



**FCC CFR47 PART 15 SUBPART C  
INDUSTRY CANADA RSS-210 ISSUE 7**

**CERTIFICATION TEST REPORT**

**FOR**

**MESHMAX – SUBSCRIBER DEVICE**

**MODEL NUMBERS: 9200-WDO, 9201-WDO**

**FCC ID: HZB-MESHMAXMP11R**

**IC ID: 1856A-MESHMAXMP11**

**REPORT NUMBER: 08U11852-2**

**ISSUE DATE: OCTOBER 06, 2008**

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**NVLAP LAB CODE 200065-0**

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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** PROXIM WIRELESS CORPORATION  
1561 BUCKEYE DRIVE,  
MILPITAS, CA 95035 USA

**EUT DESCRIPTION:** 802.11 a/b/g Access Point – Client Device

**MODEL NUMBERS:** 9200-WDO,

**FCC ID:** HZB-MESHMAXMP11R

**IC ID:** 1856A-MESHMAXMP11

**SERIAL NUMBER:** 02192

**DATE TESTED:** June 2 - August 8, 2008

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA RSS-210 Issue 7	Pass
INDUSTRY CANADA RSS-GEN Issue 2	Pass

Compliance Certification Services, Inc. (CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by CCS based on interpretations and/or observations of test results. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by CCS will constitute fraud and shall nullify the document. No part of this report may be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any government agency.

Approved & Released For CCS By:



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EMC SUPERVISOR  
COMPLIANCE CERTIFICATION SERVICES

Tested By:



THANH NGUYEN  
EMC ENGINEER  
COMPLIANCE CERTIFICATION SERVICES

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2003, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 2, and RSS-210 Issue 7.

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://www.ccsemc.com>.

## 4. CALIBRATION AND UNCERTAINTY

### 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

### 4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Power Line Conducted Emission	+/- 2.3 dB
Radiated Emission	+/- 3.4 dB

Uncertainty figures are valid to a confidence level of 95%.

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

The EUT is an 802.11a/b/g Access Point (client device), Models: 9200-WDO, 9201-WDO. 9200-WDO supports software configurable Mesh and Wi-Fi on 2.4 and 5GHz radios. 9201-WDO supports only Wi-Fi on 2.4 and 5 GHz radios. Both model numbers are electrically identical, only software has different functionality (mesh require SW license).

The radio module is manufactured by Proxim Wireless.

### 5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5745 - 5825	802.11a	27.82	605.34
5760 - 5780	802.11 a 40MHz	28.10	645.65

### **5.3. DESCRIPTION OF AVAILABLE ANTENNAS**

The radio utilizes a Dish Antenna for 5.8 GHz band with a maximum gain of 33.4 dBi.

### **5.4. SOFTWARE AND FIRMWARE**

The firmware installed in the EUT during testing was TFTP Server, version 8.2.7.

The EUT driver software installed during testing was GuildFTPd, version 0.999.14.

The test utility software used during testing was ART, rev. 4.8 BUILD # 16.

### **5.5. WORST-CASE CONFIGURATION AND MODE**

The worst-case channel is determined as the channel with the highest output power. The channel with the highest output power for EUT with Dish antenna was low channel for 11a Turbo mode (40MHz BW), therefore radiated emission below 1 GHz was performed at low channel, 11a Turbo mode, 12 Mbps.

Power Line Conducted Emission was performed with EUT connected to the Dish Antenna, transmitting at low channel, 11a mode Turbo mode (40 MHz BW), 12 Mbps.

## 5.6. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

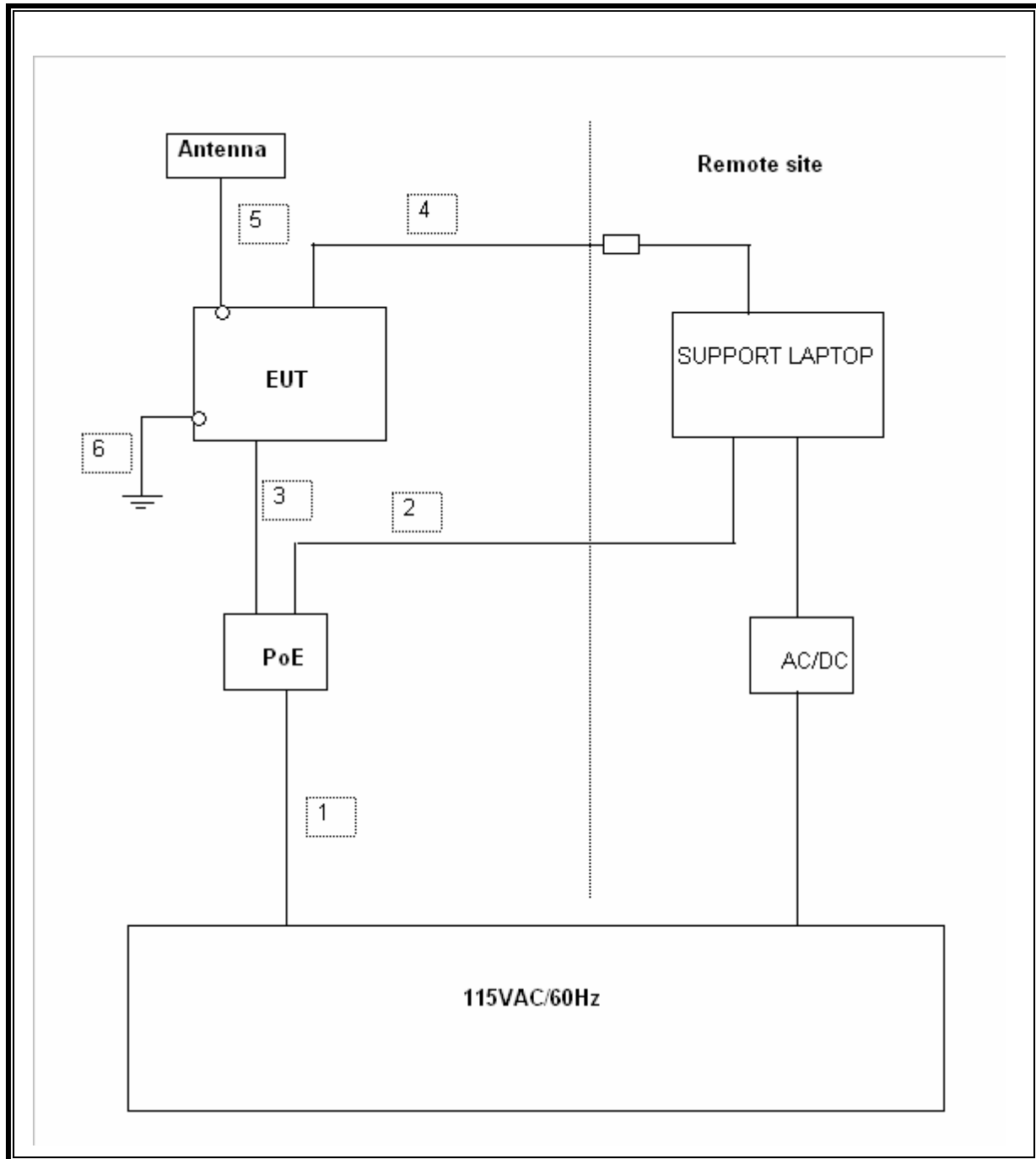
PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	SONY	PCG-881R	R2429159	N/A
AC/DC Adapter	SONY	PCGA-AC16V	0202B0335718P	N/A
POE	AULT INC.	PW143RD4800F02	N/A	N/A

### I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	1	US 115V	Un-shielded	1 m	N/A
2	WLAN	1	RJ45	Un-shielded	2 m	PoE
3	WLAN	1	RJ45	Un-shielded	0.3 m	PoE
4	Serial	1	RJ11	Un-shielded	2 m	Disconnect when testing
5	Antenna	1	N Type	Shielded	0.3 m	1 meter use for dish
6	GND	1	Screw	15 AWG	1.5 m	Chassis ground.



**SETUP DIAGRAM FOR TESTS**



## 6. ANTENNA PORT TEST RESULTS

### 6.1. 6 dB BANDWIDTH

#### LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

#### TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

#### RESULTS

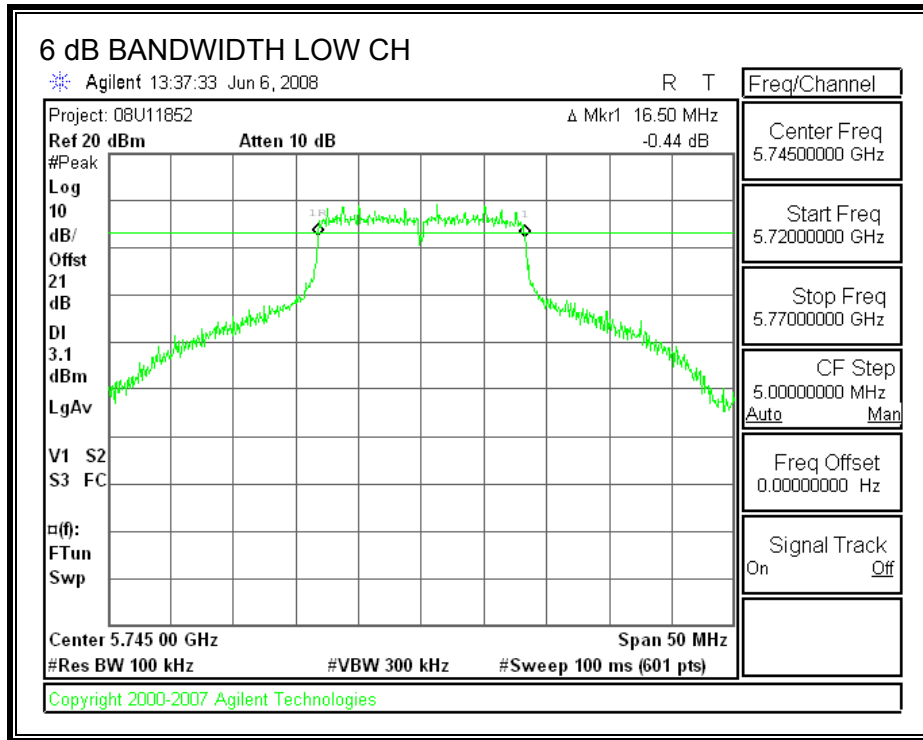
##### 802.11a, 20MHz, Mode

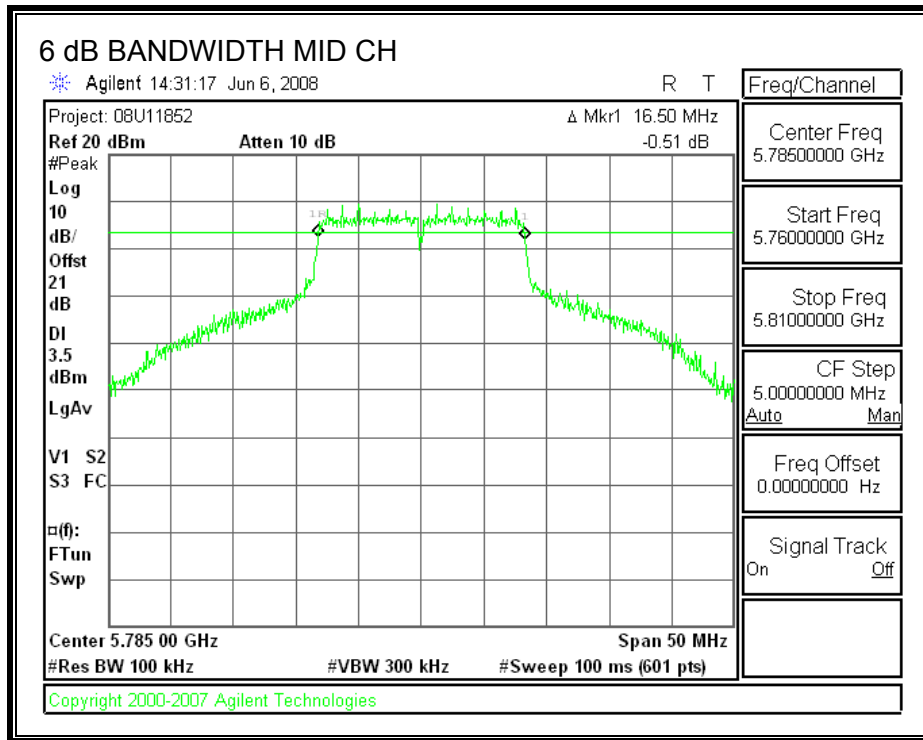
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5745	16.5	0.5
Middle	5785	16.5	0.5
High	5825	16.5	0.5

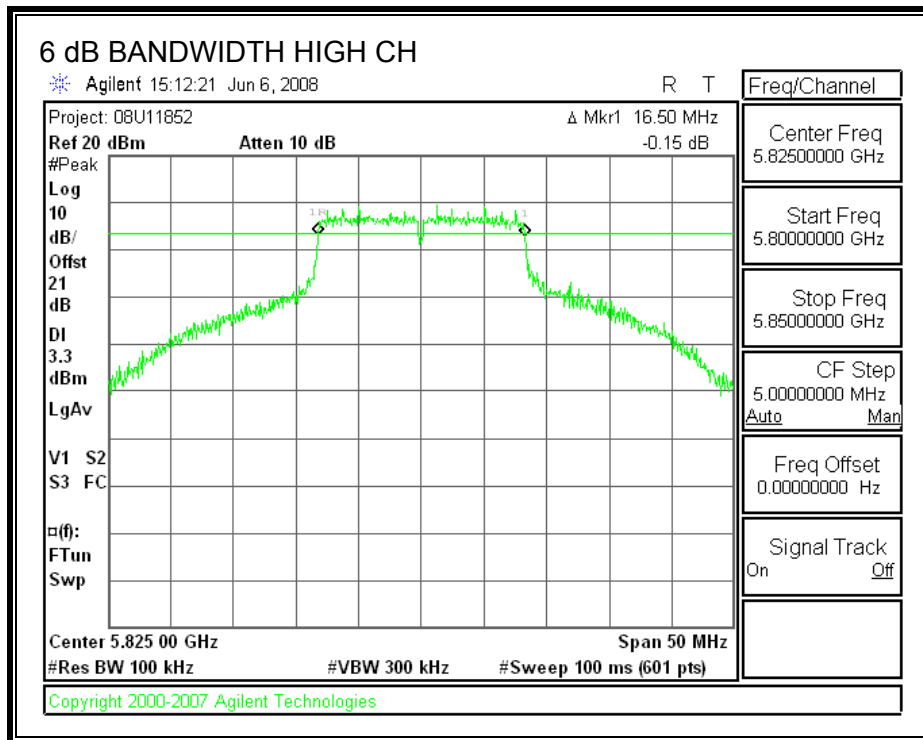
##### 802.11a, 40MHz, Mode

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5760	32.58	0.5
High	5780	32.50	0.5

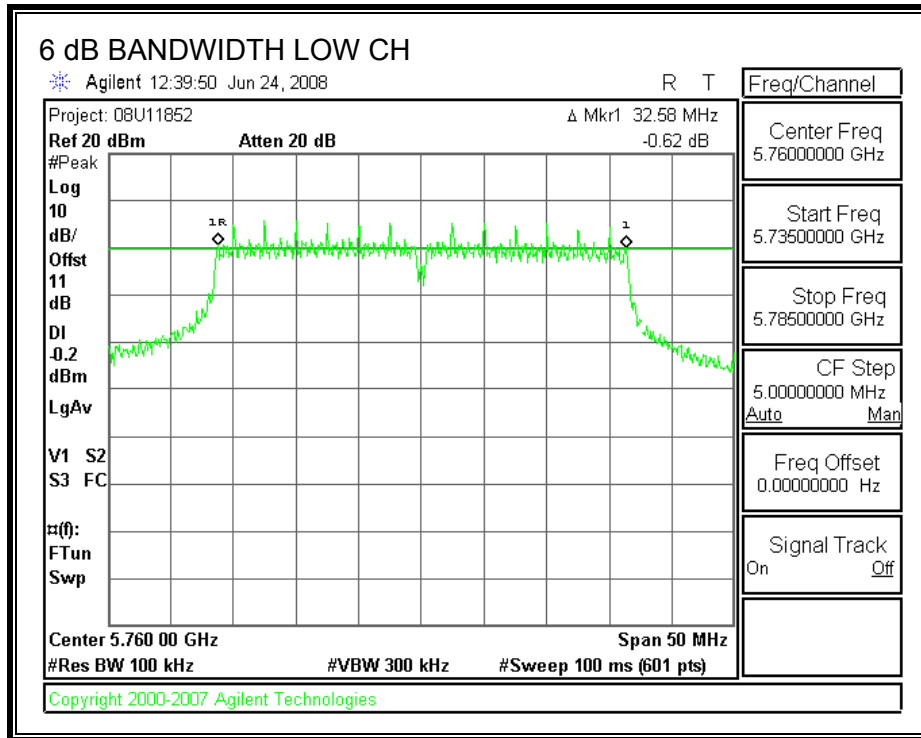
**802.11a, 20MHz, Mode, 6 dB BANDWIDTH**

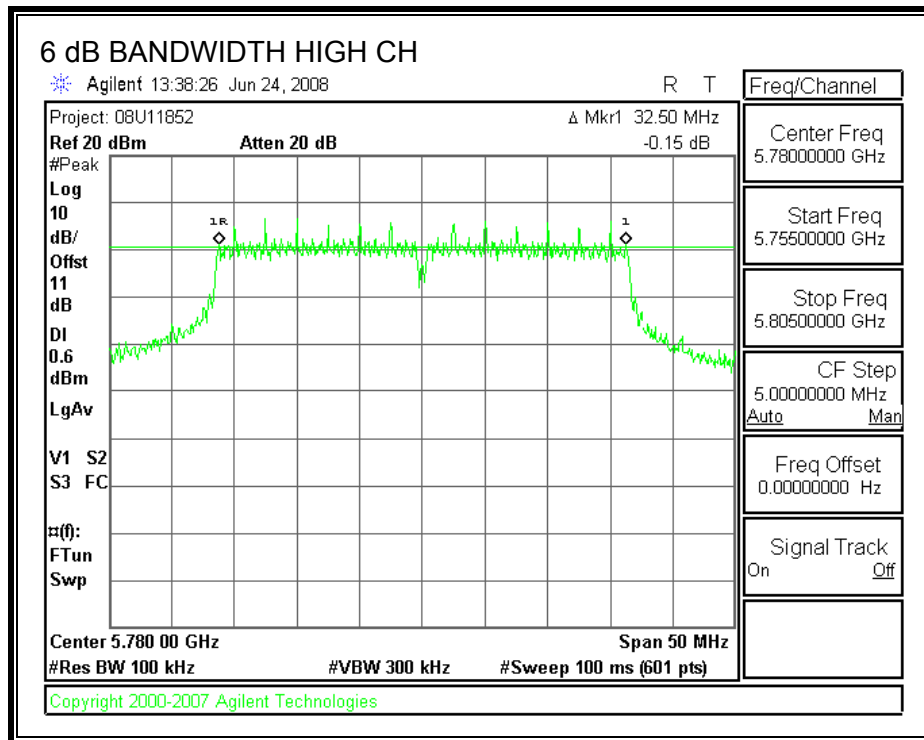






**802.11a, 40MHz, Mode, 6 dB BANDWIDTH**





## 6.2. 99% BANDWIDTH

### LIMITS

None; for reporting purposes only.

### TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

### RESULTS

#### 802.11a, 20MHz, Mode:

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5745	16.6271
Middle	5785	17.2838
High	5825	17.5472

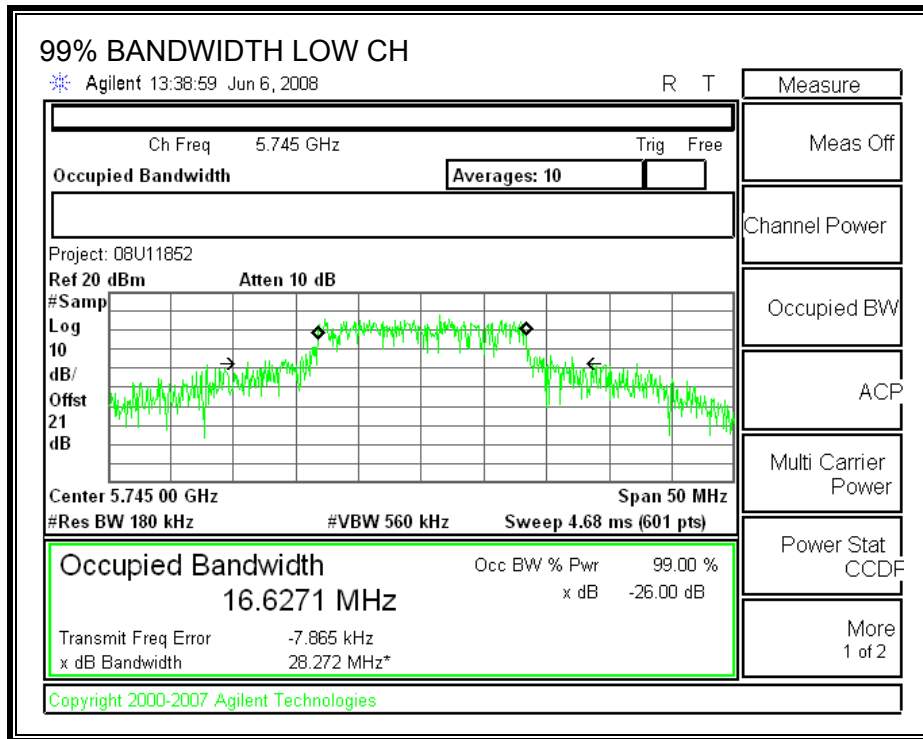
#### 802.11a, 40MHz, Mode:

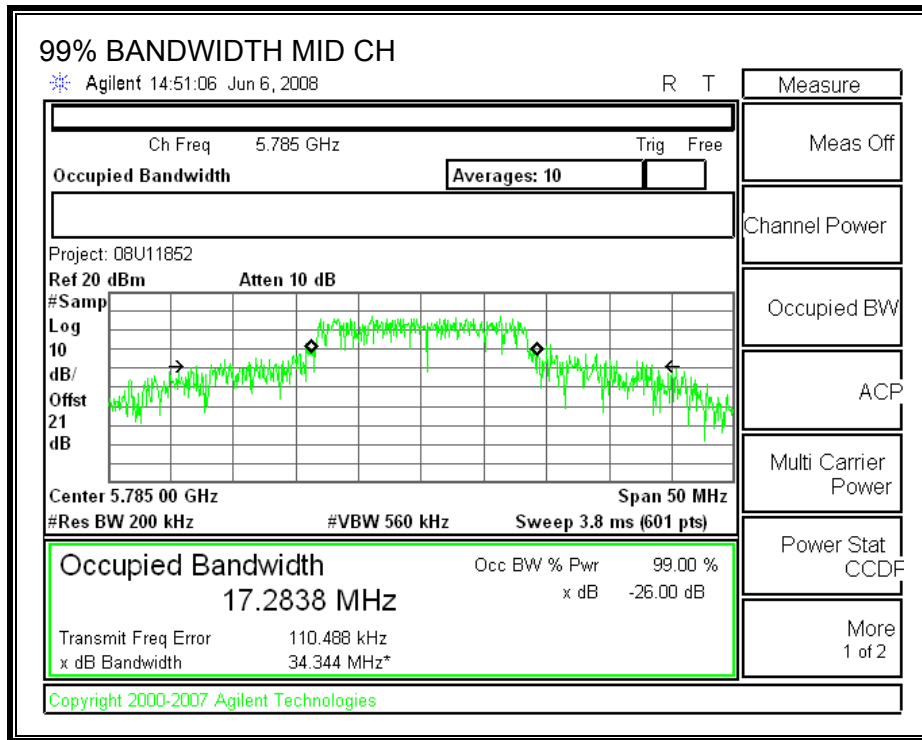
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5760	32.9695
High	5780	32.9694

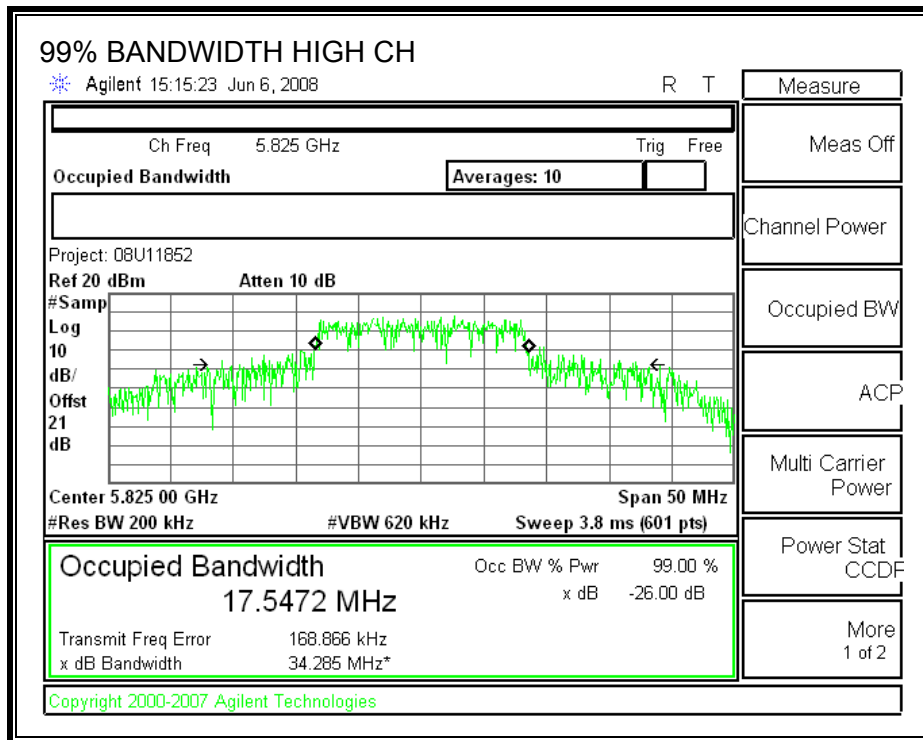


**802.11a, 20MHz Mode:**

**99% BANDWIDTH**

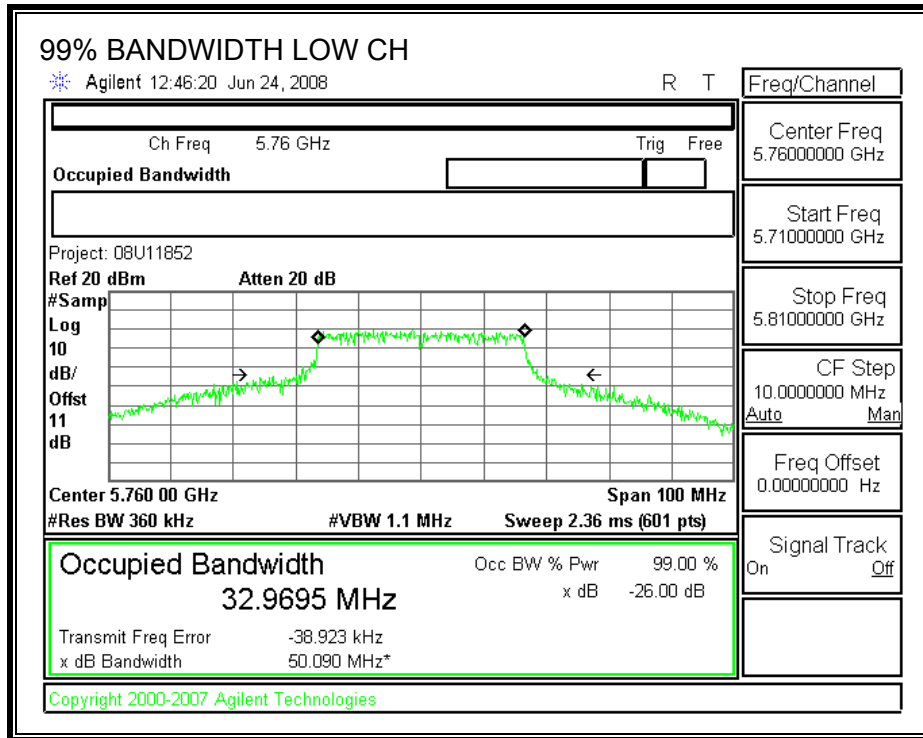


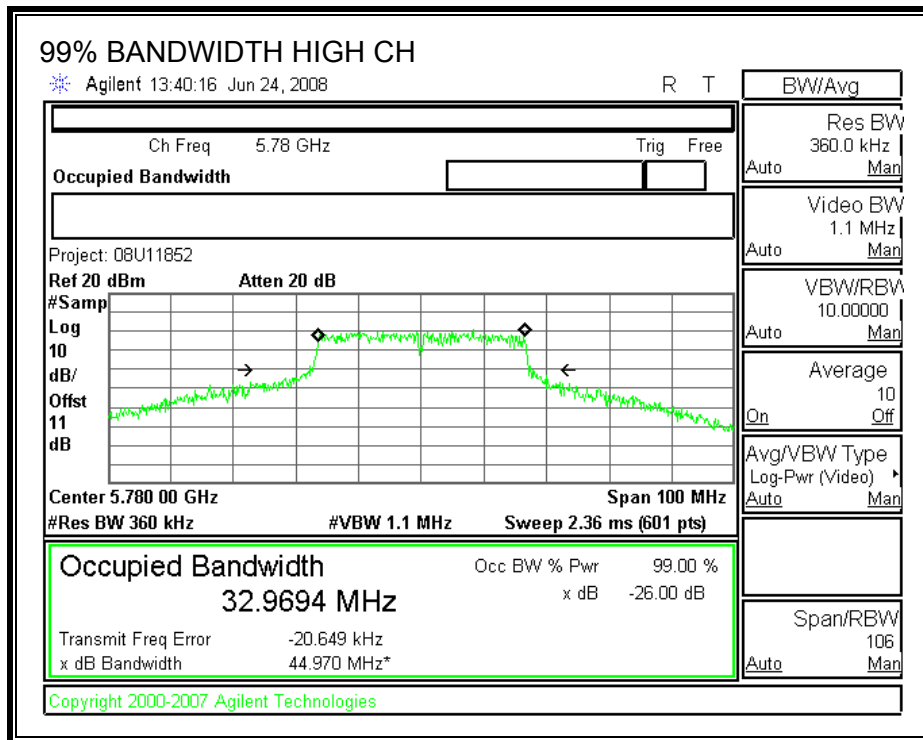




**802.11a, 40MHz Mode:**

**99% BANDWIDTH**





### 6.3. OUTPUT POWER

#### LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

The Dish antenna gain is 33.4 dBi for Point to Point operations in the 5.8 GHz band; therefore the limit is 30 dBm.

#### TEST PROCEDURE

Peak power is measured using the Channel bandwidth Alternative peak output power procedure specified in "TCB Training for Devices covered under Scopes A1 - A4" by Joe Dichoso, May 2003.

#### RESULTS

For Dish Antenna:

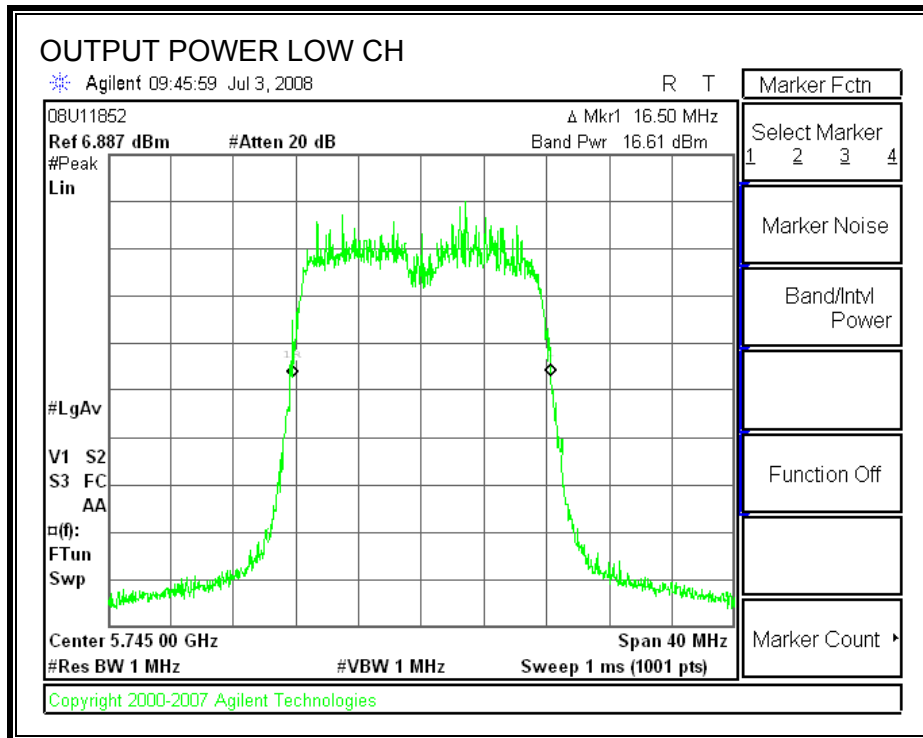
##### 20 MHz BW

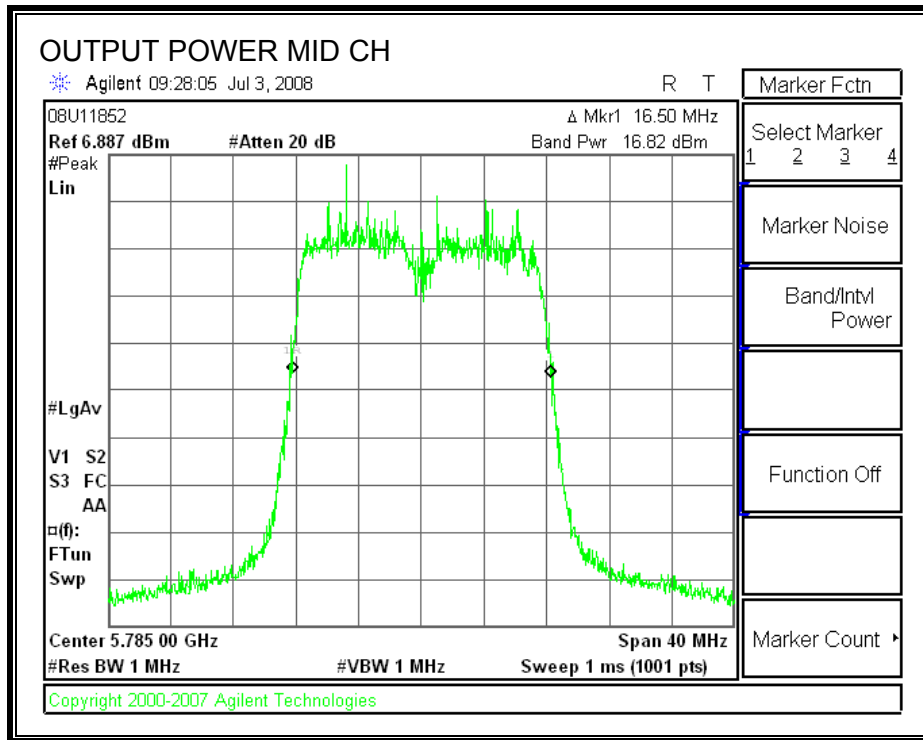
Channel	Frequency (MHz)	Spectrum Analyzer Reading (dBm)	Attenuator and Cable Offset (dB)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	5745	16.61	11	27.61	30	-2.39
Middle	5785	16.82	11	27.82	30	-2.18
High	5825	16.71	11	27.71	30	-2.29

##### 40 MHz BW

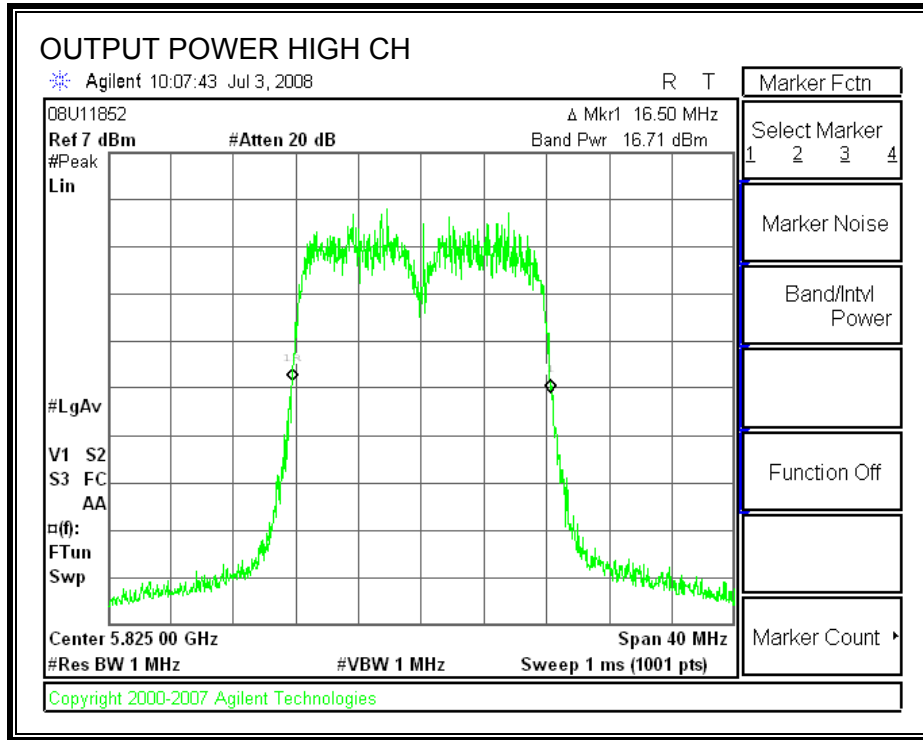
Channel	Frequency (MHz)	Spectrum Analyzer Reading (dBm)	Attenuator and Cable Offset (dB)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	5760	16.60	11.5	28.10	30	-1.90
High	5800	16.47	11.5	27.97	30	-2.03

**802.11a, 20MHz, Mode, OUTPUT POWER**

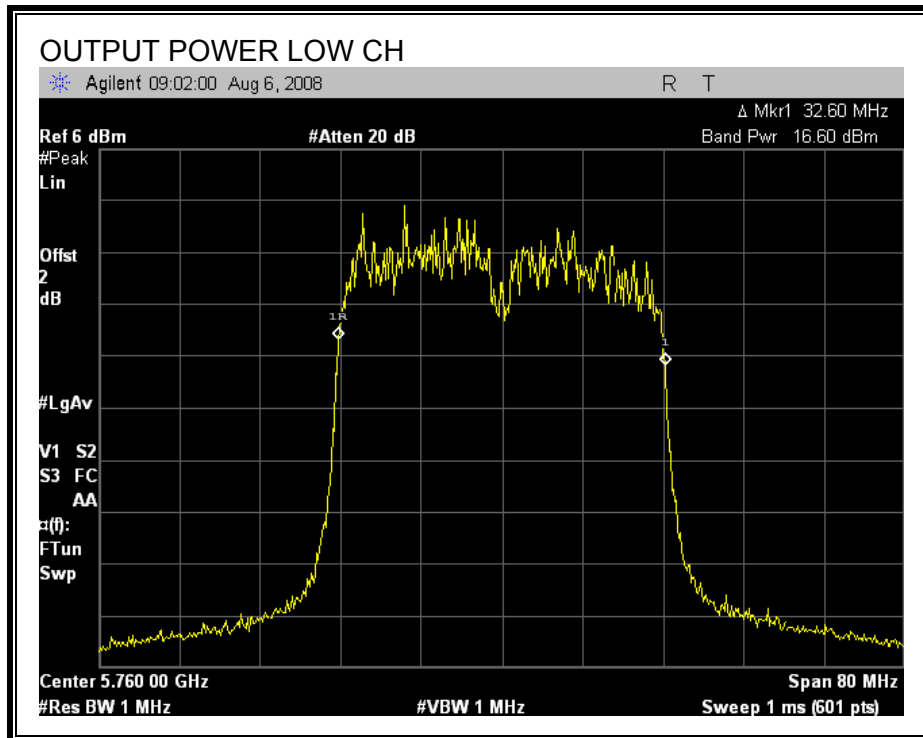


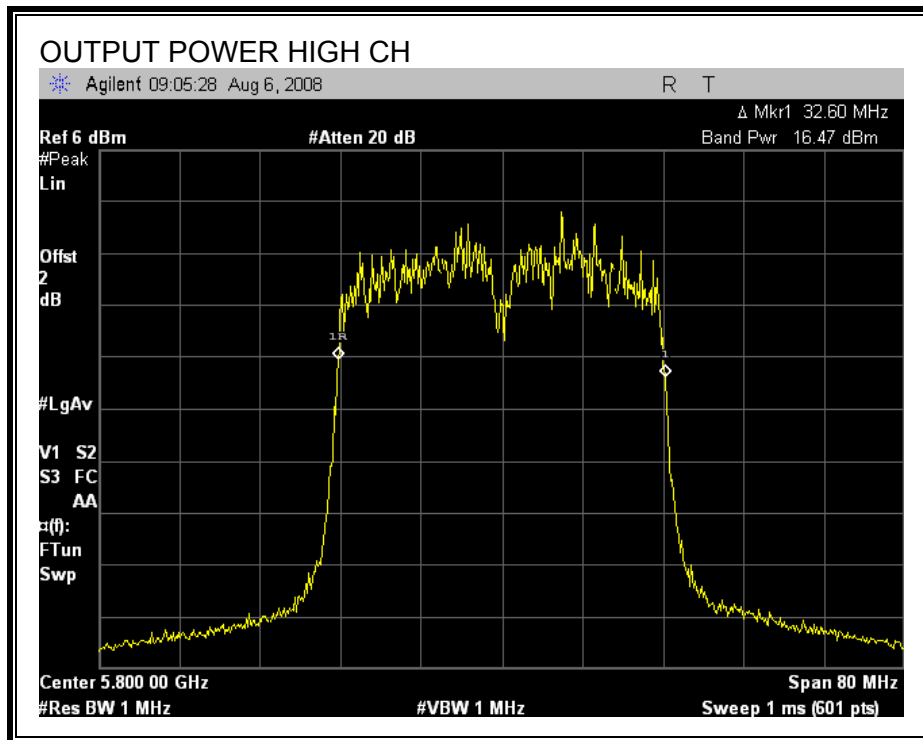






**802.11a, 40MHz, Mode, OUTPUT POWER**





## 6.4. AVERAGE POWER

### LIMITS

None; for reporting purposes only.

### TEST PROCEDURE

The transmitter output is connected to a power meter.

### RESULTS

The cable assembly insertion loss of 11.0 dB (including 10 dB pad and 1.0 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

#### 802.11a, 20MHz, Mode

Channel	Frequency (MHz)	Power (dBm)
Low	5745	22.49
Middle	5785	22.30
High	5825	22.09

#### 802.11a, 40MHz, Mode

Channel	Frequency (MHz)	Power (dBm)
Low	5760	20.20
High	5780	20.10

## 6.5. POWER SPECTRAL DENSITY

### LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

### TEST PROCEDURE

Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

### RESULTS

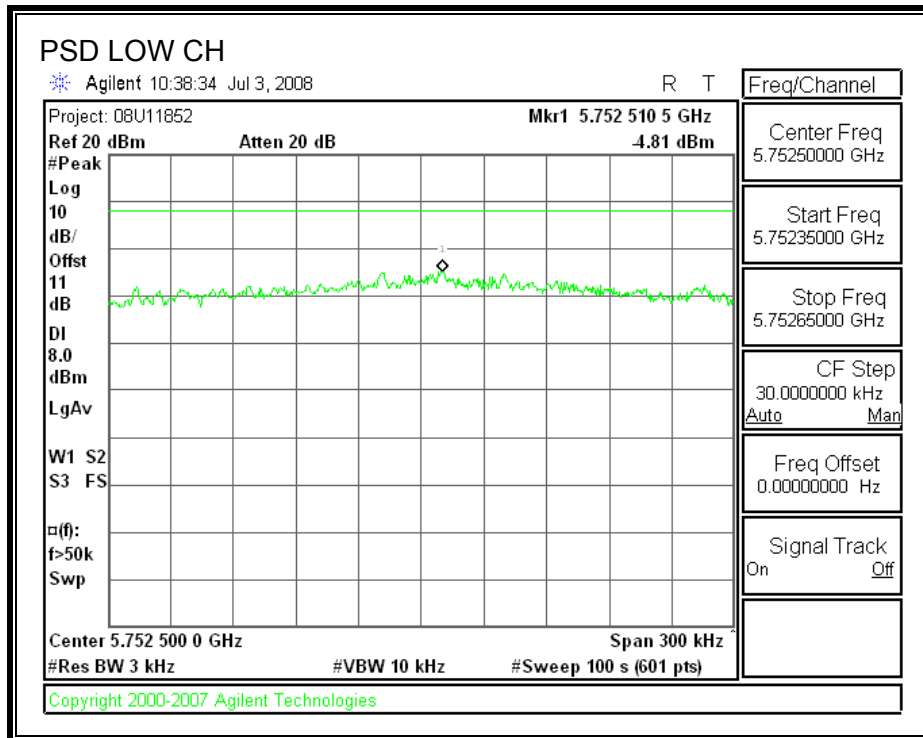
#### 802.11a, 20MHz, Mode:

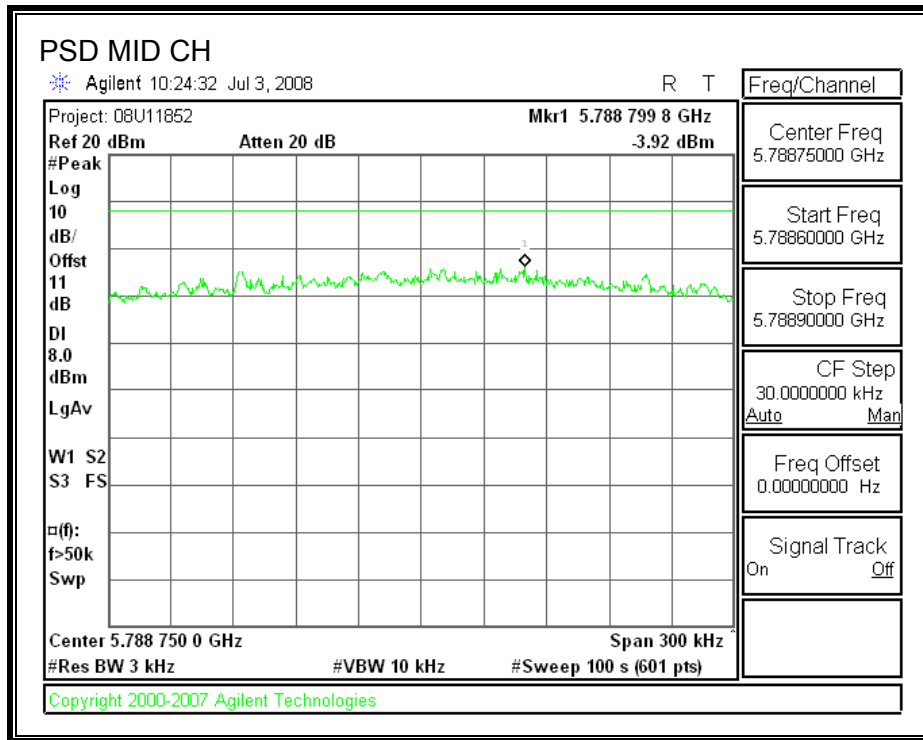
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5745	-4.81	8	-12.81
Middle	5785	-3.92	8	-11.92
High	5825	-4.95	8	-12.95

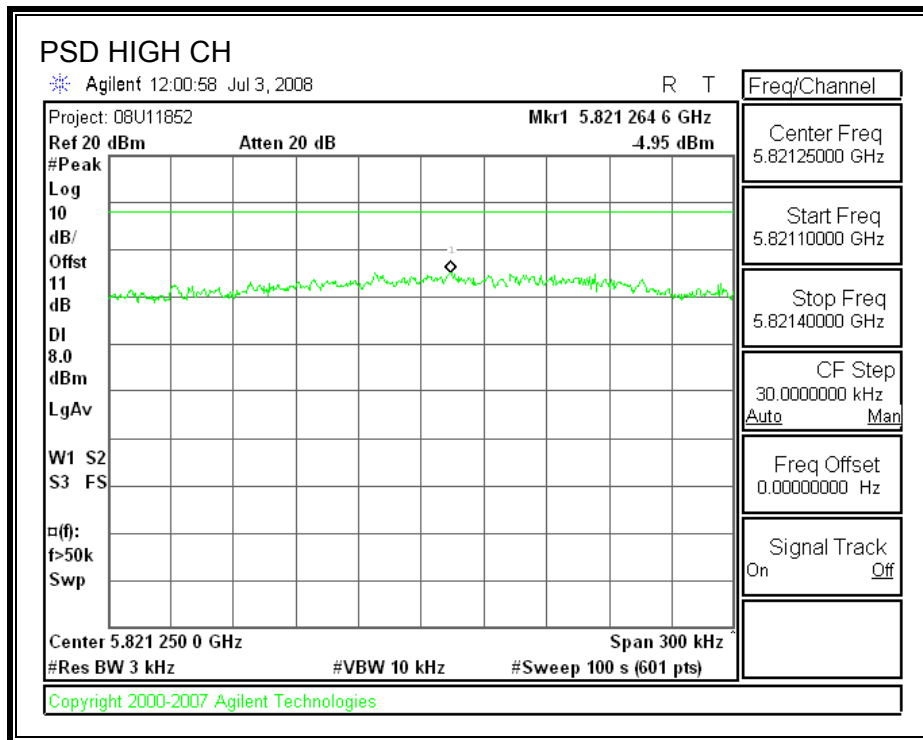
#### 802.11a, 40MHz, Mode:

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5760	-3.79	8	-11.79
High	5780	-4.93	8	-12.93

**802.11a, 20MHz, Mode, POWER SPECTRAL DENSITY**

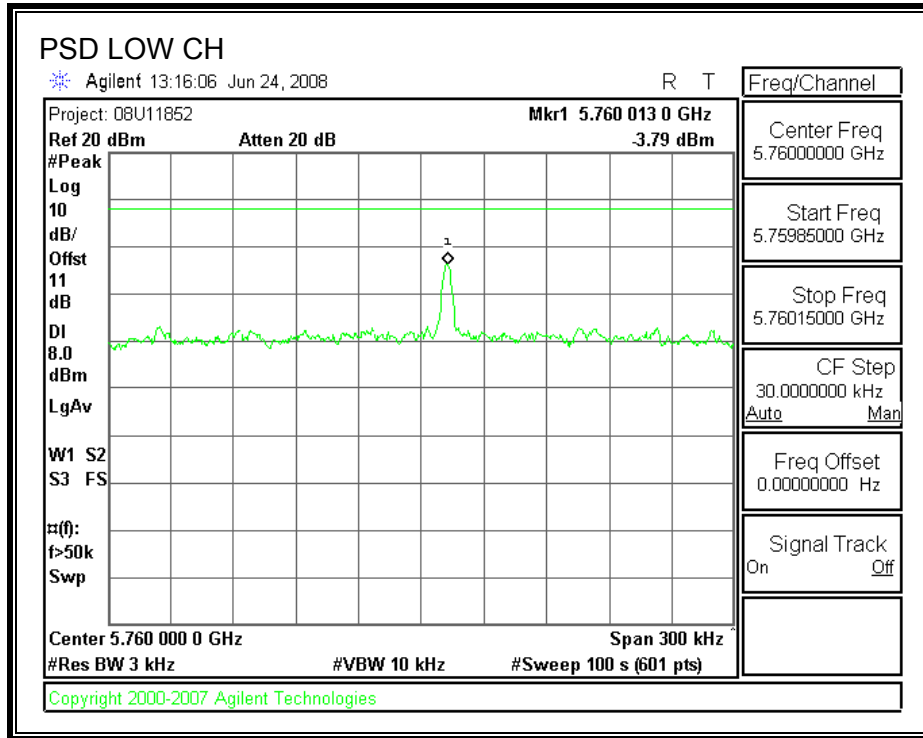


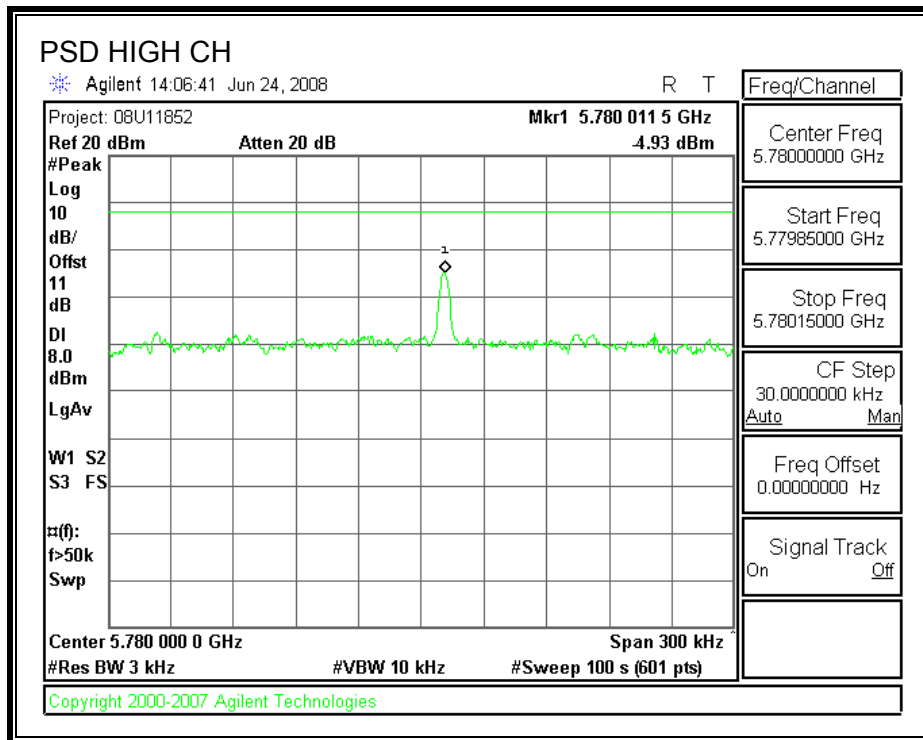






802.11a, 40MHz, Mode, POWER SPECTRAL DENSITY





## **6.6. CONDUCTED SPURIOUS EMISSIONS**

### **LIMITS**

FCC §15.247 (d)

IC RSS-210 A8.5

Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

### **TEST PROCEDURE**

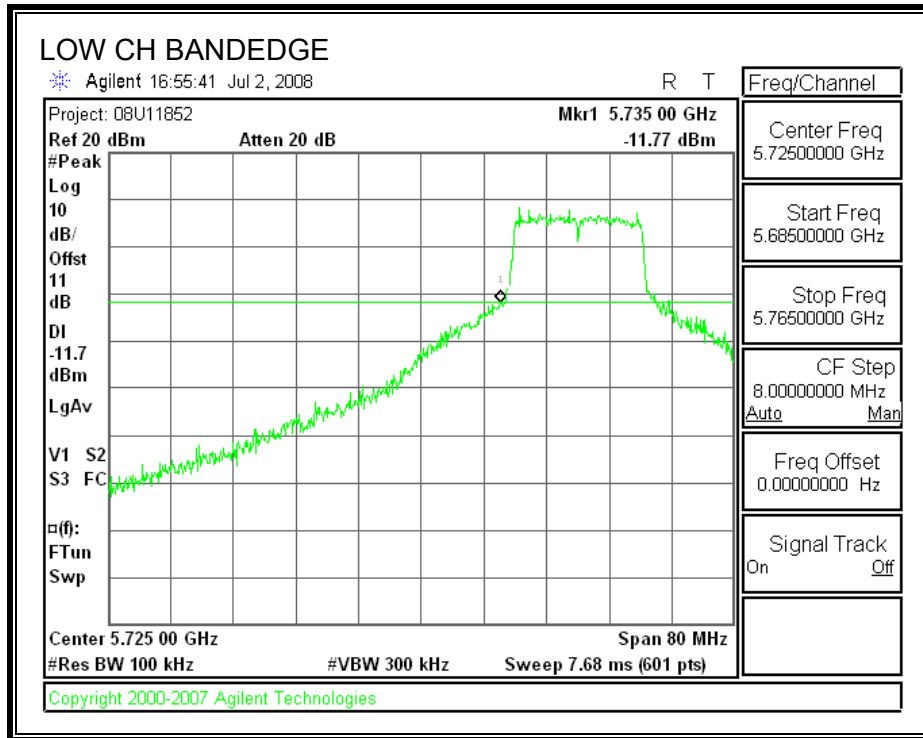
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

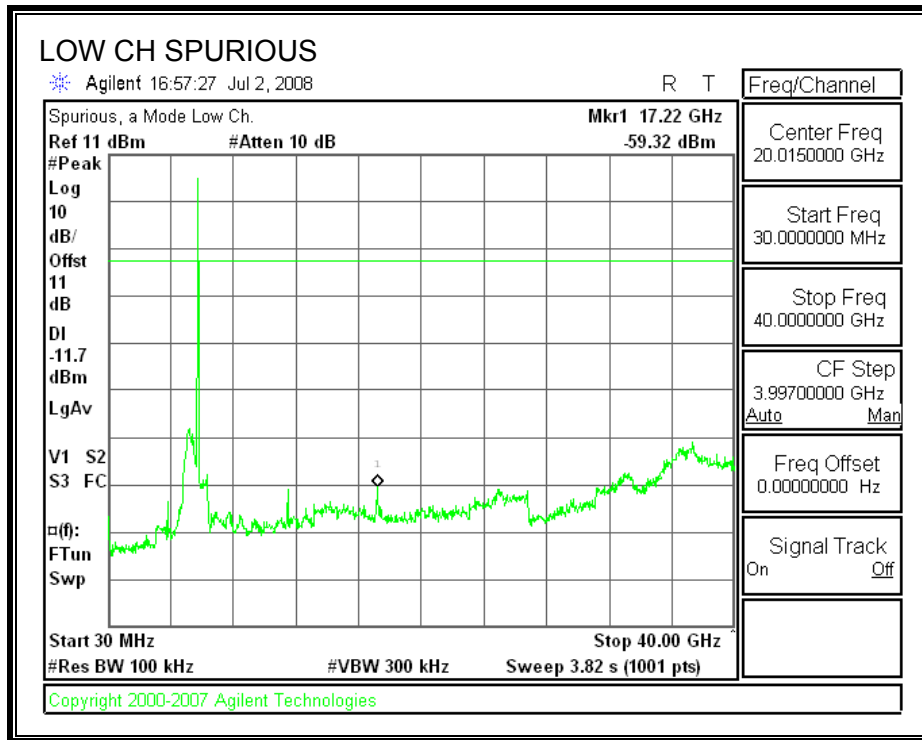
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

**RESULTS**

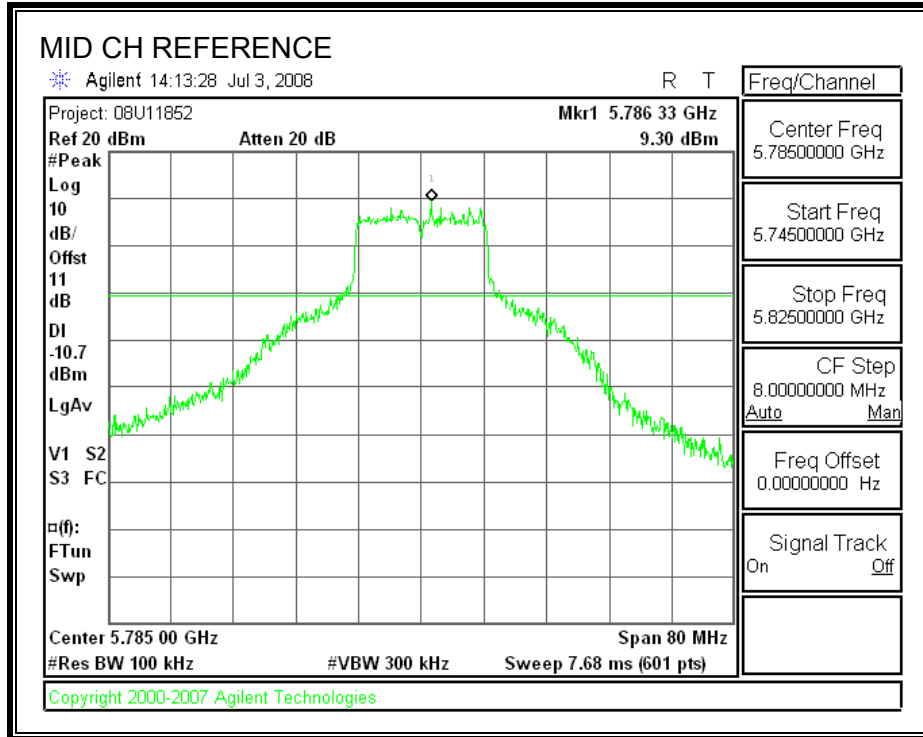
**802.11a, 20MHz, Mode**

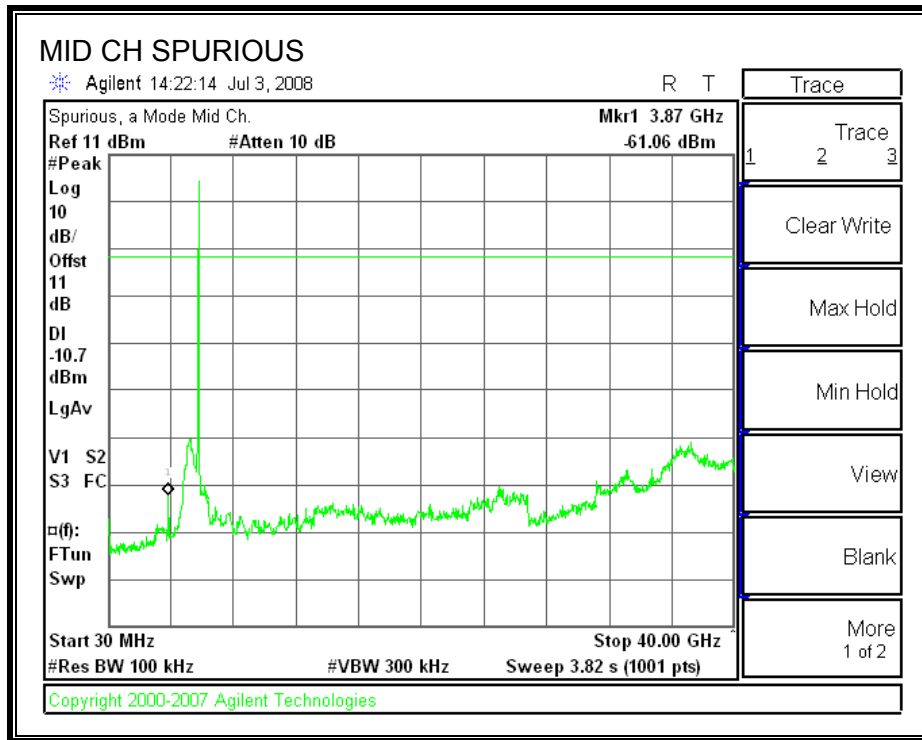
**SPURIOUS EMISSIONS, LOW CHANNEL**



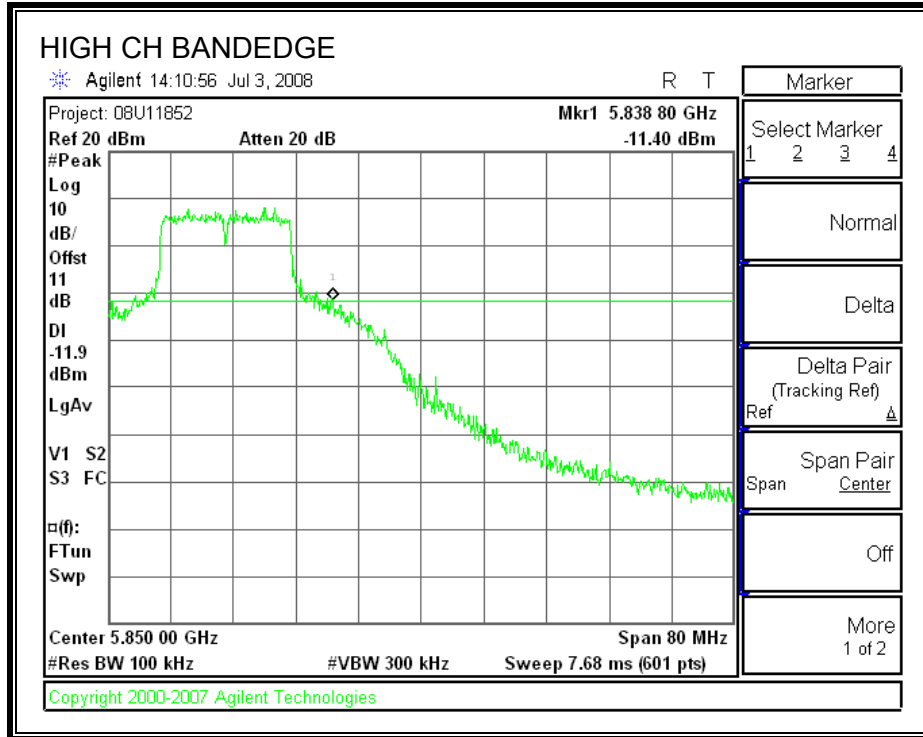


**SPURIOUS EMISSIONS, MID CHANNEL**

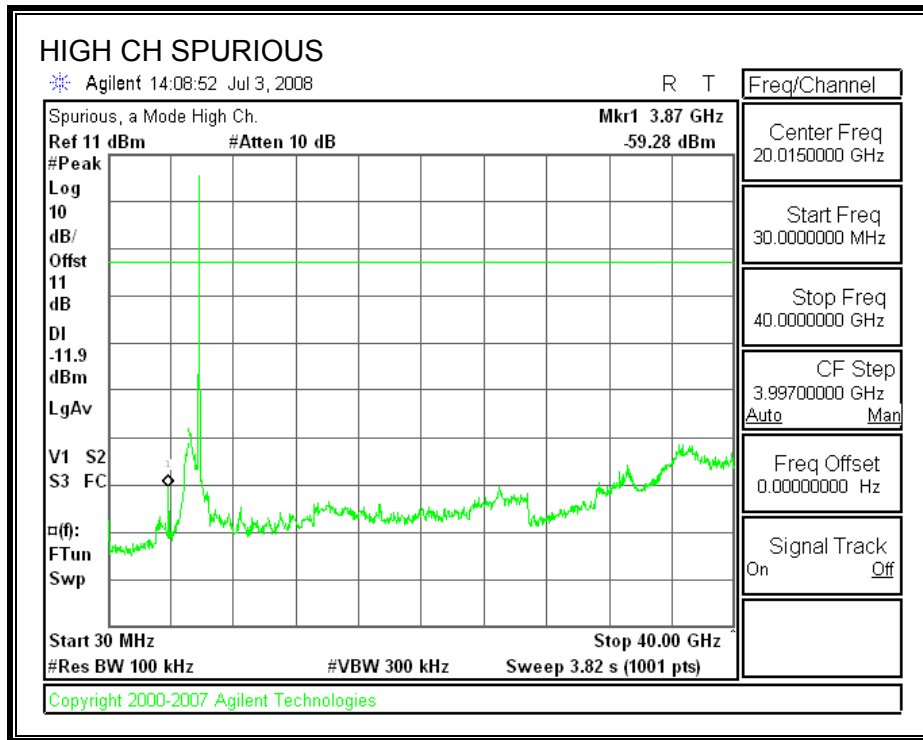




**SPURIOUS EMISSIONS, HIGH CHANNEL**

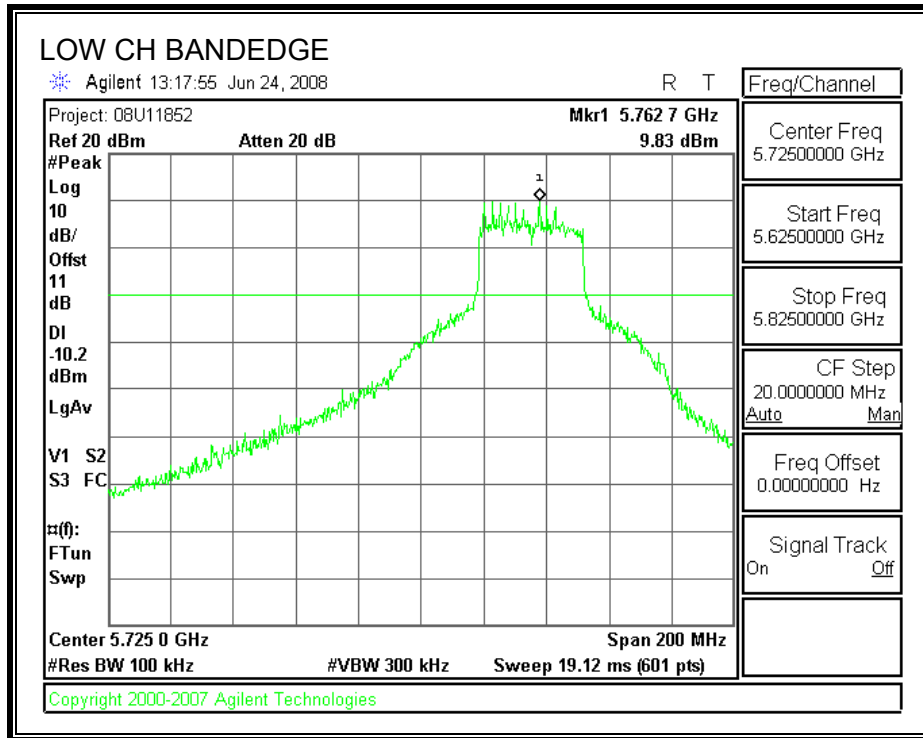


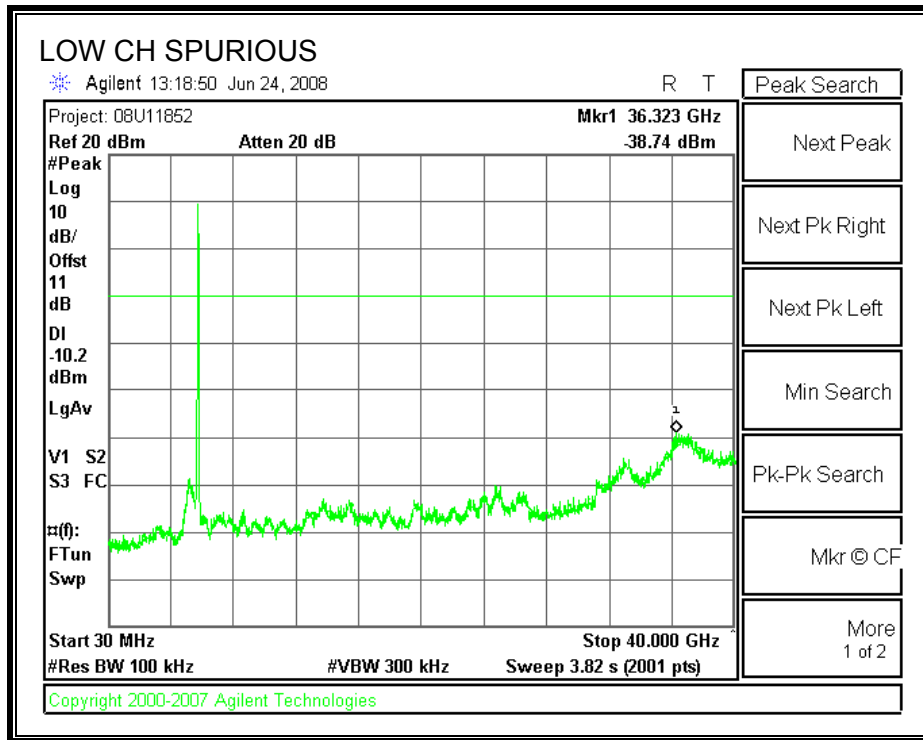




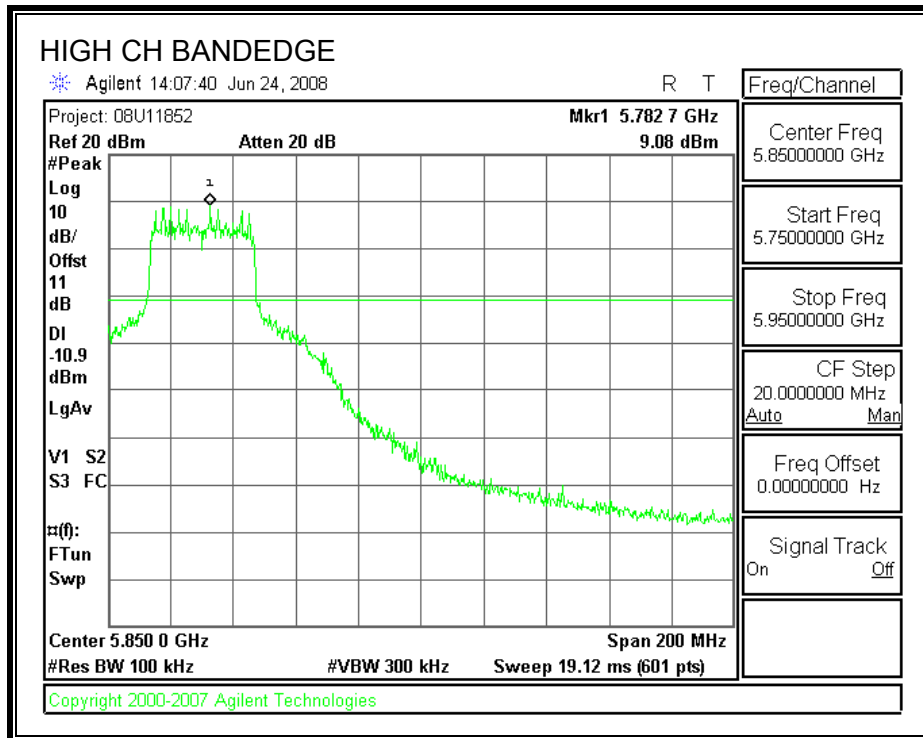
**802.11a, 40MHz, Mode**

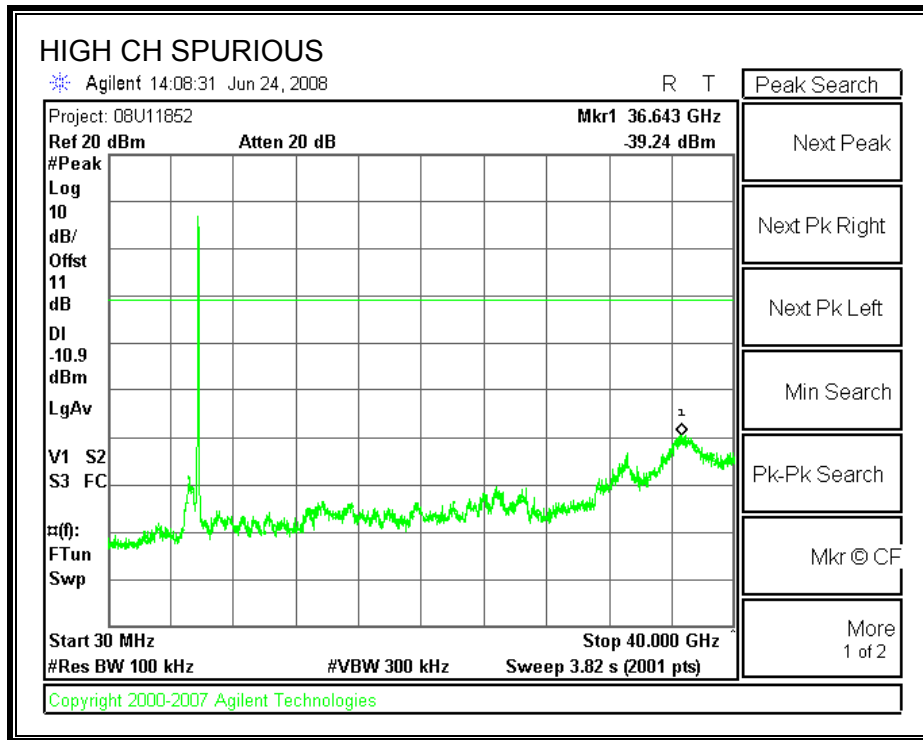
**SPURIOUS EMISSIONS, LOW CHANNEL**





**SPURIOUS EMISSIONS, HIGH CHANNEL**





## 7. TRANSMITTER RADIATED EMISSION ABOVE 1 GHz

### 7.1. TX ABOVE 1 GHz FOR 20 MHz BW IN THE 5.8 GHz BAND

#### HARMONICS AND SPURIOUS EMISSIONS:

High Frequency Measurement																	
Compliance Certification Services, Fremont 5m Chamber																	
Company:		Proxim															
Project #:		08U11852															
Date:		6/2/2008															
Test Engineer:		Thanh Nguyen															
Configuration:		EUT 5054 , Dish 5GHz antenna, Support Laptop.															
Mode:		Tx 5.8GHz DTS band															
Test Equipment:																	
Horn 1-18GHz			Pre-amplifier 1-26GHz			Pre-amplifier 26-40GHz			Horn > 18GHz			Limit					
T73; S/N: 6717 @3m			T144 Miteq 3008A00931			T88 Miteq 26-40GHz			T89; ARA 18-26GHz; S/N:1049			FCC 15.205					
Hi Frequency Cables																	
2 foot cable			3 foot cable			12 foot cable			HPF			Reject Filter			Peak Measurements RBW=VBW=1MHz		
						A.5m Chamber						R_002			Average Measurements RBW=1MHz; VBW=10Hz		
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Flt dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)		
<b>Low ch 5745MHz</b>																	
11.490	3.0	42.3	28.6	38.6	11.6	-35.9	0.0	0.0	56.7	43.0	74	54	-17.3	-11.0	V		
11.490	3.0	40.2	26.5	38.6	11.6	-35.9	0.0	0.0	54.5	40.9	74	54	-19.5	-13.1	H		
<b>Mid ch 5785 MHz</b>																	
11.570	3.0	41.9	28.5	38.7	11.7	-35.8	0.0	0.0	56.4	43.0	74	54	-17.6	-11.0	H		
11.570	3.0	43.0	30.2	38.7	11.7	-35.8	0.0	0.0	57.6	44.8	74	54	-16.4	-9.2	V		
<b>High Ch 5825MHz</b>																	
11.650	3.0	44.1	32.6	38.7	11.8	-35.7	0.0	0.0	58.9	47.4	74	54	-15.1	-6.6	V		
11.650	3.0	43.3	30.1	38.7	11.8	-35.7	0.0	0.0	58.1	44.9	74	54	-15.9	-9.1	H		
No other emissions were detected above system noise floor																	
Rev. 4.12.7																	
f	Measurement Frequency					Amp	Preamp Gain					Avg Lim	Average Field Strength Limit				
Dist	Distance to Antenna					D Corr	Distance Correct to 3 meters					Pk Lim	Peak Field Strength Limit				
Read	Analyzer Reading					Avg	Average Field Strength @ 3 m					Avg Mar	Margin vs. Average Limit				
AF	Antenna Factor					Peak	Calculated Peak Field Strength					Pk Mar	Margin vs. Peak Limit				
CL	Cable Loss					HPF	High Pass Filter										

## 7.2. TX ABOVE 1 GHz FOR 40 MHz BW IN THE 5.8 GHz BAND

### HARMONICS AND SPURIOUS EMISSIONS:

**High Frequency Measurement**  
 Compliance Certification Services, 3 Meters\_C Chamber

Company: Proxim  
 Project #: 08U11852  
 Date: 6/2/2008  
 Test Engineer: Thanh Nguyen  
 Configuration: EUT , Dish 5GHz antenna, Support Laptop.  
 Mode: Tx 5.8GHz Turbo 40MHz band.

**Test Equipment:**

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T60; S/N: 2238 @3m	T145 Agilent 3008A0056	T88 Miteq 26-40GHz	T89; ARA 18-26GHz; S/N:1049	FCC 15.205

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter	Peak Measurements RBW=VBW=1MHz Average Measurements RBW=1MHz ; VBW=10Hz
	Thanh 187215003	Ninous 208946002		R_001	

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filt dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
<b>Low CH, 5760MHz</b>															
11.519	3.0	36.0	24.8	37.4	3.9	-33.1	0.0	0.0	44.3	33.0	74	54	-29.7	-21.0	H
11.519	3.0	39.7	24.9	37.4	3.9	-33.1	0.0	0.0	48.0	33.1	74	54	-26.0	-20.9	V
<b>High CH, 5780MHz</b>															
11.560	3.0	37.6	24.3	37.4	3.9	-33.0	0.0	0.0	45.9	32.6	74	54	-28.1	-21.4	H
11.560	3.0	35.6	23.2	37.4	3.9	-33.0	0.0	0.0	43.9	31.5	74	54	-30.1	-22.5	V

No other emissions were detected above system noise floor

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

## 8. RECEIVER RADIATED EMISSION ABOVE 1 GHz

### 8.1. RX ABOVE 1 GHz FOR 20 MHz BW IN THE 5.8 GHz BAND

High Frequency Measurement																	
Compliance Certification Services, 3 Meters_C Chamber																	
Company:		Proxim															
Project #:		08U11852															
Date:		6/2/2008															
Test Engineer:		Thanh Nguyen															
Configuration:		EUT , Dish 5GHz antenna															
Mode:		Receive mode															
<b>Test Equipment:</b>																	
Horn 1-18GHz			Pre-amplifier 1-26GHz			Pre-amplifier 26-40GHz			Horn > 18GHz			Limit					
T60; S/N: 2238 @3m			T145 Agilent 3008A005t									RX RSS 210					
<b>Hi Frequency Cables</b>																	
2 foot cable			3 foot cable			12 foot cable			HPF			Reject Filter			Peak Measurements		
			Thanh 187215003			Ninous 208946002									RBW=VBW=1MHz		
Average Measurements																	
RBW=1MHz , VBW=10Hz																	
f	Dist	Read Pk	Read Avg.	AF	CL	Amp	D Corr	Fln	Peak	Avg	Pk Lim	Avg Lim	Pk Mar	Avg Mar	Notes		
GHz	(m)	dBuV	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dBuV/m	dBuV/m	dB	dB	(V/H)		
1.067	3.0	67.5	44.0	25.6	1.6	-36.1	0.0	0.0	58.6	35.1	74	54	-15.4	-18.9	V		
1.986	3.0	59.9	34.1	27.9	1.9	-35.4	0.0	0.0	54.2	28.5	74	54	-19.8	-25.5	V		
1.065	3.0	61.8	41.2	25.6	1.6	-36.1	0.0	0.0	52.9	32.2	74	54	-21.1	-21.8	H		
No other emissions were detected above system noise floor																	
f	Measurement Frequency					Amp	Preamp Gain					Avg Lim	Average Field Strength Limit				
Dist	Distance to Antenna					D Corr	Distance Correct to 3 meters					Pk Lim	Peak Field Strength Limit				
Read	Analyzer Reading					Avg	Average Field Strength @ 3 m					Avg Mar	Margin vs. Average Limit				
AF	Antenna Factor					Peak	Calculated Peak Field Strength					Pk Mar	Margin vs. Peak Limit				
CL	Cable Loss					HPF	High Pass Filter										



## 8.2. RX ABOVE 1 GHz FOR 40 MHz BW IN THE 5.8 GHz BAND

**High Frequency Measurement**  
 Compliance Certification Services, 3 Meters\_C Chamber

Company: Proxim  
 Project #: 08U11852  
 Date: 6/2/2008  
 Test Engineer: Thanh Nguyen  
 Configuration: EUT , Dish 5GHz antenna  
 Mode: Receive mode a 40GHz.

**Test Equipment:**

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T60; S/N: 2238 @3m	T145 Agilent 3008A0050			RX RSS 210

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter	
	Thanh 187215003	Ninous 208946002			Peak Measurements RBW=VBW=1MHz Average Measurements RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fldr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
1.065	3.0	67.2	43.9	25.6	1.6	-36.1	0.0	0.0	58.3	35.0	74	54	-15.7	-19.0	Y
1.980	3.0	58.7	36.6	27.9	1.9	-35.4	0.0	0.0	53.0	30.9	74	54	-21.0	-23.1	Y
1.068	3.0	62.3	43.3	25.6	1.6	-36.1	0.0	0.0	53.4	34.4	74	54	-20.6	-19.6	H

**No other emissions were detected above system noise floor**

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

## **9. WORST-CASE BELOW 1 GHz**

### **SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION)**

#### **Dish Antenna**

No radiated emissions from the radio portion of the EUT were detected in the restricted bands of 15.205

## 10. AC POWER LINE CONDUCTED EMISSIONS

### LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

\*Decreases with the logarithm of the frequency.

### TEST PROCEDURE

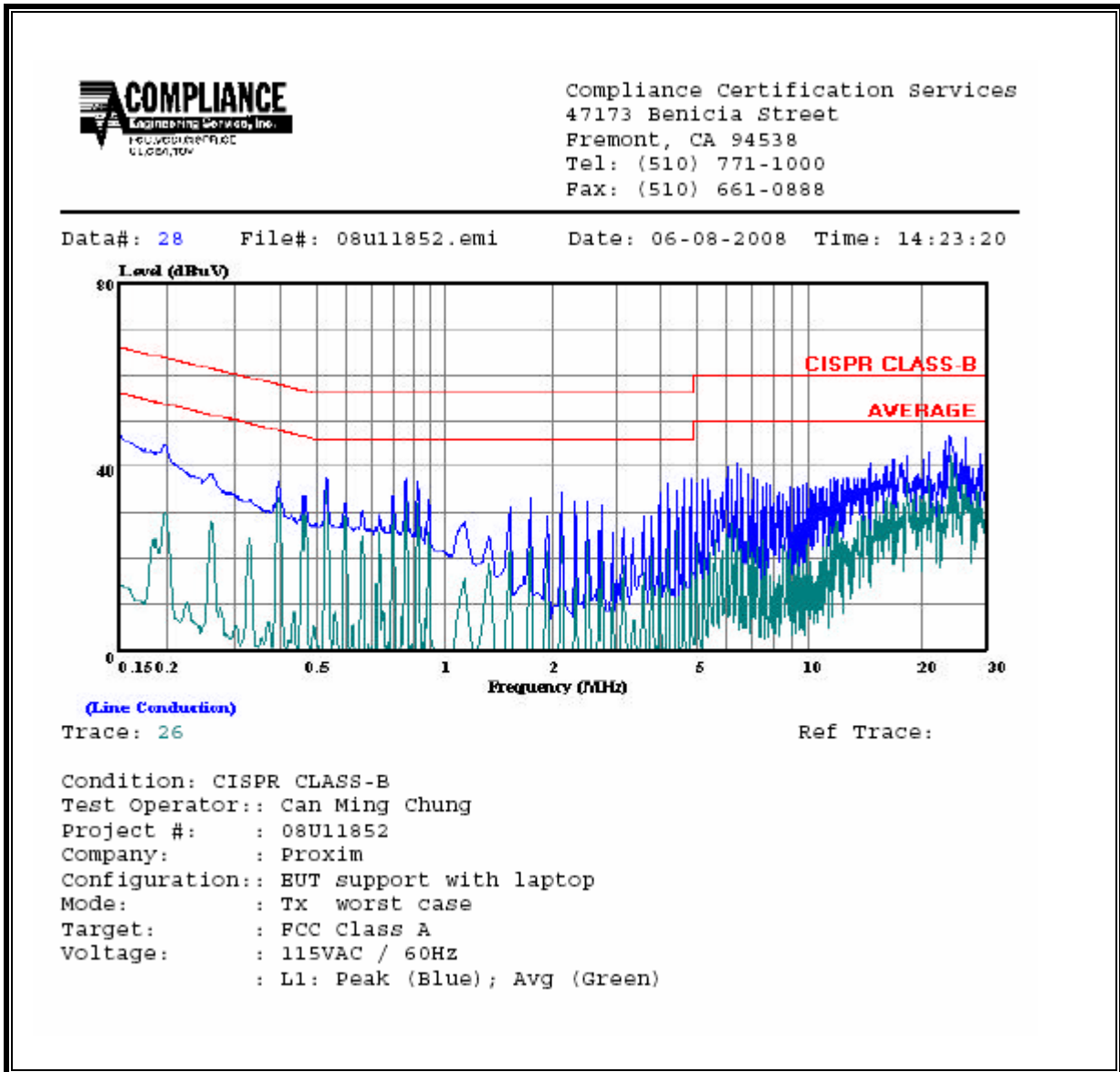
ANSI C63.4

**RESULTS**

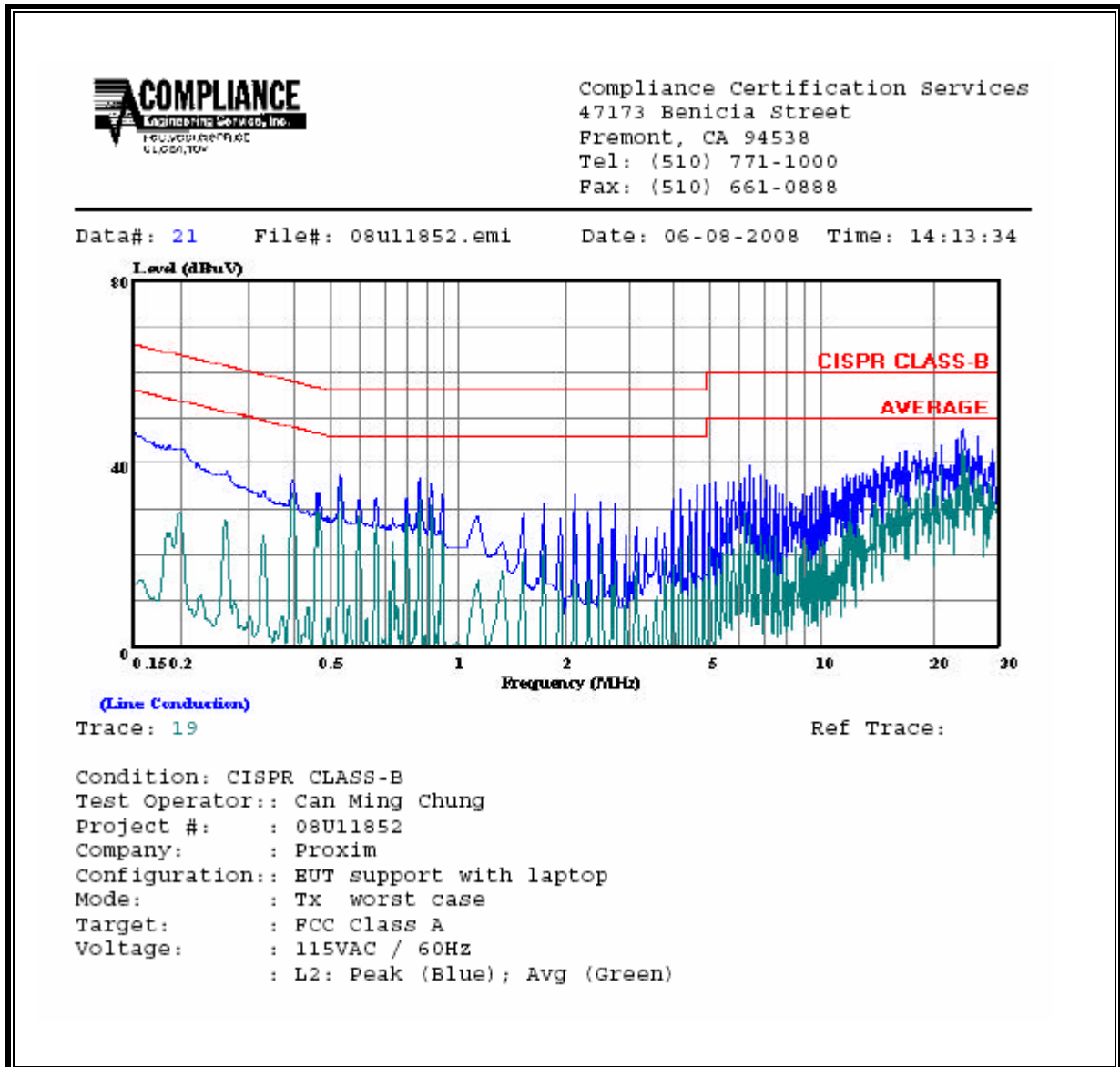
**6 WORST EMISSIONS**

CONDUCTED EMISSIONS DATA (115VAC 60Hz)										
Freq. (MHz)	Reading			Class (dB)	Limit QP	FCC A		Margin		Remark L1 / L2
	PK (dBuV)	QP (dBuV)	AV (dBuV)			AV	QP (dB)	AV (dB)		
0.16	45.93	--	29.24	0.00	79.00	66.00	-33.07	-36.76	L1	
6.52	39.34	--	31.00	0.00	73.00	60.00	-33.66	-29.00	L1	
24.27	46.93	--	41.59	0.00	73.00	60.00	-26.07	-18.41	L1	
0.20	44.64	--	30.07	0.00	79.00	66.00	-34.36	-35.93	L2	
6.15	39.72	--	34.44	0.00	73.00	60.00	-33.28	-25.56	L2	
24.27	45.86	--	40.94	0.00	73.00	60.00	-27.14	-19.06	L2	
6 Worst Data										

**LINE 1 RESULTS**



**LINE 2 RESULTS**



## 11. MAXIMUM PERMISSIBLE EXPOSURE

### FCC RULES

§1.1310 The criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0 .....	614	1.63	*(100)	6
3.0–30 .....	1842/f	4.89/f	*(900/f <sup>2</sup> )	6
30–300 .....	61.4	0.163	1.0	6
300–1500 .....	.....	.....	f/300	6
1500–100,000 .....	.....	.....	5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34 .....	614	1.63	*(100)	30
1.34–30 .....	824/f	2.19/f	*(180/f <sup>2</sup> )	30

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)—Continued

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
30–300 .....	27.5	0.073	0.2	30
300–1500 .....	.....	.....	f/1500	30
1500–100,000 .....	.....	.....	1.0	30

f = frequency in MHz

\* = Plane-wave equivalent power density

NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

**IC RULES**

IC Safety Code 6, Section 2.2.1 (a) A person other than an RF and microwave exposed worker shall not be exposed to electromagnetic radiation in a frequency band listed in Column 1 of Table 5, if the field strength exceeds the value given in Column 2 or 3 of Table 5, when averaged spatially and over time, or if the power density exceeds the value given in Column 4 of Table 5, when averaged spatially and over time.

**Table 5  
 Exposure Limits for Persons Not Classed As RF and Microwave Exposed Workers (Including the General Public)**

1 Frequency (MHz)	2 Electric Field Strength; rms (V/m)	3 Magnetic Field Strength; rms (A/m)	4 Power Density (W/m <sup>2</sup> )	5 Averaging Time (min)
0.003–1	280	2.19		6
1–10	280/ <i>f</i>	2.19/ <i>f</i>		6
10–30	28	2.19/ <i>f</i>		6
30–300	28	0.073	2*	6
300–1 500	1.585 <i>f</i> <sup>0.5</sup>	0.0042 <i>f</i> <sup>0.5</sup>	<i>f</i> /150	6
1 500–15 000	61.4	0.163	10	6
15 000–150 000	61.4	0.163	10	616 000 / <i>f</i> <sup>1.2</sup>
150 000–300 000	0.158 <i>f</i> <sup>0.5</sup>	4.21 x 10 <sup>-4</sup> <i>f</i> <sup>0.5</sup>	6.67 x 10 <sup>-5</sup> <i>f</i>	616 000 / <i>f</i> <sup>1.2</sup>

\* Power density limit is applicable at frequencies greater than 100 MHz.

- Notes:**
1. Frequency, *f*, is in MHz.
  2. A power density of 10 W/m<sup>2</sup> is equivalent to 1 mW/cm<sup>2</sup>.
  3. A magnetic field strength of 1 A/m corresponds to 1.257 microtesla (μT) or 12.57 milligauss (mG).



## **CALCULATIONS**

Given

$$E = \sqrt{(30 * P * G) / d}$$

and

$$S = E^2 / 3770$$

where

E = Field Strength in Volts/meter

P = Power in Watts

G = Numeric antenna gain

d = Distance in meters

S = Power Density in milliwatts/square centimeter

Combining equations, rearranging the terms to express the distance as a function of the remaining variables, changing to units of Power to mW and Distance to cm, and substituting the logarithmic form of power and gain yields:

$$d = 0.282 * 10^{((P + G) / 20)} / \sqrt{S}$$

where

d = MPE distance in cm

P = Power in dBm

G = Antenna Gain in dBi

S = Power Density Limit in mW/cm<sup>2</sup>

Rearranging terms to calculate the power density at a specific distance yields

$$S = 0.0795 * 10^{((P + G) / 10)} / (d^2)$$

The power density in units of mW/cm<sup>2</sup> is converted to units of W/m<sup>2</sup> by multiplying by a factor of 10.

**LIMITS**

From FCC §1.1310 Table 1 (B), the maximum value of S = 1.0 mW/cm<sup>2</sup>

From IC Safety Code 6, Section 2.2 Table 5 Column 4, S = 10 W/m<sup>2</sup>

**RESULTS**

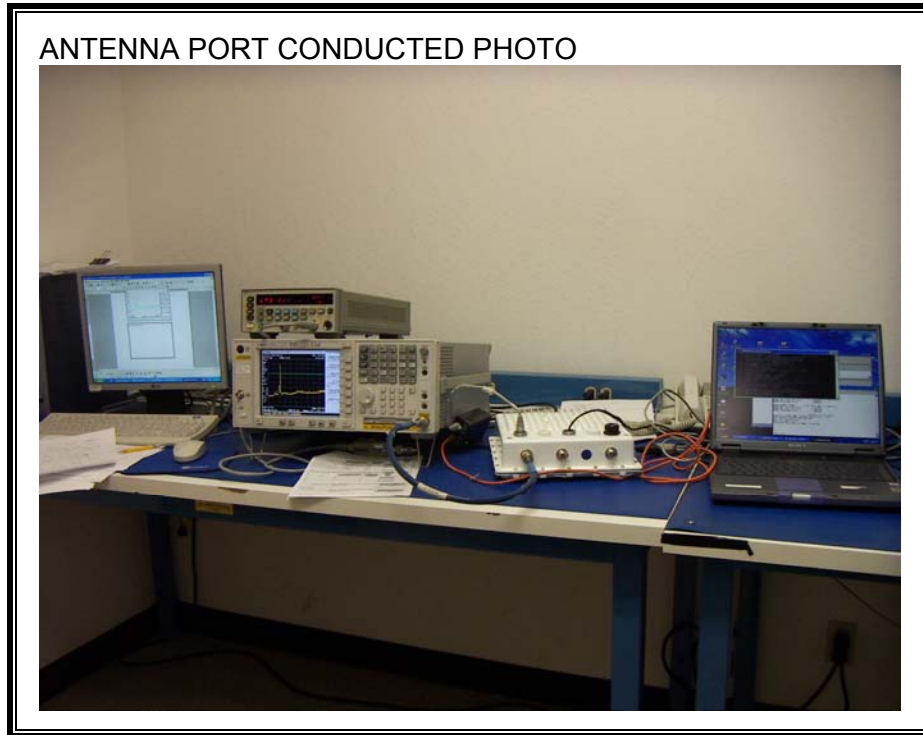
**For Dish Antenna with effective gain of 31.3 dBi:**

(MPE distance is greater than 20 cm)

Mode	Band	FCC Limit (mW/cm <sup>2</sup> )	IC Limit (W/m <sup>2</sup> )	Output (dBm)	Antenna (dBi)	MPE Distance (cm)
WLAN	5 GHz	1.0	10.0	28.10	31.30	263.18

## 12. SETUP PHOTOS

### ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP



**RADIATED RF MEASUREMENT SETUP**



RADIATED BACK PHOTO



**POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP**





**END OF REPORT**