PCTEST ENGINEERING LABORATORY, INC.

6660 – B Dobbin Road · Columbia, MD 21045 · USA
Telephone 410.290.6652 / Fax 410.290.6654
http://www.pctestlab.com (email: randy@pctestlab.com)

CERTIFICATE OF COMPLIANCE

MANUFACTURER NAME & ADDRESS:
UNIDEN Corporation
2-12-7 Hatchobori, Chuo-ku
Tokyo, JAPAN 104-8512

DATE & LOCATION OF TESTING:
Date(s) of Tests: October 15-22, 2003
Test Report S/N: 15.230924532.AMW
Test Site: PCTEST Lab, Columbia, MD

FCC ID:	**AMWUP717**
APPLICANT:	**UNIDEN CORPORATION**

SUMMARY:

Model No.:	**TRU8885**
Equipment EUT Type:	**5.8 GHz Cordless Phone**
Max. Output Power:	**18.67 dBm EIRP (HS), 24.18 dBm EIRP (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

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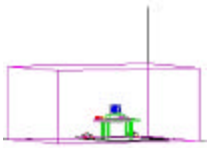
Attestation Statements



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	AMWUP717
Test Device Serial No.:	S/N: 2 ☐ Production ☒ Pre-Production ☐ Engineering
FCC CLASSIFICATION	FCC Part 15 Digital Transmission System (DTS)
DATE(S) OF TEST	October 15-22, 2003
TESTS REPORT S/N:	15.230924532.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.**

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 are, the Baltimore-Washington Internt'l (BWI) airport, the city of Baltimore and the Washington, DC area. (see Figure 1.2-1).

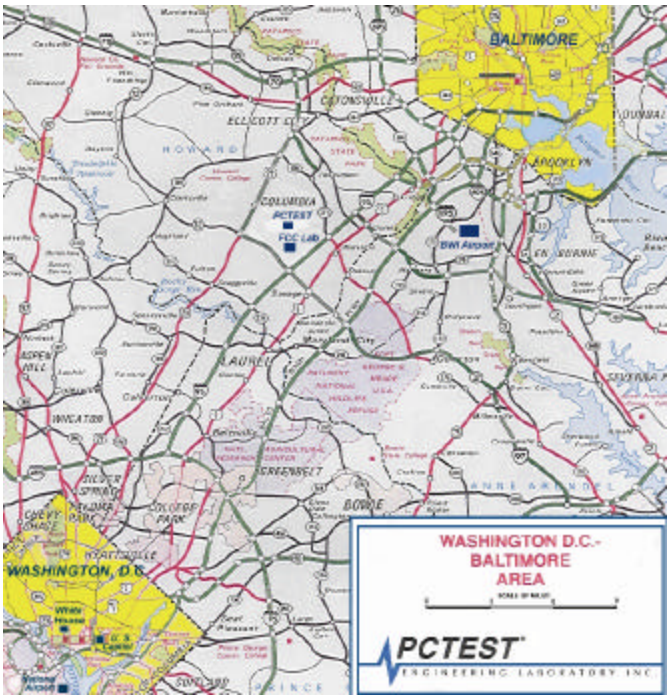


Figure 1.3-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

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.

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 components(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

3.0 DESCRIPTION OF TEST

3.1 Conducted Emissions

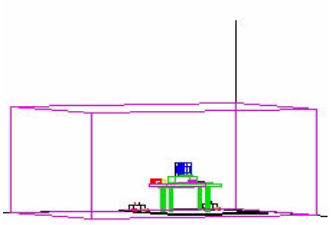


Figure 3.1-1. Shielded Enclosure Line-Conducted Test Facility

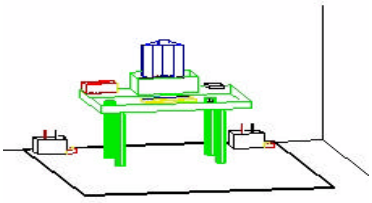


Figure 3.1-2. Line Conducted Emission Test Set-Up

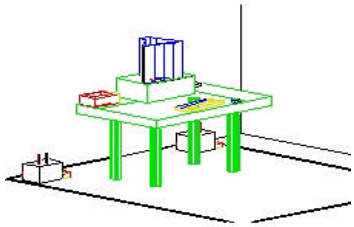


Figure 3.1-3. Wooden Table & Bonded LISNs

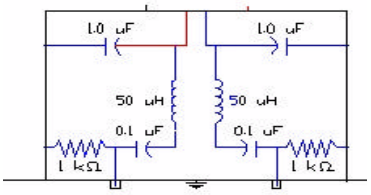


Figure 3.1-4. LISN Schematic Diagram

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 patter 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.

3.2 Radiated Emissions

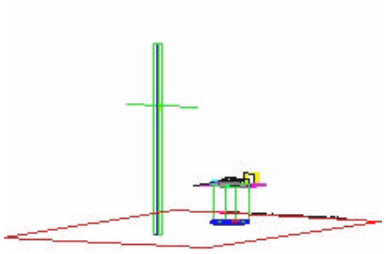


Figure 3.2-1. Meter Test Site

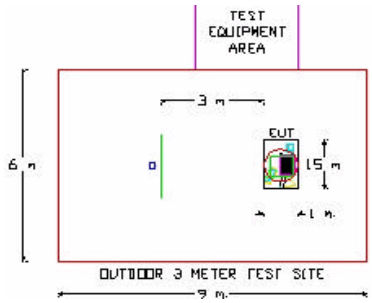


Figure 3.2-2. Dimensions of Outdoor Test Site

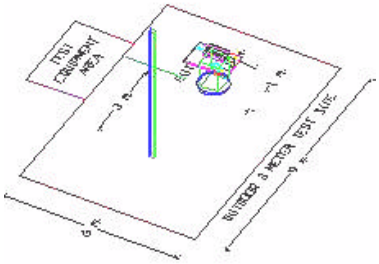


Figure 3.2-3. Turntable and System Setup

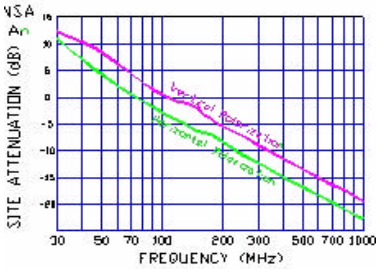


Figure 3.2-4. Normalized Site Attenuation Curves (H&V)

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.

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

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)	12/05/03	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)	11/02/03	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	Holaday 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

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):	October 15-22, 2003
Test Engineer:	Al Cirwithian
Method/System:	TDD/ TDMA DTS
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/cm²	3 Channels

Table A-1. Summary of Test Results

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	3.05	Pass
5782	17	4.48	Pass
5828	35	5.10	Pass

– See next pages for actual measured spectrum plots

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

Frequency (MHz)	Channel No.	Test Results Base	
		6dB Bandwidth (MHz)	Pass/Fail
5741	1	2.18	Pass
5782	17	1.80	Pass
5828	35	1.83	Pass

– See next pages for actual measured spectrum plots

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

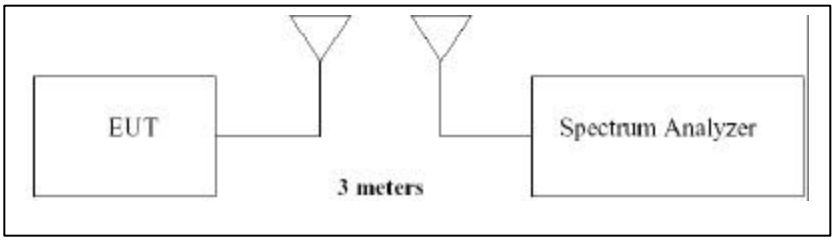
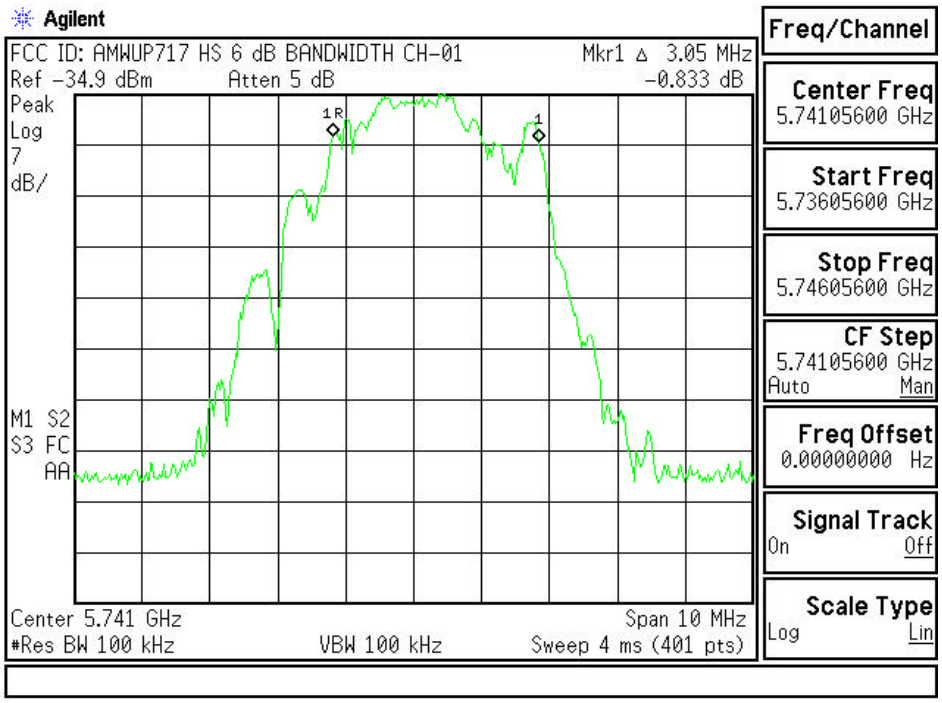
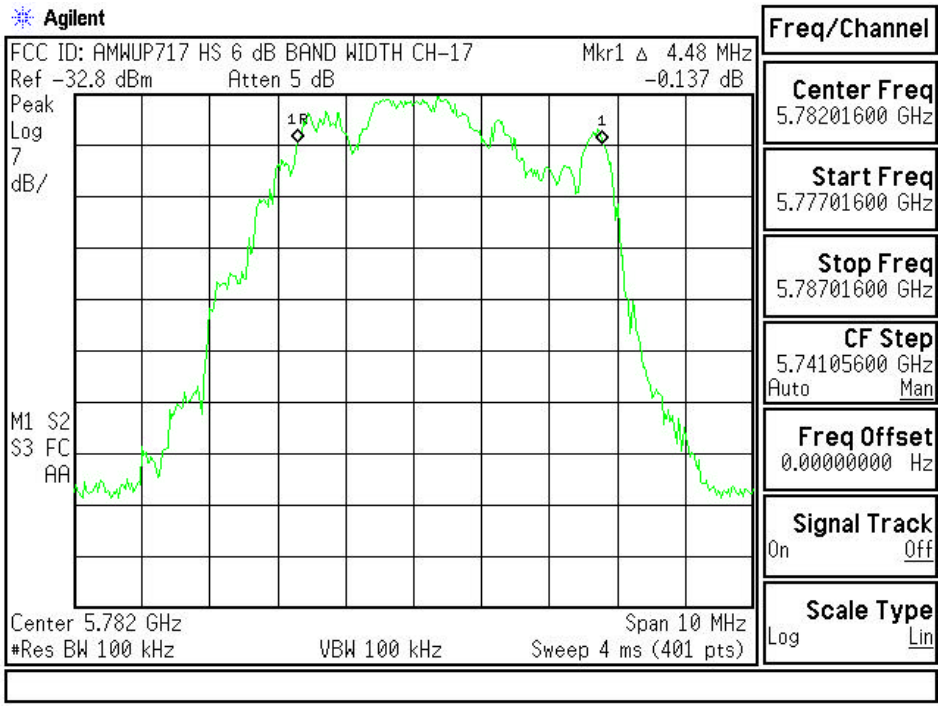


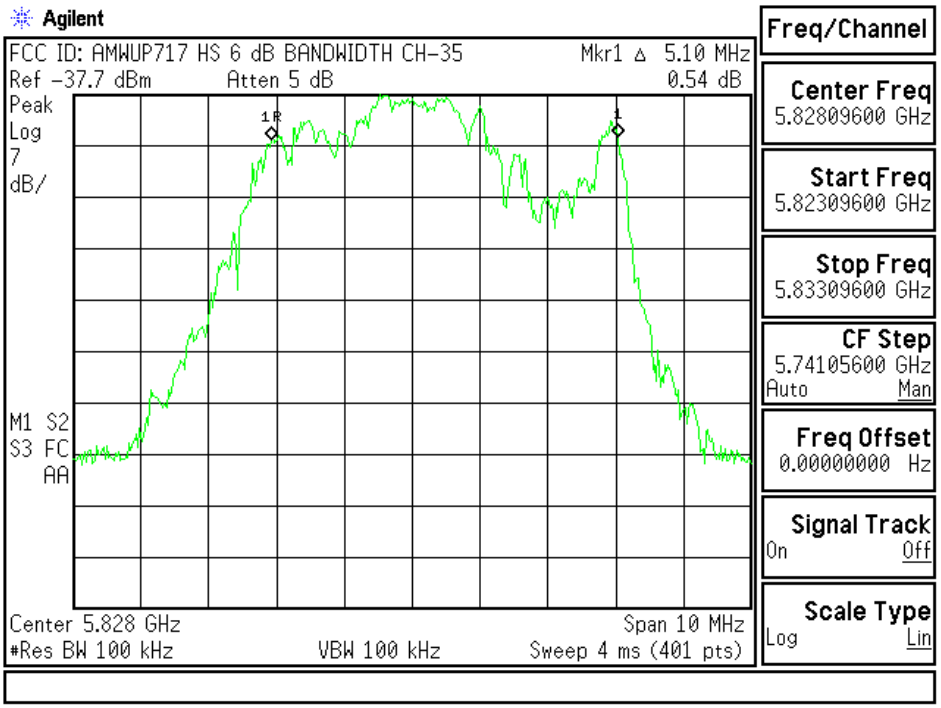
Figure A-1. Test Instrument & Measurement Setup



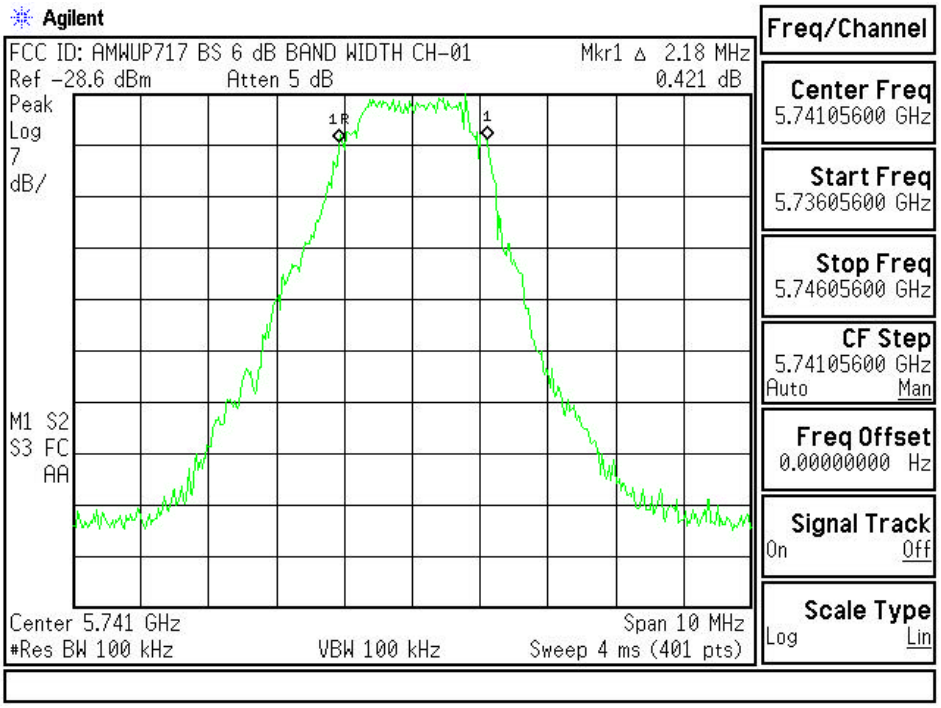
Plot A-1. 6dB Bandwidth Plot – Ch. 01 (HS)



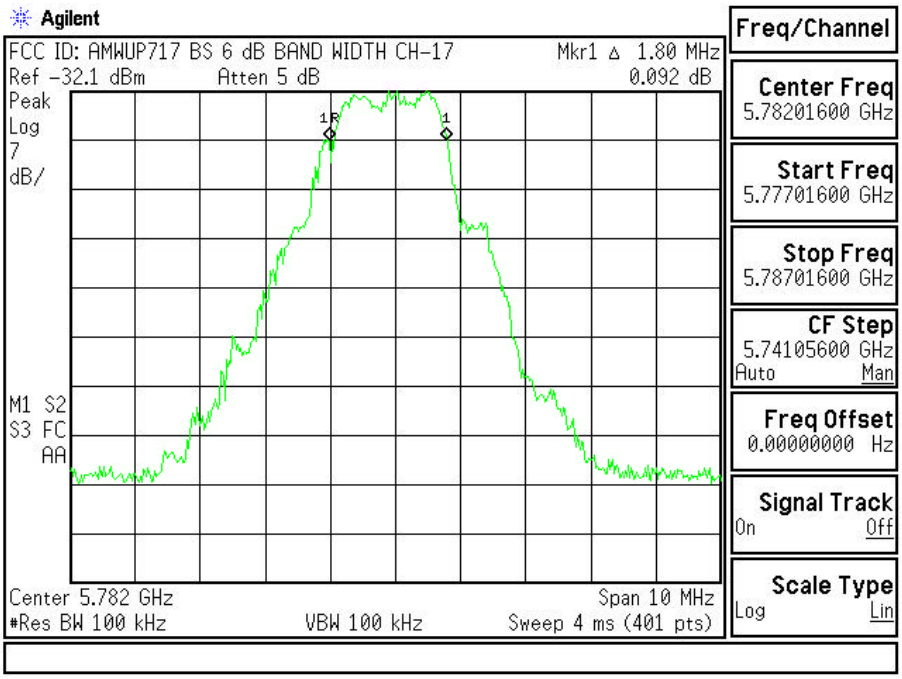
Plot A-2. 6dB Bandwidth Plot – Ch. 17 (HS)



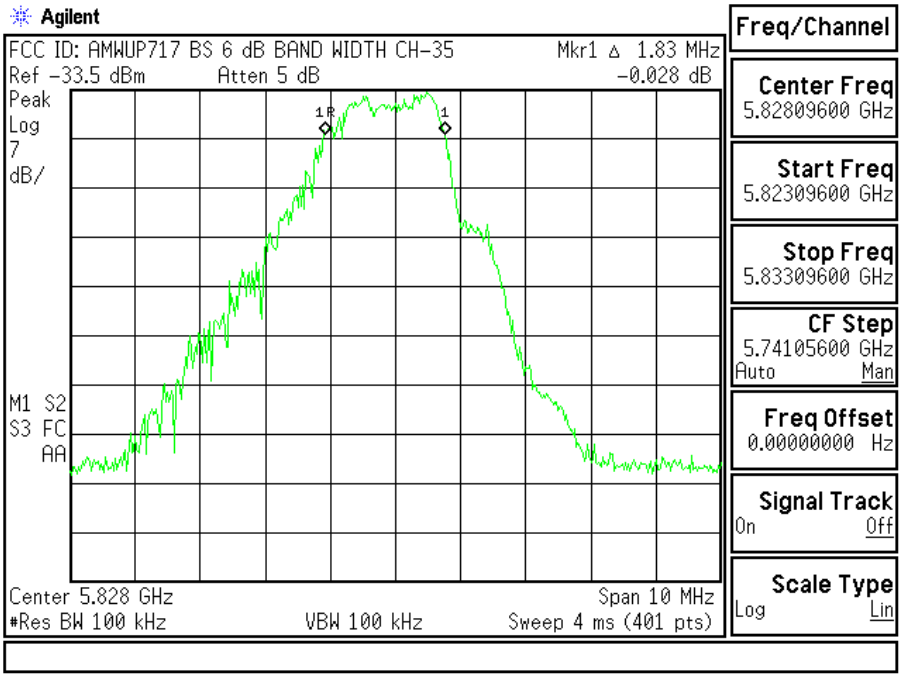
Plot A-3. 6dB Bandwidth Plot – Ch. 35 (HS)



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



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



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

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 $P = (E*d)^2/(30*G)$ Output Power = $(785{,}236* 3)^2/(30*2.51)$ = 0.0734 Watts

Frequency (MHz)	Channel No.	Test Results (HS)			
		Power Output (dBm)	Margin (dB)	Limit	Power Output (W)
5741	1	18.67	-11.33	+ 30 dBm	0.0734
5782	17	17.37	-12.63	+ 30 dBm	0.0560
5828	35	15.37	-14.63	+ 30 dBm	0.0344

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. Conducted Output Power Measurements (HS)

Frequency (MHz)	Channel No.	Test Results (Base)			
		Power Output (dBm)	Margin (dB)	Limit	Power Output (W)
5741	1	24.18	-5.82	+ 30 dBm	0.0261
5782	17	21.47	-8.53	+ 30 dBm	0.0146
5828	35	19.37	-10.63	+ 30 dBm	0.0867

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. Conducted Output Power Measurements (BASE)

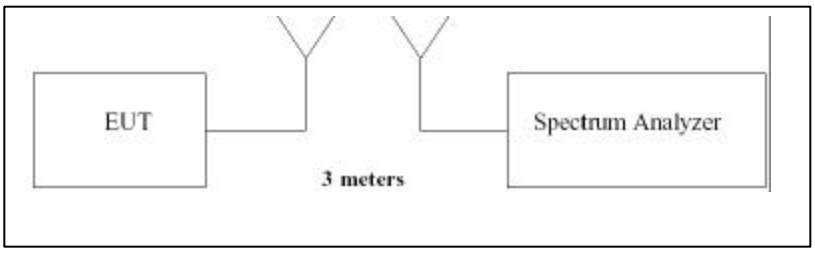
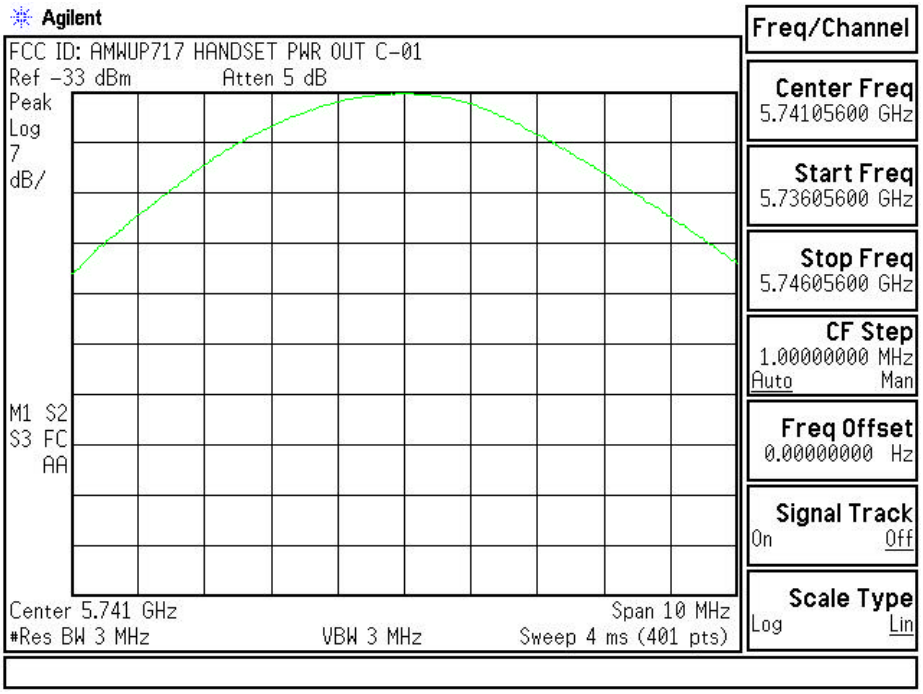
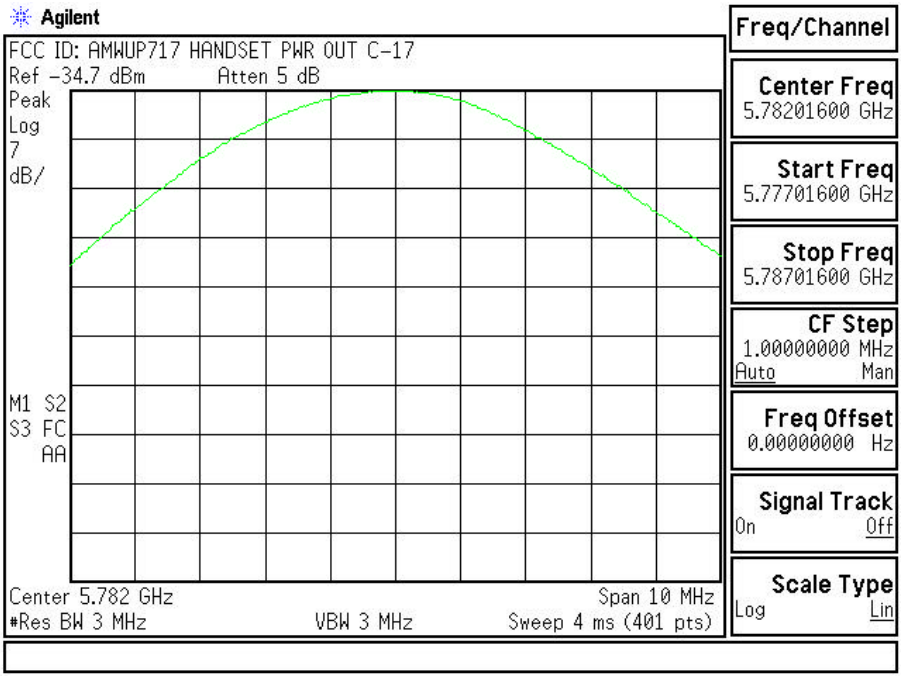


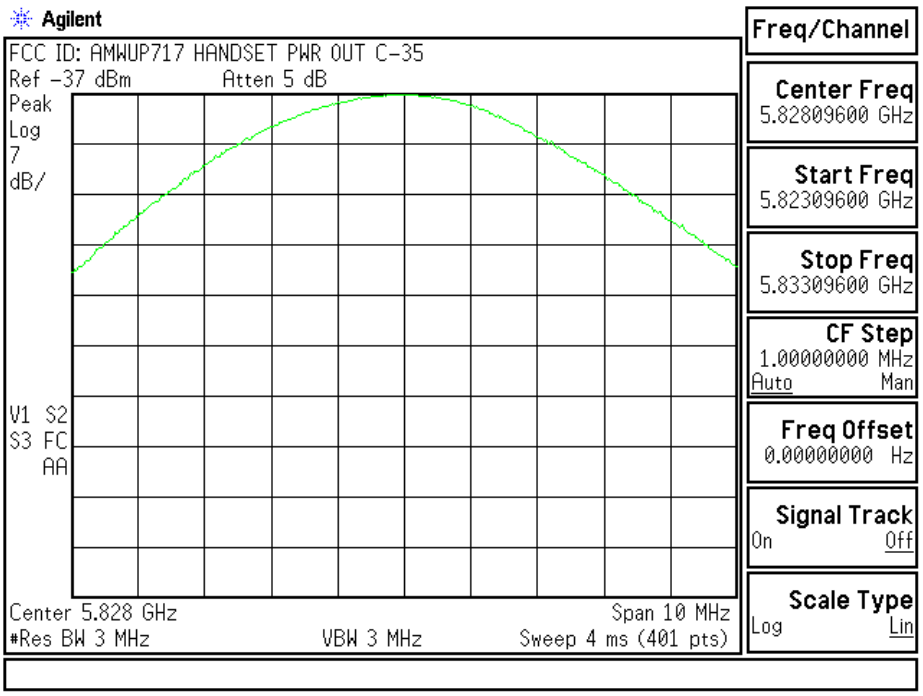
Figure A-2. Test Instrument & Measurement Setup



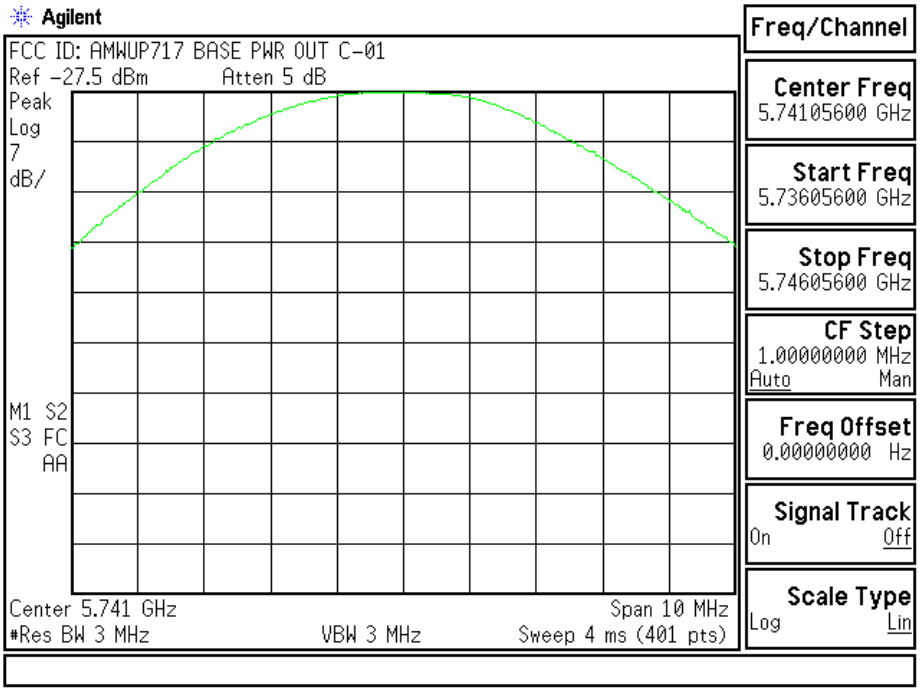
Plot A-4. Max. Output Power Plot – Ch. 01 (HS)



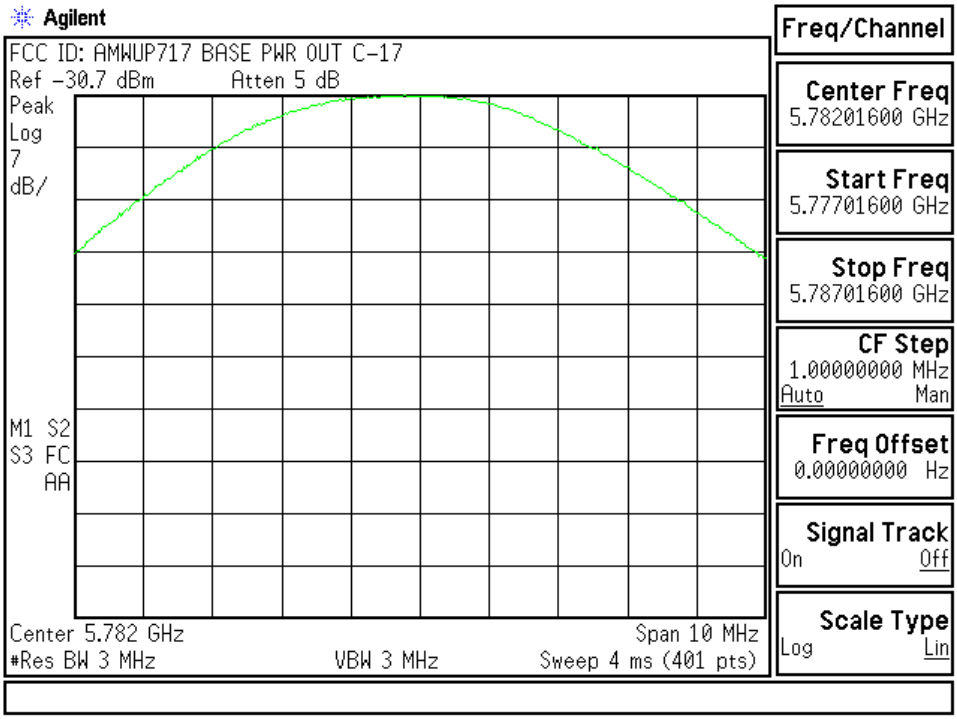
Plot A-5. Max. Output Power Plot – Ch. 17 (HS)



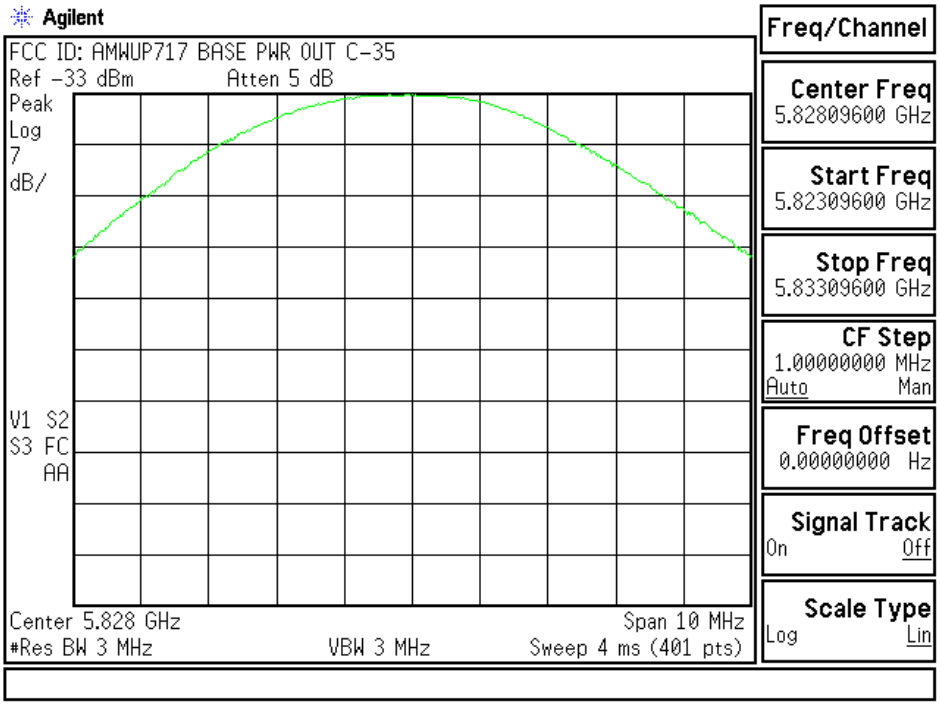
Plot A-6. Max. Output Power Plot – Ch. 35 (HS)



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



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



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