FCC CFR47 PART 15 SUBPART E
CLASS II PERMISSIVE CHANGE TEST REPORT

FOR

WLAN MODULE WITH WCE (WIFI COVERAGE EXTENDER)

FOR DAS WITH CISCO 1242 ACCESS POINT

MODEL NUMBER: 860M with WCE

FCC ID: OJFMA860WCE

REPORT NUMBER: 07U11538-1

ISSUE DATE: FEBRUARY 15, 2008

Prepared for

MOBILE ACCESS NETWORKS
8391 OLD COURTHOUSE ROAD
VIENNA, VIRGINA 22182

Prepared by

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	01/11/08	Initial Issue	T. Chan

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	MOBILE ACCESS NETWORKS 8391 OLD COURTHOUSE ROAD VIENNA, VIRGINA 22182
EUT DESCRIPTION:	WLAN MODULE WITH WCE (WIFI COVERAGE EXTENDER) FOR DAS WITH CISC 1242 ACCESS POINT
MODEL:	860M with WCE
SERIAL NUMBER:	860M S/N: 0740007; WCE S/N: 0646908
DATE TESTED:	JAN 02-06, 2008

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart E	No Non-Compliance Noted

Compliance Certification Services, Inc. tested the above equipment in accordance with the requirements set forth in the above standards. 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 Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services 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:

THU CHAN
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, and FCC MO&O 06-96.

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
Radiated Emission, 30 to 200 MHz	+/- 3.3 dB
Radiated Emission, 200 to 1000 MHz	+4.5 / -2.9 dB
Radiated Emission, 1000 to 2000 MHz	+4.5 / -2.9 dB
Power Line Conducted Emission	+/- 2.9 dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a WLAN Module with WCE (WiFi Coverage Extender) for DAS with Cisco 1242 Access Point, enable 802.11a/b/g Wi-Fi signals transceiver.

The radio module is manufactured by MobileAccess Networks.

5.2. DESCRIPTION OF CLASS II PERMISSIVE CHANGE

Add additional UNII Band II upper 5.2GHz and Band III 5.6GHz in the original report which is grant by February 12, 2008.

5.3. MAXIMUM OUTPUT POWER

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

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5180 - 5240	802.11a	13.00	19.95
5260 - 5320	802.11a	17.98	62.81
5500 - 5700	802.11a	17.32	53.95

5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a Patch antenna, with a maximum gain of 5 dBi.

5.5. SOFTWARE AND FIRMWARE

The test utility software used during testing was Tera Term Professional, Version 4.56.

5.6. WORST-CASE CONFIGURATION AND MODE

The worst-case channel is determined as the channel with the highest output power.

5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
AP	CISCO	Aronet 1200	FTX1038B39L	LDK102056
AC/DC adapter	Delta Elect. Inc	ADP-18-PB	PZT0651811543	N/A
AC/DC adapter	Mean Well	PSU40A-8	EJ202624-0457	N/A

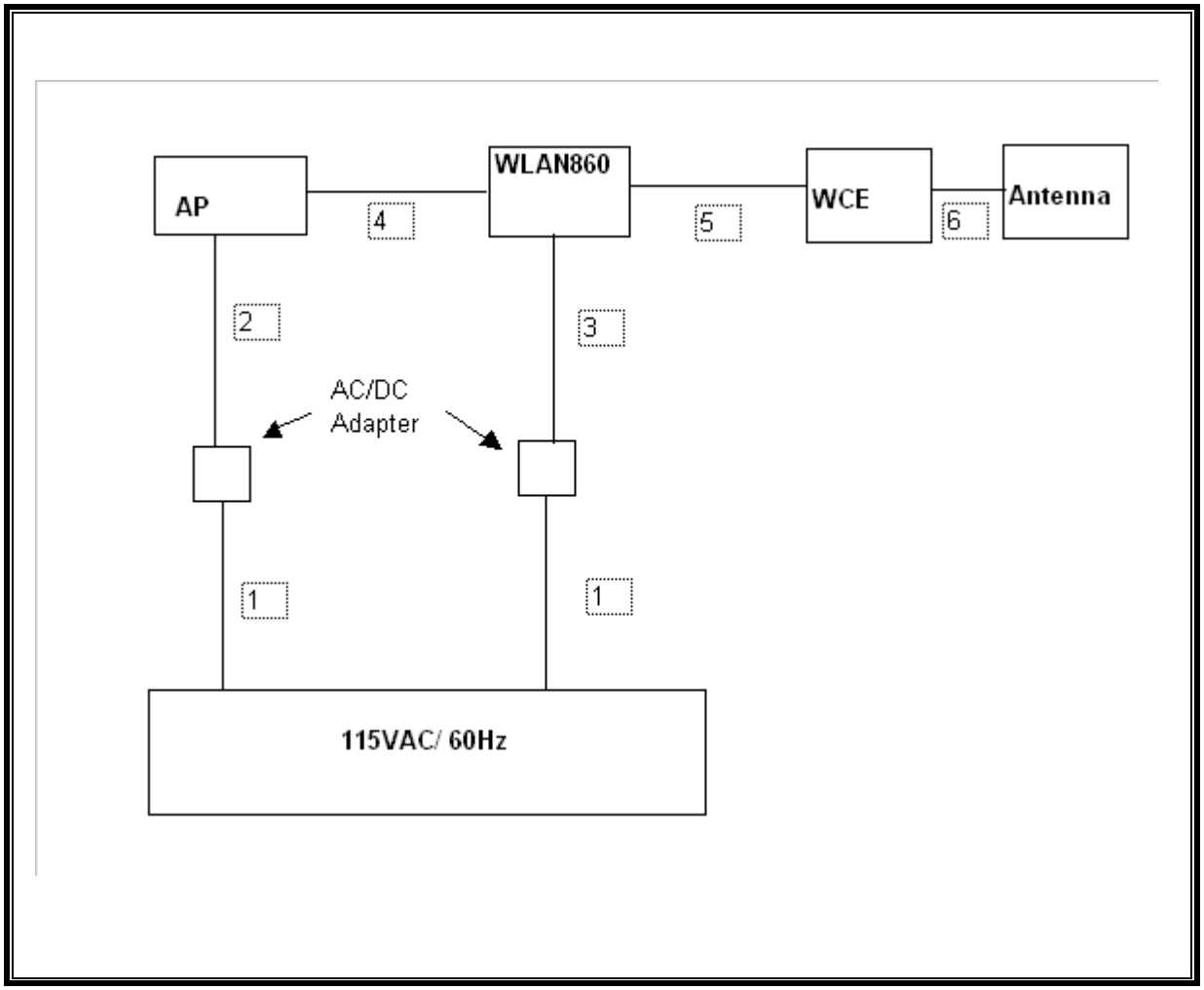
I/O CABLES

I/O CABLE LIST						
Cable No.	**Port**	**# of Identica Ports**	**Connector Type**	**Cable Type**	**Cable Length**	**Remarks**
1	AC	2	US 115V	Un-shielded	1.5m	N/A
2	DC	1	DC plug	Un-shielded	2m	Ferrite bead at AP end
3	DC	1	4 Pin	26AWG	2m	N/A
4	BNC	1	SMA	Shielded	.6m	Patch type N RP SMA
5	BNC	1	N type	Shielded	1m	Type N to N
6	BNC	1	N type	Shielded	.3m	Type N to N

TEST SETUP

The EUT WLAN Module 860 is connected in a wireless Access Point CISCO AIRONET 1200 and Wifi Coverage Expender (WCE) during the tests. Test software exercised the radio card.

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST					
Description	**Manufacturer**	**Model**	**Asset**	**Cal Date**	**Cal Due**
Quasi-Peak Adaptor	Agilent / HP	85650A	3145A01654	1/21/2007	1/21/2008
SA Display Section 2	Agilent / HP	85662A	2816A16696	4/7/2007	4/7/2008
SA RF Section, 1.5 GHz	Agilent / HP	85680B	2814A04227	1/7/2007	1/7/2008
Preamplifier, 1300 MHz	Agilent / HP	8447D	1937A02062	5/9/2007	5/9/2008
Antenna, Bilog 30 MHz ~ 2 Ghz	Sunol Sciences	JB1	A121003	8/13/2007	8/13/2008
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	6717	4/15/2007	4/15/2008
Preamplifier, 1 ~ 26.5 GHz	Agilent / HP	8449B	3008A00561	10/3/2007	10/3/2008
Spectrum Analyzer 3 Hz ~ 44 GHz	Agilent / HP	E4446A	US42070220	11/26/2007	11/26/2008
LISN, 10 kHz ~ 30 MHz	FCC	LISN-50/250-25-2	2023	9/15/2007	9/15/2008
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BNC	8379443	9/15/2007	9/15/2008
EMI Test Receiver	R & S	ESHS 20	827129/006	1/27/2008	1/27/2008
Peak / Average Power Sensor	Agilent	E9327A	US40440755	12/2/2007	12/2/2008
Peak Power Meter	Agilent / HP	E4416A	GB41291160	12/2/2007	12/2/2008

7. ANTENNA PORT TEST RESULTS

7.1. 802.11a MODE IN THE UPPER 5.2 GHz BAND

7.1.1. 26 dB and 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

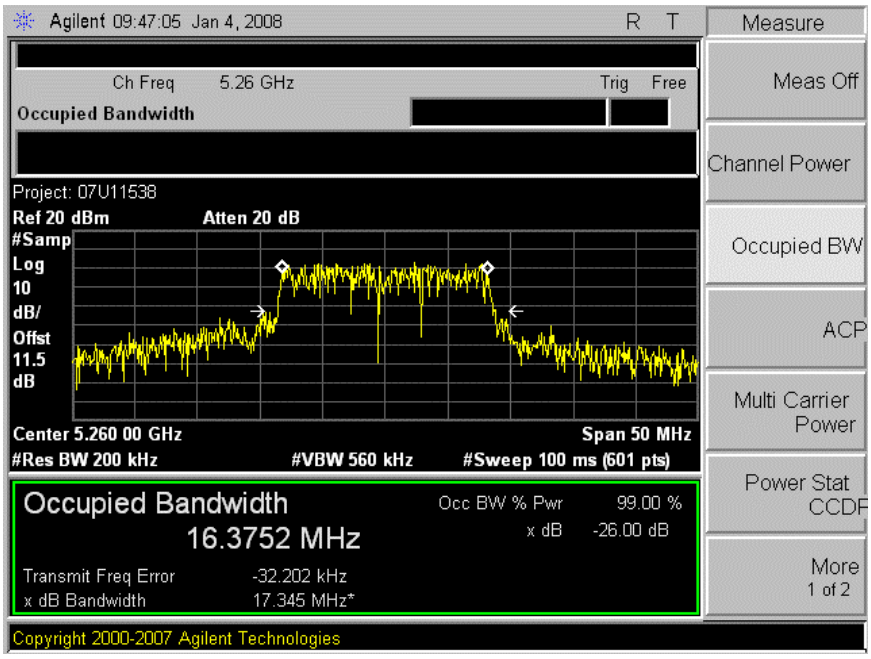
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

RESULTS

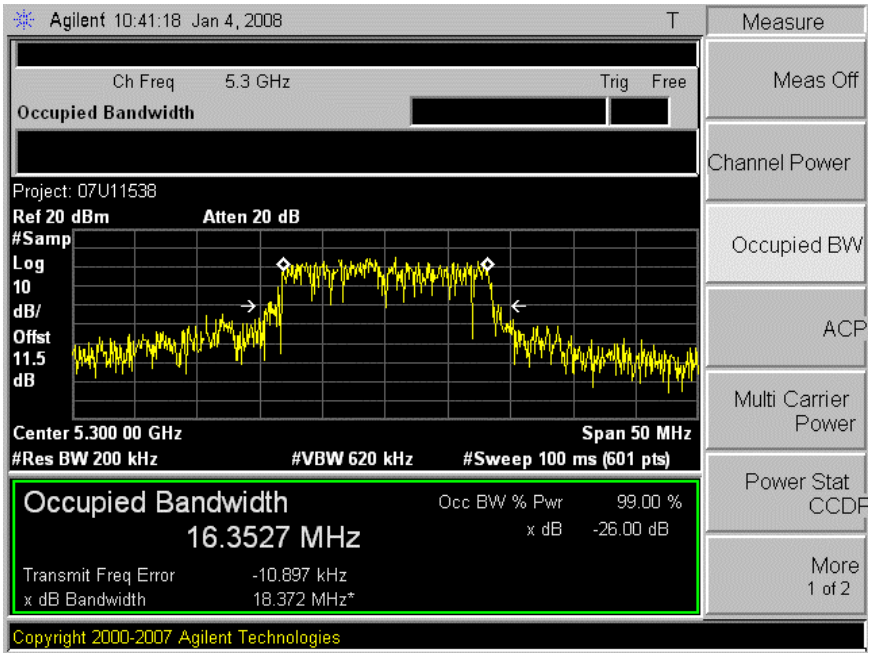
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5260	17.345	16.3752
Middle	5300	18.372	16.3527
High	5320	17.337	16.27

26 dB and 99% BANDWIDTH

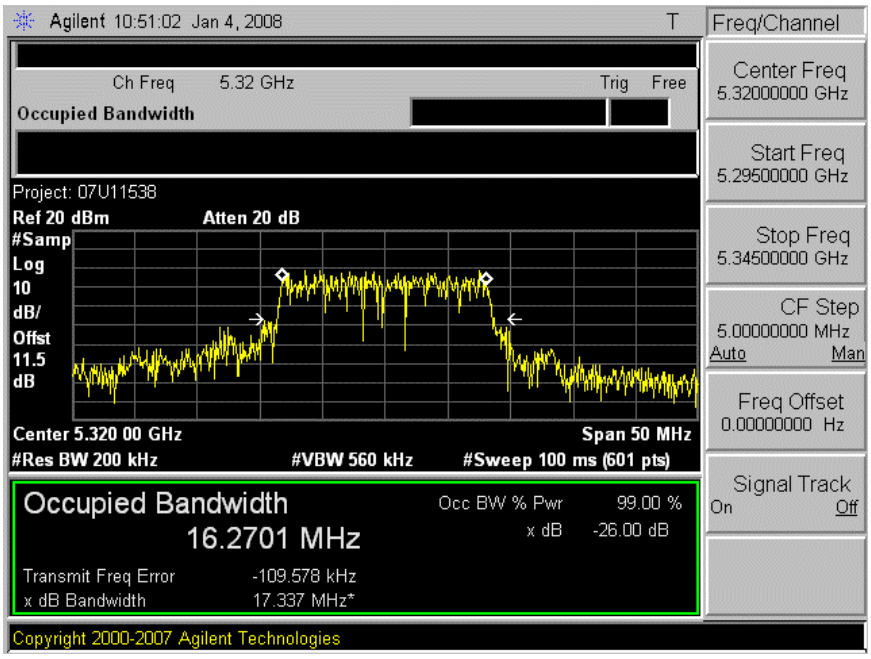
BANDWIDTH LOW CH



BANDWIDTH MID CH



BANDWIDTH HIGH CH



7.1.2. OUTPUT POWER

LIMITS

FCC §15.407 (a) (2)

For the 5.25-5.35 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26-dB emission bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

The transmitter output operates continuously therefore Method # 1 is used.

RESULTS

Limit

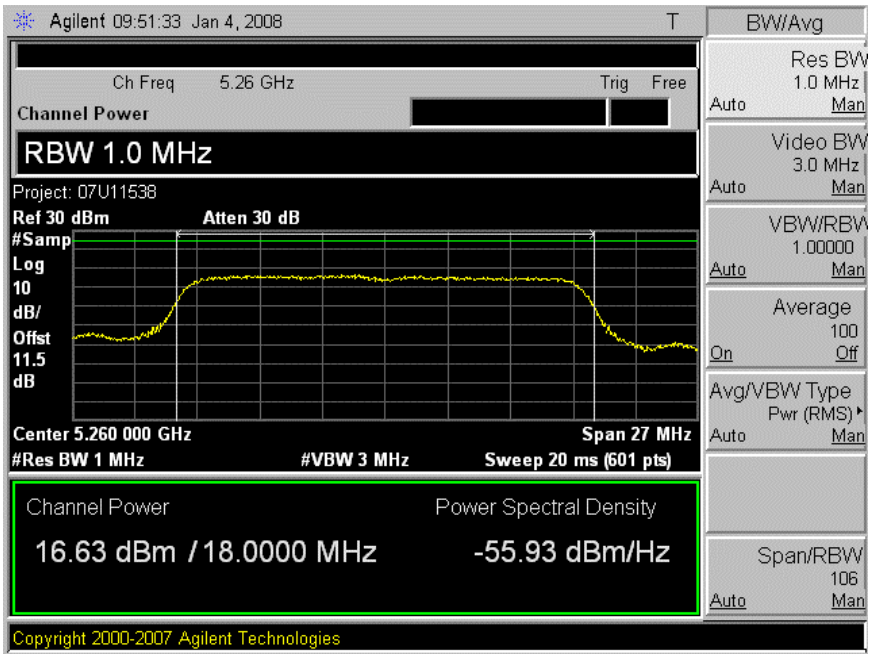
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5260	24	17.345	23.39	5.00	23.39
Mid	5300	24	18.372	23.64	5.00	23.64
High	5320	24	17.337	23.39	5.00	23.39

Results

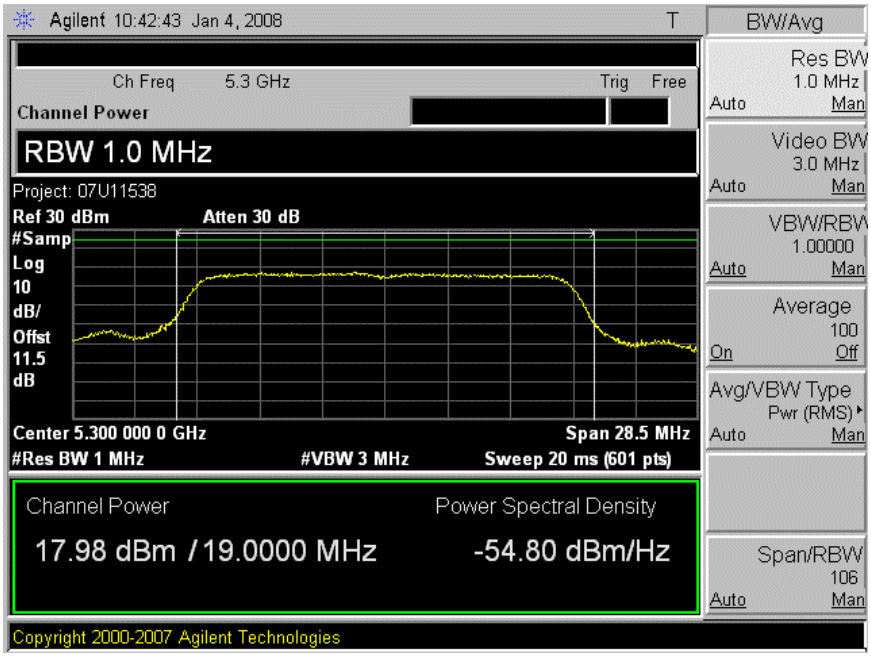
Channel	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)
Low	5280	16.63	23.39	-6.76
Mid	5300	17.98	23.64	-5.66
High	5320	11.85	23.39	-11.54

OUTPUT POWER

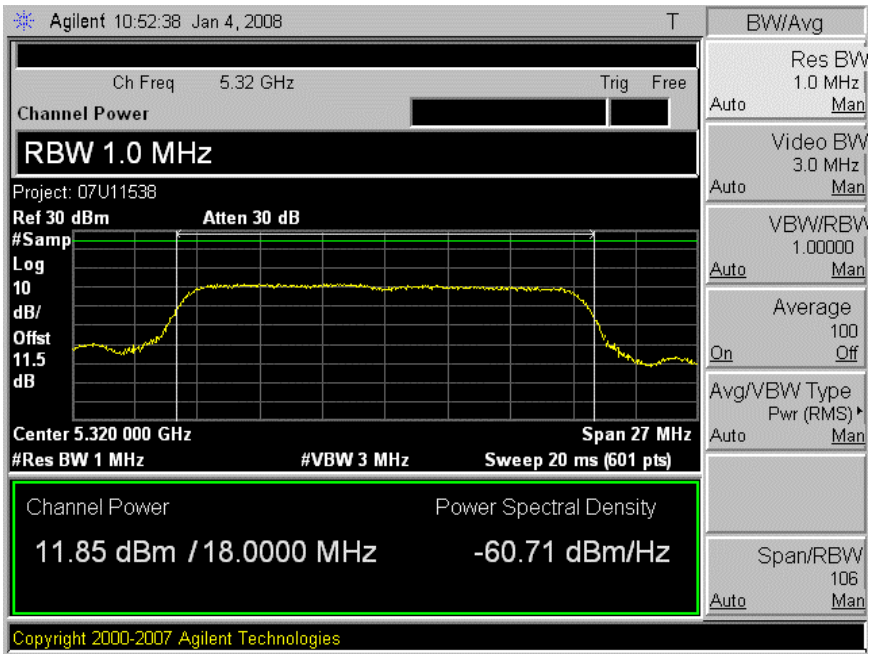
OUTPUT POWER LOW CH



OUTPUT POWER MID CH



OUTPUT POWER HIGH CH



7.1.3. 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 10.5 dB (including 10 dB pad and.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Power (dBm)
Low	5280	15.65
Middle	5300	17.05
High	5320	11.10

PEAK POWER SPECTRAL DENSITY

LIMITS

FCC §15.407 (a) (2)

For the 5.25–5.35 GHz band, the peak power spectral density shall not exceed 11 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 11 dBm.

TEST PROCEDURE

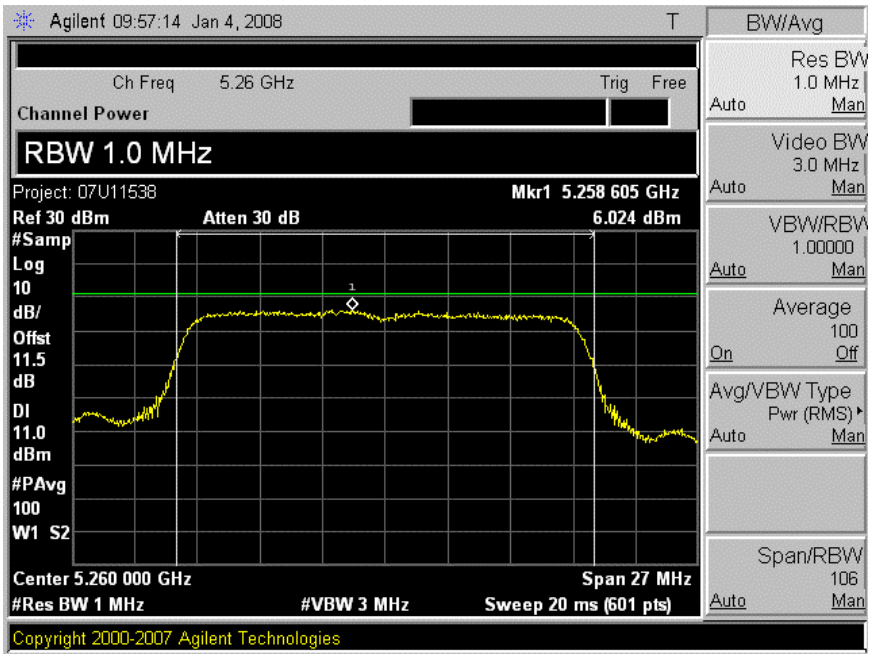
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

RESULTS

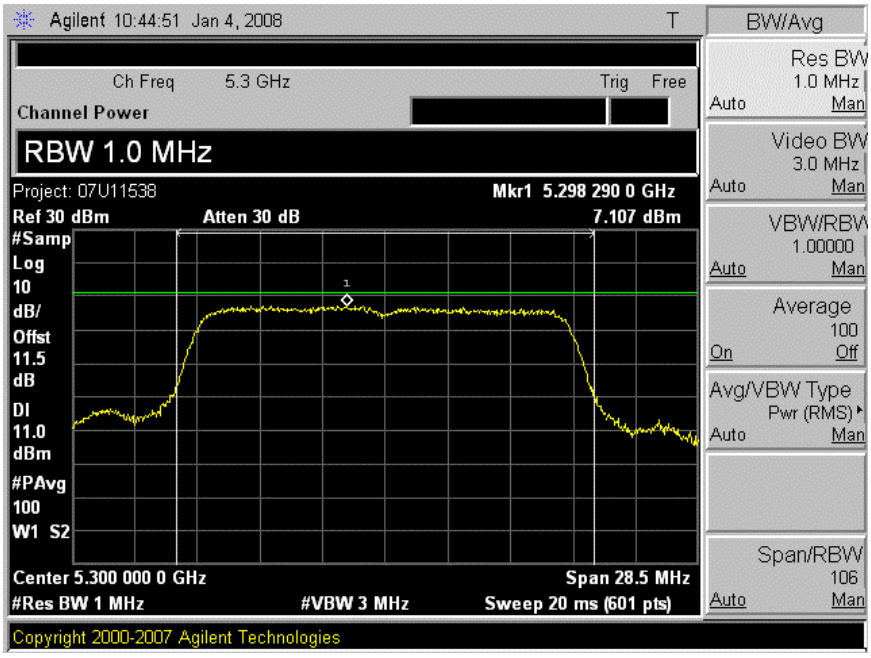
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5260	6.02	11	-4.98
Middle	5300	7.11	11	-3.89
High	5320	2.16	11	-8.84

POWER SPECTRAL DENSITY

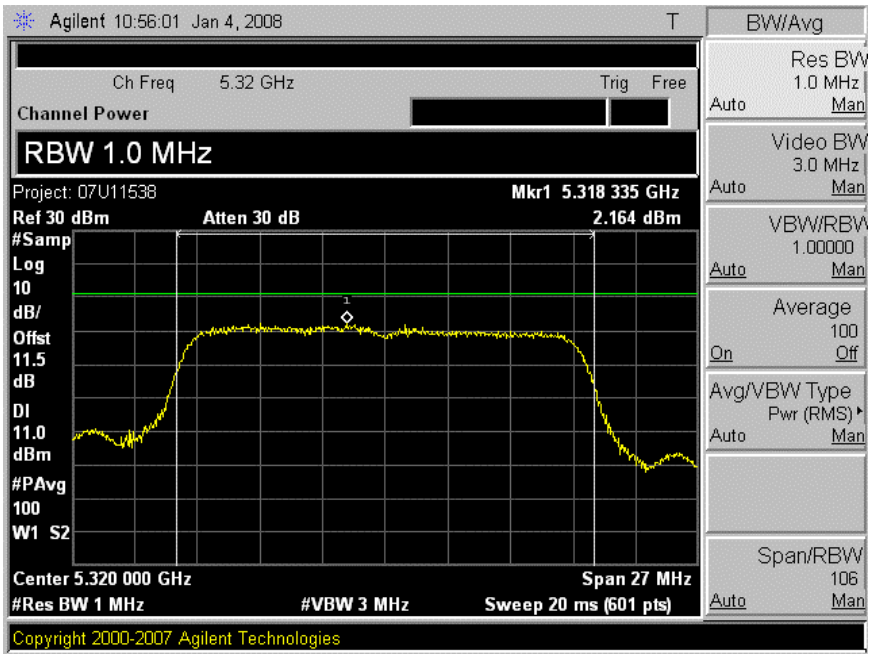
PSD LOW CH



PSD MID CH



PSD HIGH CH



7.1.5. PEAK EXCURSION

LIMITS

FCC §15.407 (a) (6)

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

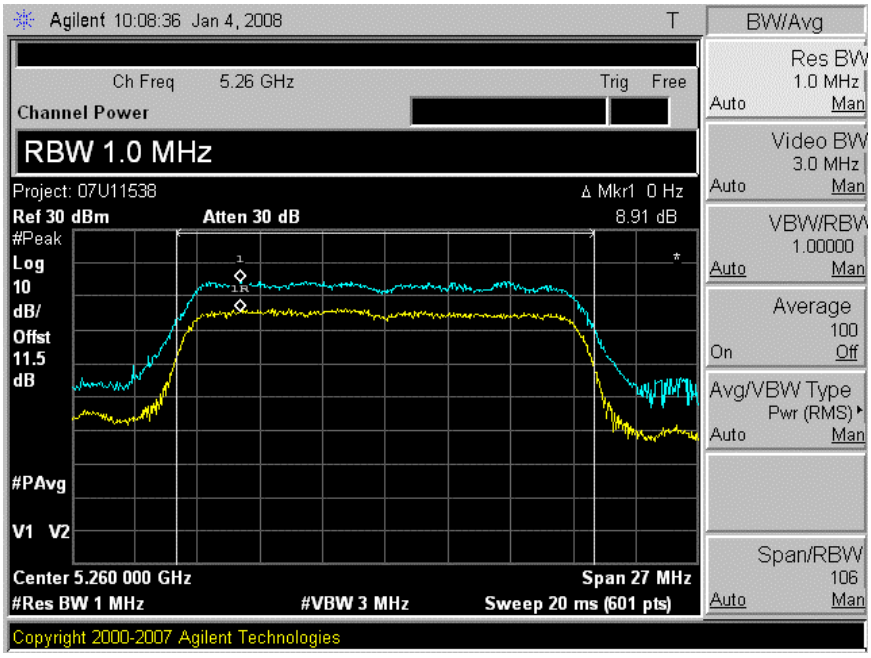
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

RESULTS

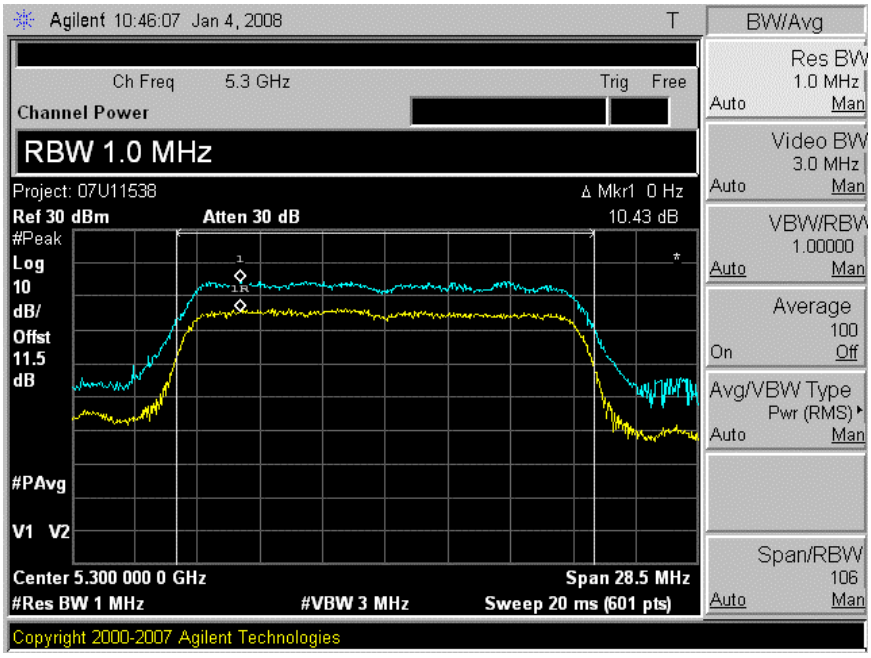
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5280	8.91	13	-4.09
Middle	5300	10.43	13	-2.57
High	5320	9.09	13	-3.91

PEAK EXCURSION

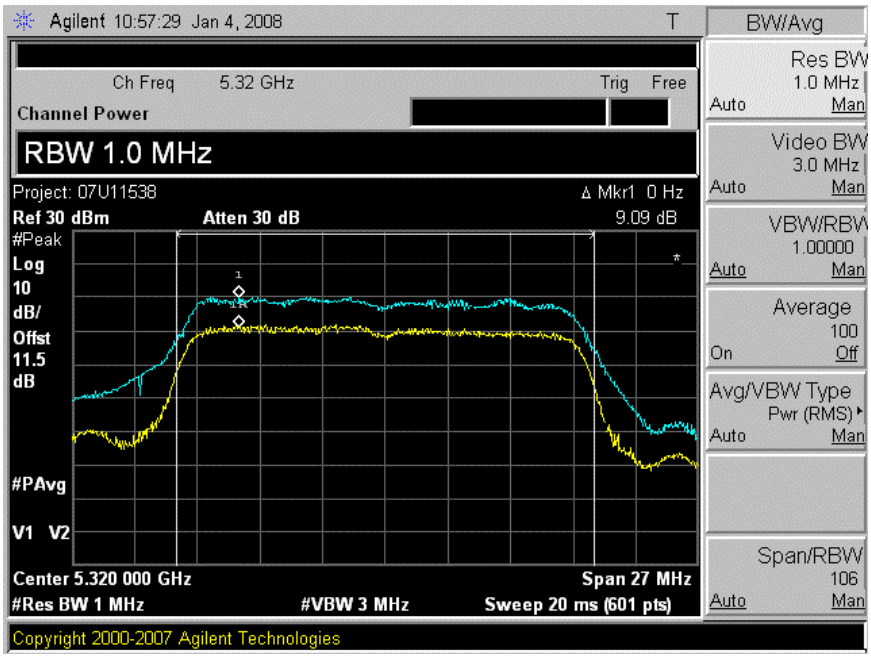
PEAK EXCURSION LOW CH



PEAK EXCURSION MID CH



PEAK EXCURSION HIGH CH



7.1.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.407 (b) (2)

For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.25-5.35 GHz band shall not exceed an EIRP of -27 dBm / MHz.

Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band.

TEST PROCEDURE

Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

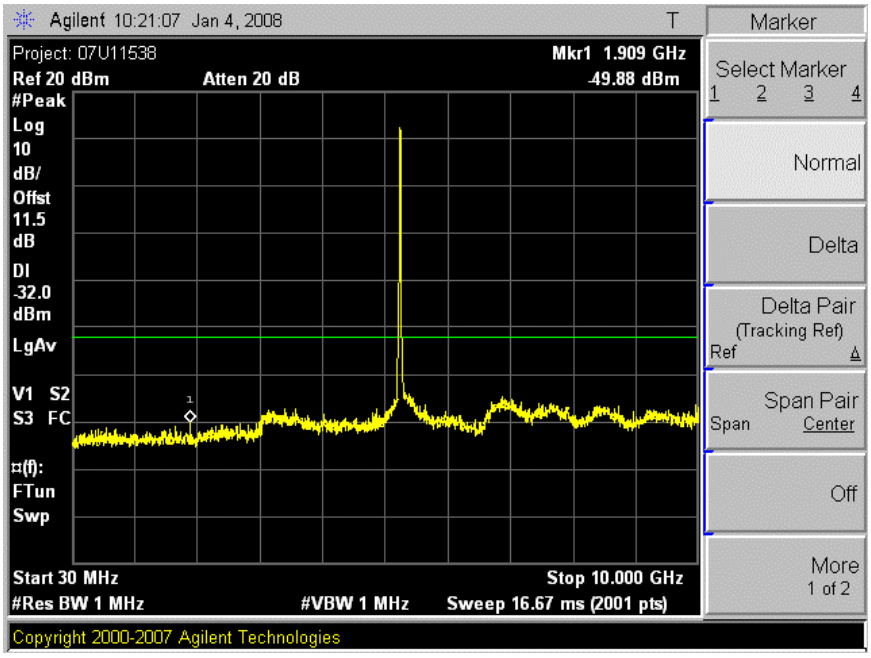
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to the average EIRP limit, adjusted for the maximum antenna gain. If necessary, additional average detection measurements are made.

Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

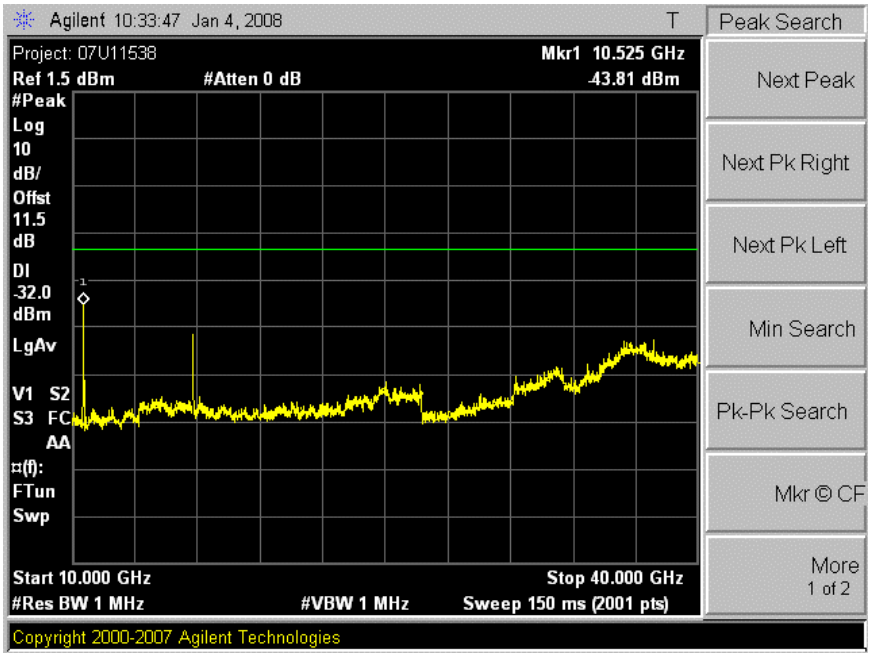
RESULTS

SPURIOUS EMISSIONS

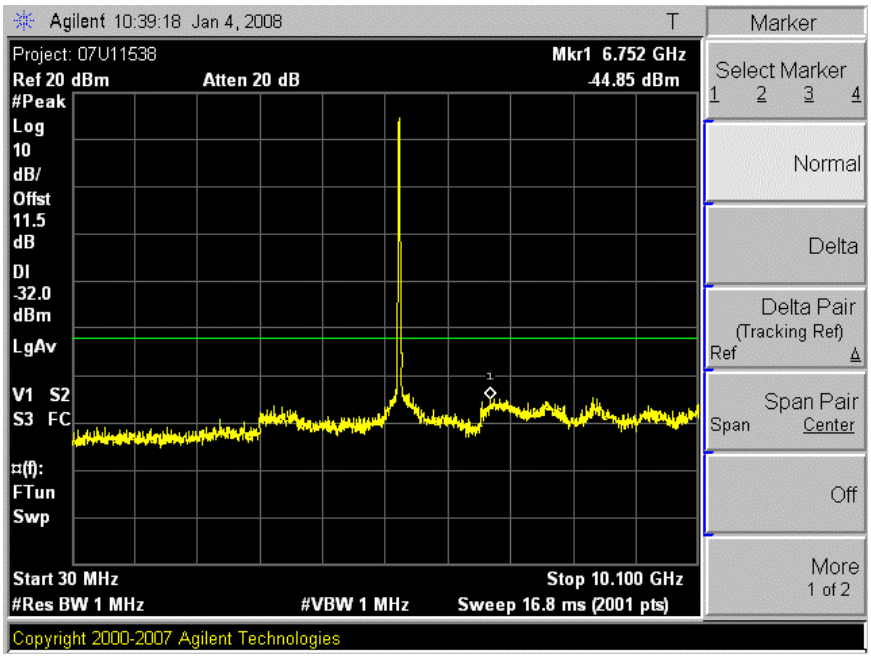
LOW CHANNEL SPURIOUS



LOW CHANNEL SPURIOUS

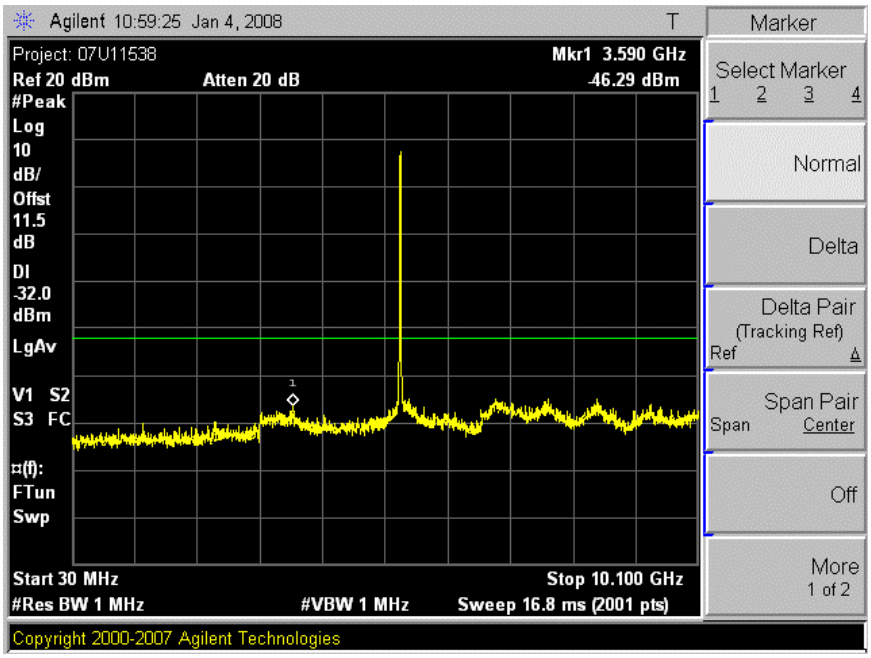


MID CHANNEL SPURIOUS

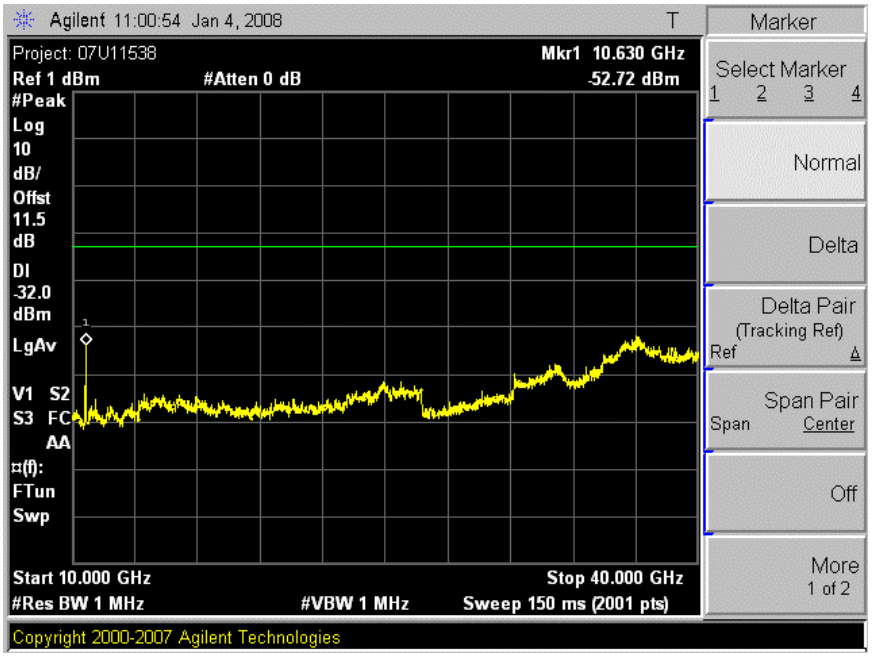


MID CHANNEL SPURIOUS

HIGH CHANNEL SPURIOUS



HIGH CHANNEL SPURIOUS



7.2. 802.11a MODE IN THE 5.6 GHz BAND

7.2.1. 26 dB and 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

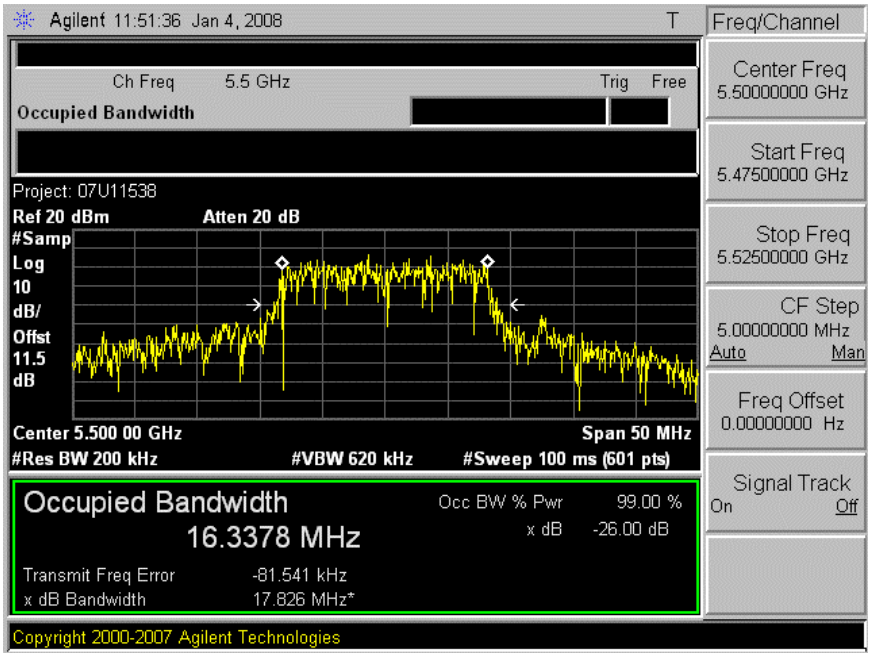
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

RESULTS

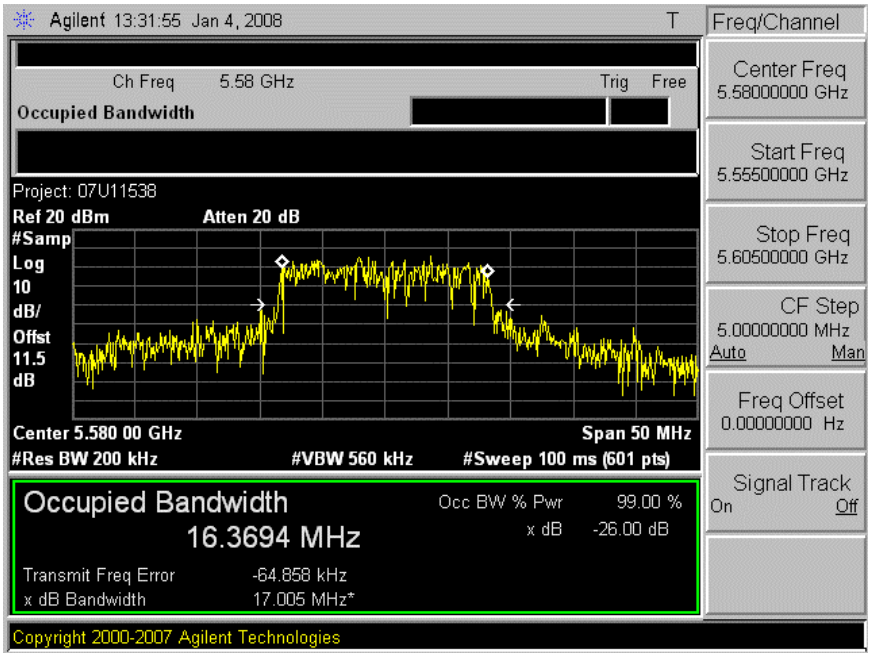
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5500	17.826	16.338
Middle	5580	17.005	16.369
High	5700	17.585	16.435

26 dB and 99% BANDWIDTH

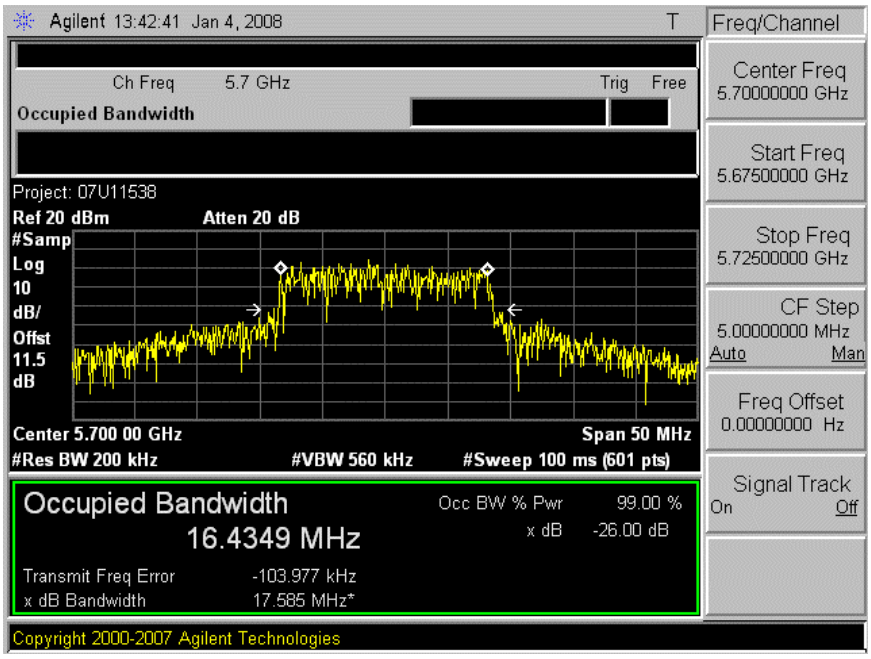
BANDWIDTH LOW CH



BANDWIDTH MID CH



BANDWIDTH HIGH CH



7.2.2. OUTPUT POWER

LIMITS

FCC §15.407 (a) (2)

For the 5.47-5.725 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26-dB emission bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

The transmitter output operates continuously therefore Method # 1 is used.

RESULTS

Limit

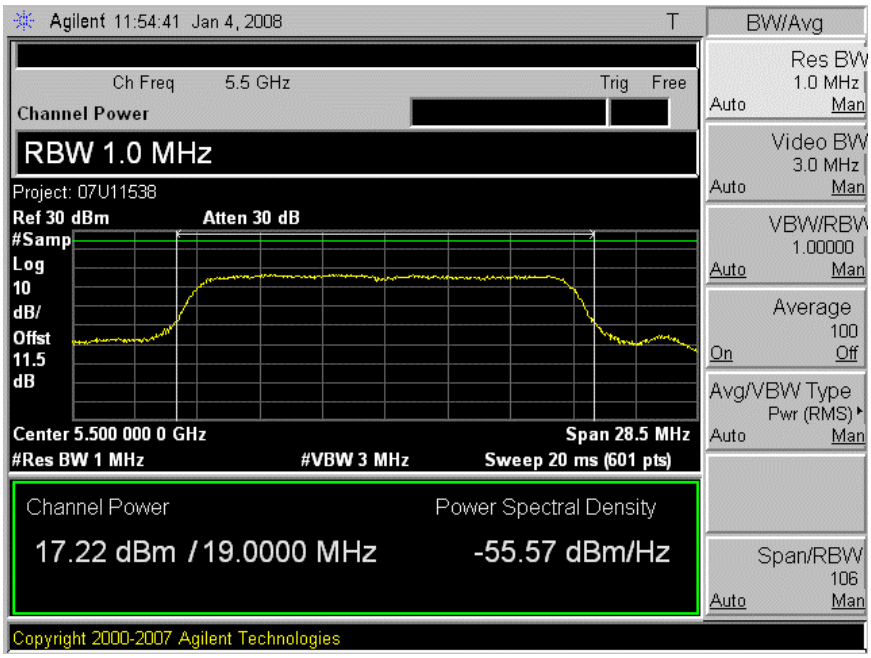
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5500	24	17.826	23.51	5.00	23.51
Mid	5580	24	17.005	23.31	5.00	23.31
High	5700	24	17.585	23.45	5.00	23.45

Results

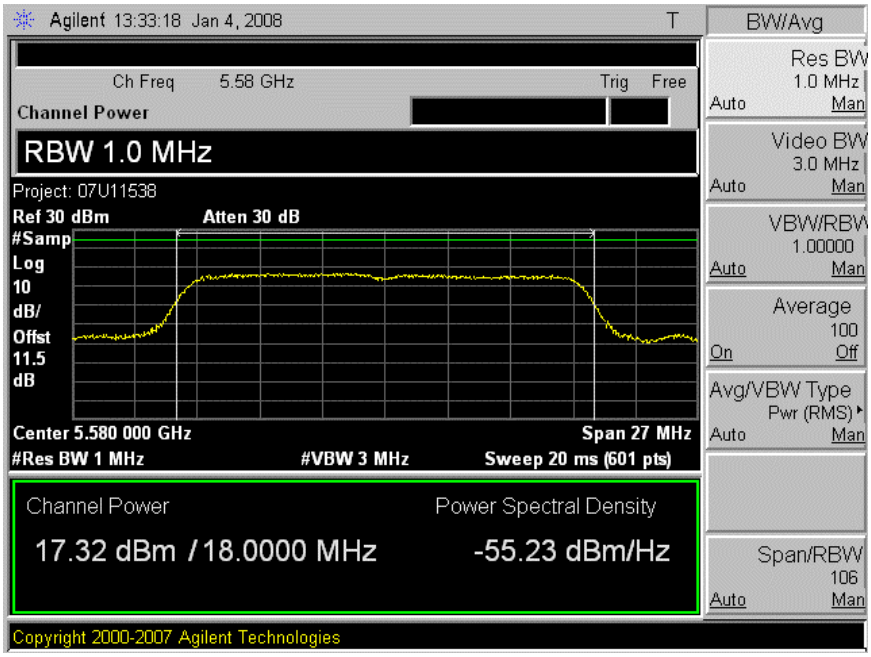
Channel	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)
Low	5500	17.22	23.51	-6.29
Mid	5580	17.32	23.31	-5.99
High	5700	15.36	23.45	-8.09

OUTPUT POWER

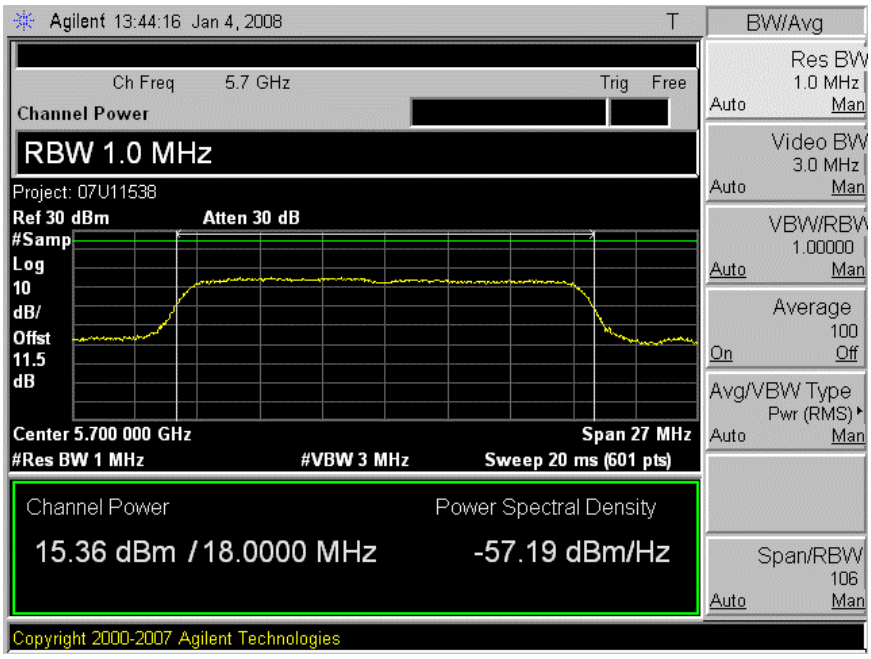
OUTPUT POWER LOW CH



OUTPUT POWER MID CH



OUTPUT POWER HIGH CH



7.2.3. 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 10.5dB (including 10 dB pad and .5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Power (dBm)
Low	5500	16.53
Middle	5580	16.83
High	5700	14.80

7.2.4. PEAK POWER SPECTRAL DENSITY

LIMITS

FCC §15.407 (a) (2)

For the 5.47-5.725 GHz band, the peak power spectral density shall not exceed 11 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 11 dBm.

TEST PROCEDURE

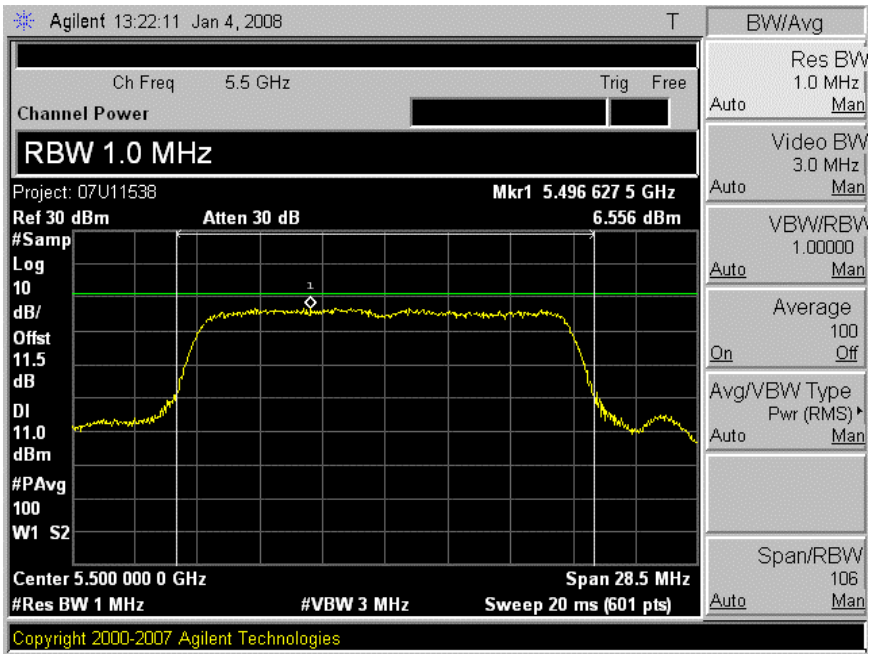
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

RESULTS

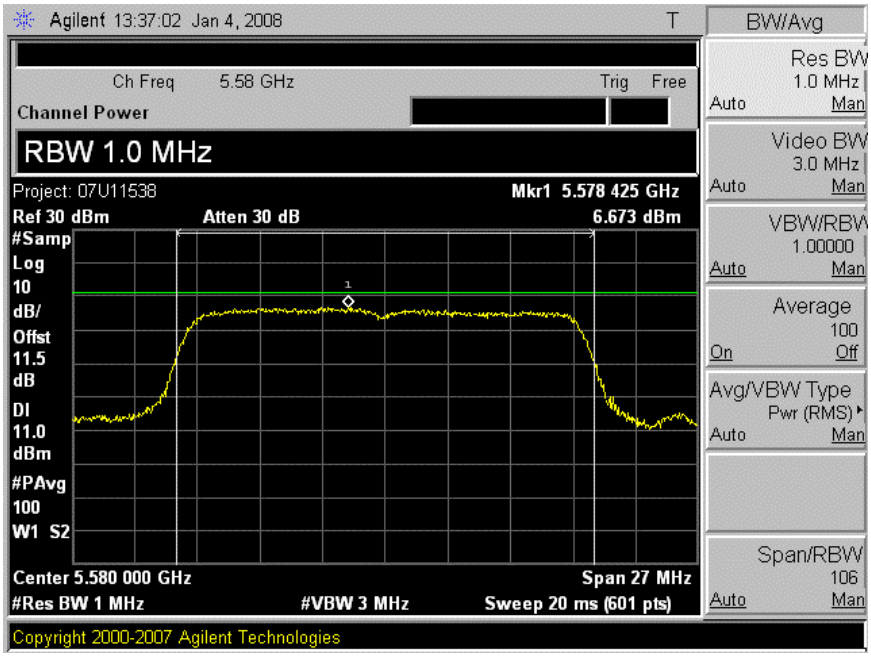
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5500	6.56	11	-4.44
Middle	5580	6.67	11	-4.33
High	5700	4.82	11	-6.18

POWER SPECTRAL DENSITY

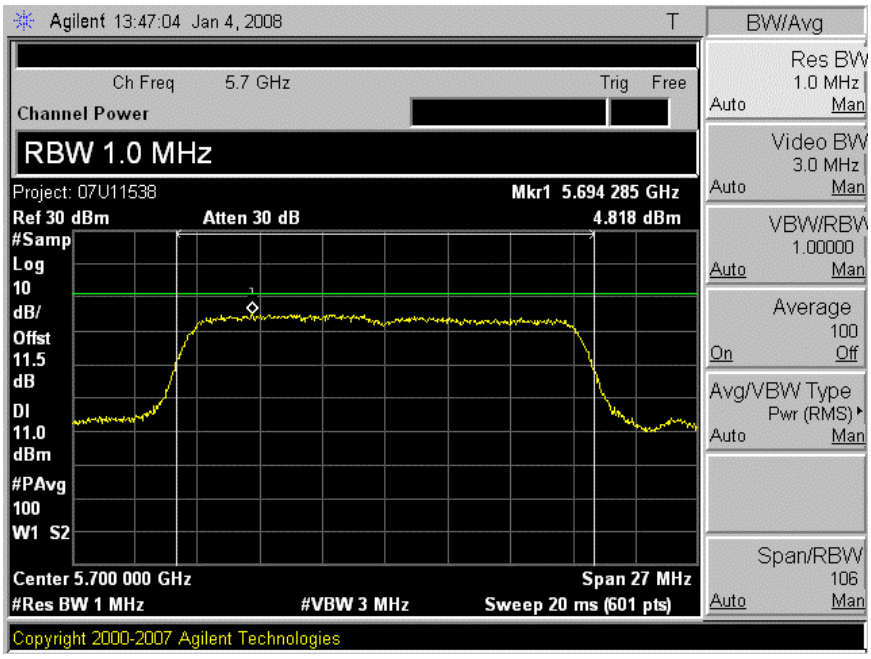
PSD LOW CH



PSD MID CH



PSD HIGH CH



7.2.5. PEAK EXCURSION

LIMITS

FCC §15.407 (a) (6)

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

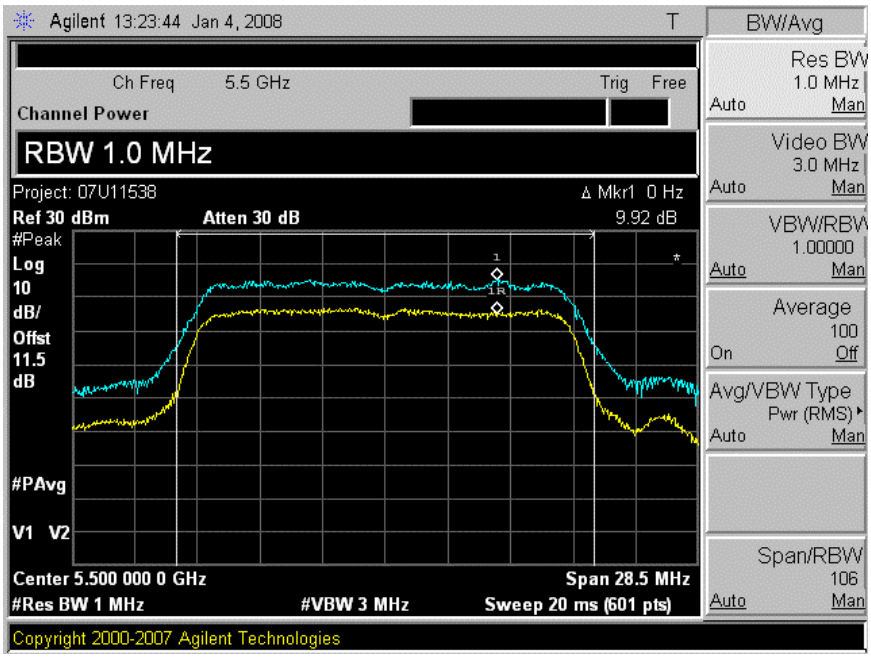
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

RESULTS

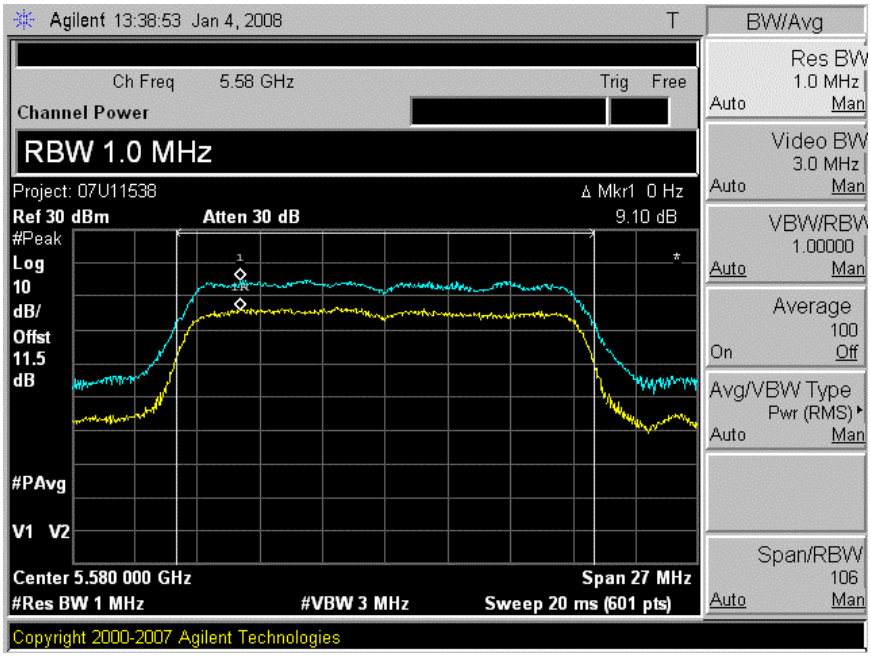
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5500	9.92	13	-3.08
Middle	5580	9.10	13	-3.90
High	5700	10.62	13	-2.38

PEAK EXCURSION

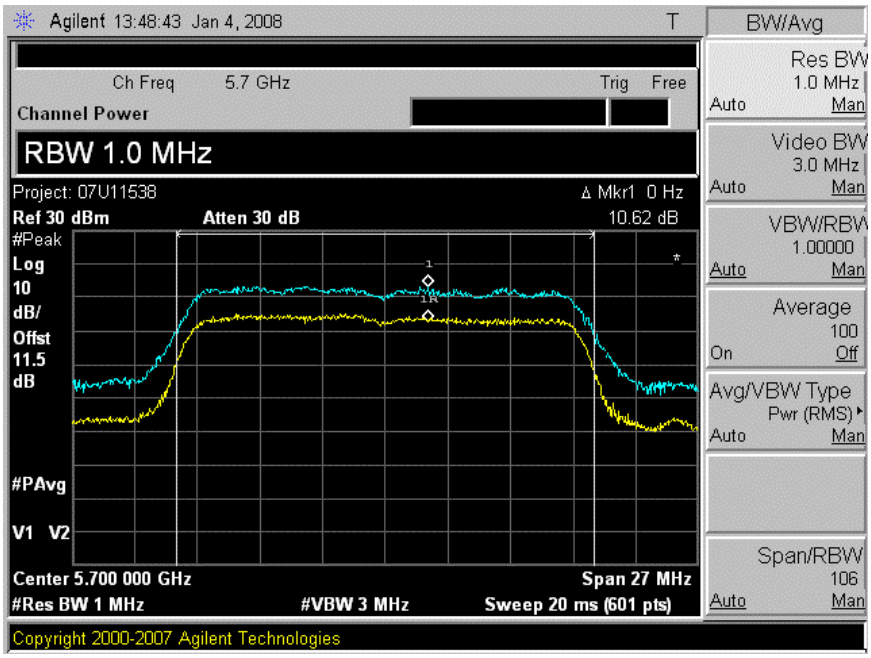
PEAK EXCURSION LOW CH



PEAK EXCURSION MID CH



PEAK EXCURSION HIGH CH



7.2.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.407 (b) (3)

For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of -27 dBm / MHz.

TEST PROCEDURE

Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

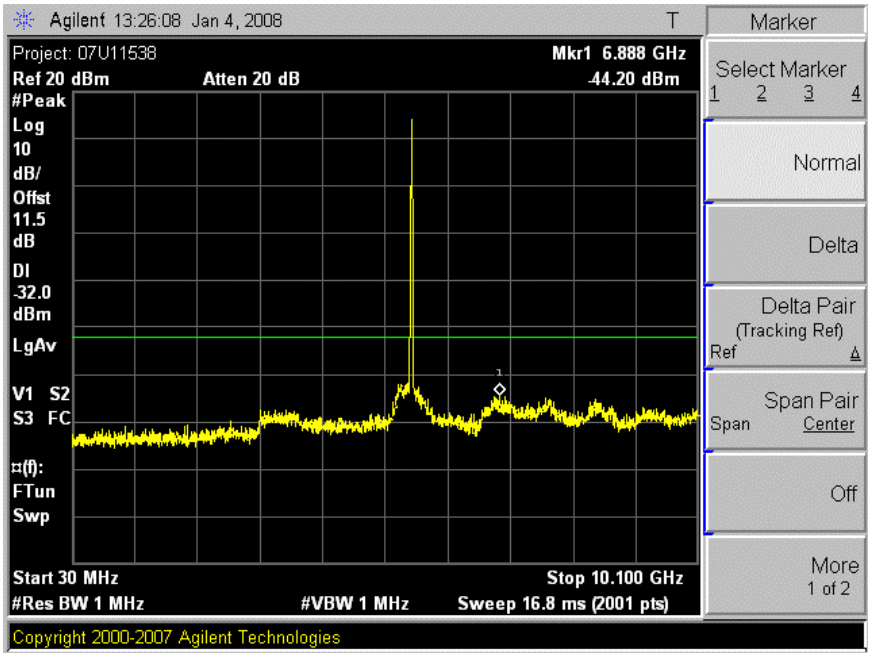
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to the average EIRP limit, adjusted for the maximum antenna gain. If necessary, additional average detection measurements are made.

Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

RESULTS

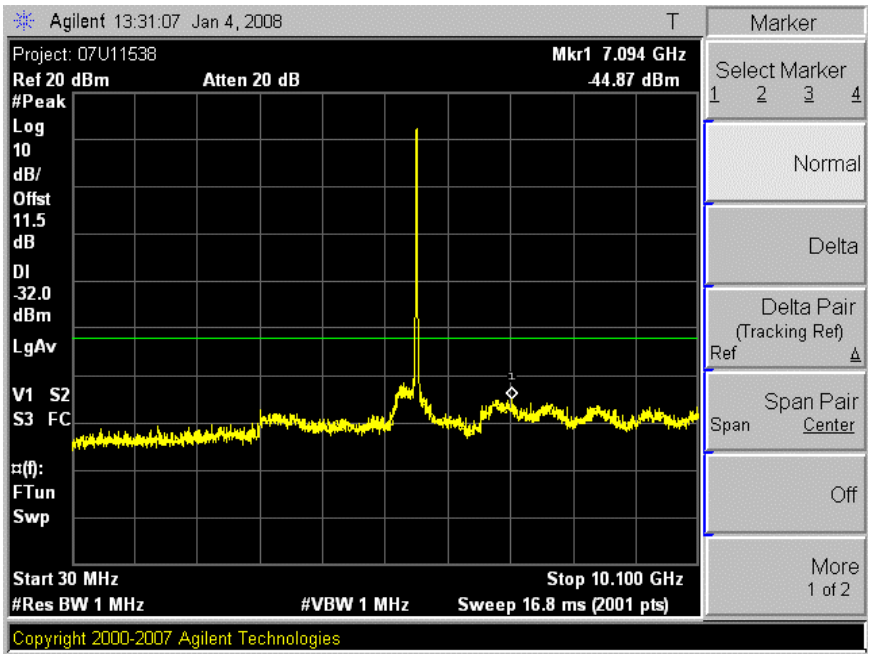
SPURIOUS EMISSIONS

LOW CHANNEL SPURIOUS



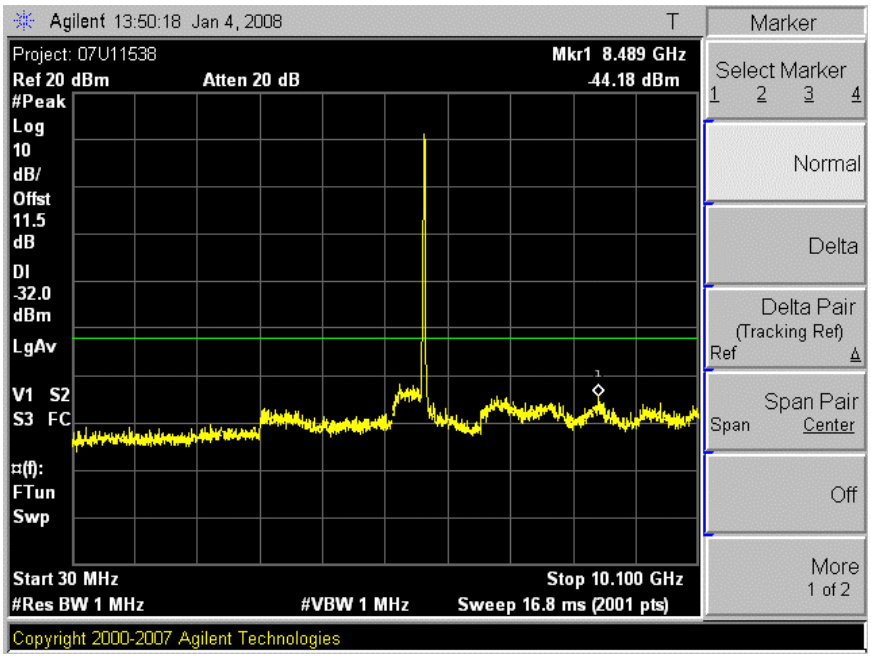
LOW CHANNEL SPURIOUS

MID CHANNEL SPURIOUS



MID CHANNEL SPURIOUS

HIGH CHANNEL SPURIOUS



HIGH CHANNEL SPURIOUS

8. RADIATED TEST RESULTS

8.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

8.2. TRANSMITTER ABOVE 1 GHz

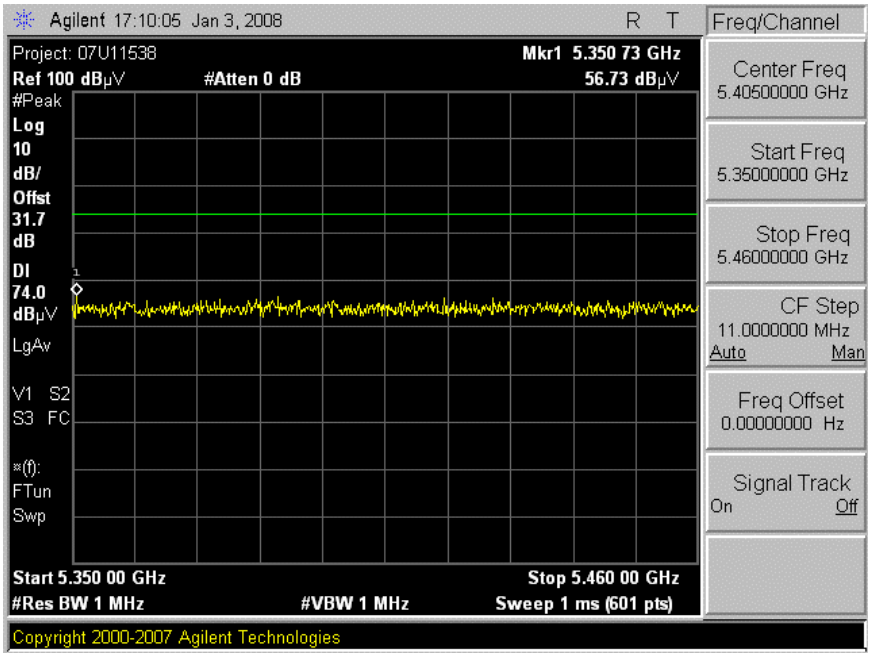
8.2.1. TRANSMITTER ABOVE 1 GHz FOR 802.11a MODE IN THE UPPER 5.2 GHz BAND

AUTHORIZED BANDEDGE (LOW CHANNEL, HORIZONTAL):

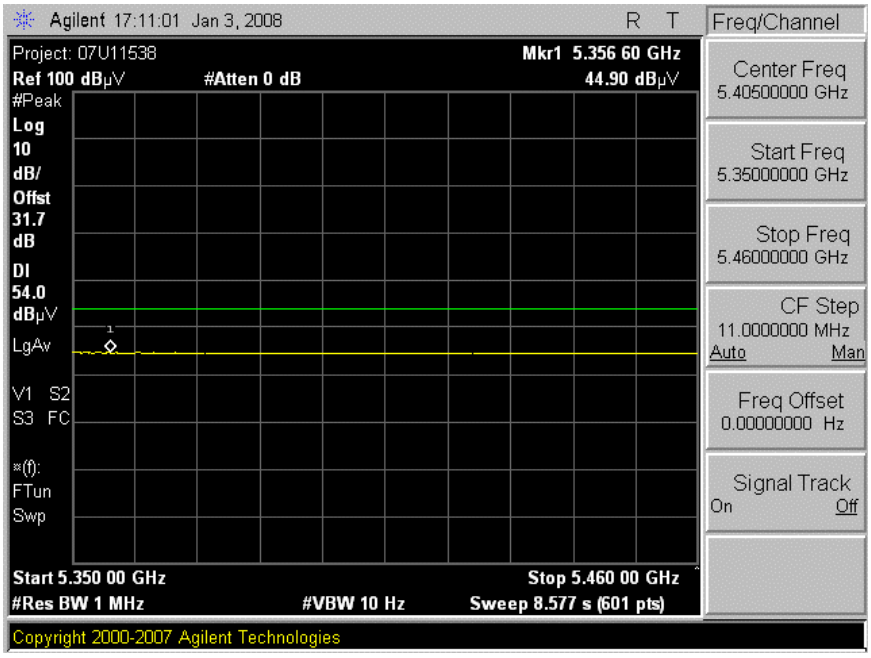
See original lower 5.2GHz band report which is grant by February 12, 2008.

RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

HIGH CHANNEL RESTRICTED, PEAK, HORIZ

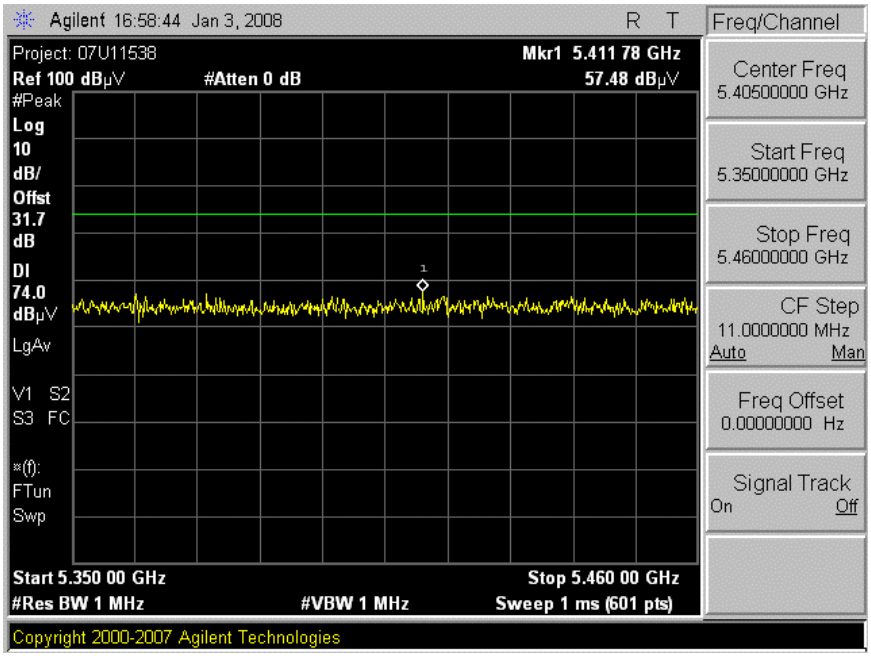


HIGH CHANNEL RESTRICTED, AVG, HORIZ

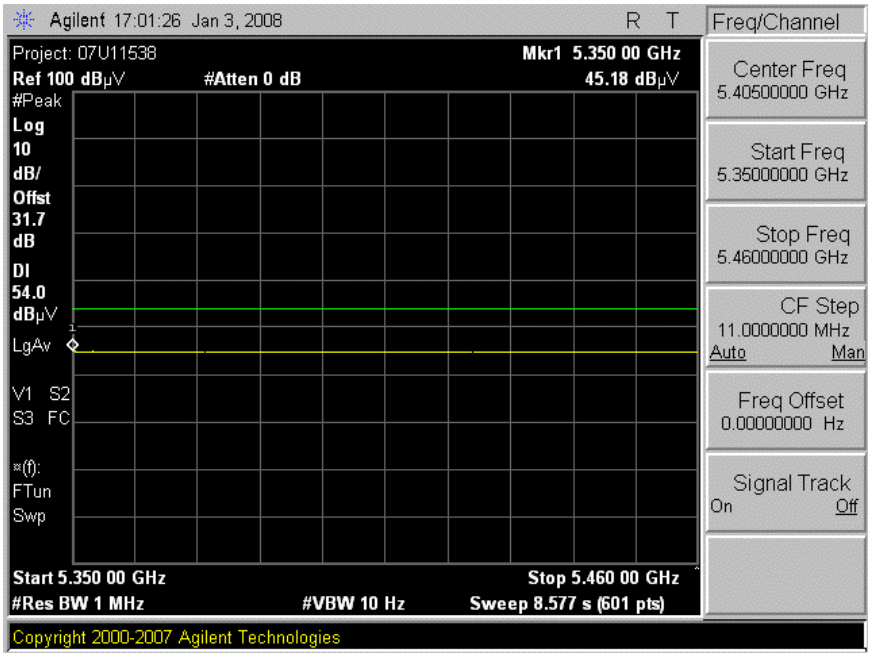


RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)

HIGH CHANNEL RESTRICTED, PEAK, VERT



HIGH CHANNEL RESTRICTED, AVG, VERT



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Company: MobileAccess Networks
Project #: 07U11538
Date: 01/04/2008
Test Engineer: Thanh Nguyen
Configuration: EUT with support equipment
Mode: Transmit 5.3GHz Band

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T145 Agilent 3008A005(			FCC 15.209

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
		B-5m Chamber		

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	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Tx 5260MHz															
10.520	3.0	35.94	23.3	37.1	10.8	-34.4	0.0	0.0	49.4	36.7	74	54	-24.6	-17.3	V
15.780	3.0	36.01	23.0	37.5	13.0	-32.2	0.0	0.0	54.3	41.2	74	54	-19.7	-12.8	Noise floor
10.520	3.0	35.19	23.4	37.1	10.8	-34.4	0.0	0.0	48.7	36.9	74	54	-25.3	-17.1	H
15.780	3.0	36.30	22.7	37.5	13.0	-32.2	0.0	0.0	54.6	41.0	74	54	-19.4	-13.0	Noise floor
Tx 5300MHz															V
10.600	3.0	37.5	23.5	37.1	10.9	-34.3	0.0	0.0	51.2	37.2	74	54	-22.8	-16.8	V
15.900	3.0	35.5	23.7	37.2	13.0	-32.2	0.0	0.0	53.5	41.7	74	54	-20.5	-12.3	Noise floor
10.600	3.0	36.8	23.6	37.1	10.9	-34.3	0.0	0.0	50.5	37.3	74	54	-23.5	-16.7	H
15.900	3.0	35.8	22.9	37.2	13.0	-32.2	0.0	0.0	53.8	40.9	74	54	-20.2	-13.1	Noise floor
Tx 5320MHz															
10.640	3.0	37.8	23.5	37.1	11.0	-34.2	0.0	0.0	51.6	37.3	74	54	-22.4	-16.7	V
15.960	3.0	35.7	23.0	37.1	13.1	-32.2	0.0	0.0	53.6	40.9	74	54	-20.4	-13.1	Noise floor
10.640	3.0	36.6	23.8	37.1	11.0	-34.2	0.0	0.0	50.4	37.6	74	54	-23.6	-16.4	H
15.960	3.0	35.8	22.7	37.1	13.1	-32.2	0.0	0.0	53.7	40.6	74	54	-20.3	-13.4	Noise floor
No other emissions were detected above noise floor															

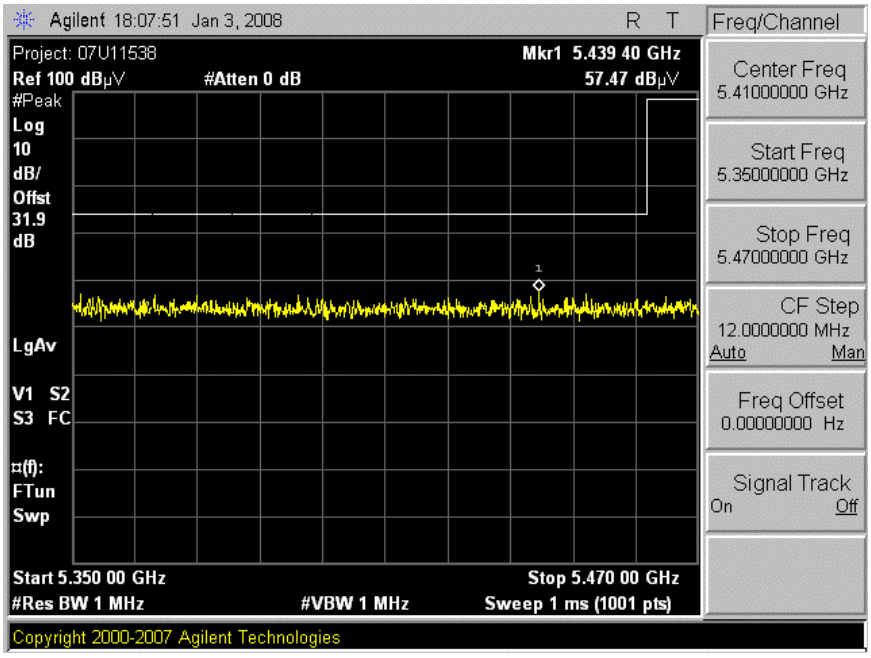
Rev. 4.12.7

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		

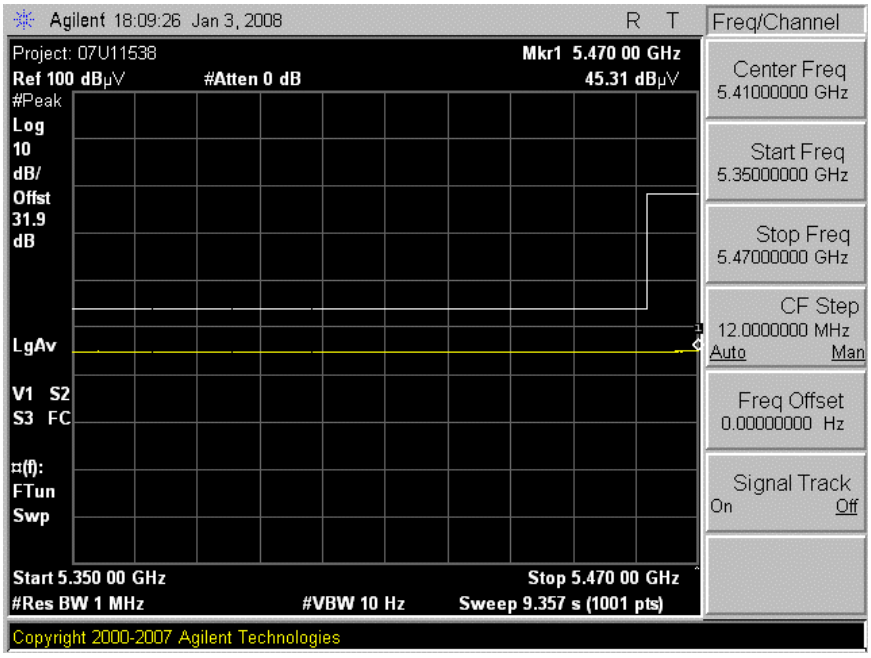
8.2.2. TRANSMITTER ABOVE 1 GHz FOR 802.11a MODE IN THE 5.6 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

LOW CHANNEL RESTRICTED, PEAK, HORIZ

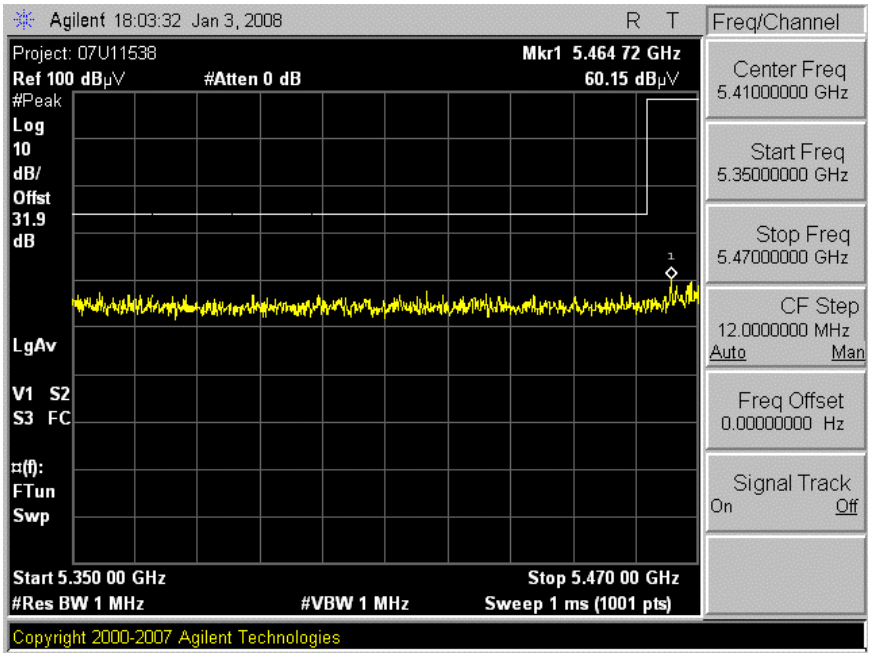


LOW CHANNEL RESTRICTED, AVG, HORIZ

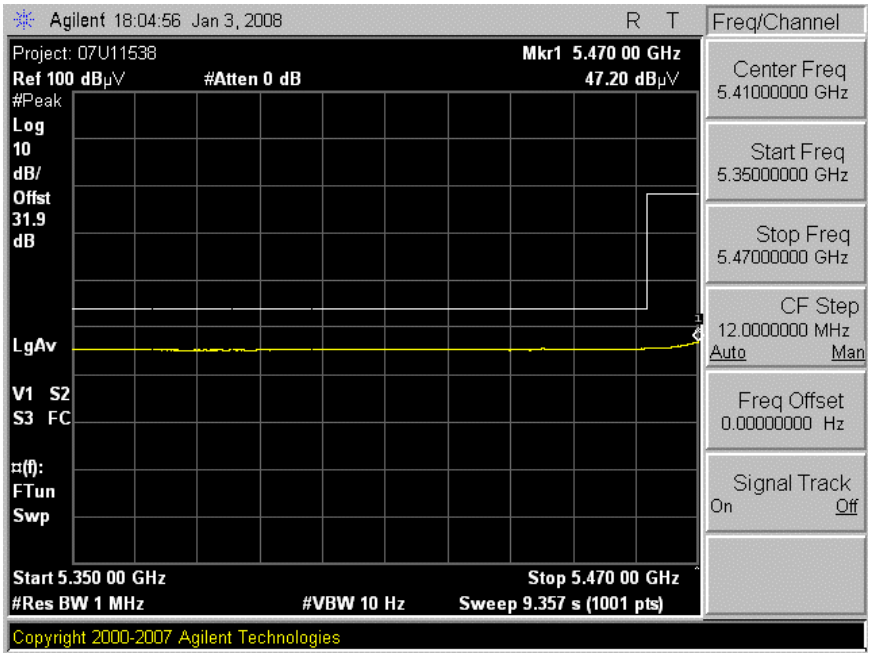


RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

LOW CHANNEL RESTRICTED, PEAK, VERT

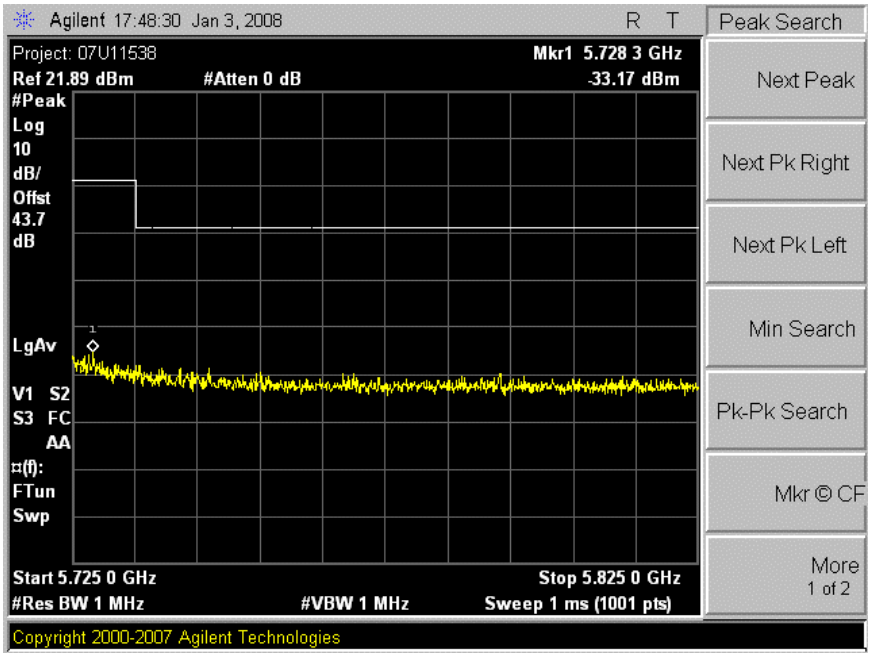


LOW CHANNEL RESTRICTED, AVG, VERT

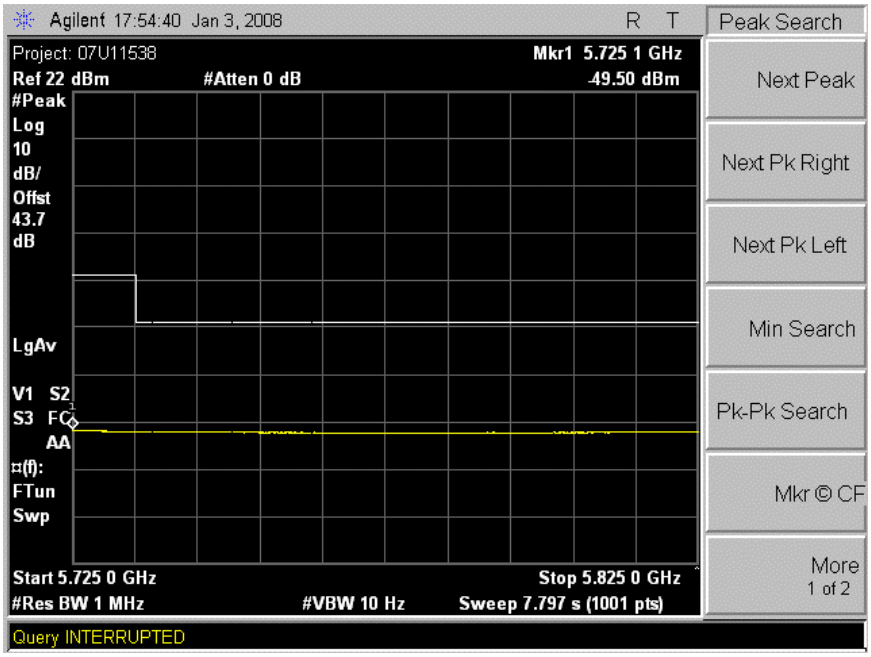


AUTHORIZED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

HIGH CHANNEL, PEAK, HORIZ

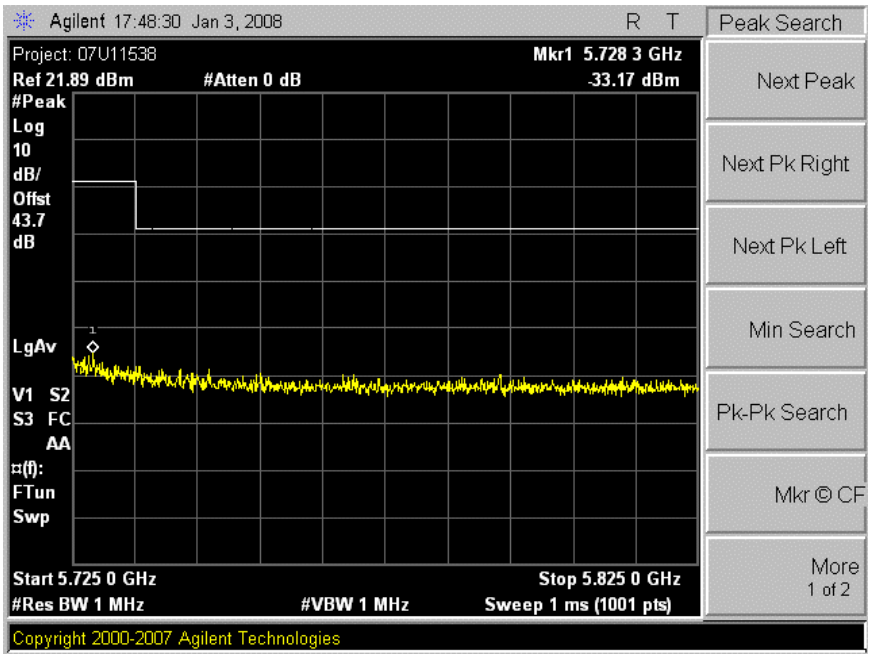


HIGH CHANNEL, AVG, HORIZ

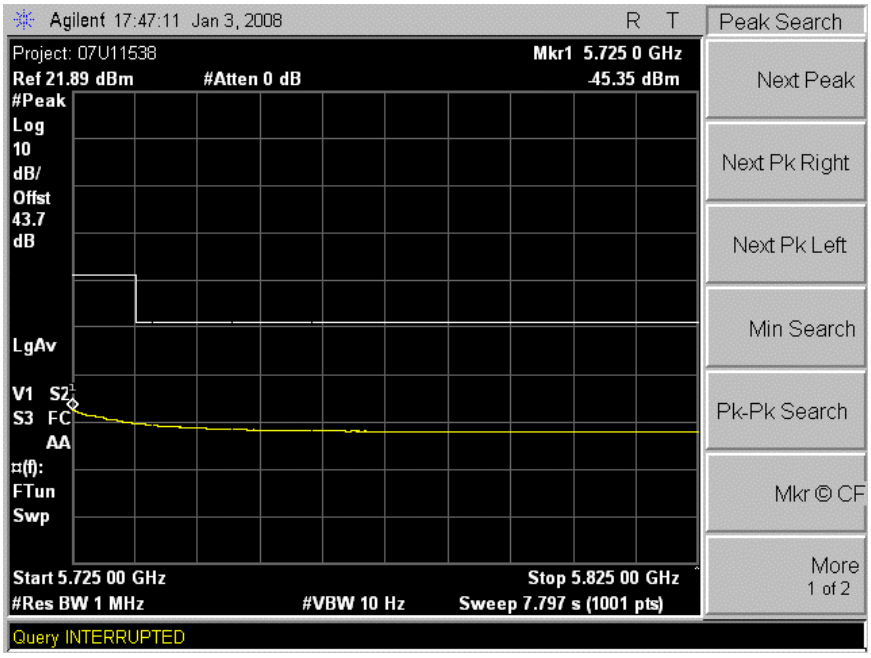


AUTHORIZED BANDEDGE (HIGH CHANNEL, VERTICAL)

HIGH CHANNEL, PEAK, VERT



HIGH CHANNEL, AVG, VERT



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Company: MobileAccess Networks
Project #: 07U11538
Date: 01/03/2008
Test Engineer: Thanh Nguyen
Configuration: EUT with support equipment
Mode: Transmit 5.5GHz Band

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T145 Agilent 3008A005(			FCC 15.209

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
		B-5m Chamber		

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	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Tx 5500MHz															
11.000	3.0	37.64	24.4	37.2	11.3	-33.8	0.0	0.0	52.5	39.2	74	54	-21.5	-14.8	V
16.500	3.0	34.50	22.0	38.9	13.3	-32.1	0.0	0.0	54.6	42.1	74	54	-19.4	-11.9	Noise floor
11.000	3.0	38.08	23.9	37.2	11.3	-33.8	0.0	0.0	52.9	38.7	74	54	-21.1	-15.3	H
16.500	3.0	33.3	22.0	38.9	13.3	-32.1	0.0	0.0	53.4	42.0	74	54	-20.6	-12.0	Noise floor
Tx 5580MHz															V
11.160	3.0	36.6	23.3	37.3	11.5	-33.5	0.0	0.0	51.8	38.6	74	54	-22.2	-15.4	V
16.740	3.0	33.7	22.0	39.8	13.3	-32.1	0.0	0.0	54.8	43.2	74	54	-19.2	-10.8	Noise floor
11.160	3.0	35.5	23.3	37.3	11.5	-33.5	0.0	0.0	50.8	38.6	74	54	-23.2	-15.4	H
16.740	3.0	34.4	22.0	39.8	13.3	-32.1	0.0	0.0	55.5	43.1	74	54	-18.5	-10.9	Noise floor
Tx 5700MHz															
11.400	3.0	34.9	22.3	37.4	11.8	-33.2	0.0	0.0	50.8	38.3	74	54	-23.2	-15.7	V
17.100	3.0	32.8	21.3	41.2	13.5	-32.0	0.0	0.0	55.5	44.0	74	54	-18.5	-10.0	Noise floor
11.400	3.0	34.3	21.2	37.4	11.8	-33.2	0.0	0.0	50.3	37.1	74	54	-23.7	-16.9	H
17.100	3.0	33.6	21.3	41.2	13.5	-32.0	0.0	0.0	56.3	44.0	74	54	-17.7	-10.0	Noise floor
No other emissions were detected above noise floor															
															H

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		

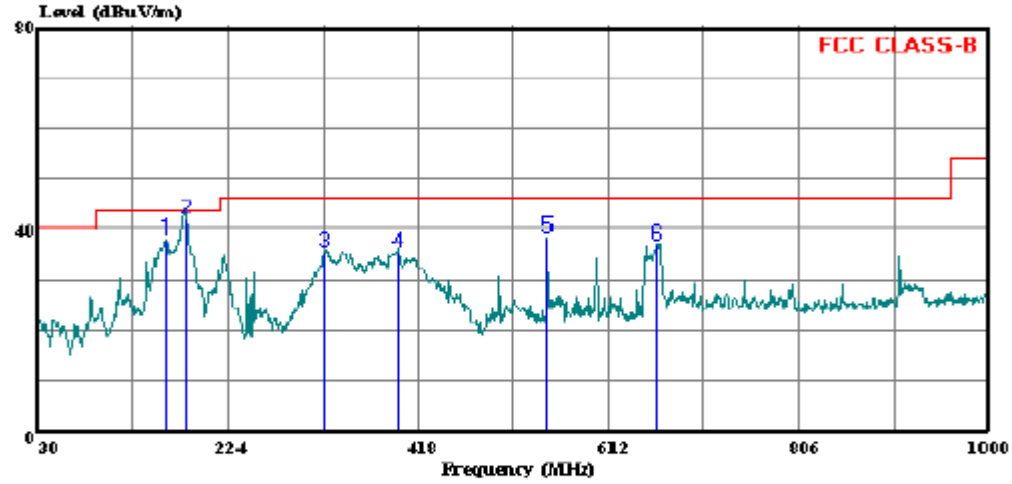
8.3. WORST-CASE BELOW 1 GHz

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

HORIZONTAL PLOT

Compliance Certification Services
47173 Benicia Street
Fremont, CA 94538
Tel: (510) 771-1000
Fax: (510) 661-0888

Data#: 8 File#: 07u11538.emi Date: 01-02-2008 Time: 15:17:49



Trace: 5 Ref Trace:

Condition: FCC CLASS-B HORIZONTAL
Engineer: : Thanh Nguyen
Company: : MobileAccess Networks
Project #: : 07U11538
Test Configuration:: EUT with Support Equipment
Mode of operation: : Transmit worst case
Test Target: : FCC Class B

HORIZONTAL DATA

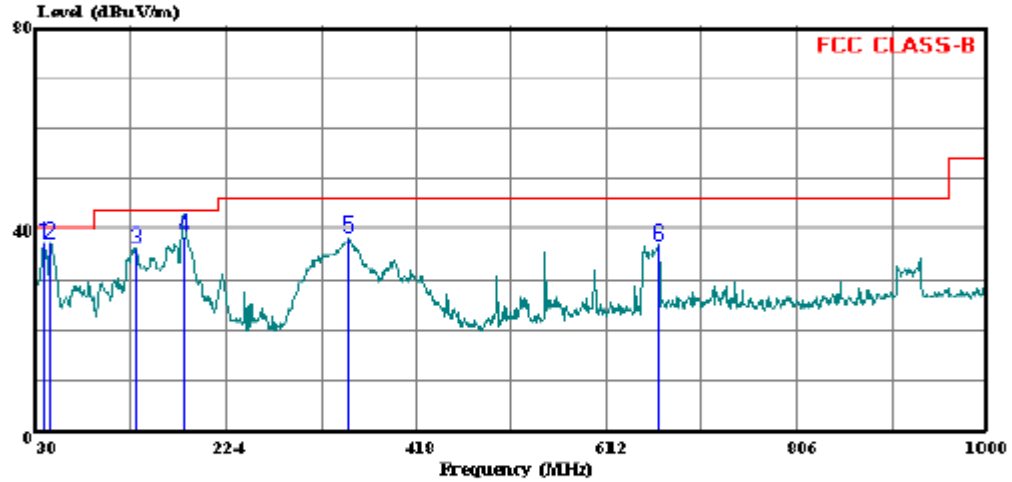
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	159.010	52.40	-14.17	38.23	43.50	-5.27	Peak
2	180.950	57.03	-14.96	42.07	43.50	-1.43	QP
3	321.970	47.40	-11.69	35.71	46.00	-10.29	Peak
4	396.660	45.70	-9.98	35.72	46.00	-10.28	Peak
5	549.920	44.70	-6.36	38.34	46.00	-7.66	Peak
6	661.470	41.20	-4.23	36.97	46.00	-9.03	Peak

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)

VERTICAL PLOT

Compliance Certification Services
47173 Benicia Street
Fremont, CA 94538
Tel: (510) 771-1000
Fax: (510) 661-0888

Data#: 4 File#: 07u11538.emi Date: 01-02-2008 Time: 14:56:01



Trace: 1 Ref Trace:

Condition: FCC CLASS-B VERTICAL
Engineer : Thanh Nguyen
Company : MobileAccess Networks
Project # : 07U11538
Test Configuration:: EUT with Support Equipment
Mode of operation: : Transmit worst case
Test Target : FCC Class B

VERTICAL DATA

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	37.760	48.10	-10.80	37.30	40.00	-2.70	Peak
2	45.520	53.70	-16.27	37.43	40.00	-2.57	Peak
3	131.850	49.40	-13.12	36.28	43.50	-7.22	Peak
4	181.490	53.88	-14.98	38.90	43.50	-4.60	QP
5	349.130	49.60	-11.03	38.57	46.00	-7.43	Peak
6	665.350	41.20	-4.14	37.06	46.00	-8.94	Peak

9. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

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

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

6 WORST EMISSIONS

860&WCE POWER SOURCE

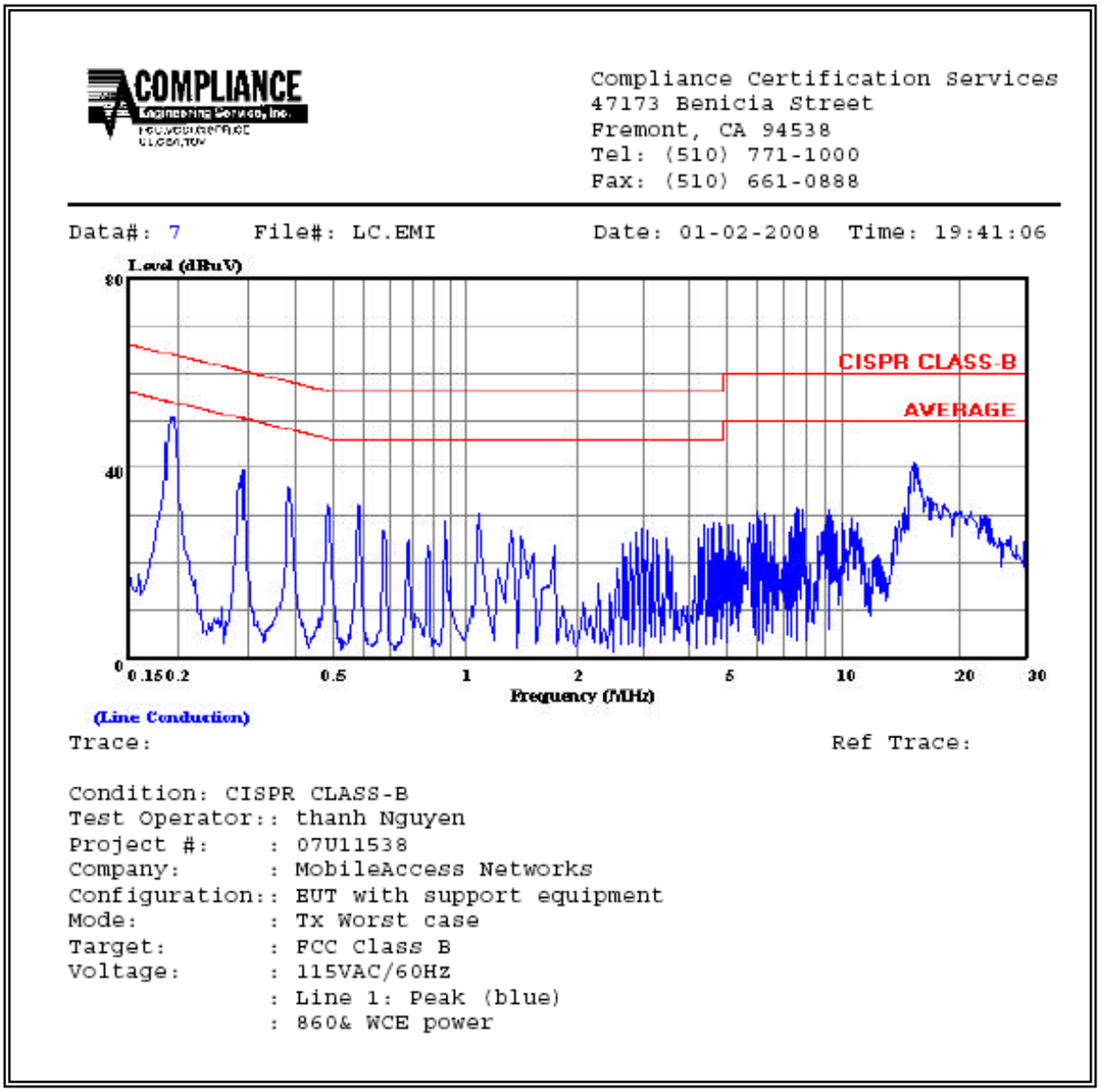
CONDUCTED EMISSIONS DATA (115VAC 60Hz)_860&WCE									
Freq.	Reading			Closs	Limit	EN_B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.19	50.34	--	--	0.00	63.99	53.99	-13.65	-3.65	L1
0.29	39.32	--	--	0.00	60.41	50.41	-21.09	-11.09	L1
15.55	41.00	--	--	0.00	60.00	50.00	-19.00	-9.00	L1
0.19	48.49	--	--	0.00	63.95	53.95	-15.46	-5.46	L2
0.29	38.72	--	--	0.00	60.50	50.50	-21.78	-11.78	L2
15.47	45.62	--	--	0.00	60.00	50.00	-14.38	-4.38	L2
6 Worst Data									

AP POWER SOURCE

CONDUCTED EMISSIONS DATA (115VAC 60Hz)_CISCO PWR									
Freq.	Reading			Closs	Limit	EN_B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.15	57.18	--	32.59	0.00	65.89	55.89	-8.71	-23.30	L1
0.25	51.18	--	34.71	0.00	61.79	51.79	-10.61	-17.08	L1
1.37	37.32	--	20.64	0.00	56.00	46.00	-18.68	-25.36	L1
0.15	57.05	--	32.64	0.00	65.94	55.94	-8.89	-23.30	L2
0.19	54.24	--	21.91	0.00	64.17	54.17	-9.93	-32.26	L2
1.66	39.52	--	25.64	0.00	56.00	46.00	-16.48	-20.36	L2
6 Worst Data									

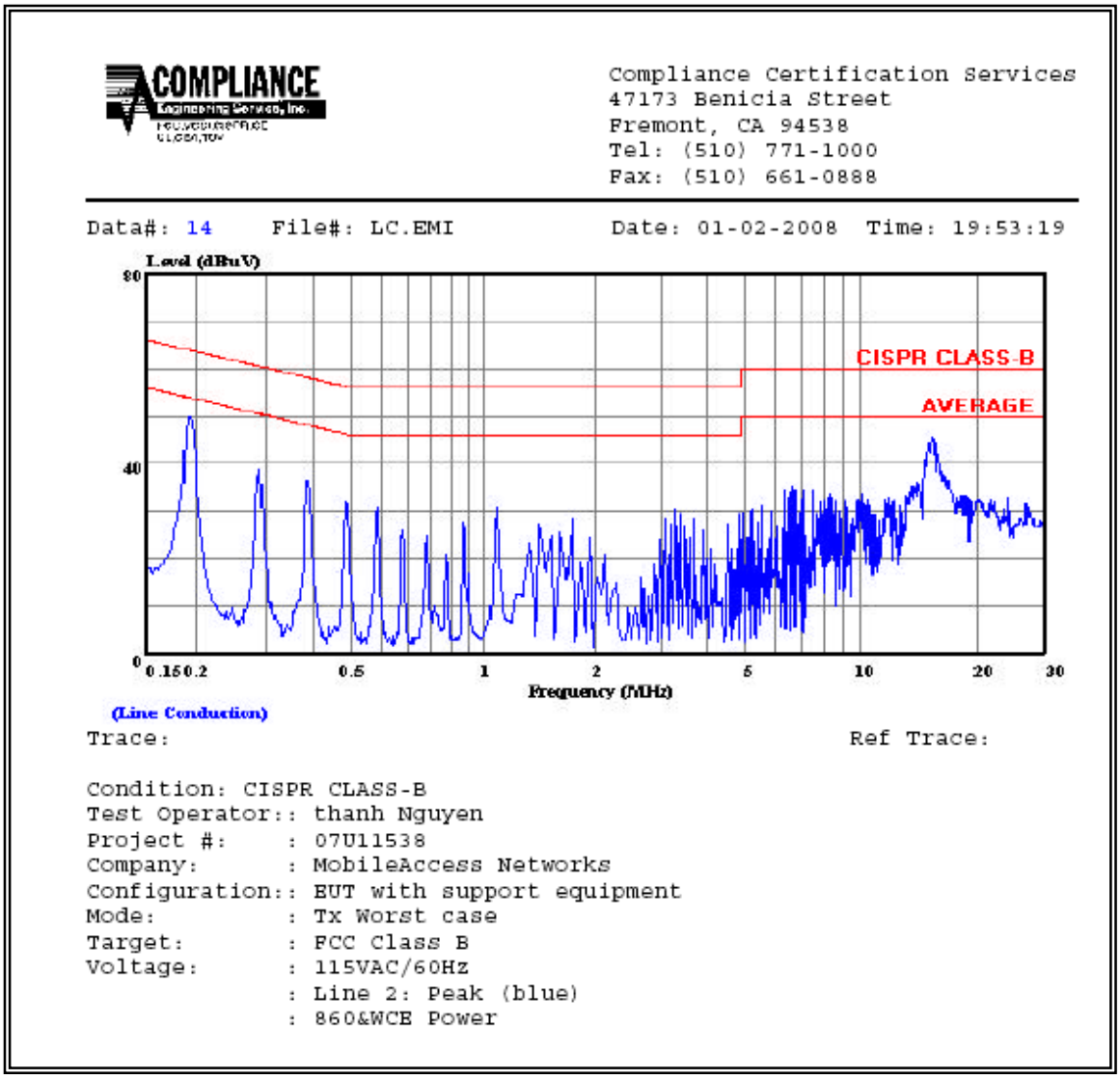
LINE 1 RESULTS

860&WCE POWER SOURCE



LINE 2 RESULTS

860&WCE POWER SOURCE

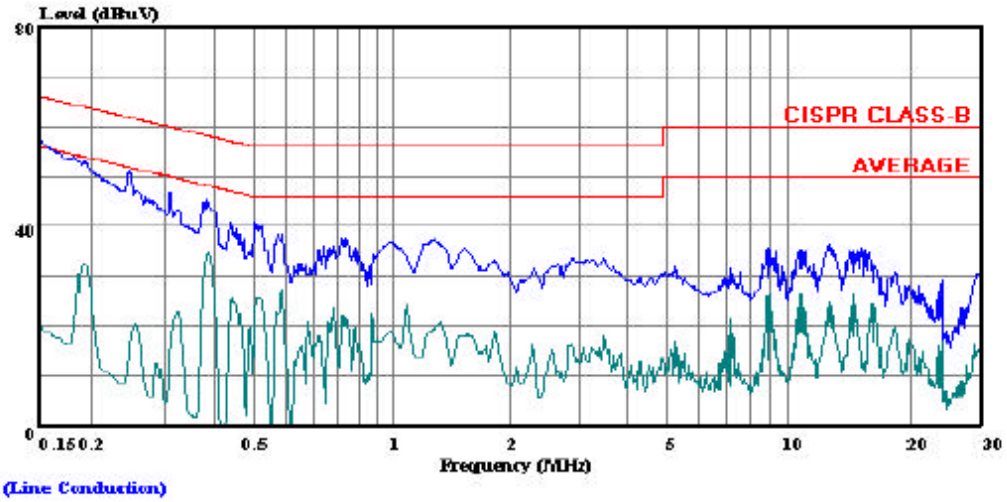


LINE 1 RESULTS

AP POWER SOURCE

Compliance Certification Services
47173 Benicia Street
Fremont, CA 94538
Tel: (510) 771-1000
Fax: (510) 661-0888

Data#: 28 File#: Lc.emi Date: 01-02-2008 Time: 20:16:37



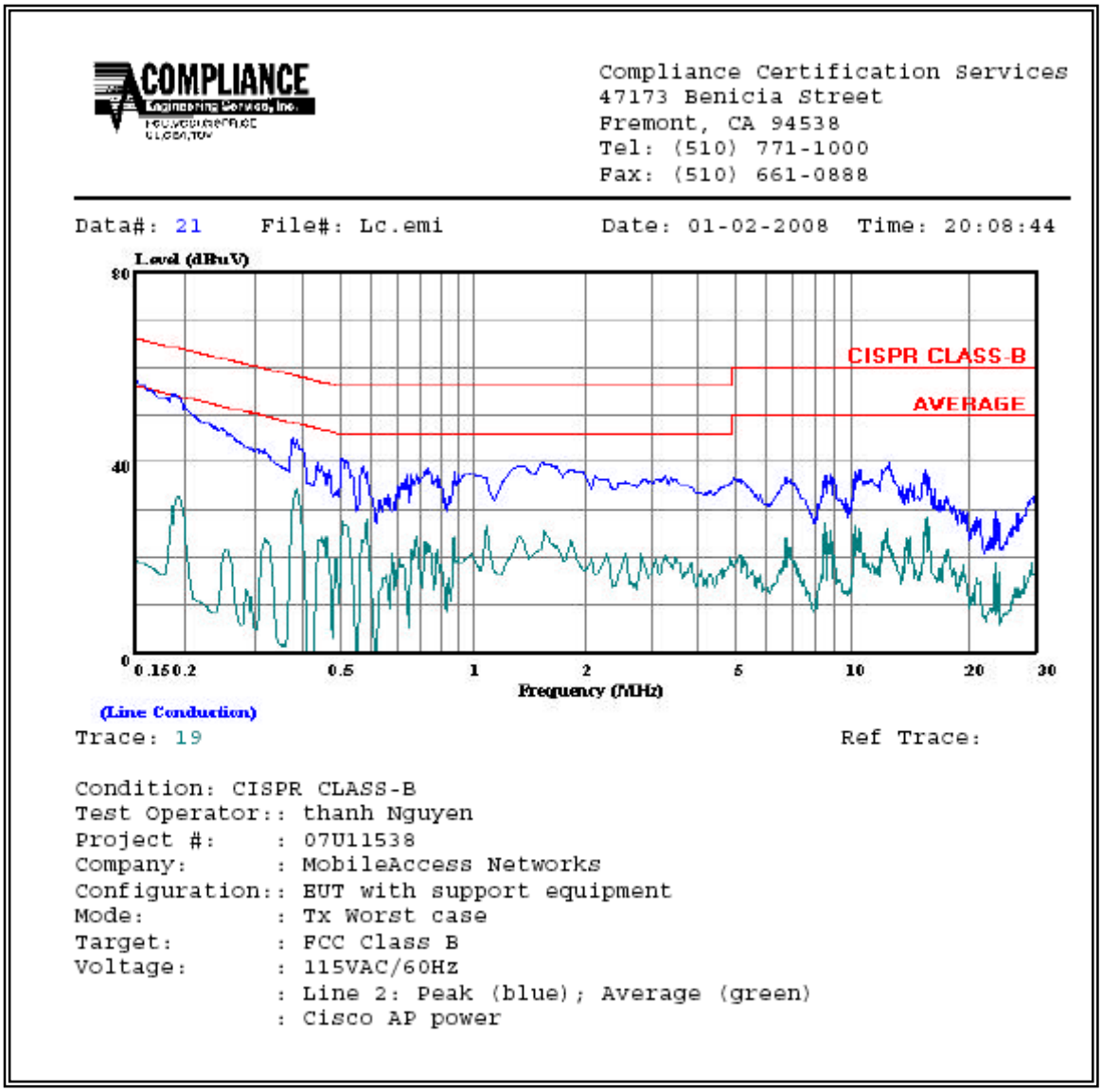
(Line Conduction)

Trace: 26 Ref Trace:

Condition: CISPR CLASS-B
Test Operator:: thanh Nguyen
Project #: : 07U11538
Company: : MobileAccess Networks
Configuration:: EUT with support equipment
Mode: : Tx Worst case
Target: : FCC Class B
Voltage: : 115VAC/60Hz
: Line 1: Peak (blue); Average (Green)
: Cisco AP power

LINE 2 RESULTS

AP POWER SOURCE



10. DYNAMIC FREQUENCY SELECTION

10.1. OVERVIEW

10.1.1. LIMITS

FCC

§15.407 (h) and FCC 06-96 APPENDIX "COMPLIANCE MEASUREMENT PROCEDURES FOR UNLICENSED-NATIONAL INFORMATION INFRASTRUCTURE DEVCIES OPERATING IN THE 5250-5350 MHz AND 5470-5725 MHz BANDS INCORPORATING DYNAMIC FREQUENCY SELECTION".

Table 1: Applicability of DFS requirements prior to use of a channel

Requirement	Operational Mode		
	Master	Client (without radar detection)	Client (with radar detection)
Non-Occupancy Period	Yes	Not required	Yes
DFS Detection Threshold	Yes	Not required	Yes
Channel Availability Check Time	Yes	Not required	Not required
Uniform Spreading	Yes	Not required	Not required

Table 2: Applicability of DFS requirements during normal operation

Requirement	Operational Mode		
	Master	Client **(without DFS)**	Client **(with DFS)**
DFS Detection Threshold	Yes	Not required	Yes
Channel Closing Transmission Time	Yes	Yes	Yes
Channel Move Time	Yes	Yes	Yes

Table 3: Interference Threshold values, Master or Client incorporating In-Service Monitoring

Maximum Transmit Power	Value (see note)
≥ 200 milliwatt	-64 dBm
< 200 milliwatt	-62 dBm
Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna Note 2: Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response.	

Table 4: DFS Response requirement values

Parameter	Value
Non-occupancy period	30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds
Channel Closing Transmission Time	200 milliseconds + approx. 60 milliseconds over remaining 10 second period
The instant that the *Channel Move Time* and the *Channel Closing Transmission Time* begins is as follows: For the Short pulse radar Test Signals this instant is the end of the *Burst*. For the Frequency Hopping radar Test Signal, this instant is the end of the last radar burst generated. For the Long Pulse radar Test Signal this instant is the end of the 12 second period defining the radar transmission. The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required to facilitate channel changes (an aggregate of approximately 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.	

Table 5 – Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (Microseconds)	PRI (Microseconds)	Pulses	Minimum Percentage of Successful Detection	Minimum Trials
1	1	1428	18	60%	30
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (Radar Types 1-4)				80%	120

Table 6 – Long Pulse Radar Test Signal

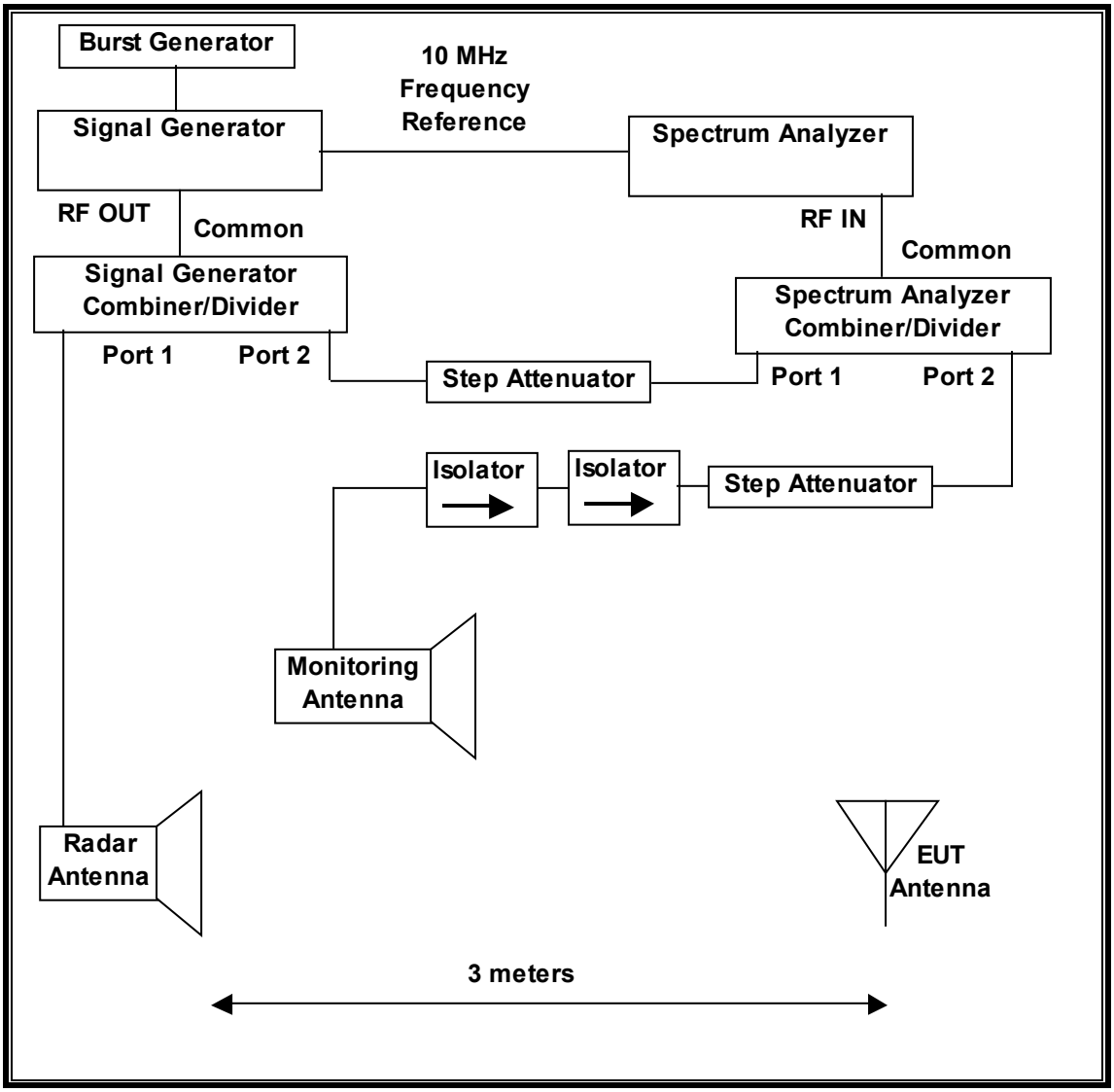
Radar Waveform	Bursts	Pulses per Burst	Pulse Width (µsec)	Chirp Width (MHz)	PRI (µsec)	Minimum Percentage of Successful Detection	Minimum Trials
5	8-20	1-3	50-100	5-20	1000-2000	80%	30

Table 7 – Frequency Hopping Radar Test Signal

Radar Waveform	Pulse Width (µsec)	PRI (µsec)	Burst Length (ms)	Pulses per Hop	Hopping Rate (kHz)	Minimum Percentage of Successful Detection	Minimum Trials
6	1	333	300	9	.333	70%	30

10.1.2. TEST AND MEASUREMENT SYSTEM

RADIATED METHOD SYSTEM BLOCK DIAGRAM



SYSTEM OVERVIEW

The short pulse and long pulse signal generating system utilizes the NTIA software. The Vector Signal Generator has been validated by the NTIA. The hopping signal generating system utilizes the CCS simulated hopping method and system, which has been validated by the DoD, FCC and NTIA. The software selects waveform parameters from within the bounds of the signal type on a random basis using uniform distribution.

The short pulse types 2, 3 and 4, and the long pulse type 5 parameters are randomized at run-time.

The hopping type 6 pulse parameters are fixed while the hopping sequence is based on the August 2005 NTIA Hopping Frequency List. The initial starting point randomized at run-time and each subsequent starting point is incremented by 475. Each frequency in the 100-length segment is compared to the boundaries of the EUT Detection Bandwidth and the software creates a hopping burst pattern in accordance with Section 7.4.1.3 Method #2 Simulated Freqeuncy Hopping Radar Waveform Generating Subsystem of FCC 06-96 APPENDIX. The frequency of the signal generator is incremented in 1 MHz steps from F_L to F_H for each successive trial. This incremental sequence is repeated as required to generate a minimum of 30 total trials and to maintain a uniform frequency distribution over the entire Detection Bandwidth.

The signal monitoring equipment consists of a spectrum analyzer set to display 8001 bins on the horizontal axis. The time-domain resolution is 2 msec / bin with a 16 second sweep time, meeting the 10 second short pulse reporting criteria. The aggregate ON time is calculated by multiplying the number of bins above a threshold during a particular observation period by the dwell time per bin, with the analyzer set to peak detection and max hold.

SYSTEM CALIBRATION

A 50-ohm load is connected in place of the spectrum analyzer, and the spectrum analyzer is connected to a horn antenna via a coaxial cable, with the reference level offset set to (horn antenna gain – coaxial cable loss). The signal generator is set to CW mode. The amplitude of the signal generator is adjusted to yield a level of –64 dBm as measured on the spectrum analyzer.

Without changing any of the instrument settings, the spectrum analyer is reconnected to the Common port of the Spectrum Analyzer Combiner/Divider. Measure the amplitude and calculate the difference from –64 dBm. Adjust the Reference Level Offset of the spectrum analyzer to this difference.

The spectrum analyzer displays the level of the signal generator as received at the antenna ports of the Master Device. The interference detection threshold may be varied from the calibrated value of –64 dBm and the spectrum analyzer will still indicate the level as received by the Master Device.

Set the signal generator to produce a radar waveform, trigger a burst manually and measure the level on the spectrum analyzer. Readjust the amplitude of the signal generator as required so that the peak level of the waveform is at a displayed level equal to the required or desired interference detection threshold. Separate signal generator amplitude settings are determined as required for each radar type.

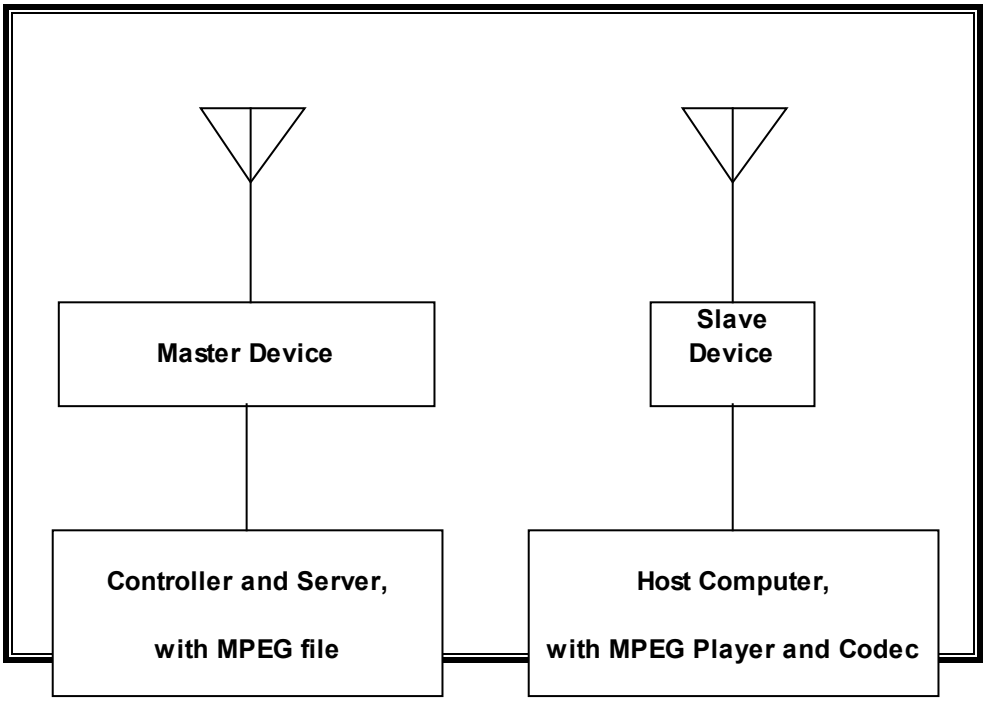
TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the DFS tests documented in this report:

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**Cal Due**
Spectrum Analyzer, 44 GHz	**Agilent / HP**	**E4446A**	**MY43360112**	**3/3/2009**
Vector Signal Generator, 20GHz	**Agilent / HP**	**E8267C**	**US43320336**	**11/16/2009**
High Speed Digital I/O Card	**National Instruments**	**PCI-6534**	**HA1612845**	**1/16/2009**

10.1.3. SETUP OF EUT

RADIATED METHOD EUT TEST SETUP



SUPPORT EQUIPMENT

The following test and measurement equipment was utilized for the DFS tests documented in this report:

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Laptop PC (Master)	Lenovo	Type 7675-CTO	LV-C1907	DoC
Master PC AC Adapter	Lenovo	92P1160	11S92P1160Z1ZBG H78PTK4	N/A
Laptop PC (Slave)	IBM	Type 2373-6ZU	99-G18YF	DoC
Slave PC AC Adapter	IBM	92P1020	11S92P1020Z1Z9R M64478J	N/A
Wireless Access Point	Cisco	AIR-LAP1242AG-A-K9	FTX1038B39L	LDK102056
Access Point AC Adapter	Delta Electronics	ADP-18PB	PZT0651811543	N/A
802.11 Wireless Adapter	Cisco	AIR-CB21AG-A-K9	F0C1043N3EA	LDK102050

10.1.4. DESCRIPTION OF EUT

The EUT operates over the 5250-5350 MHz and 5470-5725 MHz ranges.

The EUT is a Master Device.

The highest power level within these bands is 22.98 dBm EIRP in the 5250-5350 MHz band and 22.32 dBm EIRP in the 5470-5725 MHz band.

The only antenna assembly utilized with the EUT has a gain of 5 dBi.

The rated output power of the Master unit is < 23dBm (EIRP). Therefore the required interference threshold level is –62 dBm. After correction for antenna gain and procedural adjustments, the required conducted threshold at the antenna port is –62 + 5 + 1 = -56 dBm.

The calibrated radiated DFS Detection Threshold level is set to –64 dBm. The tested level is lower than the required level hence it provides margin to the limit.

The EUT uses one transmitter/receiver connected to the antenna. The EUT is set up in a normal configuration to perform radiated tests.

The Slave device associated with the EUT during these tests does not have radar detection capability.

WLAN traffic is generated by streaming the video file TestFile.mp2 “6 ½ Magic Hours” from the Master to the Slave in full motion video mode using the media player with the V2.61 Codec package.

TPC is not required since the maximum EIRP is less than 500 mW (27 dBm).

The EUT utilizes the 802.11a architecture. One nominal channel bandwidth, 20 MHz, is implemented.

The software installed in the access point is revision 6.00.1.

MANUFACTURER’S STATEMENT REGARDING UNIFORM CHANNEL SPREADING

This statement is in a separate document.

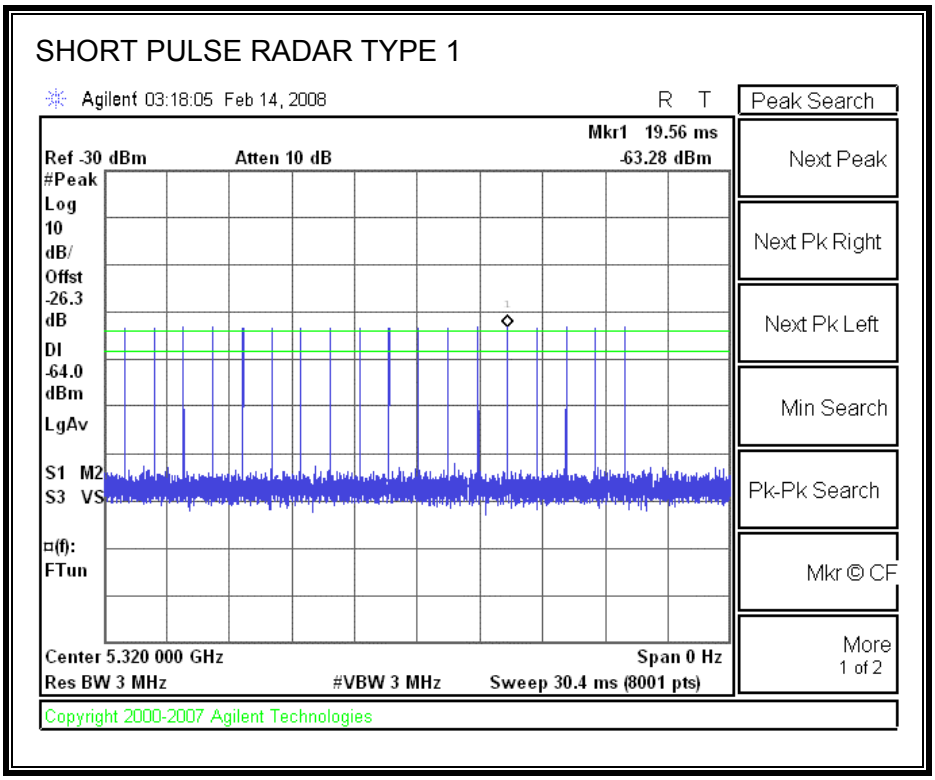
10.2. RESULTS

10.2.1. TEST CHANNEL

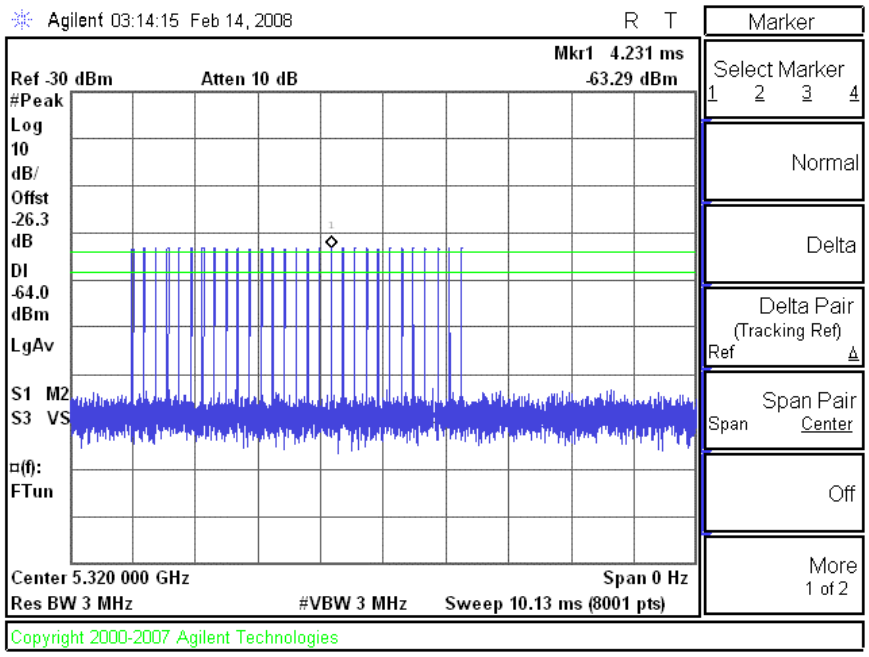
All tests were performed at a channel center frequency of 5320 MHz. Measurements were performed using conducted test methods.

10.2.2. PLOTS OF RADAR WAVEFORMS AND WLAN TRAFFIC

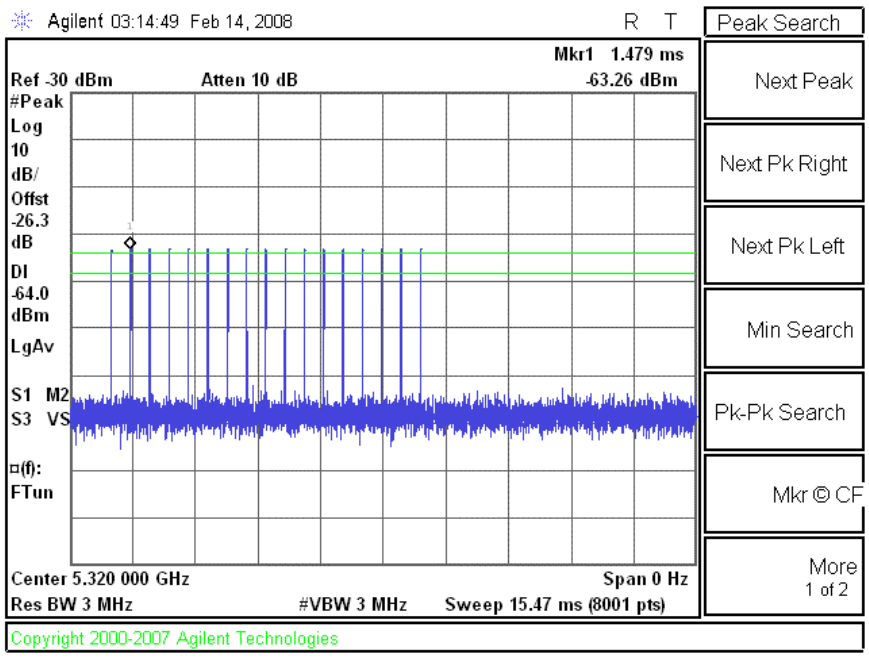
PLOTS OF RADAR WAVEFORMS



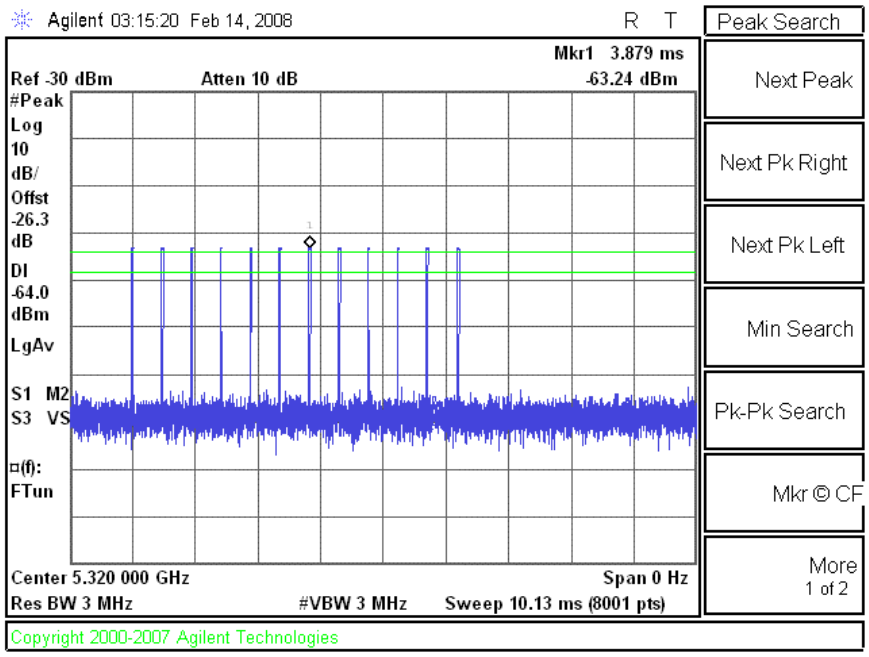
SAMPLE OF RADAR TYPE 2



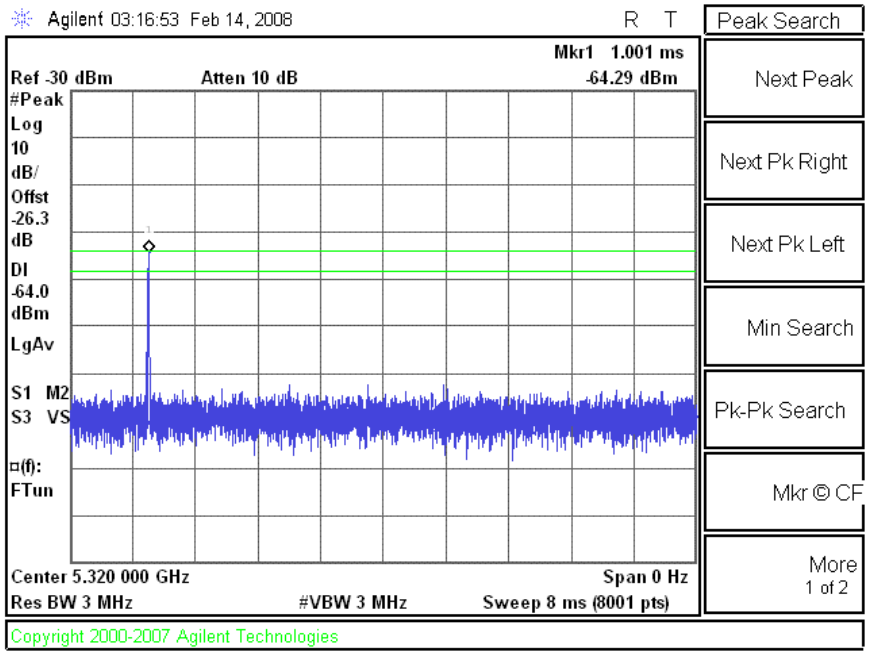
SAMPLE OF RADAR TYPE 3



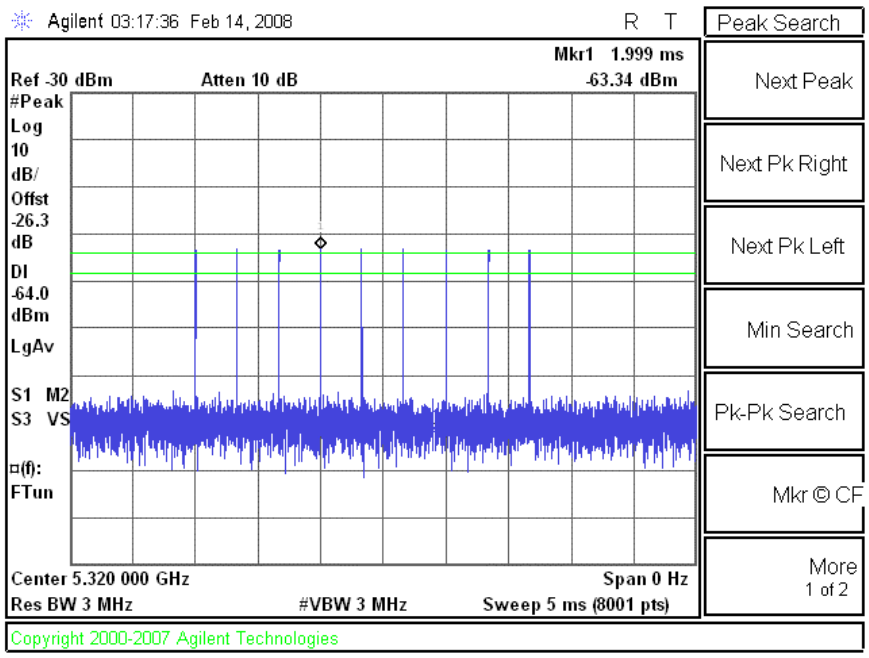
SAMPLE OF RADAR TYPE 4



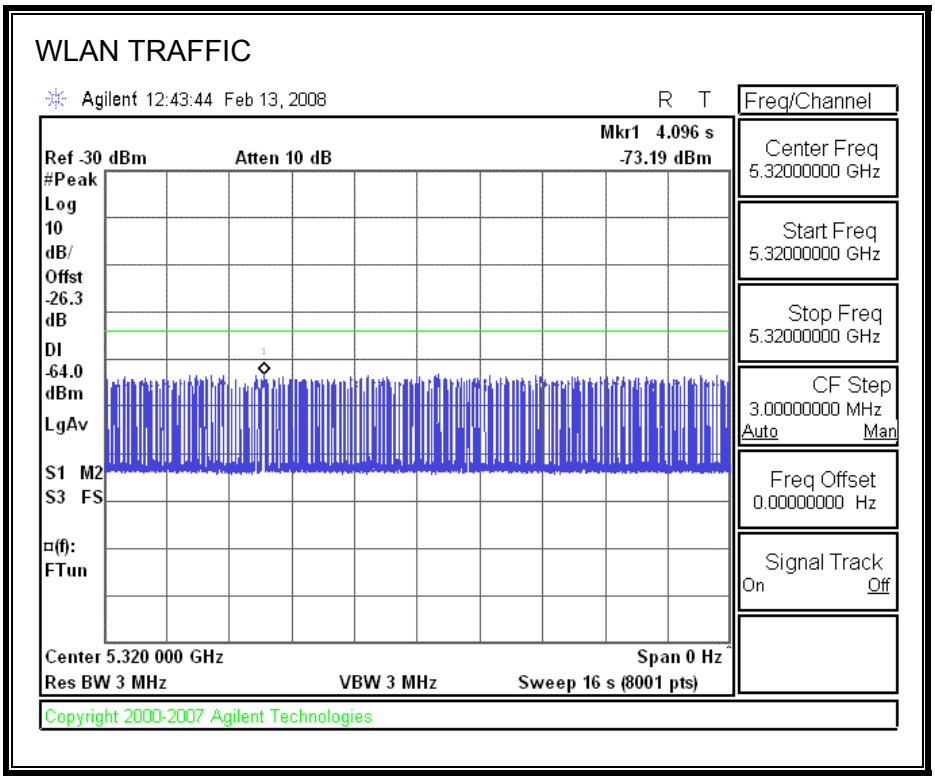
SAMPLE OF SINGLE BURST OF RADAR TYPE 5



SINGLE BURST OF RADAR TYPE 6



PLOT OF WLAN TRAFFIC FROM MASTER



10.2.3. CHANNEL AVAILABILITY CHECK TIME

PROCEDURE TO DETERMINE INITIAL POWER-UP CYCLE TIME

A link was established on channel then the EUT was rebooted. The time from the cessation of traffic to the re-initialization of traffic was measured as the time required for the EUT to complete the total power-up cycle. The time to complete the initial power-up period is 60 seconds less than this total power-up time.

PROCEDURE FOR TIMING OF RADAR BURST

With a link established on channel, the EUT was rebooted. A radar signal was triggered within 0 to 6 seconds after the initial power-up period, and transmissions on the channel were monitored on the spectrum analyzer.

The Non-Occupancy list was cleared. With a link established on channel, the EUT was rebooted. A radar signal was triggered within 54 to 60 seconds after the initial power-up period, and transmissions on the channel were monitored on the spectrum analyzer.

QUANTITATIVE RESULTS

No Radar Triggered

Timing of Reboot (sec)	Timing of Start of Traffic (sec)	Total Power-up Cycle Time (sec)	Initial Power-up Cycle Time (sec)
32.22	180.7	148.5	88.5

Radar Near Beginning of CAC

Timing of Reboot (sec)	Timing of Radar Burst (sec)	Radar Relative to Reboot (sec)	Radar Relative to Start of CAC (sec)
35.33	125.5	90.2	1.7

Radar Near End of CAC

Timing of Reboot (sec)	Timing of Radar Burst (sec)	Radar Relative to Reboot (sec)	Radar Relative to Start of CAC (sec)
35.33	182.0	146.7	58.2

QUALITATIVE RESULTS

Timing of Radar Burst	Display on Control Computer	Spectrum Analyzer Display
No Radar Triggered	EUT marks Channel as active	Transmissions begin on channel after completion of the initial power-up cycle and the CAC
Within 0 to 6 second window	EUT indicates radar detected EUT does not display any radar parameter values	No transmissions on channel
Within 54 to 60 second window	EUT indicates radar detected EUT does not display any radar parameter values	No transmissions on channel

TIMING PLOT WITHOUT RADAR DURING CAC

AP is rebooted

Traffic ceases

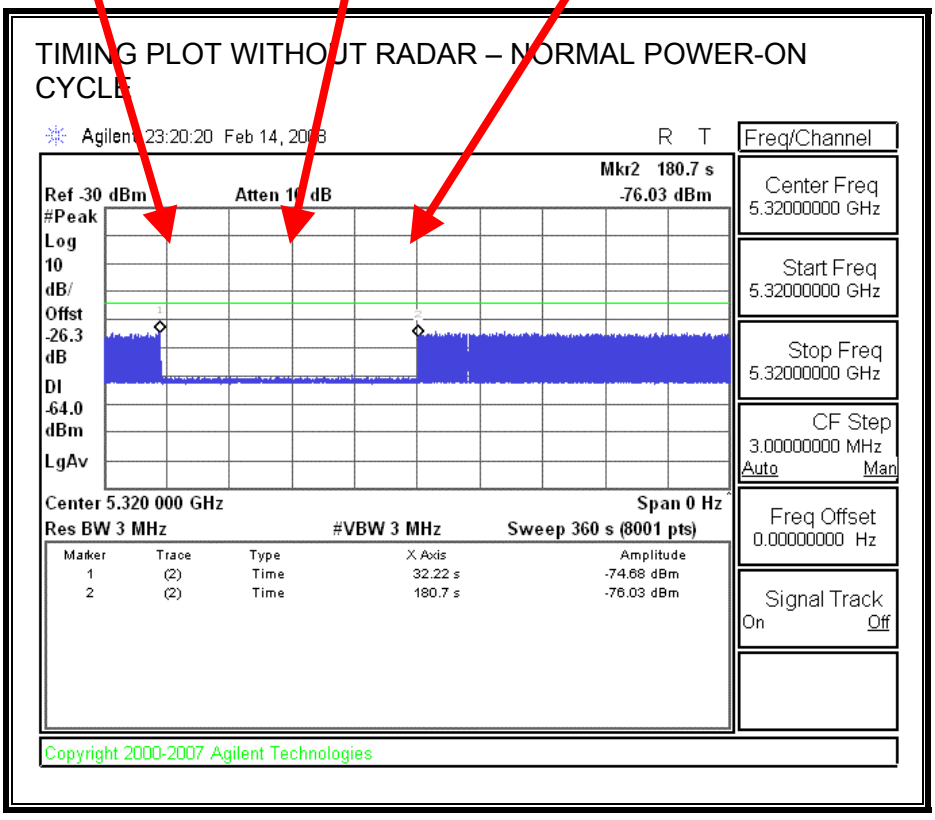
Start of Initial Power-up cycle

End of Initial Power-up cycle

Start of CAC

End of CAC

Traffic is Initiated



Transmissions begin on channel after completion of the initial power-up cycle and the CAC.

TIMING PLOT WITH RADAR NEAR BEGINNING OF CAC

AP is rebooted

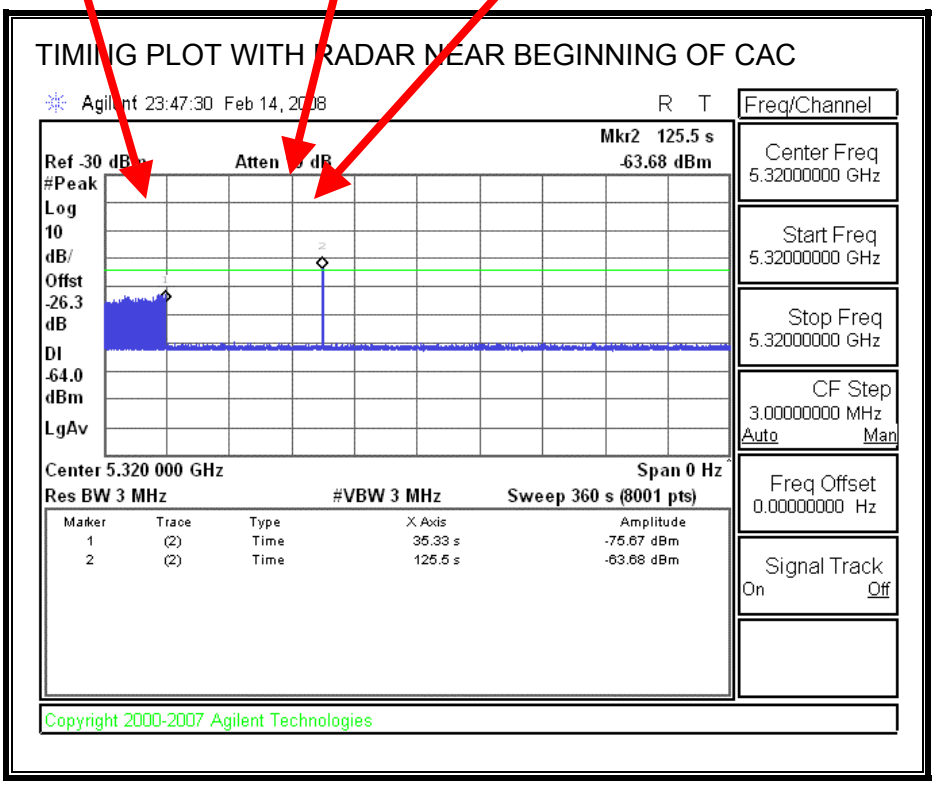
Traffic ceases

Start of Initial Power-up cycle

End of Initial Power-up cycle

Start of CAC

Radar Signal Applied



No EUT transmissions were observed after the radar signal.

TIMING PLOT WITH RADAR NEAR END OF CAC

AP is rebooted

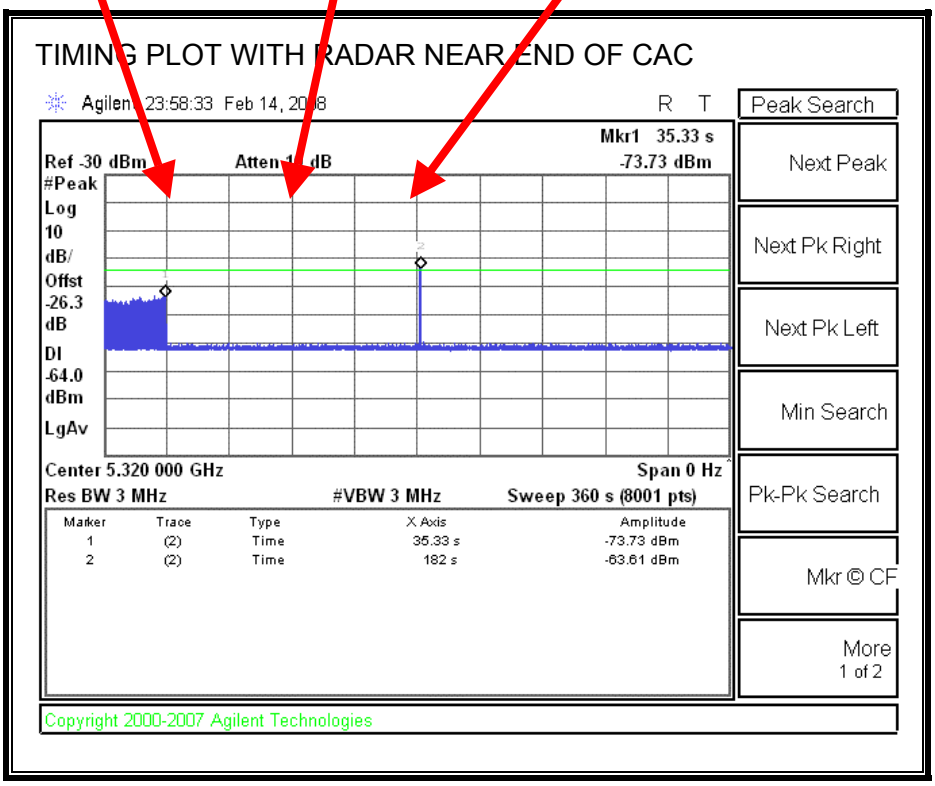
Traffic ceases

Start of Initial Power-up cycle

End of Initial Power-up cycle

Start of CAC

Radar Signal Applied



No EUT transmissions were observed after the radar signal.

10.2.4. MOVE AND CLOSING TIME

REPORTING NOTES

The reference marker is set at the end of last radar pulse.

The delta marker is set at the end of the last WLAN transmission following the radar pulse. This delta is the channel move time.

The aggregate channel closing transmission time is calculated as follows:

Aggregate Transmission Time =

(Number of analyzer bins showing transmission) * (dwell time per bin)

The observation period over which the aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

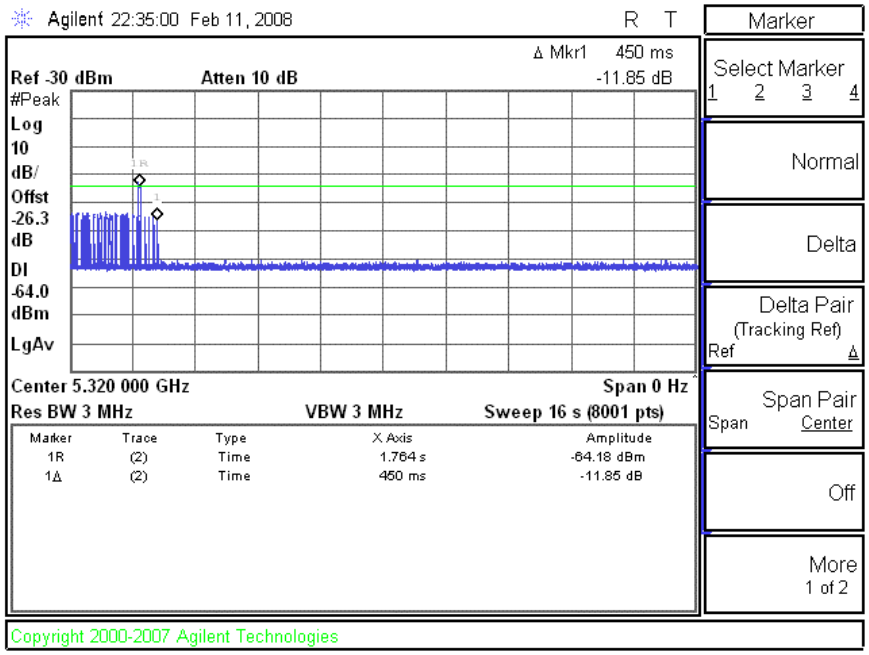
RESULTS

Channel Move Time (sec)	Limit (sec)
0.450	10

Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
8.0	60

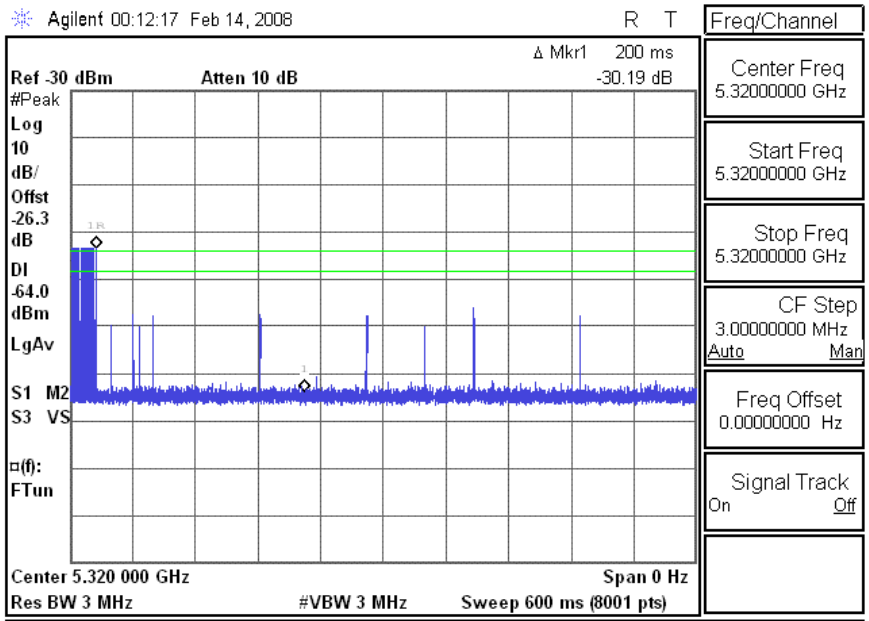
MOVE TIME

MOVE TIME PLOT



CHANNEL CLOSING TIME

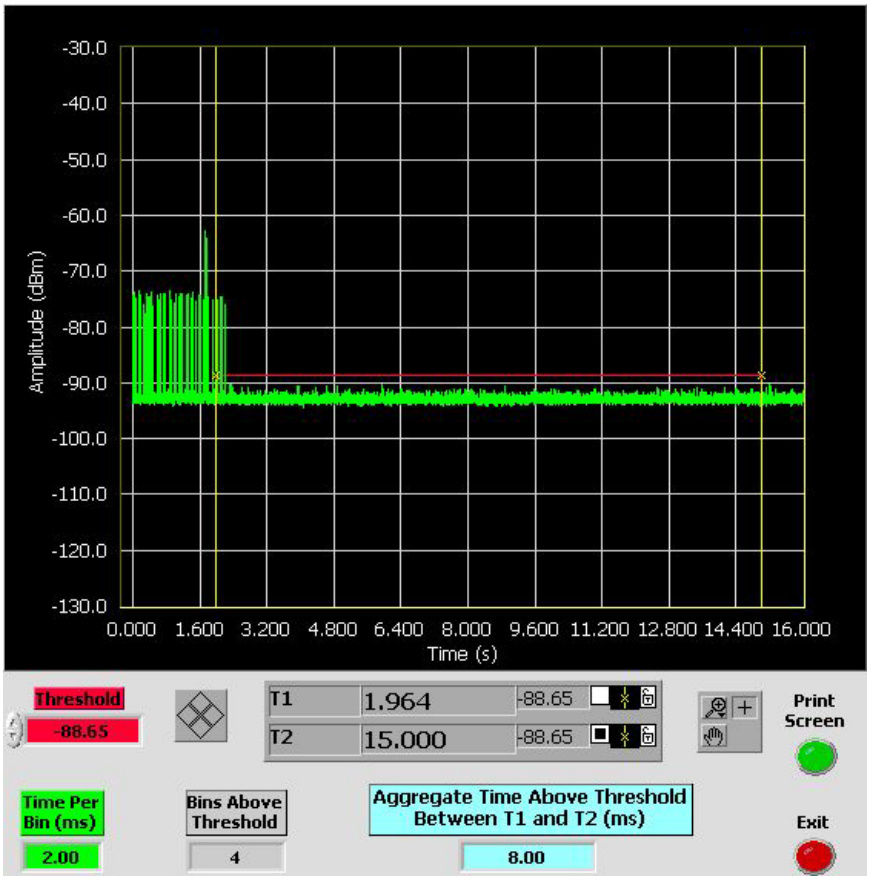
CLOSING TIME PLOT



AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

Only intermittent transmissions are observed during the aggregate monitoring period.

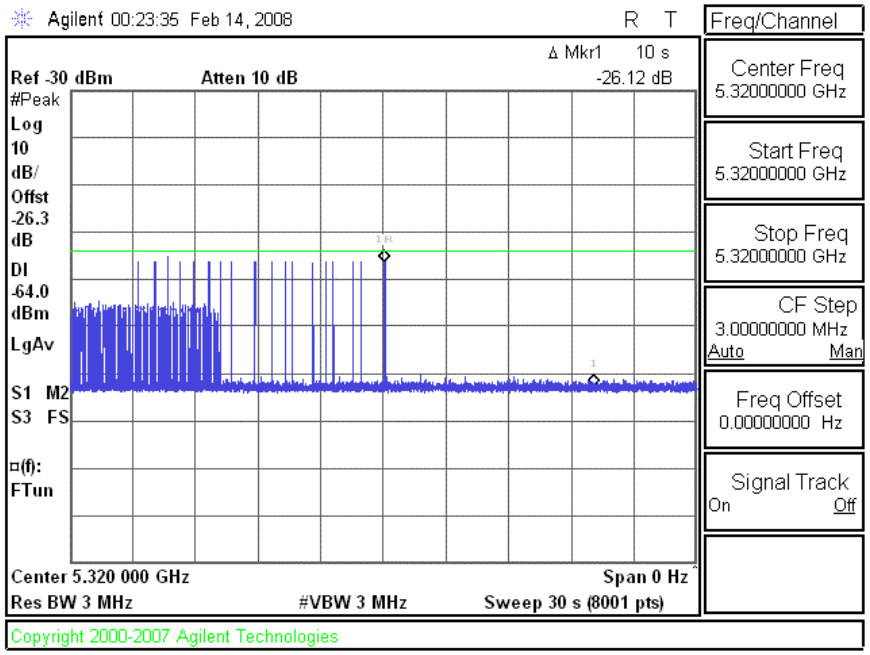
AGGREGATE CLOSING TIME PLOT



LONG PULSE CHANNEL MOVE TIME

The traffic ceases prior to 10 seconds after the end of the radar waveform.

MOVE TIME PLOT FOR LONG PULSE RADAR

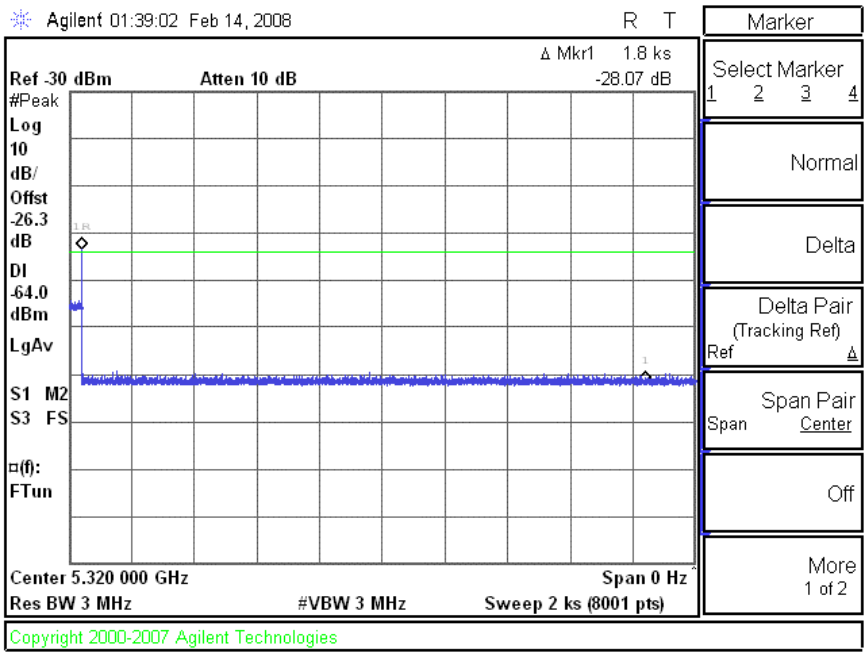


10.2.5. NON-OCCUPANCY PERIOD

RESULTS

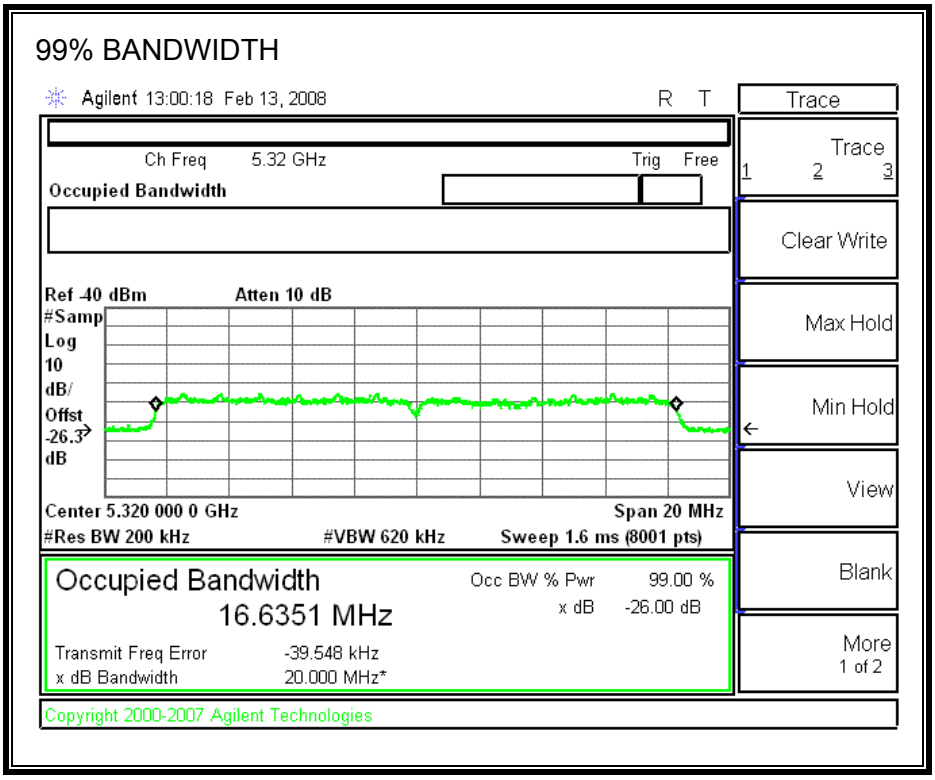
No EUT transmissions were observed on the test channel during the 30-minute observation time.

NON-OCCUPANCY PERIOD PLOT



10.2.6. DETECTION BANDWIDTH

REFERENCE PLOT OF 99% POWER BANDWIDTH



RESULTS

FL (MHz)	FH (MHz)	Detection Bandwidth (MHz)	99% Power Bandwidth (MHz)	Ratio of Detection BW to 99% Power BW (%)	Minimum Limit (%)
5312	5329	17	16.635	102.2	80

DETECTION BANDWIDTH PROBABILITY

DETECTION BANDWIDTH PROBABILITY RESULTS

Detection Bandwidth Test Results				
FCC Type 1 Waveform: 1 us Pulse Width, 1428 us PRI, 18 Pulses per Burst				
Frequency (MHz)	Number of Trials	Number Detected	Detection (%)	Mark
5311	10	0	0	
5312	10	10	100	FL
5313	10	10	100	
5314	10	10	100	
5315	10	10	100	
5316	10	10	100	
5317	10	10	100	
5318	10	10	100	
5319	10	10	100	
5320	10	10	100	
5321	10	10	100	
5322	10	10	100	
5323	10	10	100	
5324	10	10	100	
5325	10	10	100	
5326	10	10	100	
5327	10	10	100	
5328	10	10	100	
5329	10	10	100	FH
5330	10	0	0	

10.2.7. IN-SERVICE MONITORING

RESULTS

FCC Radar Test Summary				
Signal Type	Number of Trials	Detection (%)	Limit (%)	Pass/Fail
FCC TYPE 1	30	96.67	60	Pass
FCC TYPE 2	30	90.00	60	Pass
FCC TYPE 3	30	86.67	60	Pass
FCC TYPE 4	30	83.33	60	Pass
Aggregate		89.17	80	Pass
FCC TYPE 5	30	100.00	80	Pass
FCC TYPE 6	36	100.00	70	Pass

TYPE 1 DETECTION PROBABILITY

Data Sheet for FCC Fixed Radar Type 1	
1 us Pulse Width, 1428 us PRI, 18 Pulses per Burst	
Trial	Successful Detection (Yes/No)
1	Yes
2	Yes
3	Yes
4	Yes
5	Yes
6	Yes
7	Yes
8	Yes
9	Yes
10	Yes
11	Yes
12	Yes
13	Yes
14	Yes
15	Yes
16	Yes
17	Yes
18	Yes
19	Yes
20	Yes
21	Yes
22	No
23	Yes
24	Yes
25	Yes
26	Yes
27	Yes
28	Yes
29	Yes
30	Yes

TYPE 2 DETECTION PROBABILITY

Data Sheet for FCC Short Pulse Radar Type 2				
Waveform	Pulse Width (us)	PRI (us)	Pulses Per Burst	Successful Detection (Yes/No)
2001	2.9	190.00	29	Yes
2002	1.1	227.00	26	Yes
2003	4	185.00	25	Yes
2004	3.4	200.00	26	Yes
2005	4.7	202.00	28	Yes
2006	2.1	214.00	26	Yes
2007	3.6	173.00	27	No
2008	2	202.00	25	Yes
2009	2.8	171.00	25	Yes
2010	3.6	186.00	29	Yes
2011	3.2	181.00	23	Yes
2012	4.2	171.00	23	Yes
2013	4.2	198.00	28	No
2014	2.7	212.00	28	Yes
2015	2.1	198.00	25	Yes
2016	1.4	151.00	24	Yes
2017	1.8	223.00	26	Yes
2018	5	188.00	24	Yes
2019	2.3	179.00	25	Yes
2020	2.6	209.00	23	Yes
2021	2.2	230.00	26	No
2022	2.8	217.00	27	Yes
2023	1.7	229.00	28	Yes
2024	1	154.00	26	Yes
2025	1.6	198.00	23	Yes
2026	1.4	220.00	23	Yes
2027	2.6	183.00	23	Yes
2028	3.9	192.00	26	Yes
2029	4.2	213.00	23	Yes
2030	3.5	154.00	27	Yes

TYPE 3 DETECTION PROBABILITY

Data Sheet for FCC Short Pulse Radar Type 3				
Waveform	Pulse Width (us)	PRI (us)	Pulses Per Burst	Successful Detection (Yes/No)
3001	5.1	479.00	17	Yes
3002	6.4	410.00	18	Yes
3003	7.6	440.00	16	Yes
3004	8	320.00	16	Yes
3005	8.8	299.00	17	No
3006	5.5	335.00	18	Yes
3007	7.2	288.00	18	No
3008	9	388.00	17	Yes
3009	6.2	302.00	18	Yes
3010	5.2	477.00	17	Yes
3011	7.9	359.00	18	Yes
3012	8.8	464.00	16	Yes
3013	8.6	380.00	16	Yes
3014	5.5	361.00	16	Yes
3015	9.2	430.00	17	Yes
3016	8.9	342.00	17	Yes
3017	10	302.00	18	Yes
3018	8.8	269.00	17	No
3019	9.9	348.00	18	Yes
3020	7.6	306.00	17	Yes
3021	5.1	327.00	18	Yes
3022	6.4	336.00	16	Yes
3023	8.8	280.00	17	Yes
3024	5.1	297.00	18	Yes
3025	6.6	256.00	16	Yes
3026	7	286.00	17	Yes
3027	9.9	431.00	16	No
3028	6.3	483.00	17	Yes
3029	9.2	448	16	Yes
3030	7.2	422	18	Yes

TYPE 4 DETECTION PROBABILITY

Data Sheet for FCC Short Pulse Radar Type 4				
Waveform	Pulse Width (us)	PRI (us)	Pulses Per Burst	Successful Detection (Yes/No)
4001	14.4	478.00	12	Yes
4002	16	417.00	16	Yes
4003	15.2	402.00	13	Yes
4004	18.9	398.00	16	Yes
4005	10	363.00	15	No
4006	10.9	394.00	14	No
4007	11.8	455.00	12	Yes
4008	13.9	460.00	13	Yes
4009	16.8	451.00	12	Yes
4010	19.4	270.00	16	Yes
4011	14.5	276.00	13	Yes
4012	19.4	295.00	12	Yes
4013	16.6	383.00	14	Yes
4014	17.2	498.00	16	Yes
4015	14.4	321.00	14	No
4016	14	323.00	12	Yes
4017	13.1	293.00	12	Yes
4018	10.5	255.00	16	No
4019	20	291.00	15	No
4020	19.9	306.00	16	Yes
4021	15.7	257.00	12	Yes
4022	14.2	259.00	13	Yes
4023	11.1	449.00	16	Yes
4024	19.2	455.00	13	Yes
4025	11.9	396.00	12	Yes
4026	10.2	419.00	12	Yes
4027	10.2	317.00	12	Yes
4028	19.3	444.00	15	Yes
4029	12.3	401.00	12	Yes
4030	14.6	444.00	12	Yes

TYPE 5 DETECTION PROBABILITY

Data Sheet for FCC Long Pulse Radar Type 5	
Trial	Successful Detection (Yes/No)
1	Yes
2	Yes
3	Yes
4	Yes
5	Yes
6	Yes
7	Yes
8	Yes
9	Yes
10	Yes
11	Yes
12	Yes
13	Yes
14	Yes
15	Yes
16	Yes
17	Yes
18	Yes
19	Yes
20	Yes
21	Yes
22	Yes
23	Yes
24	Yes
25	Yes
26	Yes
27	Yes
28	Yes
29	Yes
30	Yes

Note: The Type 5 randomized parameters are shown in a separate document.

TYPE 6 DETECTION PROBABILITY

Data Sheet for FCC Hopping Radar Type 6				
1 us Pulse Width, 333 us PRI, 9 Pulses per Burst, 1 Burst per Hop				
NTIA August 2005 Hopping Sequence				
Trial	Starting Index Within Sequence (Base 1)	Signal Generator Frequency (MHz)	Hops within Detection BW	Successful Detection (Yes/No)
1	152	5312	2	Yes
2	627	5313	3	Yes
3	1102	5314	5	Yes
4	1577	5315	2	Yes
5	2052	5316	5	Yes
6	2527	5317	4	Yes
7	3002	5318	2	Yes
8	3477	5319	3	Yes
9	3952	5320	6	Yes
10	4427	5321	4	Yes
11	4902	5322	4	Yes
12	5377	5323	3	Yes
13	5852	5324	5	Yes
14	6327	5325	5	Yes
15	6802	5326	5	Yes
16	7277	5327	3	Yes
17	7752	5328	1	Yes
18	8227	5329	3	Yes
19	8702	5312	5	Yes
20	9177	5313	1	Yes
21	9652	5314	3	Yes
22	10127	5315	3	Yes
23	10602	5316	2	Yes
24	11077	5317	5	Yes
25	11552	5318	4	Yes
26	12027	5319	5	Yes
27	12502	5320	1	Yes
28	12977	5321	5	Yes
29	13452	5322	3	Yes
30	13927	5323	4	Yes
31	14402	5324	7	Yes
32	14877	5325	3	Yes
33	15352	5326	2	Yes
34	15827	5327	3	Yes
35	16302	5328	4	Yes
36	16777	5329	5	Yes

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^2)	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^2)	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^2)	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^2)	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.

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^2

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^2 is converted to units of W/m^2 by multiplying by a factor of 10.

LIMITS

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

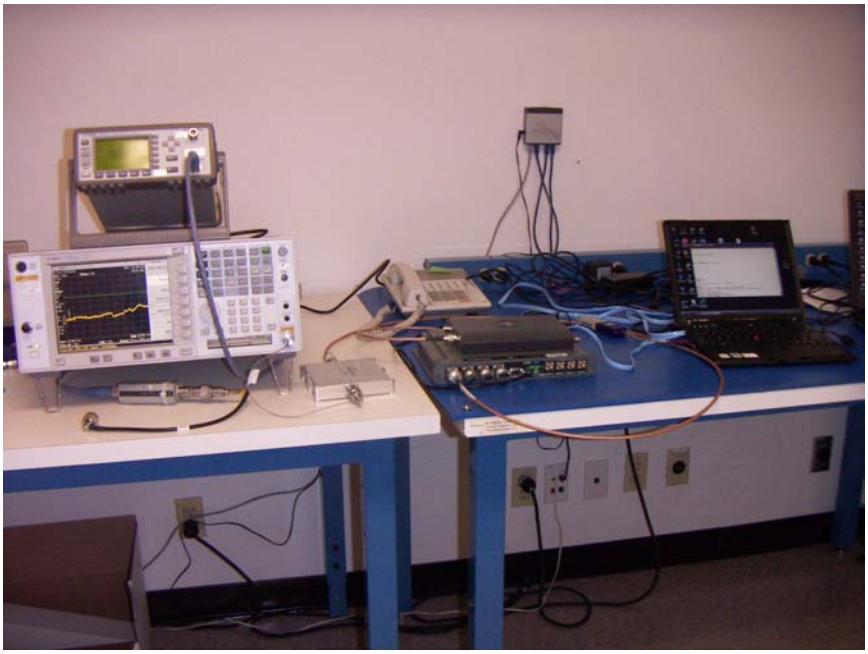
RESULTS

Mode	Band	MPE Distance (cm)	Output Power (dBm)	Antenna Gain (dBi)	FCC Power Density (mW/cm^2)
WLAN	5.3 GHz	20.0	17.98	5.00	0.04
WLAN	5.6 GHz	20.0	17.32	5.00	0.03

12. SETUP PHOTOS

ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP

ANTENNA PORT CONDUCTED PHOTO



RADIATED RF MEASUREMENT SETUP

RADIATED FRONT PHOTO

RADIATED BACK PHOTO

POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP

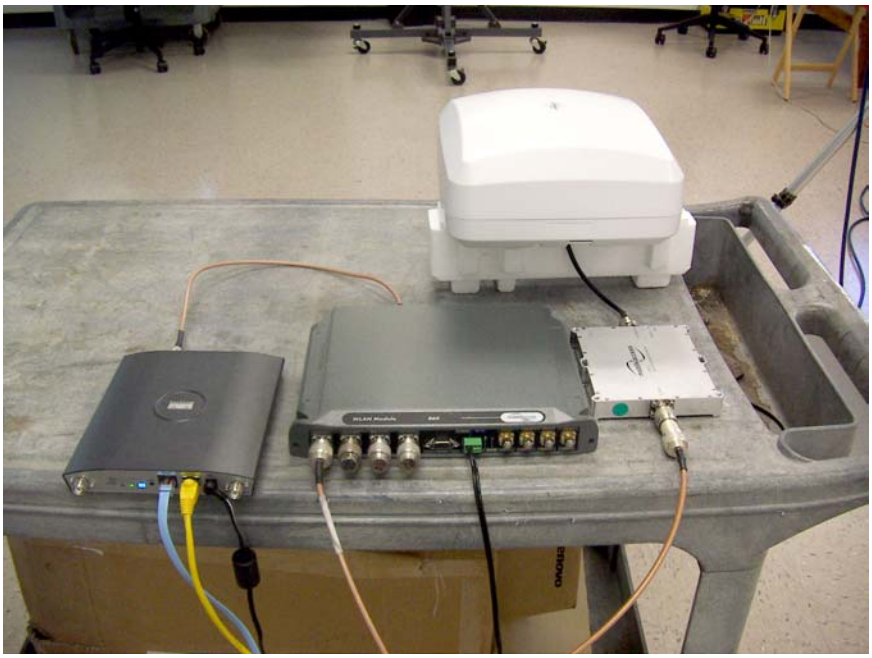
LINE CONDUCTED FRONT PHOTO

LINE CONDUCTED BACK PHOTO

DFS MEASUREMENT SETUP

DFS SETUP PHOTO

DFS CLOSE UP PHOTO



END OF REPORT