.
5. The 15 dBi Panel antenna is manipulated through typical positions, polarity and length during the tests.
6. The EUT is supplied with nominal AC voltage or/and a new/fully-recharged battery.
7. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.
8. < - 135 dBm are below the analyzer floor level.
9. Above 1 GHz, the limit is 500 µV/m (54dBµ/m) at 3 meters radiated.



PCTEST LAB TEST REPORT 15.247		FCC CERTIFICATION REPORT 	Reviewed by: Quality Manager
Filename: 15.231208606.AMW	Test Dates: Dec. 23-24, 2003	EUT Type: 5.8 GHz Cordless Phone	FCC ID: AMWUP737
			Page 24 of 39

EXHIBIT A – Test Results (Cont.)

Radiated Fundamental & Harmonic Measurements (Cont.)

§15.247(b) / §15.205 & §15.209

Handset/ Base: Handset
 Distance of Measurements: 3 Meters
 Channel: 17

Frequency (MHz)	Level (dBm)	AFCL (dB)	POL (H/V)	F/S (dBmV/m)	F/S (mV/m)	Margin (dB)
11564.03	-111.3	52.9	V	48.6	269.153	-5.4
17346.05	-126.3	62.5	V	43.2	144.544	-10.8
23128.06	-135.0	66.4	V	38.4	83.1764	-15.6
28910.08	-135.0	69.4	V	41.4	117.49	-12.6

Table A-6. Radiated Measurements @ 3 meters

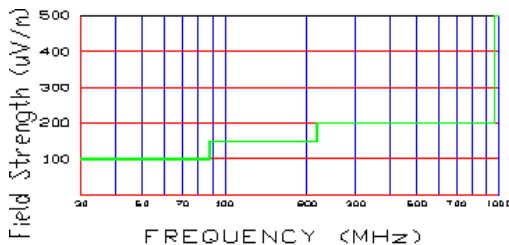


Figure A-5. Radiated limits at 3 meters.

NOTES:

1. All harmonics in the restricted bands specified in §15.205 are below the limit shown in Table G-1. (Note: * = Restricted Band measured frequency)
2. All harmonics/spurs are at least 20 dB below the highest emission in the authorized band using RBW = 100kHz
3. Average Measurements > 1GHz using RBW = 1 MHz VBW = 10 Hz
4. The peak emissions above 1 GHz are not more than 20 dB above the average limit.
5. The 15 dBi Panel antenna is manipulated through typical positions, polarity and length during the tests.
6. The EUT is supplied with nominal AC voltage or/and a new/fully-recharged battery.
7. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.
8. < - 135 dBm are below the analyzer floor level.
9. Above 1 GHz, the limit is 500 µV/m (54dBµ/m) at 3 meters radiated.



PCTEST LAB TEST REPORT 15.247		FCC CERTIFICATION REPORT 	Reviewed by: Quality Manager
Filename: 15.231208606.AMW	Test Dates: Dec. 23-24, 2003	EUT Type: 5.8 GHz Cordless Phone	FCC ID: AMWUP737
			Page 25 of 39

EXHIBIT A – Test Results (Cont.)

Radiated Fundamental & Harmonic Measurements (Cont.)

§15.247(b) / §15.205 & §15.209

Handset/ Base: Handset
 Distance of Measurements: 3 Meters
 Channel: 35

Frequency (MHz)	Level (dBm)	AFCL (dB)	POL (H/V)	F/S (dBmV/m)	F/S (mV/m)	Margin (dB)
11656.19	-112.0	53.0	V	48.0	251.189	-6.0
17484.29	-132.0	63.7	V	38.7	86.0994	-15.3
23312.38	-135.0	66.9	V	38.9	88.1049	-15.1
29140.48	-135.0	69.9	V	41.9	124.451	-12.1

Table A-7. Radiated Measurements @ 3 meters

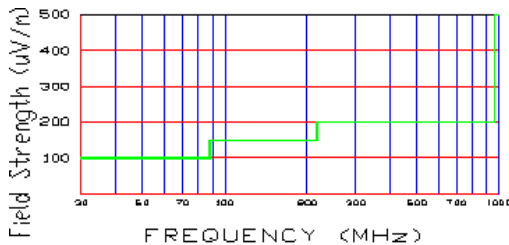


Figure A-6. Radiated limits at 3 meters.

NOTES:

1. All harmonics in the restricted bands specified in §15.205 are below the limit shown in Table G-1. (Note: * = Restricted Band measured frequency)
2. All harmonics/spurs are at least 20 dB below the highest emission in the authorized band using RBW = 100kHz
3. Average Measurements > 1GHz using RBW = 1 MHz VBW = 10 Hz
4. The peak emissions above 1 GHz are not more than 20 dB above the average limit.
5. The 15 dBi Panel antenna is manipulated through typical positions, polarity and length during the tests.
6. The EUT is supplied with nominal AC voltage or/and a new/fully-recharged battery.
7. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.
8. < - 135 dBm are below the analyzer floor level.
9. Above 1 GHz, the limit is 500 µV/m (54dBµ/m) at 3 meters radiated.



PCTEST LAB TEST REPORT 15.247		FCC CERTIFICATION REPORT 	Reviewed by: Quality Manager
Filename: 15.231208606.AMW	Test Dates: Dec. 23-24, 2003	EUT Type: 5.8 GHz Cordless Phone	FCC ID: AMWUP737
			Page 26 of 39

EXHIBIT A – Test Results (Cont.)

Radiated Fundamental & Harmonic Measurements (Cont.)

§15.247(b) / §15.205 & §15.209

Handset/ Base: BASE
 Distance of Measurements: 3 Meters
 Channel: 01

Frequency (MHz)	Level (dBm)	AFCL (dB)	POL (H/V)	F/S (dBmV/m)	F/S (mV/m)	Margin (dB)
11482.11	-116.4	52.8	V	43.4	147.911	-10.6
17223.17	-124.7	62.3	V	44.6	169.824	-9.4
22964.22	-135.0	66.0	V	38.0	79.4328	-16.0
28705.28	-135.0	69.0	V	41.0	112.202	-13.0

Table A-8. Radiated Measurements @ 3 meters

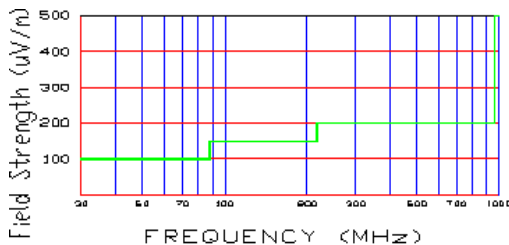


Figure A-7. Radiated limits at 3 meters.

NOTES:

1. All harmonics in the restricted bands specified in §15.205 are below the limit shown in Table G-1. (Note: * = Restricted Band measured frequency)
2. All harmonics/spurs are at least 20 dB below the highest emission in the authorized band using RBW = 100kHz
3. Average Measurements > 1GHz using RBW = 1 MHz VBW = 10 Hz
4. The peak emissions above 1 GHz are not more than 20 dB above the average limit.
5. The 15 dBi Panel antenna is manipulated through typical positions, polarity and length during the tests.
6. The EUT is supplied with nominal AC voltage or/and a new/fully-recharged battery.
7. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.
8. < - - 135 dBm are below the analyzer floor level.
9. Above 1 GHz, the limit is 500 µV/m (54dBµ/m) at 3 meters radiated.



PCTEST LAB TEST REPORT 15.247		FCC CERTIFICATION REPORT 	Reviewed by: Quality Manager
Filename: 15.231208606.AMW	Test Dates: Dec. 23-24, 2003	EUT Type: 5.8 GHz Cordless Phone	FCC ID: AMWUP737
			Page 27 of 39

EXHIBIT A – Test Results (Cont.)

Radiated Fundamental & Harmonic Measurements (Cont.)

§15.247(b) / §15.205 & §15.209

Handset/ Base: BASE
 Distance of Measurements: 3 Meters
 Channel: 17

Frequency (MHz)	Level (dBm)	AFCL (dB)	POL (H/V)	F/S (dBmV/m)	F/S (mV/m)	Margin (dB)
11564.03	-117.5	52.9	V	42.4	131.826	-11.6
17346.05	-125.9	62.5	V	43.6	151.356	-10.4
23128.06	-135.0	66.4	V	38.4	83.1764	-15.6
28910.08	-135.0	69.4	V	41.4	117.49	-12.6

Table A-9. Radiated Measurements @ 3 meters

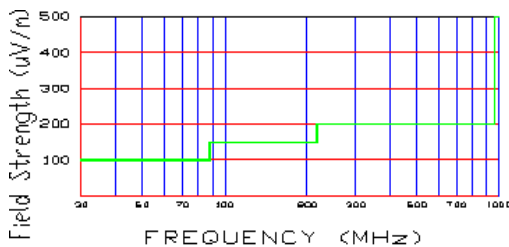


Figure A-8. Radiated limits at 3 meters.

NOTES:

1. All harmonics in the restricted bands specified in §15.205 are below the limit shown in Table G-1. (Note: * = Restricted Band measured frequency)
2. All harmonics/spurs are at least 20 dB below the highest emission in the authorized band using RBW = 100kHz
3. Average Measurements > 1GHz using RBW = 1 MHz VBW = 10 Hz
4. The peak emissions above 1 GHz are not more than 20 dB above the average limit.
5. The 15 dBi Panel antenna is manipulated through typical positions, polarity and length during the tests.
6. The EUT is supplied with nominal AC voltage or/and a new/fully-recharged battery.
7. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.
8. < - 135 dBm are below the analyzer floor level.
9. Above 1 GHz, the limit is 500 μ V/m (54dB μ /m) at 3 meters radiated.



PCTEST LAB TEST REPORT 15.247		FCC CERTIFICATION REPORT 	Reviewed by: Quality Manager
Filename: 15.231208606.AMW	Test Dates: Dec. 23-24, 2003	EUT Type: 5.8 GHz Cordless Phone	FCC ID: AMWUP737
			Page 28 of 39

EXHIBIT A – Test Results (Cont.)

Radiated Fundamental & Harmonic Measurements (Cont.)

§15.247(b) / §15.205 & §15.209

Handset/ Base: BASE
 Distance of Measurements: 3 Meters
 Channel: 35

Frequency (MHz)	Level (dBm)	AFCL (dB)	POL (H/V)	F/S (dBmV/m)	F/S (mV/m)	Margin (dB)
11656.19	-116.5	53.0	V	43.5	149.624	-10.5
17484.29	-128.0	63.7	V	42.7	136.458	-11.3
23312.38	-135.0	66.9	V	38.9	88.1049	-15.1
29140.48	-135.0	69.9	V	41.9	124.451	-12.1

Table A-10. Radiated Measurements @ 3 meters

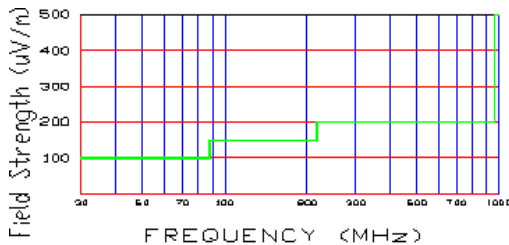


Figure A-9. Radiated limits at 3 meters.

NOTES:

1. All harmonics in the restricted bands specified in §15.205 are below the limit shown in Table G-1. (Note: * = Restricted Band measured frequency)
2. All harmonics/spurs are at least 20 dB below the highest emission in the authorized band using RBW = 100kHz
3. Average Measurements > 1GHz using RBW = 1 MHz VBW = 10 Hz
4. The peak emissions above 1 GHz are not more than 20 dB above the average limit.
5. The 15 dBi Panel antenna is manipulated through typical positions, polarity and length during the tests.
6. The EUT is supplied with nominal AC voltage or/and a new/fully-recharged battery.
7. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.
8. < - 135 dBm are below the analyzer floor level.
9. Above 1 GHz, the limit is 500 µV/m (54dBµ/m) at 3 meters radiated.



PCTEST LAB TEST REPORT 15.247		FCC CERTIFICATION REPORT 	Reviewed by: Quality Manager
Filename: 15.231208606.AMW	Test Dates: Dec. 23-24, 2003	EUT Type: 5.8 GHz Cordless Phone	FCC ID: AMWUP737
			Page 29 of 39

EXHIBIT A – Test Results (Cont.)

Radiated Spurious Measurements Handset & Base

§15.205 / §15.209

Distance of Measurements: 3 Meters

FREQ (MHz)	Level (dBm)	AFCL (dB/m)	POL (H/V)	Height (m)	Azimuth (° angle)	F/S (uV/M)	Margin (dB)
30.0	-78.40	0.00	H	3.3	30	26.97	-11.4
66.4	-81.39	5.80	H	3.2	190	37.20	-8.6
79.8	-83.07	7.48	H	2.8	190	37.20	-8.6
187.3	-86.26	15.87	H	2.2	170	67.66	-6.9
196.7	-89.33	16.34	V	2.0	180	50.17	-9.5
625.0	-98.98	28.59	H	1.1	200	67.66	-9.4

Table A-11. Radiated Measurements at 3-meters

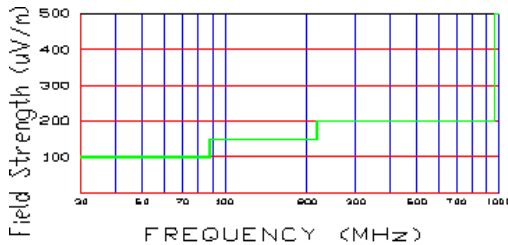


Figure A-11. Radiated limits at 3 meters

NOTES:

1. All emissions were investigated and the worst-case emissions are reported.
2. For hand-held devices, the EUT is rotated through three orthogonal axes to determine which configuration produces the maximum emissions.
3. The EUT is supplied with the minimal AC voltage or/and a new/fully re-charged battery.
4. The EUT was tested up to the 10th harmonic (25GHz) and no significant emission was found.
5. Above 1 GHz the limit is 500µV/m at 3 meters radiated.



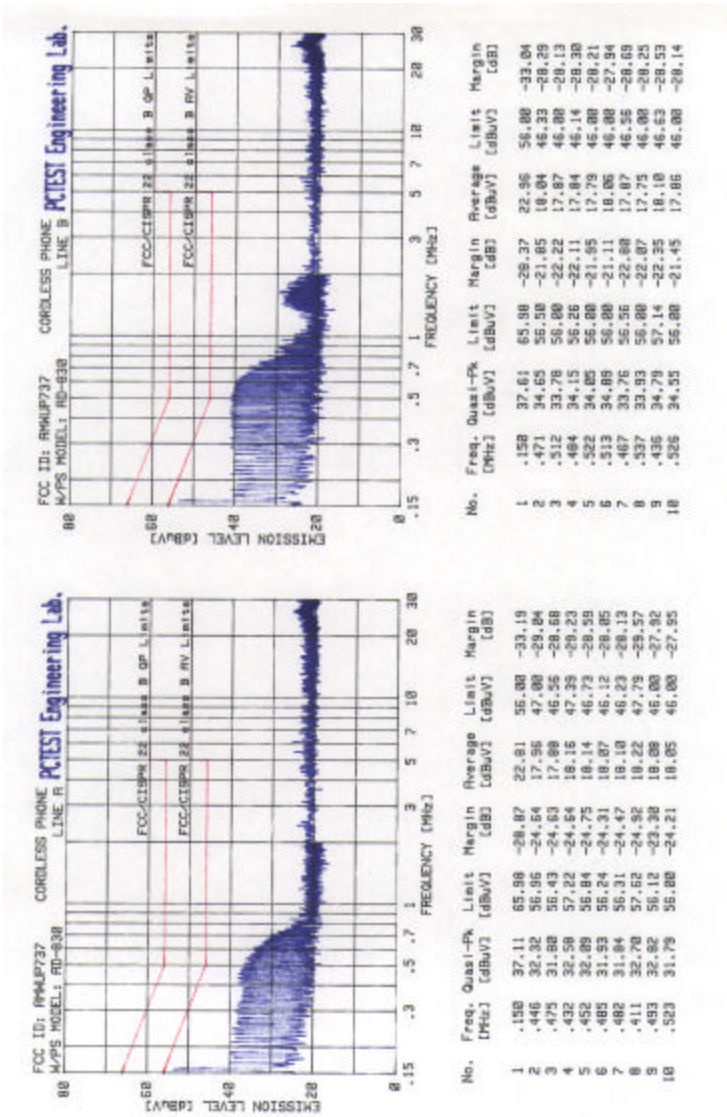
PCTEST LAB TEST REPORT 15.247		FCC CERTIFICATION REPORT 	Reviewed by: Quality Manager
Filename: 15.231208606.AMW	Test Dates: Dec. 23-24, 2003	EUT Type: 5.8 GHz Cordless Phone	FCC ID: AMWUP737
			Page 30 of 39

EXHIBIT A – Test Results (Cont.)

Line-Conducted Test Data

§15.207



Notes:

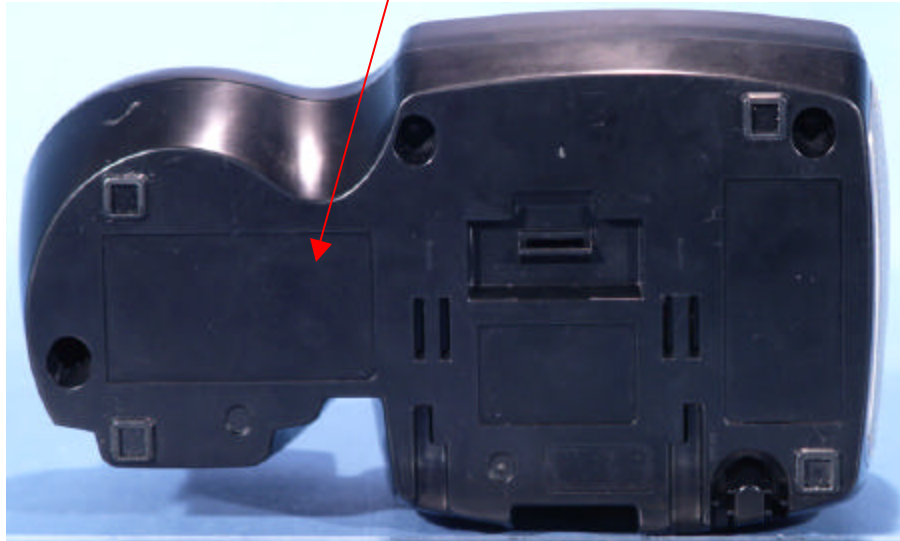
1. All Modes of operation were investigated and the worst-case emissions are reported.
2. The limit for Class B device(s) from 150kHz to 30MHz are Specified in EN55022.
3. Line A = Phase; Line B = Neutral
4. Deviations to the Specifications: *None*.

PCTEST LAB TEST REPORT 15.247		FCC CERTIFICATION REPORT	Reviewed by: Quality Manager
Filename: 15.231208606.AMW	Test Dates: Dec. 23-24, 2003	EUT Type: 5.8 GHz Cordless Phone	FCC ID: AMWUP737
			Page 31 of 39

EXHIBIT B – Labeling Requirements (Cont.)

Sample Label & Location

FCC ID Label





PCTEST LAB TEST REPORT 15.247		FCC CERTIFICATION REPORT 	Reviewed by: Quality Manager
Filename: 15.231208606.AMW	Test Dates: Dec. 23-24, 2003	EUT Type: 5.8 GHz Cordless Phone	FCC ID: AMWUP737
			Page 32 of 39

EXHIBIT C – Block Diagrams/ Schematics

The Line-Conducted and Radiated Test Pictures show the worst-case configuration and cable placement with a minimum margin to the specifications.



<p>PCTEST LAB TEST REPORT 15.247</p>		<p>FCC CERTIFICATION REPORT </p>	<p>Reviewed by: Quality Manager</p>
<p>Filename: 15.231208606.AMW</p>	<p>Test Dates: Dec. 23-24, 2003</p>	<p>EUT Type: 5.8 GHz Cordless Phone</p>	<p>FCC ID: AMWUP737</p> <p>Page 33 of 39</p>

EXHIBIT D – Parts List



PCTEST LAB TEST REPORT 15.247		FCC CERTIFICATION REPORT 		Reviewed by: Quality Manager
Filename: 15.231208606.AMW	Test Dates: Dec. 23-24, 2003	EUT Type: 5.8 GHz Cordless Phone	FCC ID: AMWUP737	Page 34 of 39

EXHIBIT E – Operational Description



PCTEST LAB TEST REPORT 15.247		FCC CERTIFICATION REPORT 	Reviewed by: Quality Manager
Filename: 15.231208606.AMW	Test Dates: Dec. 23-24, 2003	EUT Type: 5.8 GHz Cordless Phone	FCC ID: AMWUP737
			Page 35 of 39

EXHIBIT F – Test Setup Photographs

The Line-Conducted and Radiated Test Pictures show the worst-case configuration and cable placement with a minimum margin to the specifications.



PCTEST LAB TEST REPORT 15.247		FCC CERTIFICATION REPORT 	Reviewed by: Quality Manager
Filename: 15.231208606.AMW	Test Dates: Dec. 23-24, 2003	EUT Type: 5.8 GHz Cordless Phone	FCC ID: AMWUP737
			Page 36 of 39

EXHIBIT G – EUT External/Internal Photographs



PCTEST LAB TEST REPORT 15.247		FCC CERTIFICATION REPORT 	Reviewed by: Quality Manager
Filename: 15.231208606.AMW	Test Dates: Dec. 23-24, 2003	EUT Type: 5.8 GHz Cordless Phone	FCC ID: AMWUP737
			Page 37 of 39

EXHIBIT H – Users Manual





PCTEST LAB TEST REPORT 15.247		FCC CERTIFICATION REPORT 		Reviewed by: Quality Manager
Filename: 15.231208606.AMW	Test Dates: Dec. 23-24, 2003	EUT Type: 5.8 GHz Cordless Phone	FCC ID: AMWUP737	Page 38 of 39

EXHIBIT I – SAR Measurement Report

PCTEST LAB TEST REPORT 15.247		FCC CERTIFICATION REPORT 	Reviewed by: Quality Manager
Filename: 15.231208606.AMW	Test Dates: Dec. 23-24, 2003	EUT Type: 5.8 GHz Cordless Phone	FCC ID: AMWUP737
			Page 39 of 39