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

FOR

WIRELESS USB ADAPTER

MODEL NUMBER: CUSTOM DWL-AG132

FCC ID: STJ80411396001

REPORT NUMBER: 07U10885-2

ISSUE DATE: MARCH 12, 2007

Prepared for
HOSPIRA, INC.
755 JARVIS DRIVE
MORGAN HILL, CA 95037, USA

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	03/12/07	Initial Issue	T. Chan

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	HOSPIRA, INC. 755 JARVIS DRIVE MORGAN HILL, CA. 95037
EUT DESCRIPTION:	WIRELESS USB ADAPTER
MODEL:	CUSTOM DWL-AG132
SERIAL NUMBER:	0650A1004350
DATE TESTED:	FEBRUARY 23 - MARCH 01, 2007

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC 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:

CHIN PANG
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 and FCC CFR 47 Part 15.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.4, ANSI C63.7 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

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 an 802.11 a/b/g wireless upgrade module for Hospira Infusion Systems.

5.2. DESCRIPTION OF CLASS II CHANGE

The change filed under this application is adding a new antenna and modified by replacing on-board chip antenna with an RF connector, added 5.5GHz new band, and removed plastic cover.

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The antenna type is surface mount PIFA omni-directional antenna with a maximum gain of 4.5dBi.

5.4. SOFTWARE AND FIRMWARE

The EUT driver software installed in the host support equipment during testing was AR5523, Version 1.0.1.0.
The test utility software used during testing was Art Software Revision 5.3, Build #24

5.5. WORST-CASE CONFIGURATION AND MODE

The worst-case channel is determined as the channel with the highest output power. The highest measured output power is at mid channel for 5.3GHz band and low channel for 5.5GHz band.

The worst-case data rate for this channel is determined to be 6 Mb/s for a mode base on previous experience with WLAN product design architectures

The worst-case configuration has been evaluated the EUT @ Y-position.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacture**	**Model**	**Serial Number**	**FCC ID**
Laptop	Dell	Latitude D610	F5673A02	DoC
AC Adapter	Dell	AA22850	CN-OT2357162914AF04LC	DoC

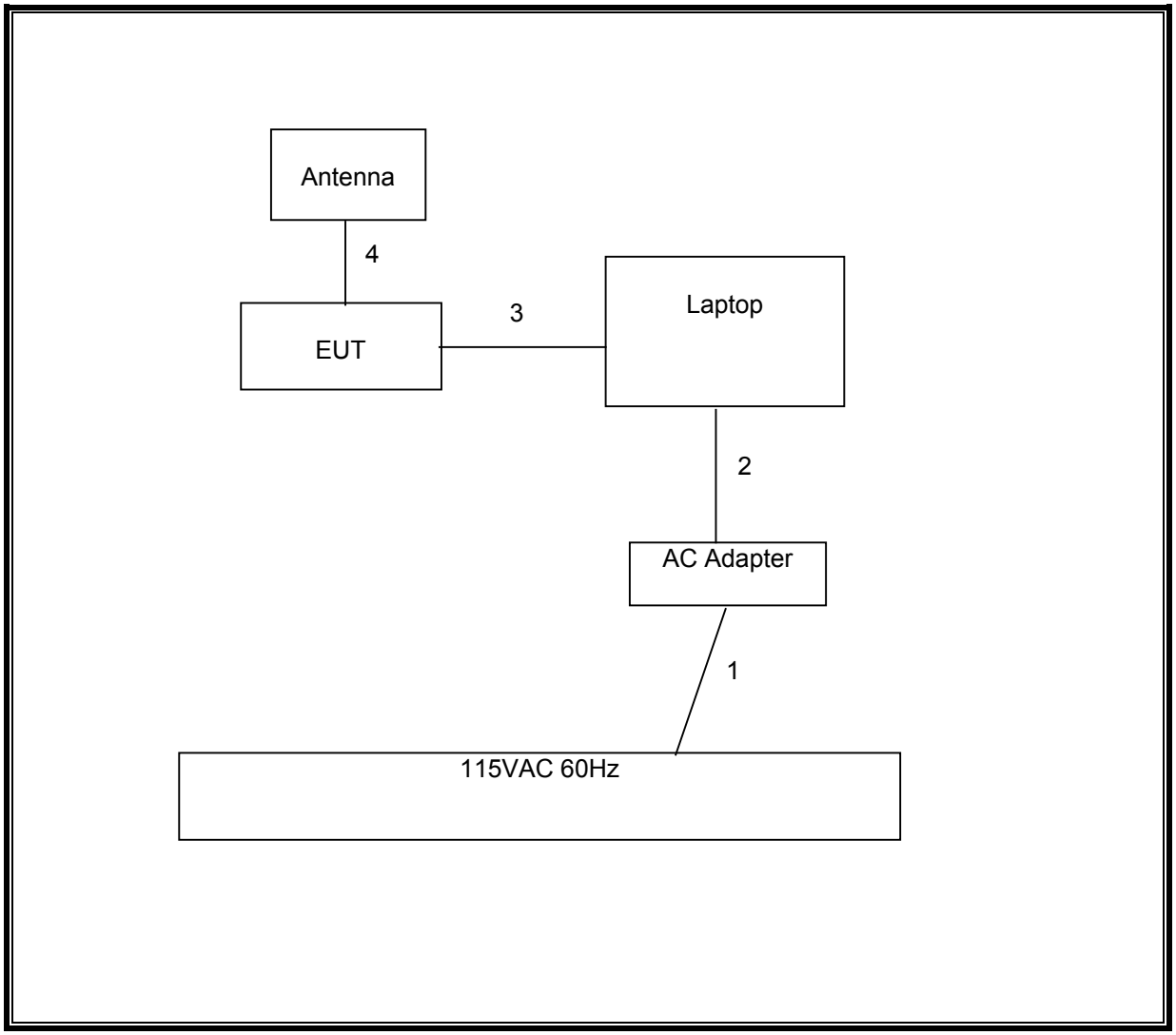
I/O CABLES

I/O CABLE LIST						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length**	**Remarks**
1	AC	1	US 115V	Un-shielded	2m	N/A
2	DC	1	DC	Un-shielded	2m	N/A
3	USB	1	Dougle	Un-shielded	2m	N/A
4	RF	1	Antenna	Un-shielded	0.1m	N/A

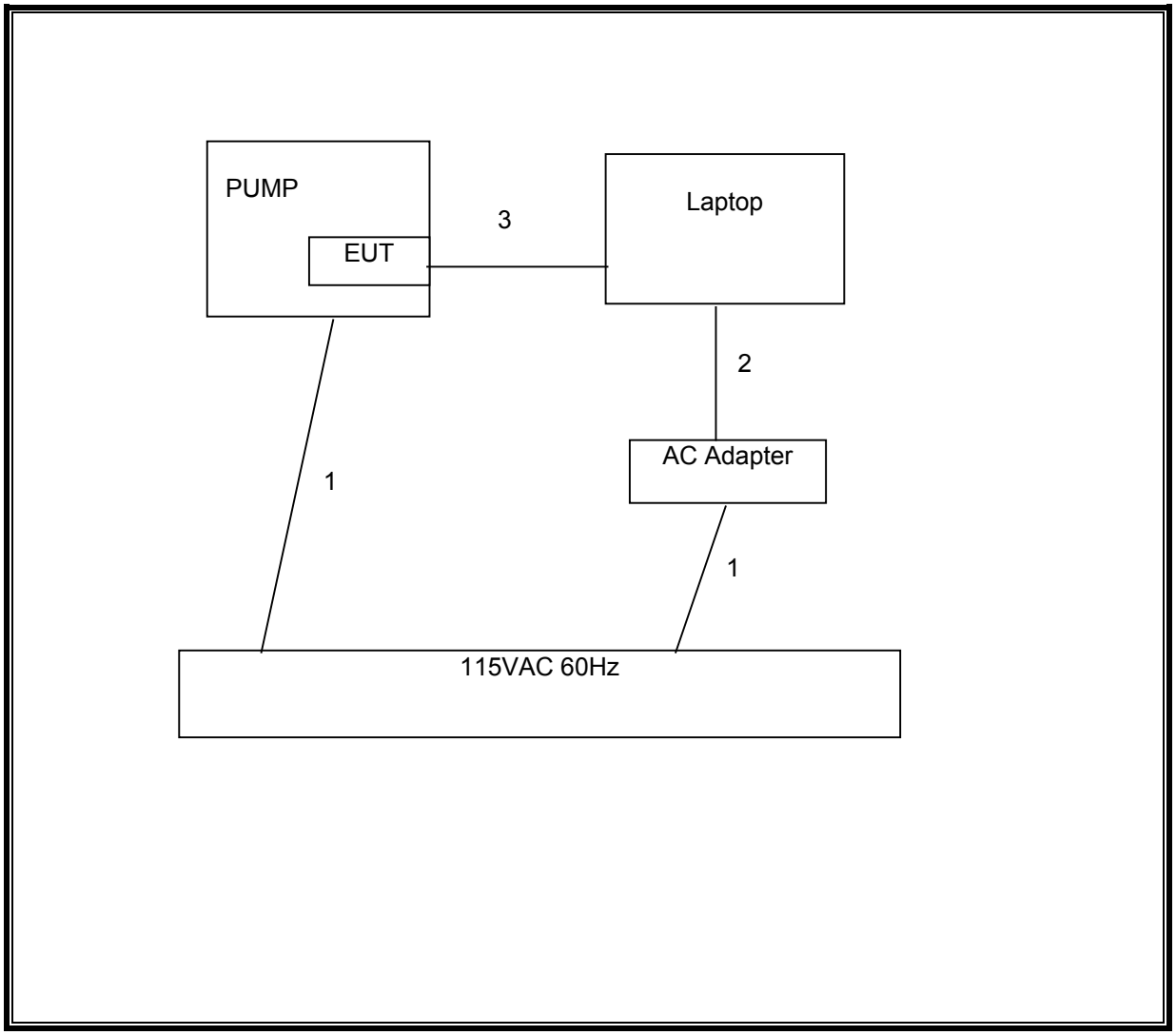
TEST SETUP

The EUT with external antenna is connected to a laptop via a USB Cable during the tests. Test software exercised the radio card.

SETUP DIAGRAM FOR TESTS (EUT MODULE WITH EXTERNAL ANTERNAL)



SETUP DIAGRAM FOR TESTS (EUT MODULE INSIDE THE PUMP)



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**	**Serial Number**	**Cal Due**
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	2/15/1906	4/22/2007
Preamplifier, 1 ~ 26.5 GHz	Agilent / HP	8449B	3008A00369	8/17/2007
Antenna, Horn 18 ~ 26 GHz	ARA	MWH-1826/B	1049	9/12/2007
Spectrum Analyzer 3 Hz ~ 44 GHz	Agilent / HP	E4446A	MY43360112	5/3/2007
Peak Power Meter	Agilent / HP	E4416A	GB41291160	12/2/2007
Peak / Average Power Sensor	Agilent	E9327A	US40440755	12/2/2007
Quasi-Peak Adaptor	Agilent / HP	85650A	2521A01038	1/11/2008
SA Display Section 3	Agilent / HP	85662A	2314A04793	12/17/2007
SA RF Section, 1.5 GHz	Agilent / HP	85680A	2314A02604	3/17/2007
Preamplifier, 1300 MHz	Agilent / HP	8447D	1937A02062	1/23/2008
Antenna, Bilog 30 MHz ~ 2 Ghz	Sunol Sciences	JB1	A121003	9/3/2006
7.6 GHz High Pass Filter	Micro Tronics	HPM13350	1	N/A

7. LIMITS AND RESULTS

7.1. CHANNEL TESTS FOR THE 5150 TO 5350 MHz BAND

7.1.1. AVERAGE POWER

AVERAGE POWER LIMIT

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

No non-compliance noted:

The cable assembly insertion loss of 11.3 dB (including 10 dB pad and 1.3dB cable) was entered as an offset in the power meter to allow for direct reading of power.

802.11a Mode

Channel	Frequency (MHz)	Average Power (dBm)
Low	5180	16.2
Low	5260	16.40
Middle	5280	16.10
Middle	5300	16.20
High	5320	16.00

7.2. CHANNEL TESTS FOR THE 5470 TO 5725 MHz BAND

7.2.1. EMISSION BANDWIDTH

LIMIT

§15.403 (i) Emission bandwidth. For purposes of this subpart the emission bandwidth shall be determined by measuring the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that are 26 dB down relative to the maximum level of the modulated carrier. Determination of the emissions bandwidth is based on the use of measurement instrumentation employing a peak detector function with an instrument resolutions bandwidth approximately equal to 1.0 percent of the emission bandwidth of the device under measurement.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 1% to 3% of the 26 dB bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled.

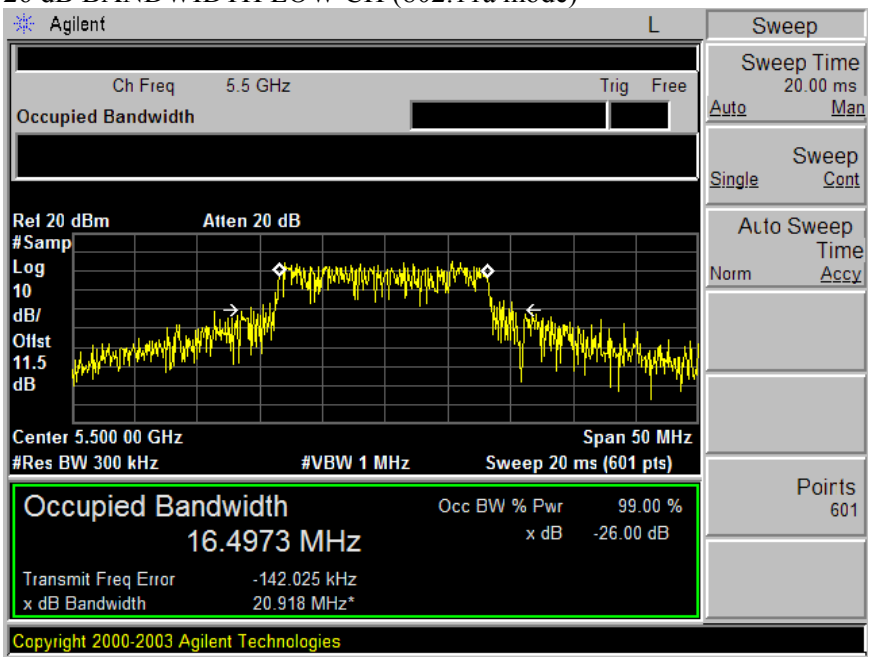
RESULTS

No non-compliance noted:

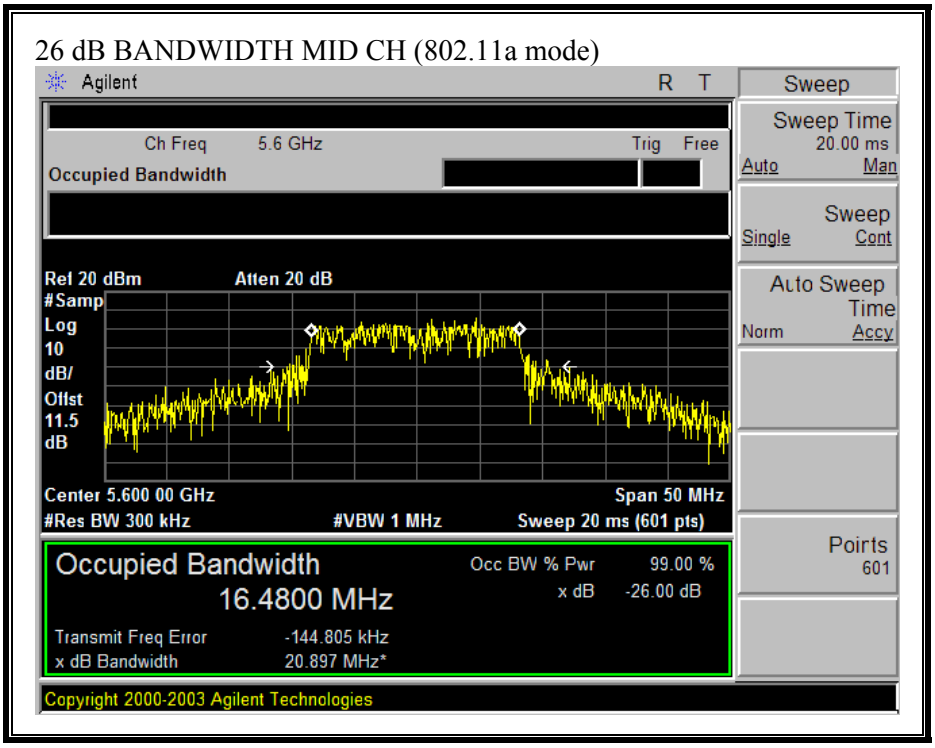
Channel	Frequency (MHz)	B (MHz)	10 Log B (dB)
Low	5500	20.92	13.21
Mid	5600	20.90	13.20
High	5700	20.34	13.08

26 dB EMISSION BANDWIDTH (802.11a MODE)

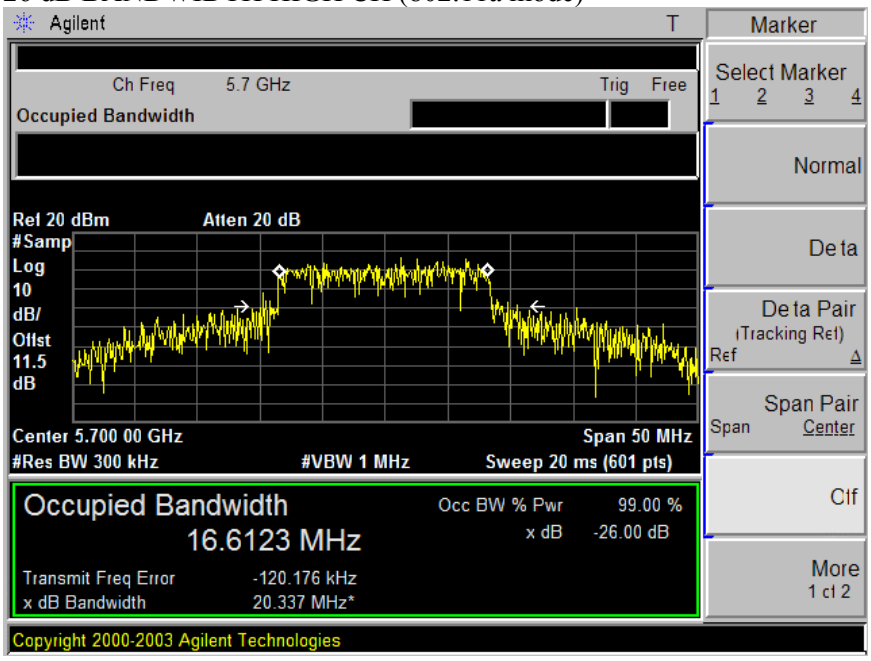
26 dB BANDWIDTH LOW CH (802.11a mode)



26 dB BANDWIDTH MID CH (802.11a mode)



26 dB BANDWIDTH HIGH CH (802.11a mode)



7.2.2. PEAK POWER

LIMIT

§15.407 (a) (2) For the 5.47–5.725 GHz band, the peak transmit 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.

LIMITS AND RESULTS

No non-compliance noted:

Limit

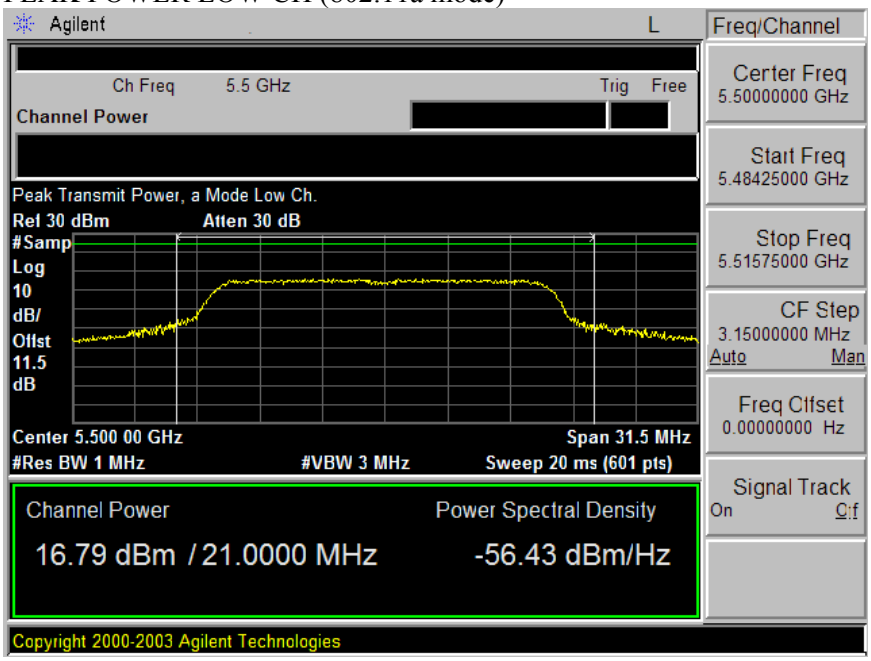
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5500	24	20.92	24.21	2.00	24.00
Mid	5600	24	20.90	24.20	2.00	24.00
High	5700	24	20.34	24.08	2.00	24.00

Results

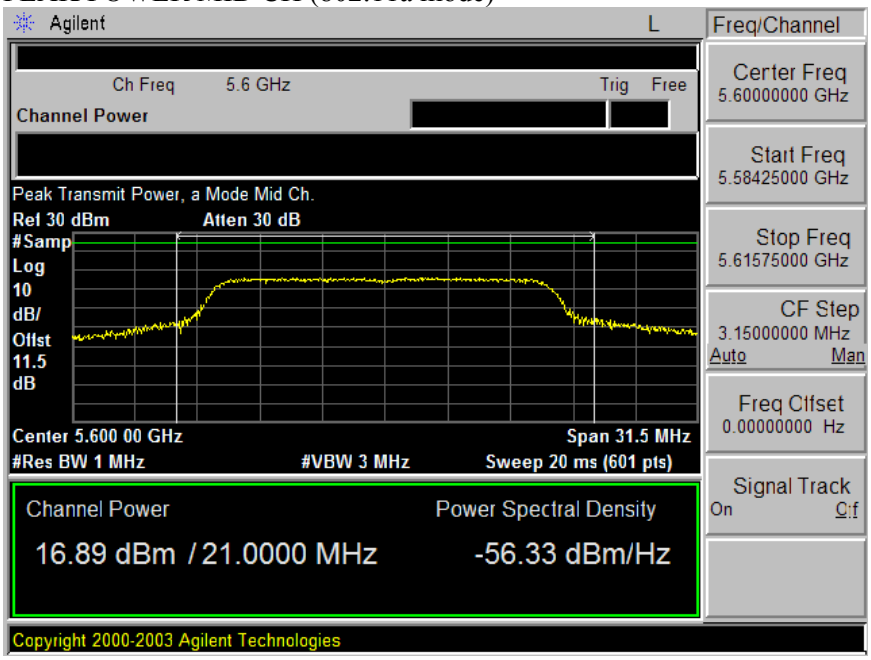
Channel	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)
Low	5500	16.79	24.00	-7.21
Mid	5600	16.89	24.00	-7.11
High	5700	16.41	24.00	-7.59

PEAK POWER (802.11a MODE)

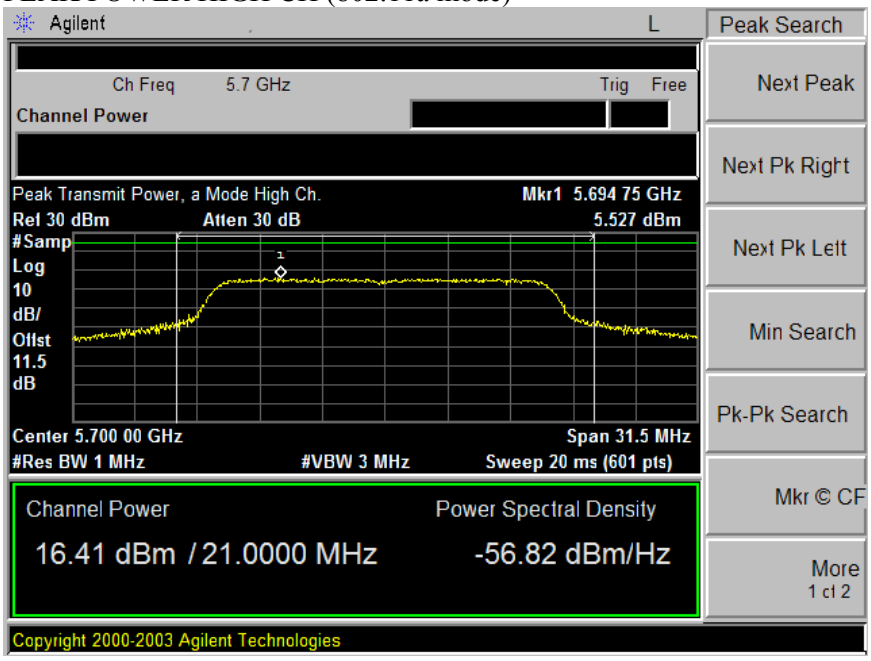
PEAK POWER LOW CH (802.11a mode)



PEAK POWER MID CH (802.11a mode)



PEAK POWER HIGH CH (802.11a mode)



7.2.3. AVERAGE POWER

AVERAGE POWER LIMIT

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

No non-compliance noted:

The cable assembly insertion loss of 11.4 dB (including 10 dB pad and 1.4 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

802.11a Mode

Channel	Frequency (MHz)	Average Power (dBm)
Low	5500	16.47
Mid	5600	16.59
High	5700	16.13

7.2.4. MAXIMUM PERMISSIBLE EXPOSURE

LIMITS

§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 and rearranging the terms to express the distance as a function of the remaining variables yields:

$d = \sqrt{((30 * P * G) / (3770 * S))}$

Changing to units of Power to mW and Distance to cm, using:

P (mW) = P (W) / 1000 and
d (cm) =100 * d (m)

yields

$d = 100 * \sqrt{((30 * (P / 1000) * G) / (3770 * S))}$
$d = 0.282 * \sqrt{(P * G / S)}$

where

d = distance in cm
P = Power in mW
G = Numeric antenna gain
S = Power Density in mW/cm^2

Substituting the logarithmic form of power and gain using:

P (mW) = 10 ^ (P (dBm) / 10) and
G (numeric) = 10 ^ (G (dBi) / 10)

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

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

LIMITS

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

RESULTS

No non-compliance noted:

Mode	Power Density Limit (mW/cm^2)	Output Power (dBm)	Antenna Gain (dBi)	MPE Distance (cm)
5180 - 5320	1.0	16.40	2.00	2.35
5500 - 5700	1.0	16.89	2.00	2.48

NOTE: For mobile or fixed location transmitters, the minimum separation distance is 20 cm, even if calculations indicate that the MPE distance would be less.

7.2.5. PEAK POWER SPECTRAL DENSITY

LIMIT

§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 = 2 dBi, therefore there is no reduction due to antenna gain.

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

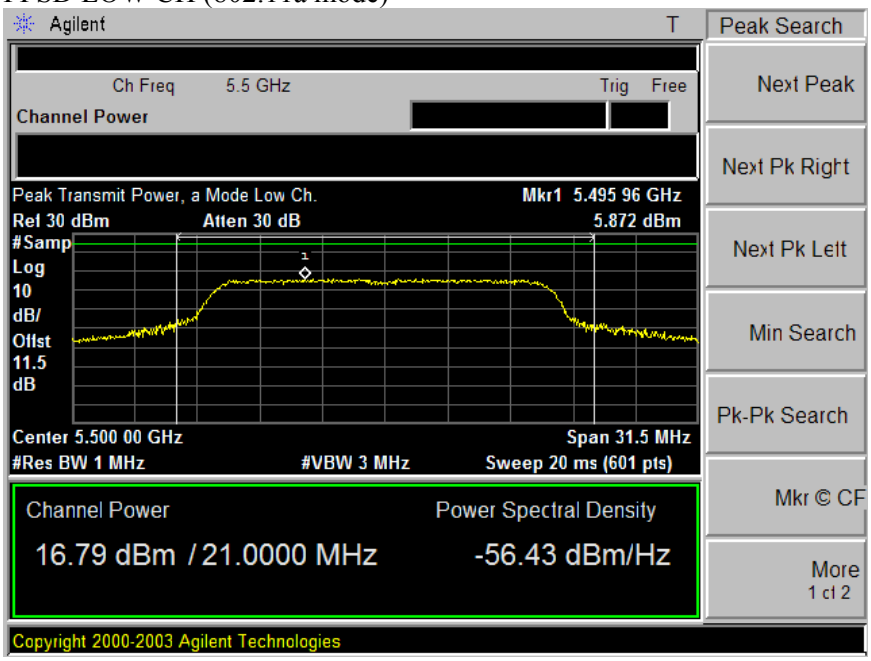
No non-compliance noted:

802.11a Mode

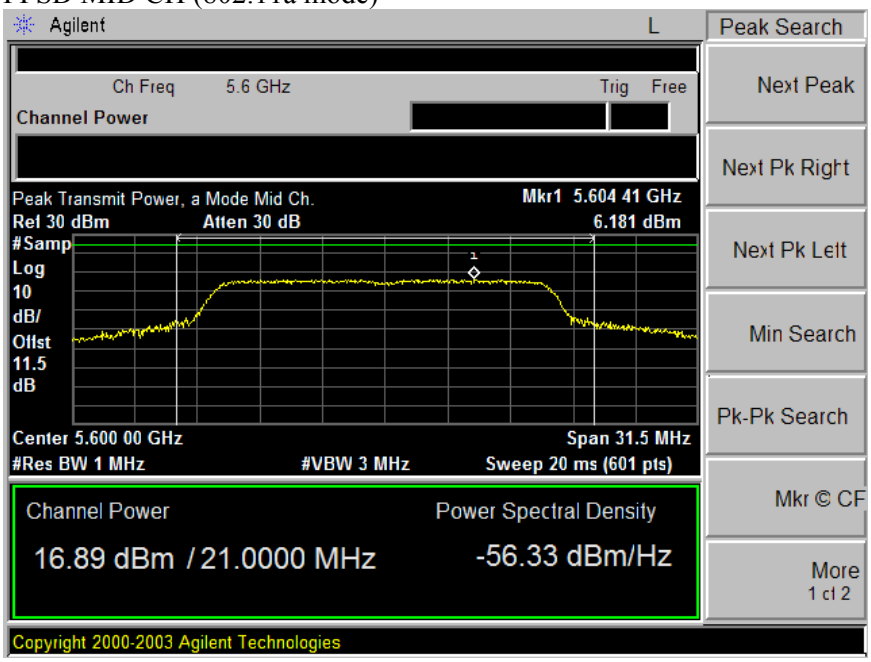
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5500	5.87	11.00	-5.13
Mid	5600	6.18	11.00	-4.82
High	5700	5.53	11.00	-5.47

PEAK POWER SPECTRAL DENSITY (802.11a MODE)

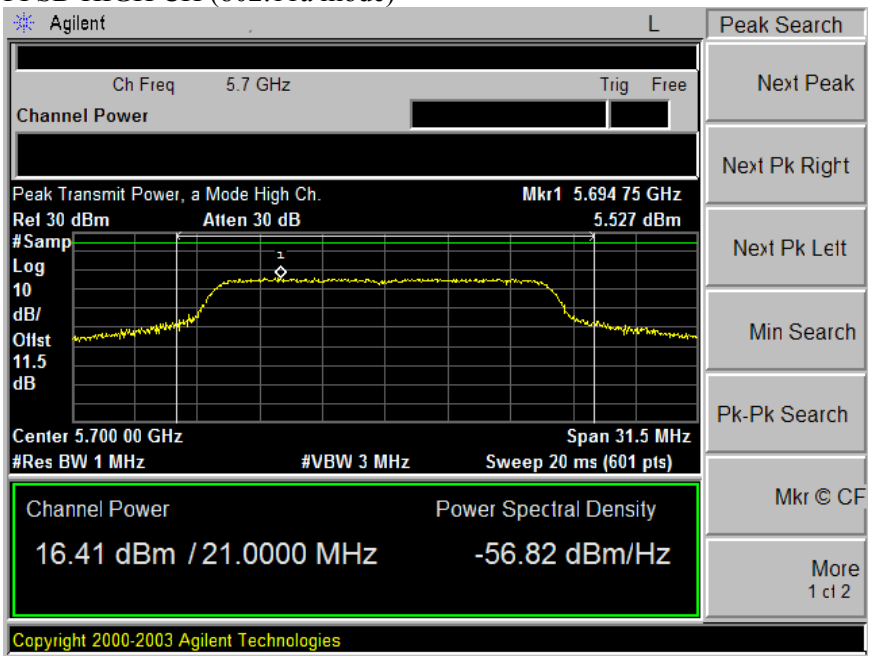
PPSD LOW CH (802.11a mode)



PPSD MID CH (802.11a mode)



PPSD HIGH CH (802.11a mode)



7.2.6. PEAK EXCURSION

LIMIT

§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

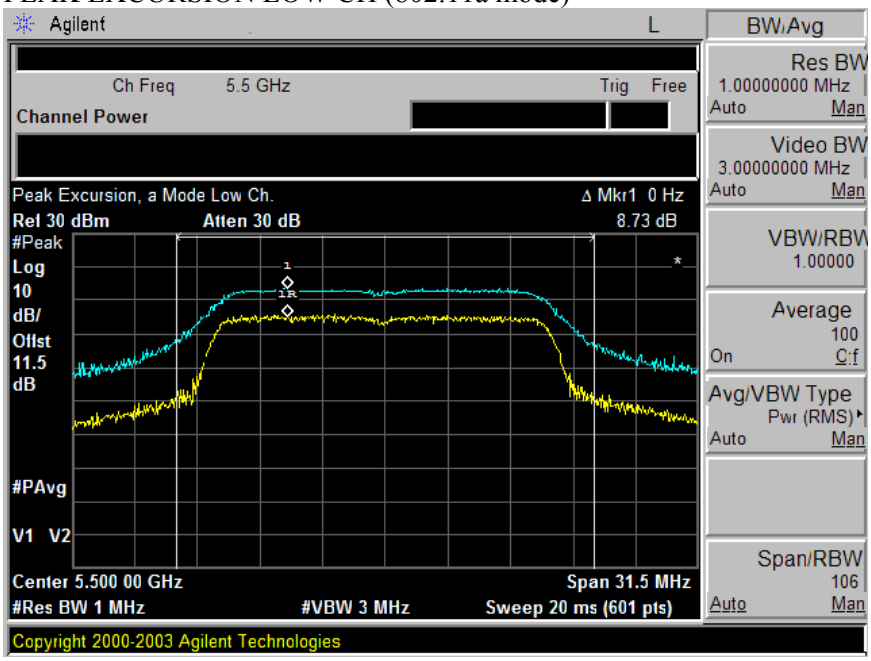
No non-compliance noted:

802.11a Mode

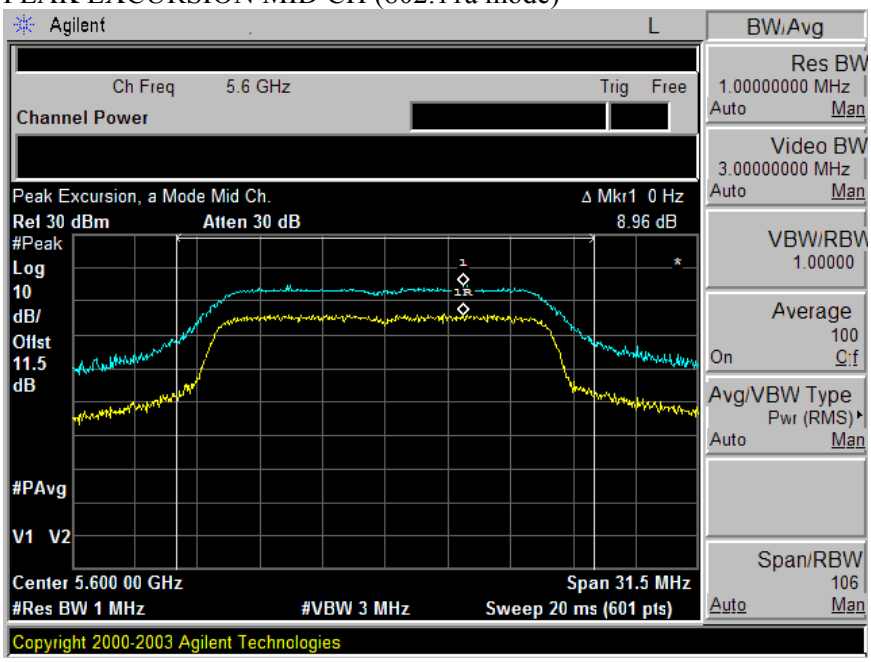
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5500	8.73	13	-4.27
Mid	5600	8.96	13	-4.04
High	5700	9.98	13	-3.02

PEAK EXCURSION (802.11a MODE)

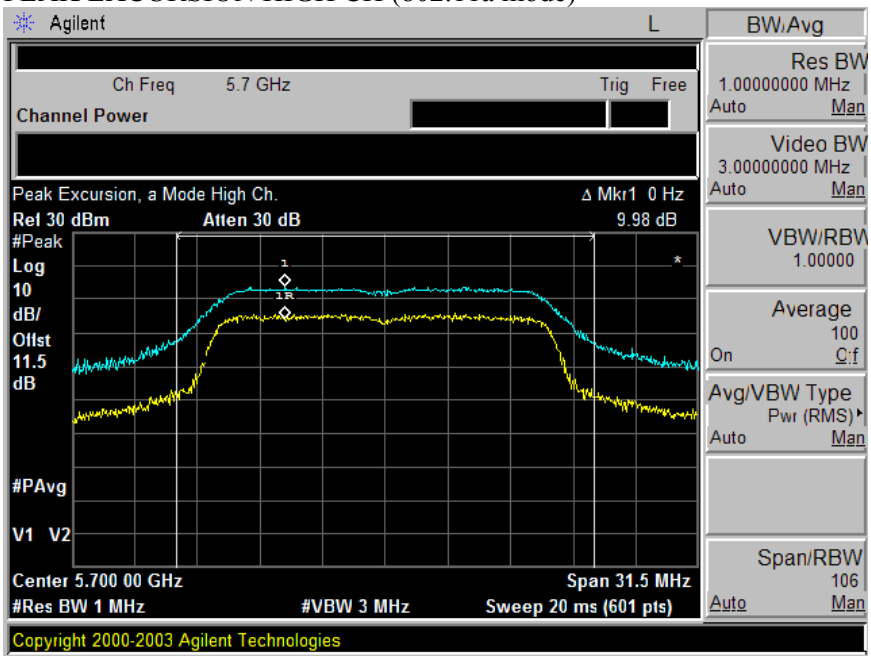
PEAK EXCURSION LOW CH (802.11a mode)



PEAK EXCURSION MID CH (802.11a mode)



PEAK EXCURSION HIGH CH (802.11a mode)



7.2.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

§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.

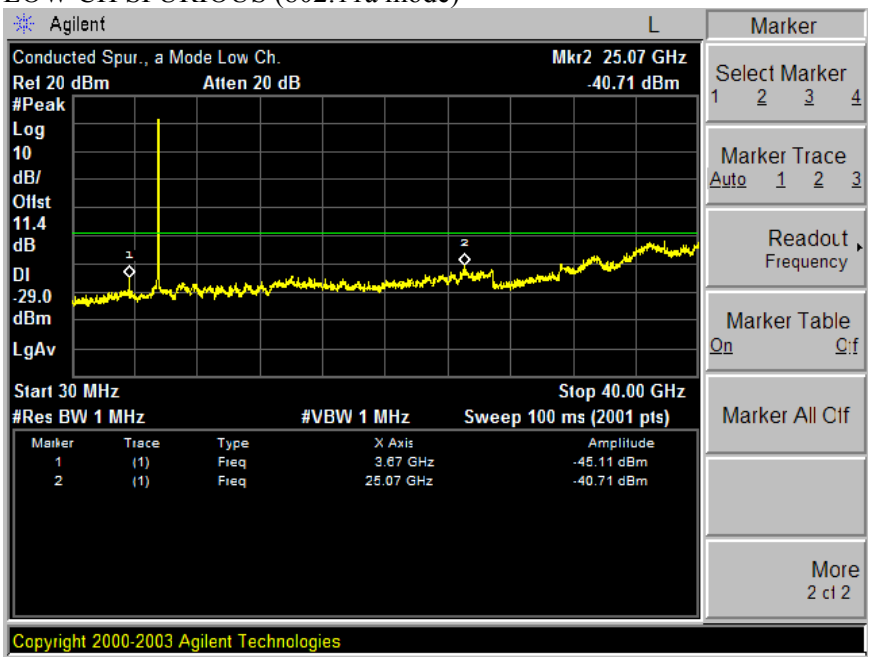
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

RESULTS

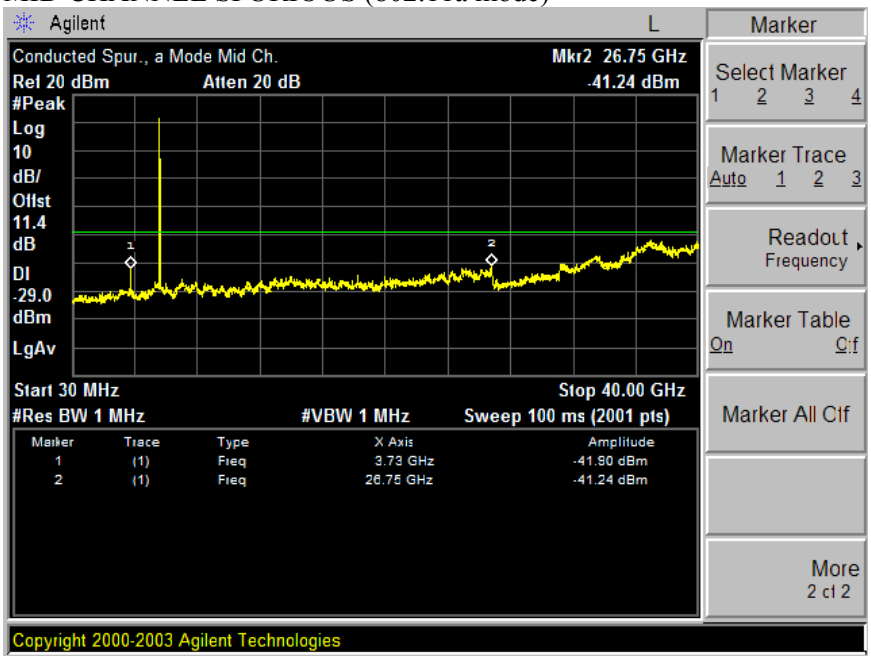
No non-compliance noted:

SPURIOUS EMISSIONS (802.11a MODE)

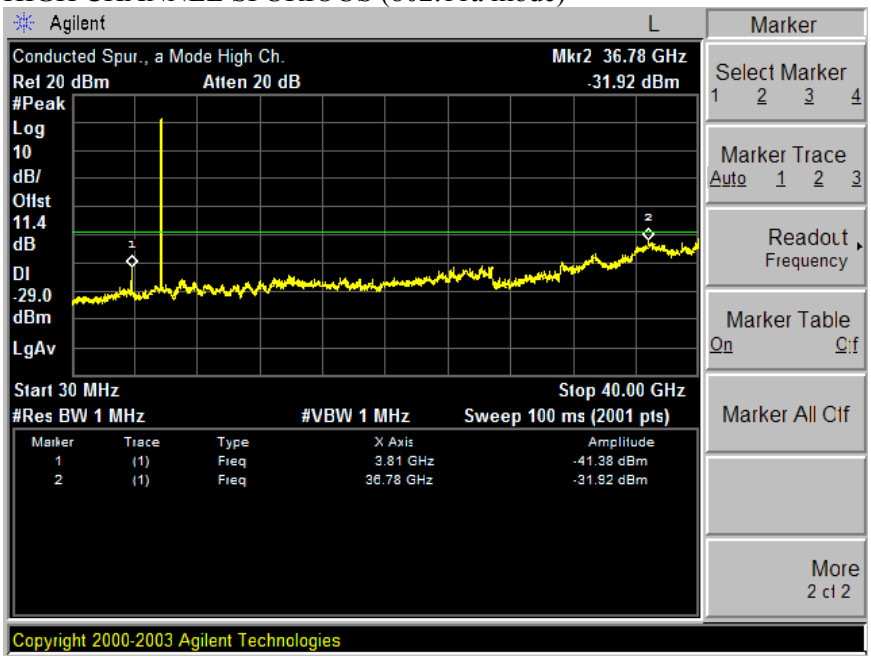
LOW CH SPURIOUS (802.11a mode)



MID CHANNEL SPURIOUS (802.11a mode)



HIGH CHANNEL SPURIOUS (802.11a mode)



7.2.8. FREQUENCY STABILITY

LIMIT

§15.407 (g) Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual.

TEST PROCEDURE

Reference measurements of the carrier frequency are made at nominal conditions of +20°C and the rated supply voltage.

Additional measurements are made at temperatures of – 30°C and +50°C at the manufacturer's rated power supply voltage. Additional measurements are made at +/- 15 percent of the manufacturer's rated supply voltage temperature of +20°C.

The additional measurements are compared with the reference measurements to calculate the frequency stability.

RESULTS

No non-compliance noted:

Reference Frequency at 20 deg C and 115 VAC

Supply Voltage (VAC)	Temperature (deg C)	Frequency (MHz)	Delta (ppm)	Notes
115.00	20	5599.88186	Reference	
115.00	-30	5599.944894	-11.256	*
115.00	50	5599.87700	0.869	
97.75	20	5599.88085	0.181	
132.25	20	5599.88059	0.227	

- Note: The absolute frequency shift at –30 deg C is 63.03 kHz. An examination of the adjacent restricted band edge and adjacent out-of-band radiated emission plots shows that the unwanted emission masks of the outermost channels will remain compliant under the above environmental conditions and the above frequency shift.

7.3. RADIATED EMISSIONS

7.3.1. TRANSMITTER RADIATED SPURIOUS EMISSIONS

LIMITS

§15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])
13.36 - 13.41			

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
[2] Above 38.6

§15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

§15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

§15.209 (b) In the emission table above, the tighter limit applies at the band edges.

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 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each band.

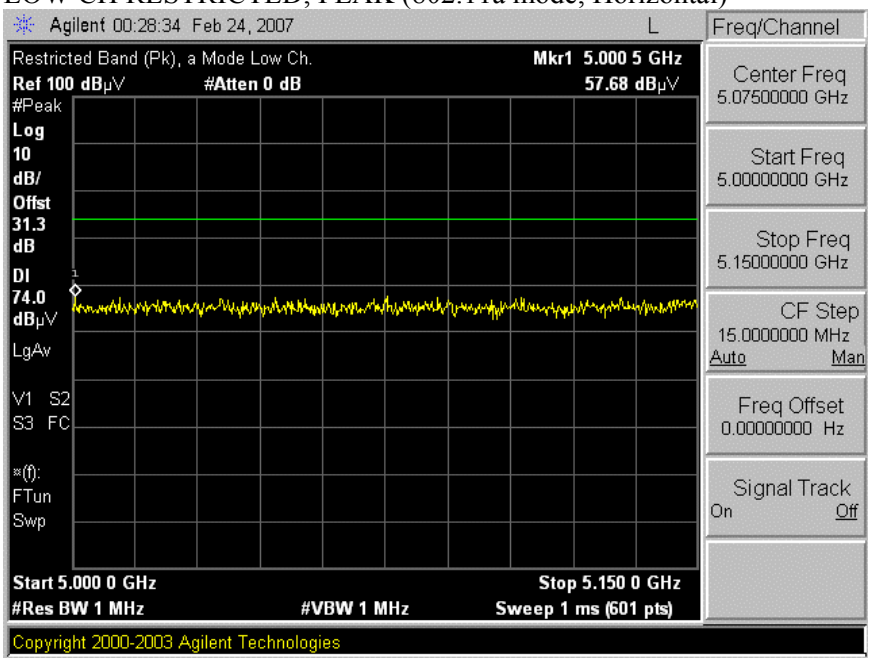
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

7.3.2. TRANSMITTER ABOVE 1 GHZ FOR 5150 TO 5350 MHz BAND

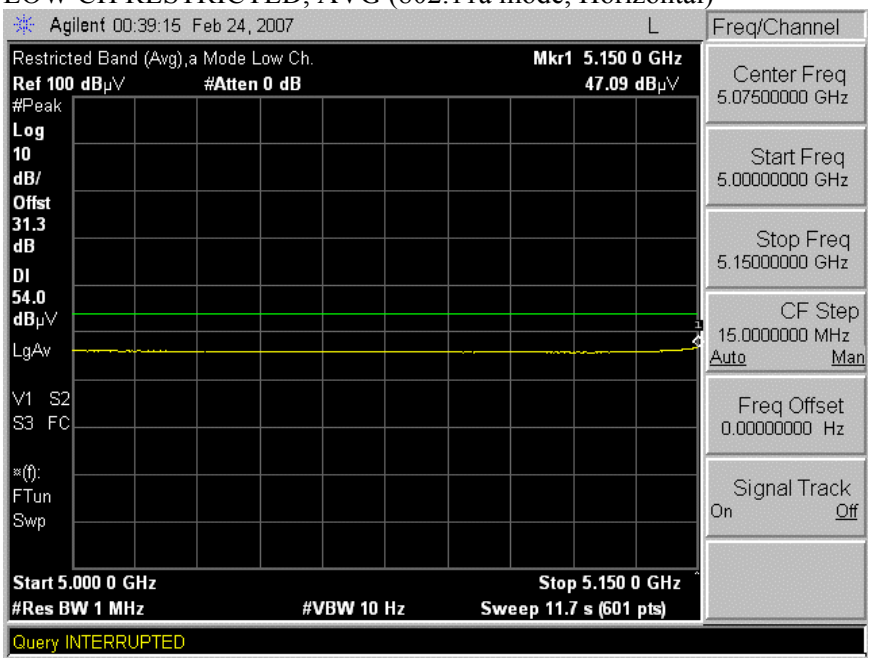
EUT MODULE WITH EXTERNAL ANTENNA

RESTRICTED BANDEDGE (802.11a MODE, LOW CHANNEL, HORIZONTAL)

LOW CH RESTRICTED, PEAK (802.11a mode, Horizontal)

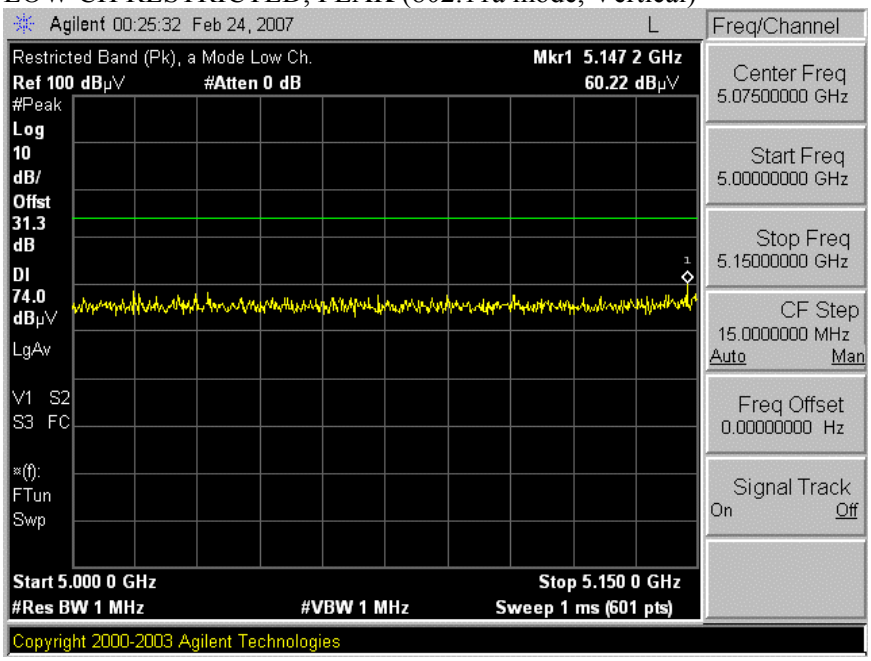


LOW CH RESTRICTED, AVG (802.11a mode, Horizontal)

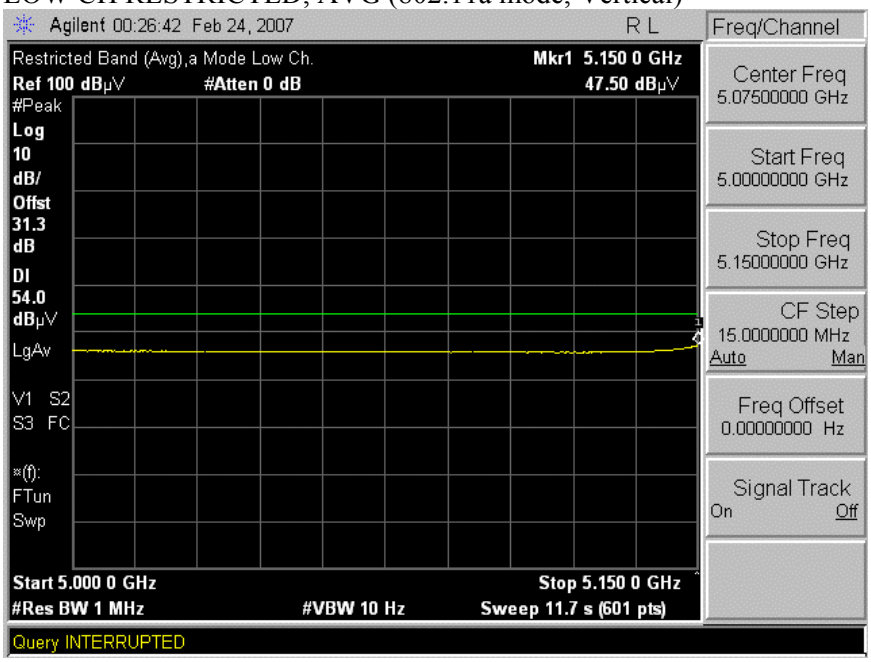


RESTRICTED BANDEDGE (802.11a MODE, LOW CHANNEL, VERTICAL)

LOW CH RESTRICTED, PEAK (802.11a mode, Vertical)

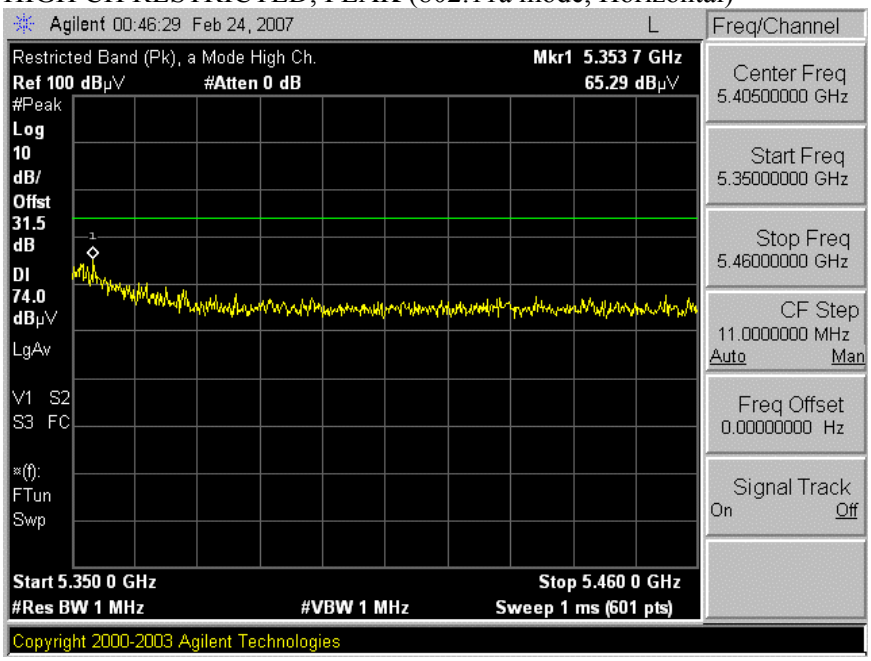


LOW CH RESTRICTED, AVG (802.11a mode, Vertical)

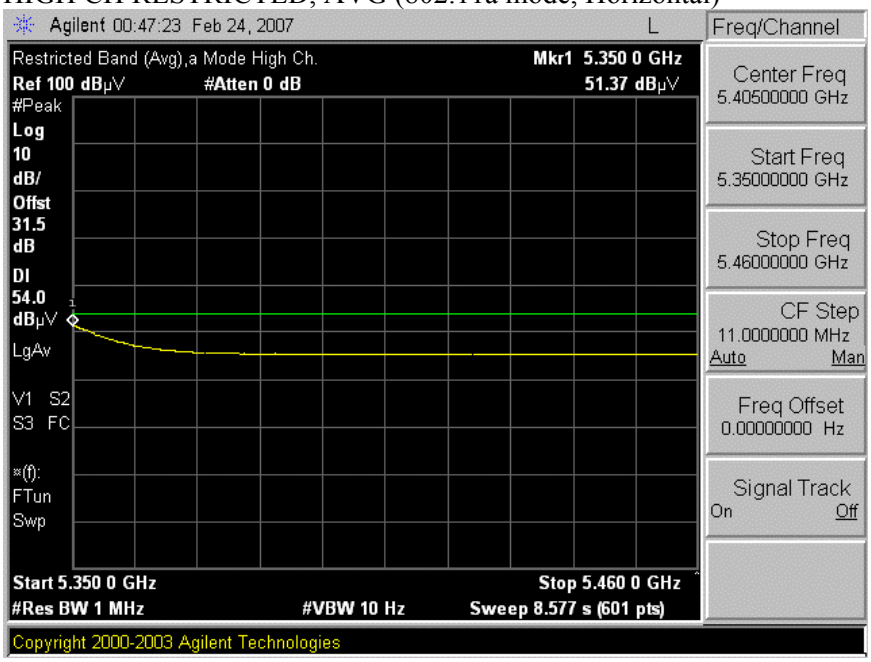


RESTRICTED BANDEDGE (802.11a MODE, HIGH CHANNEL, HORIZONTAL)

HIGH CH RESTRICTED, PEAK (802.11a mode, Horizontal)

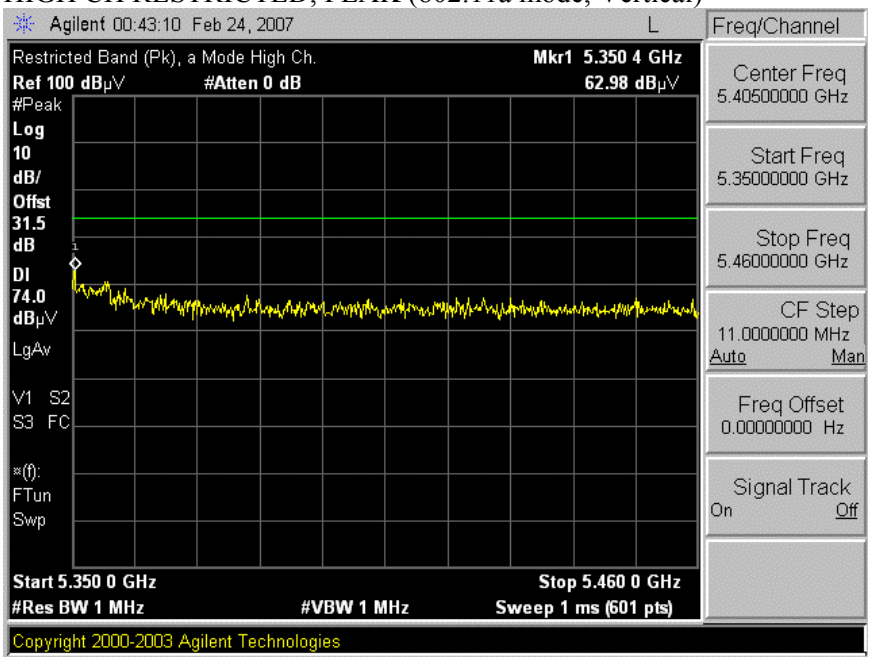


HIGH CH RESTRICTED, AVG (802.11a mode, Horizontal)

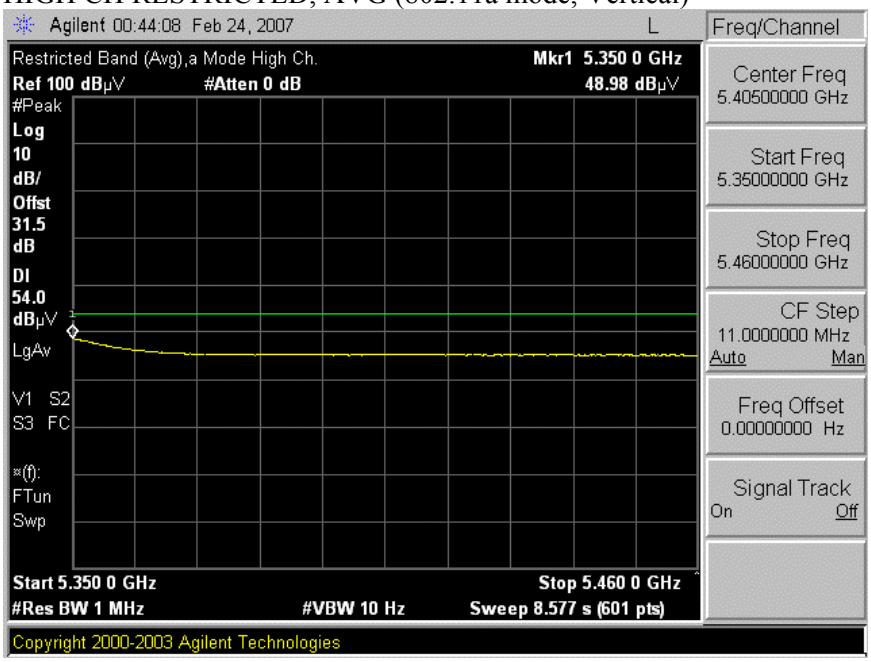


RESTRICTED BANDEDGE (802.11a MODE, HIGH CHANNEL, VERTICAL)

HIGH CH RESTRICTED, PEAK (802.11a mode, Vertical)



HIGH CH RESTRICTED, AVG (802.11a mode, Vertical)



HARMONICS AND SPURIOUS EMISSIONS (802.11a MODE)

High Frequency Measurement
Compliance Certification Services, Fremont Chamber B

Company: Hospira
Project #: 07U10885
Date: 02/24/2007
Test Engineer: Thanh Nguyen
Configuration: EUT/Antenna
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	T144 Miteq 3008A00931		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
	Thanh 187215003	Gordon 203134001	HPF_7.6GHz	

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)
Low Ch 5180Mhz															
15.540	1.0	46.9	34.5	38.1	13.9	-34.8	-9.5	0.7	55.2	42.8	74	54	-18.8	-11.2	V
20.706	1.0	44.9	32.7	33.3	14.3	-35.1	-9.5	0.1	47.9	35.7	74	54	-26.1	-18.3	V
15.540	1.0	50.2	36.0	38.1	13.9	-34.8	-9.5	0.7	58.5	44.3	74	54	-15.5	-9.7	H
20.706	1.0	44.1	32.6	33.3	14.3	-35.1	-9.5	0.1	47.2	35.7	74	54	-26.8	-18.3	H
Mid Ch 5260Mhz															
15.780	1.0	51.5	39.2	37.5	14.0	-34.6	-9.5	0.7	59.6	47.2	74	54	-14.4	-6.8	V
21.040	1.0	44.8	33.0	33.4	14.3	-35.2	-9.5	0.0	47.7	36.0	74	54	-26.3	-18.0	V
15.780	1.0	56.9	43.6	37.5	14.0	-34.6	-9.5	0.7	64.9	51.6	74	54	-9.1	-2.4	H
21.040	1.0	44.8	32.8	33.4	14.3	-35.2	-9.5	0.0	47.7	35.8	74	54	-26.3	-18.2	H
High Ch 5320MHz															
10.640	1.0	55.7	43.8	37.1	11.6	-36.6	-9.5	0.8	59.0	47.1	74	54	-15.0	-6.9	V
15.960	1.0	48.8	36.8	37.1	14.1	-34.5	-9.5	0.7	56.6	44.6	74	54	-17.4	-9.4	V
21.280	1.0	48.8	36.8	33.4	14.6	-35.1	-9.5	0.0	52.2	40.2	74	54	-21.8	-13.8	V
10.640	1.0	52.0	40.5	37.1	11.6	-36.6	-9.5	0.8	55.3	43.8	74	54	-18.7	-10.2	H
15.960	1.0	45.3	32.7	37.1	14.1	-34.5	-9.5	0.7	53.2	40.5	74	54	-20.8	-13.5	H
21.280	1.0	46.0	32.7	33.4	14.6	-35.1	-9.5	0.0	49.3	36.0	74	54	-24.7	-18.0	H

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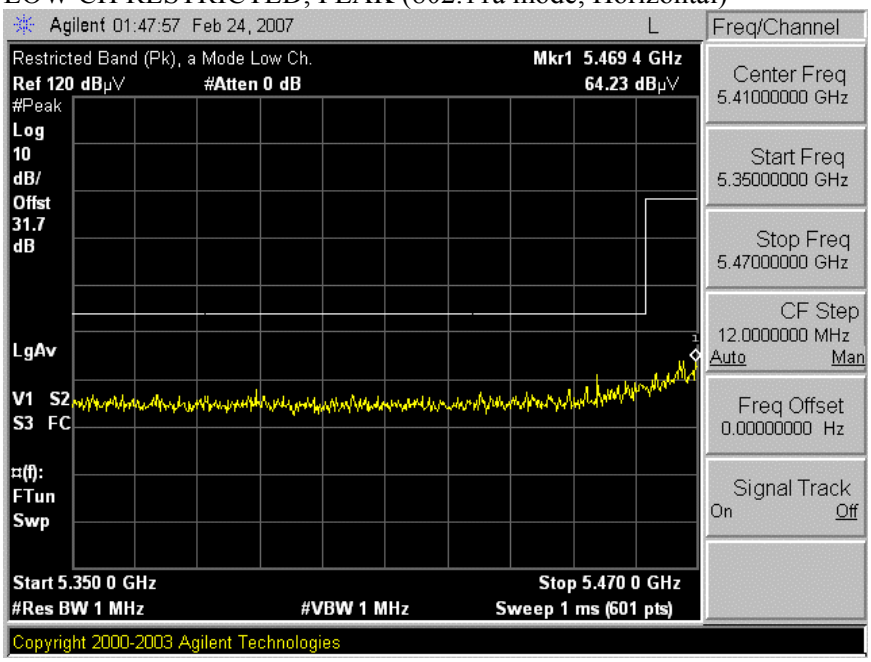
f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field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

7.3.3. TRANSMITTER ABOVE 1 GHZ FOR 5470 TO 5725 MHz BAND

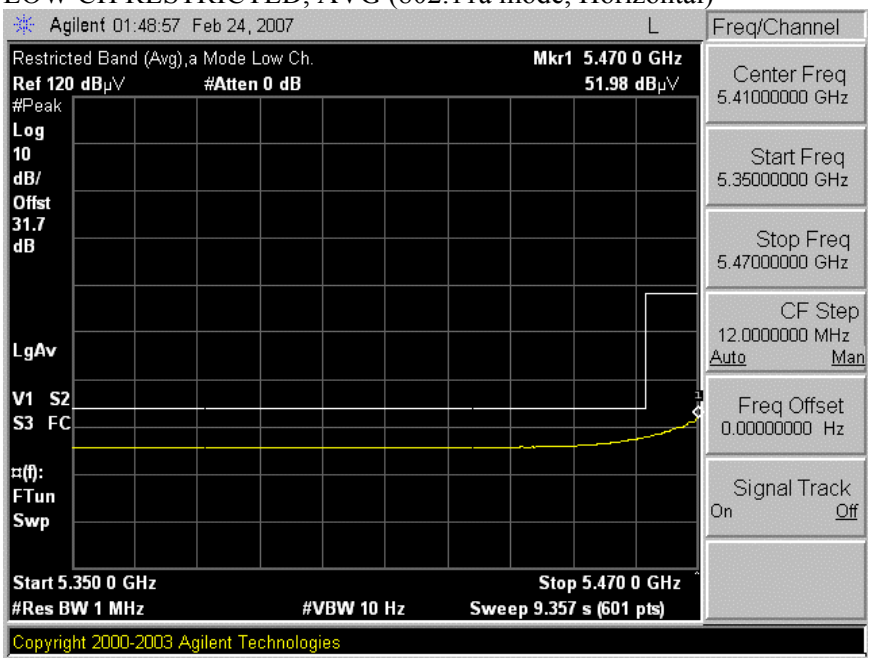
EUT MODULE WITH EXTERNAL ANTENNA

RESTRICTED BANDEDGE (802.11a MODE, LOW CHANNEL, HORIZONTAL)

LOW CH RESTRICTED, PEAK (802.11a mode, Horizontal)

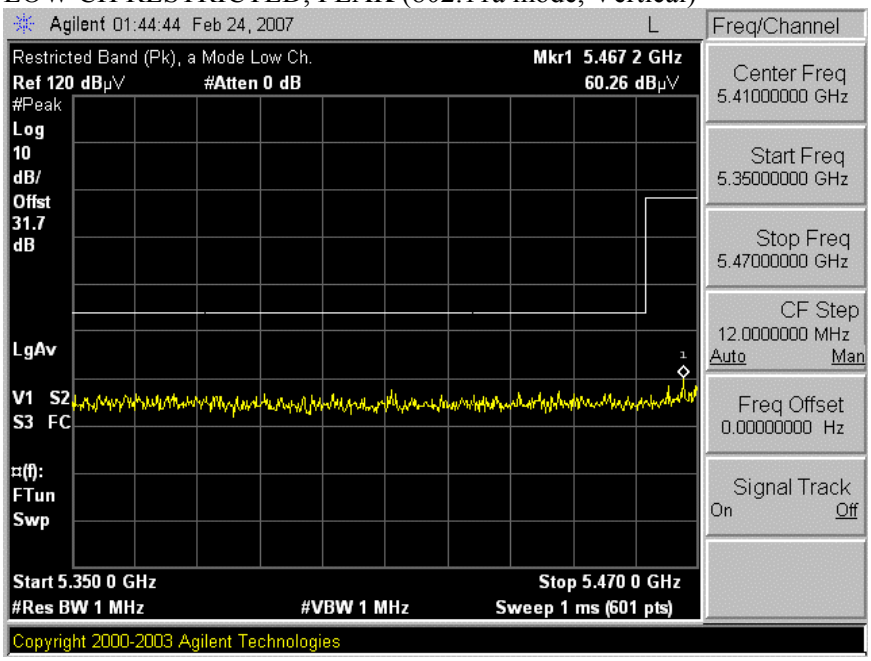


LOW CH RESTRICTED, AVG (802.11a mode, Horizontal)

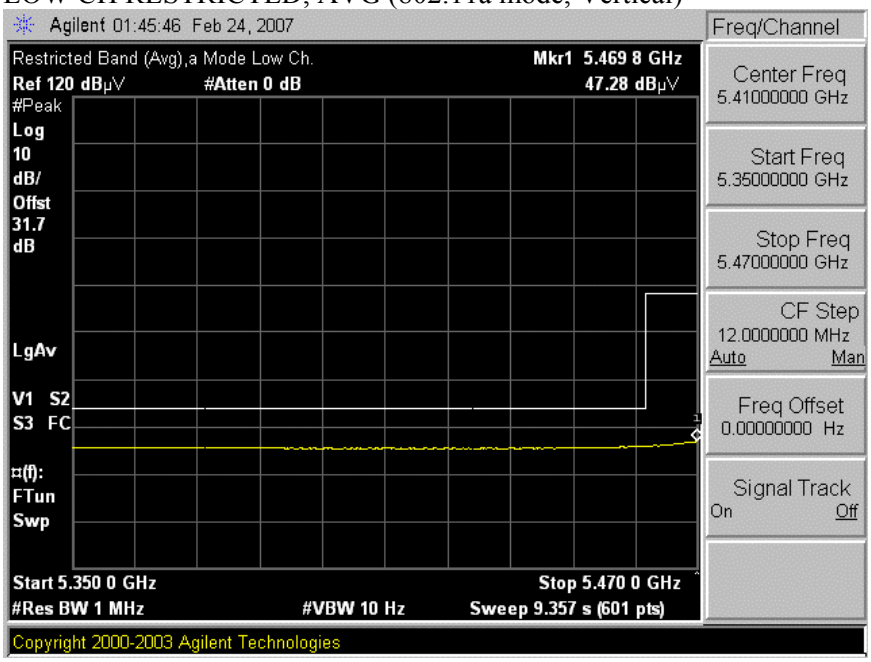


RESTRICTED BANDEDGE (802.11a MODE, LOW CHANNEL, VERTICAL)

LOW CH RESTRICTED, PEAK (802.11a mode, Vertical)

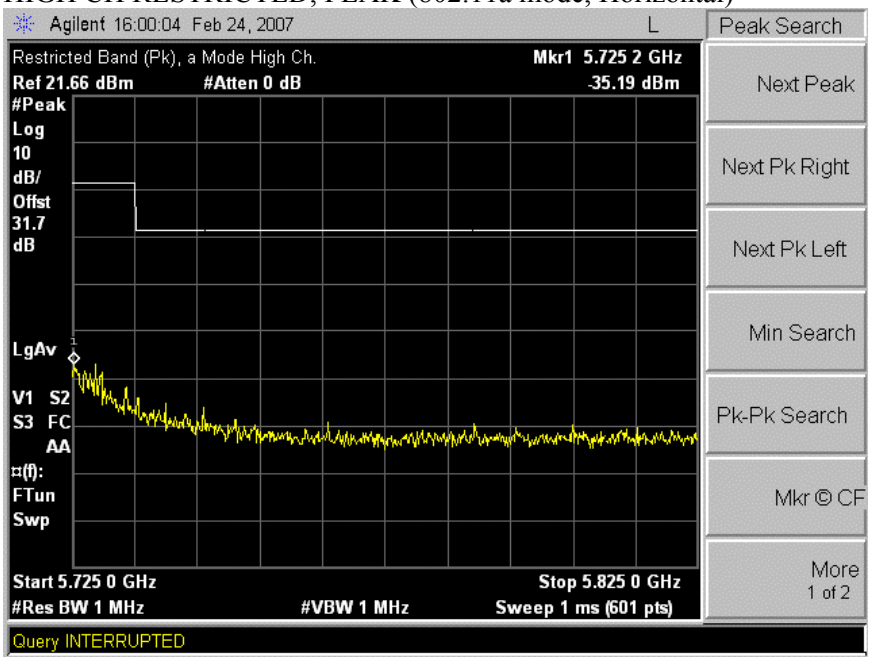


LOW CH RESTRICTED, AVG (802.11a mode, Vertical)

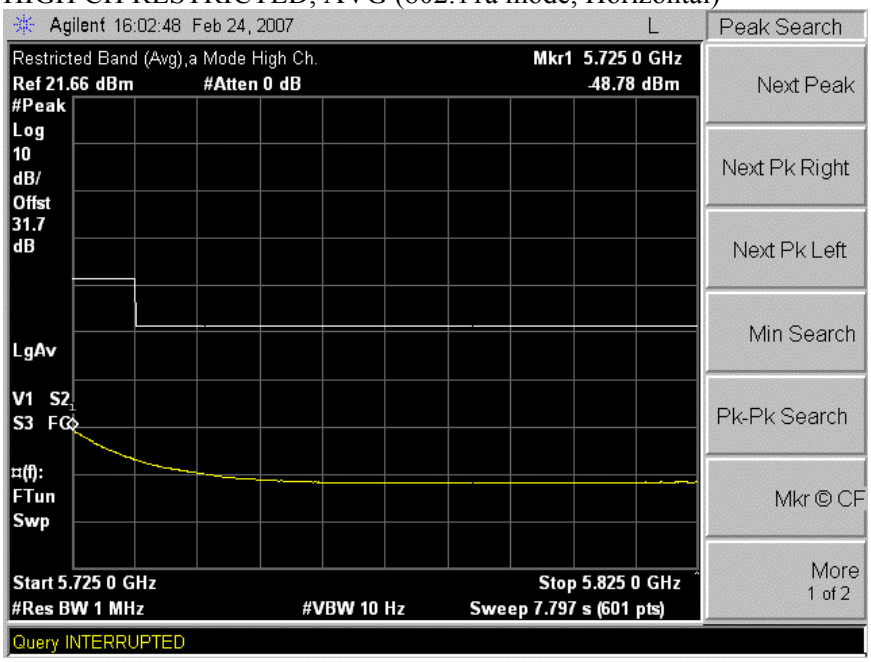


RESTRICTED BANDEDGE (802.11a MODE, HIGH CHANNEL, HORIZONTAL)

HIGH CH RESTRICTED, PEAK (802.11a mode, Horizontal)

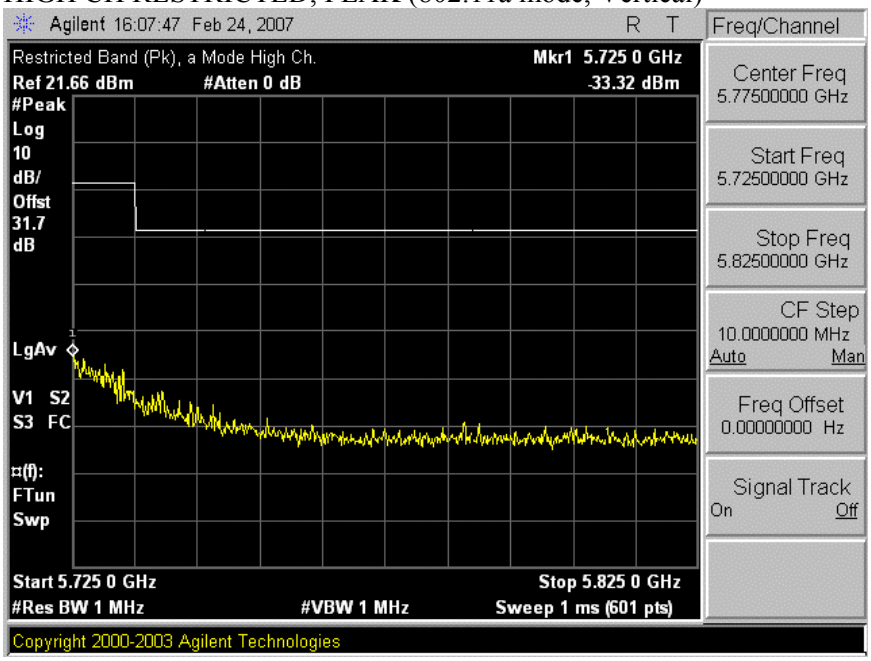


HIGH CH RESTRICTED, AVG (802.11a mode, Horizontal)

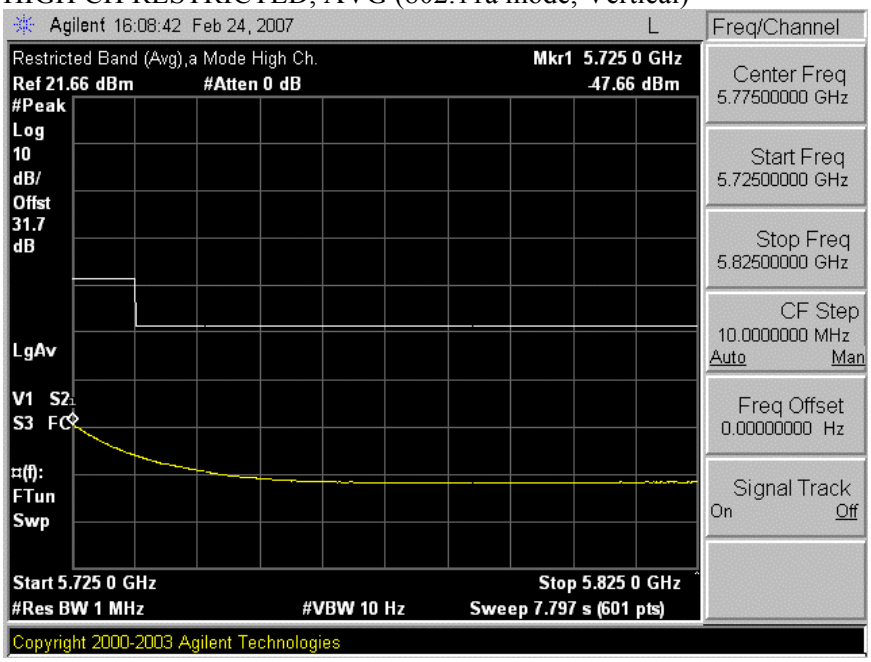


RESTRICTED BANDEDGE (802.11a MODE, HIGH CHANNEL, VERTICAL)

HIGH CH RESTRICTED, PEAK (802.11a mode, Vertical)



HIGH CH RESTRICTED, AVG (802.11a mode, Vertical)



HARMONICS AND SPURIOUS EMISSIONS (802.11a MODE)

High Frequency Measurement
Compliance Certification Services, Fremont Chamber B

Company: Hospira
Project #: 07U10885
Date: 02/24/2007
Test Engineer: Thanh Nguyen
Configuration: EUT/Antenna
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	T144 Miteq 3008A00931		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
	Thanh 187215003	Gordon 203134001	HPF_7.6GHz	

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)
Low Ch 5500Mhz															
11.000	1.0	50.3	37.6	37.2	11.9	-36.3	-9.5	0.0	53.7	40.9	74	54	-20.3	-13.1	V
11.000	1.0	52.9	39.4	37.2	11.9	-36.3	-9.5	0.7	57.0	43.5	74	54	-17.0	-10.5	H
Mid Ch 5600Mhz															
11.200	1.0	62.0	47.1	37.3	12.1	-36.1	-9.5	0.7	66.5	51.6	74	54	-7.5	-2.4	V
22.400	1.0	43.2	31.3	33.5	15.7	-34.6	-9.5	0.0	48.3	36.4	74	54	-25.7	-17.6	V
11.200	1.0	51.5	39.5	37.3	12.1	-36.1	-9.5	0.7	56.1	44.0	74	54	-17.9	-10.0	H
22.400	1.0	42.6	31.5	33.5	15.7	-34.6	-9.5	0.0	47.8	36.7	74	54	-26.2	-17.3	H
High Ch 57000MHz															
11.400	1.0	50.6	38.7	37.4	12.3	-35.9	-9.5	0.7	55.6	43.6	74	54	-18.4	-10.4	V
22.800	1.0	45.9	33.0	33.6	16.1	-34.4	-9.5	0.0	51.6	38.8	74	54	-22.4	-15.2	V
11.400	1.0	47.5	34.9	37.4	12.3	-35.9	-9.5	0.7	52.4	39.8	74	54	-21.6	-14.2	H
22.800	1.0	44.2	32.4	33.6	16.1	-34.4	-9.5	0.0	49.9	38.2	74	54	-24.1	-15.8	H

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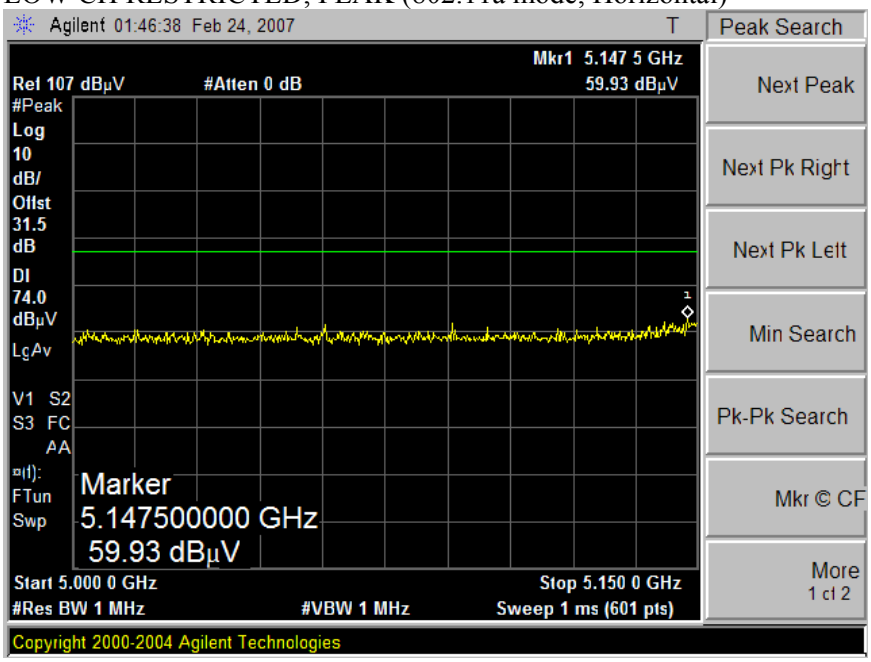
f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field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

7.3.4. TRANSMITTER ABOVE 1 GHZ FOR 5150 TO 5350 MHz BAND

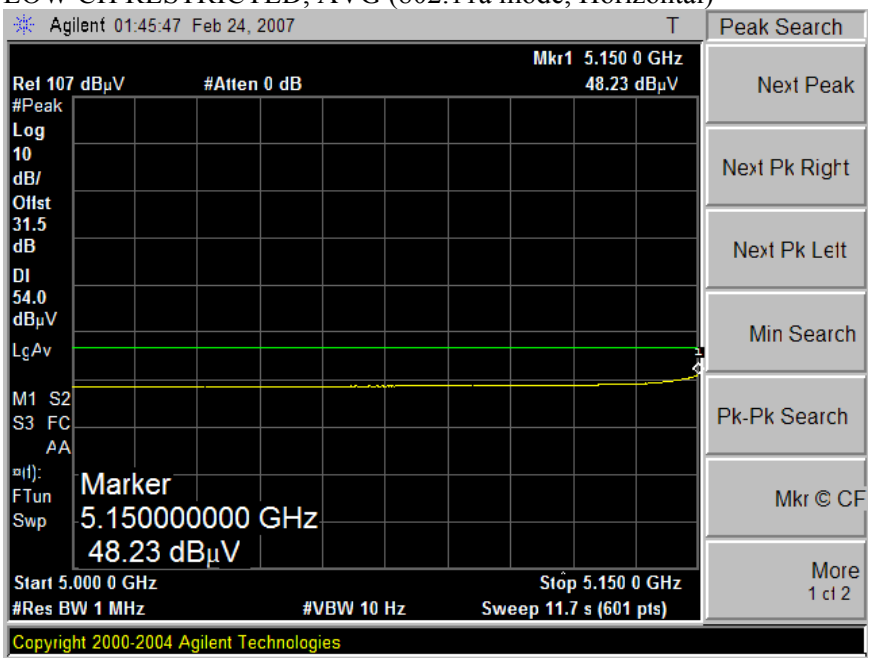
EUT MODULE NSIDE THE PLUM A+

RESTRICTED BANDEDGE (802.11a MODE, LOW CHANNEL, HORIZONTAL)

LOW CH RESTRICTED, PEAK (802.11a mode, Horizontal)

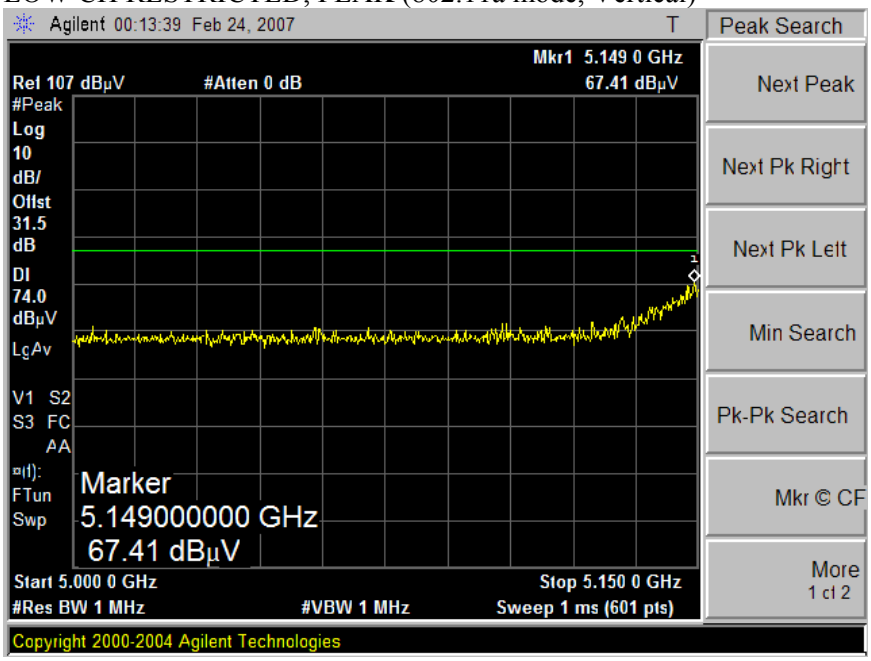


LOW CH RESTRICTED, AVG (802.11a mode, Horizontal)

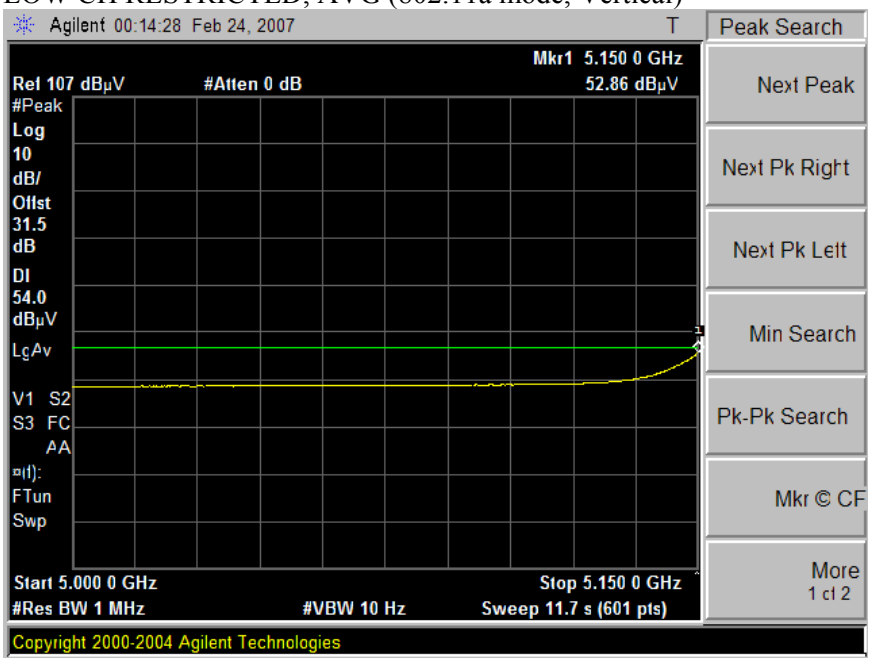


RESTRICTED BANDEDGE (802.11a MODE, LOW CHANNEL, VERTICAL)

LOW CH RESTRICTED, PEAK (802.11a mode, Vertical)

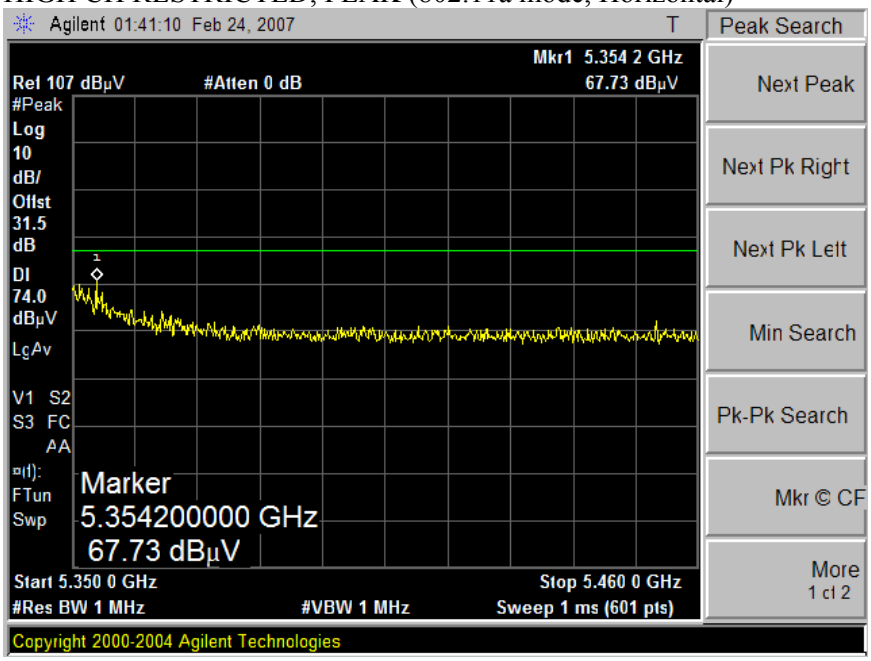


LOW CH RESTRICTED, AVG (802.11a mode, Vertical)

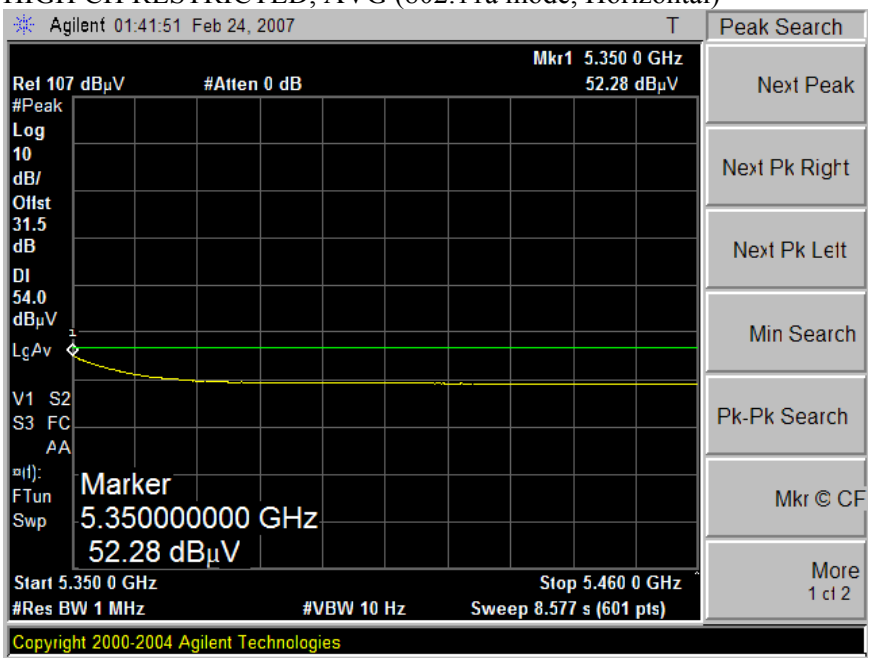


RESTRICTED BANDEDGE (802.11a MODE, HIGH CHANNEL, HORIZONTAL)

HIGH CH RESTRICTED, PEAK (802.11a mode, Horizontal)

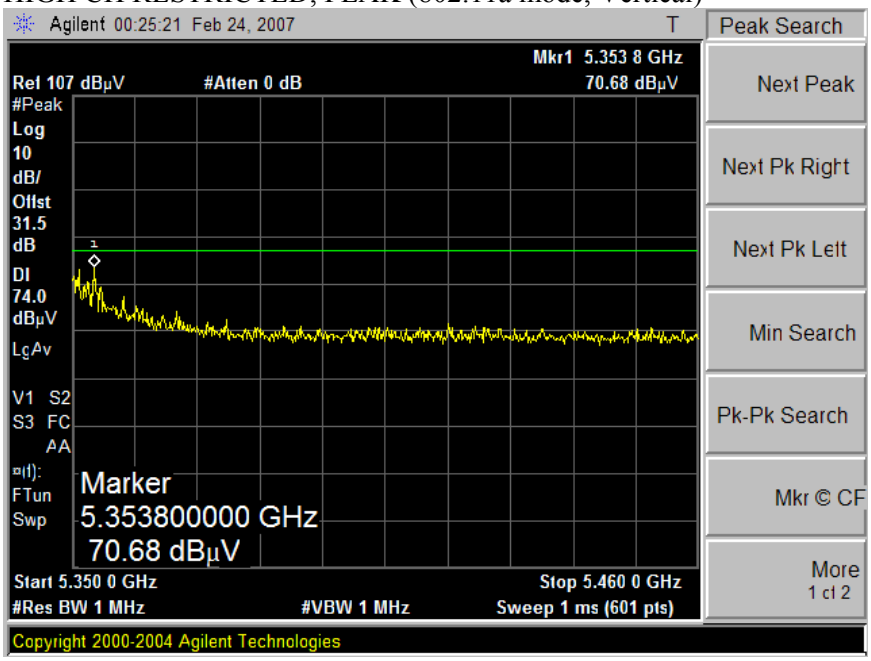


HIGH CH RESTRICTED, AVG (802.11a mode, Horizontal)

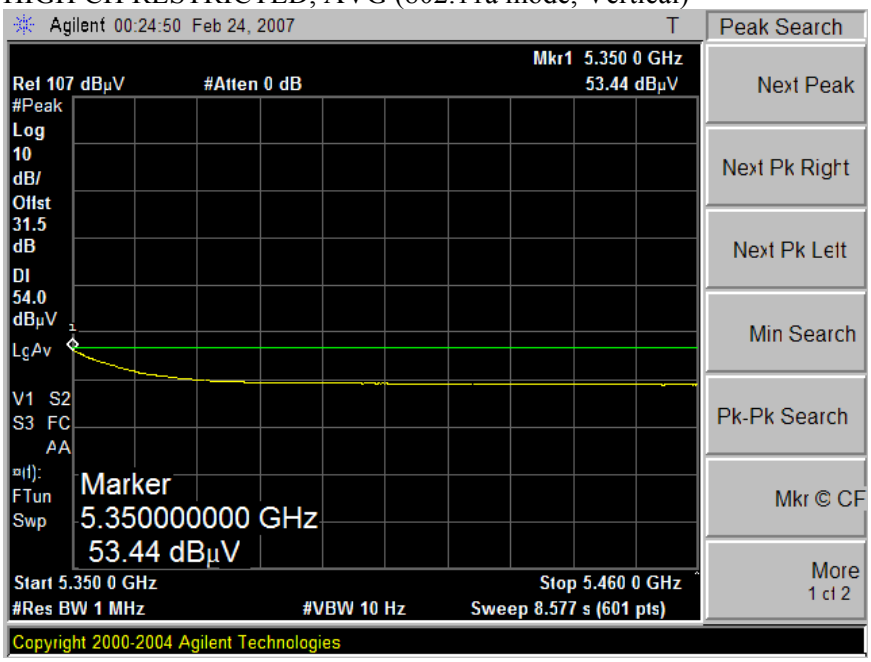


RESTRICTED BANDEDGE (802.11a MODE, HIGH CHANNEL, VERTICAL)

HIGH CH RESTRICTED, PEAK (802.11a mode, Vertical)



HIGH CH RESTRICTED, AVG (802.11a mode, Vertical)



HARMONICS AND SPURIOUS EMISSIONS (802.11a MODE)

High Frequency Measurement
Compliance Certification Services, Fremont Chamber B

Company: Hospira
Project #: 07U10885
Date: 3/10/2007
Test Engineer: Chin Pang
Configuration: EUT in the host system / Laptop
Mode: 5.2GHz Band, Transmit

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T60; S/N: 2238 @3m	T34 HP 8449B	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
Thanh 177079008		Gordon 203134001	HPF_7.6GHz	

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)
5180MHz															
15.540	3.0	45.6	32.0	38.0	13.4	-32.2	0.0	0.7	65.6	52.0	74	54	-8.4	-2.0	V
15.540	3.0	44.5	31.0	38.0	13.4	-32.2	0.0	0.7	64.5	51.0	74	54	-9.5	-3.0	H
5260MHz															
15.780	3.0	46.5	33.0	37.9	13.5	-32.2	0.0	0.7	66.5	53.0	74	54	-7.5	-1.0	V
15.780	3.0	44.5	31.4	37.9	13.5	-32.2	0.0	0.7	64.5	51.4	74	54	-9.5	-2.6	H
5280MHz															
15.840	3.0	44.0	30.5	37.9	13.6	-32.1	0.0	0.7	64.0	50.5	74	54	-10.0	-3.5	V
15.840	3.0	46.4	33.7	37.9	13.6	-32.1	0.0	0.7	66.4	53.7	74	54	-7.6	-0.3	H
5300MHz															
10.600	3.0	43.6	30.3	37.4	11.4	-32.6	0.0	0.8	60.5	47.2	74	54	-13.5	-6.8	V
15.900	3.0	43.6	30.6	37.9	13.6	-32.1	0.0	0.7	63.6	50.6	74	54	-10.4	-3.4	V
10.600	3.0	44.0	30.7	37.4	11.4	-32.6	0.0	0.8	60.9	47.6	74	54	-13.1	-6.4	H
15.900	3.0	46.3	33.5	37.9	13.6	-32.1	0.0	0.7	66.3	53.5	74	54	-7.7	-0.5	H
5320MHz															
10.640	3.0	43.7	30.6	37.3	11.4	-32.6	0.0	0.8	60.6	47.5	74	54	-13.4	-6.5	V
15.960	3.0	46.0	32.3	37.8	13.6	-32.1	0.0	0.7	66.0	52.3	74	54	-8.0	-1.7	V
10.640	3.0	44.0	31.5	37.3	11.4	-32.6	0.0	0.8	60.9	48.4	74	54	-13.1	-5.6	H
15.960	3.0	46.5	33.6	37.8	13.6	-32.1	0.0	0.7	66.5	53.6	74	54	-7.5	-0.4	H

Rev. 1.24.7
Note: No other emissions were detected above the system noise floor.

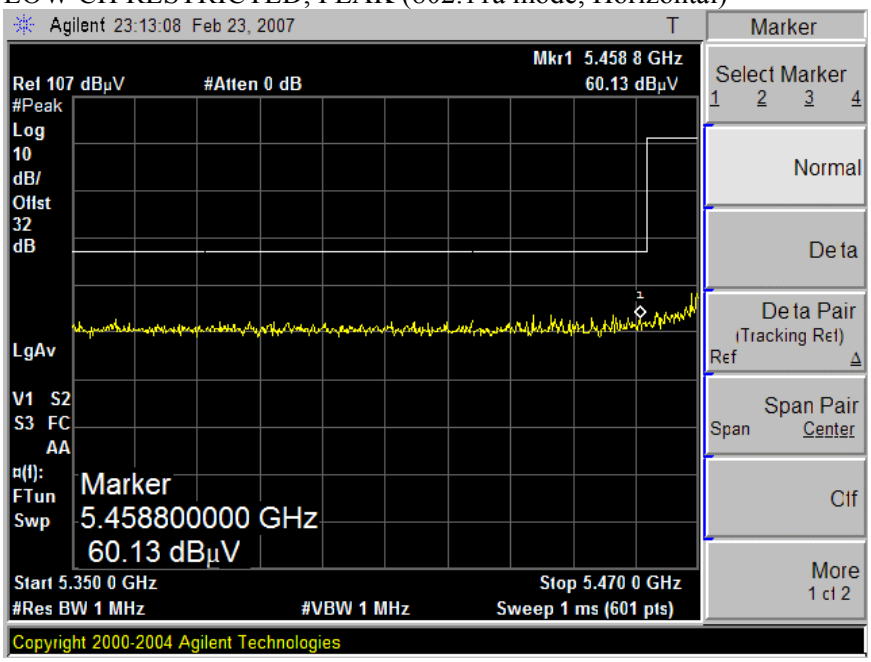
f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field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

7.3.5. TRANSMITTER ABOVE 1 GHZ FOR 5470 TO 5725 MHz BAND

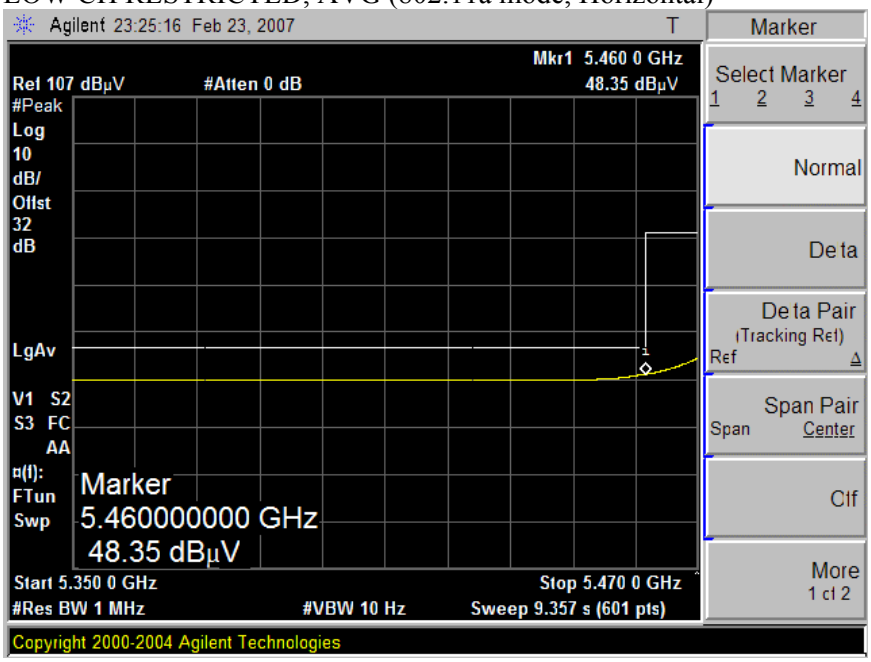
EUT MODULE INSTALLED INSIDE THE PUMP

RESTRICTED BANDEDGE (802.11a MODE, LOW CHANNEL, HORIZONTAL)

LOW CH RESTRICTED, PEAK (802.11a mode, Horizontal)

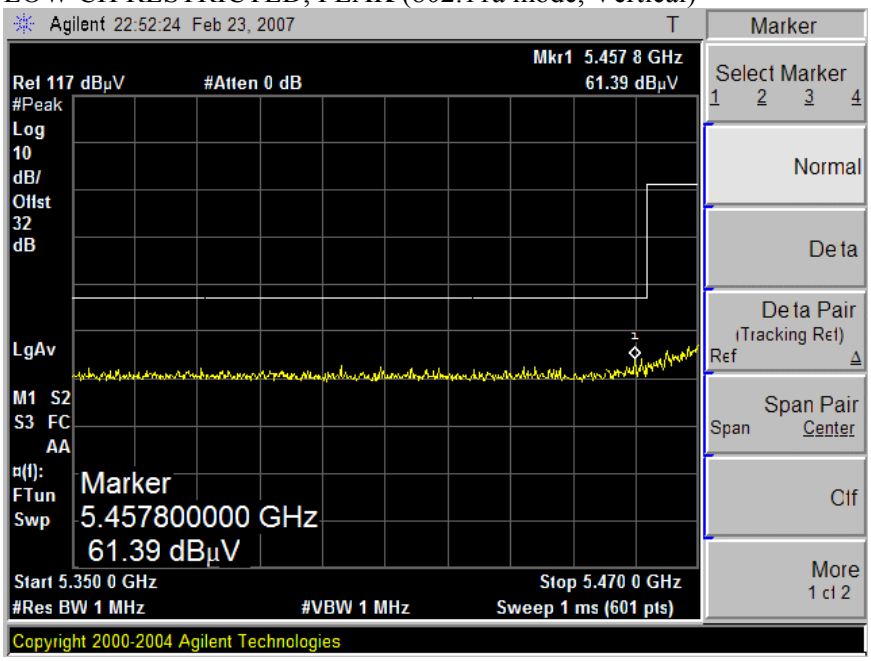


LOW CH RESTRICTED, AVG (802.11a mode, Horizontal)

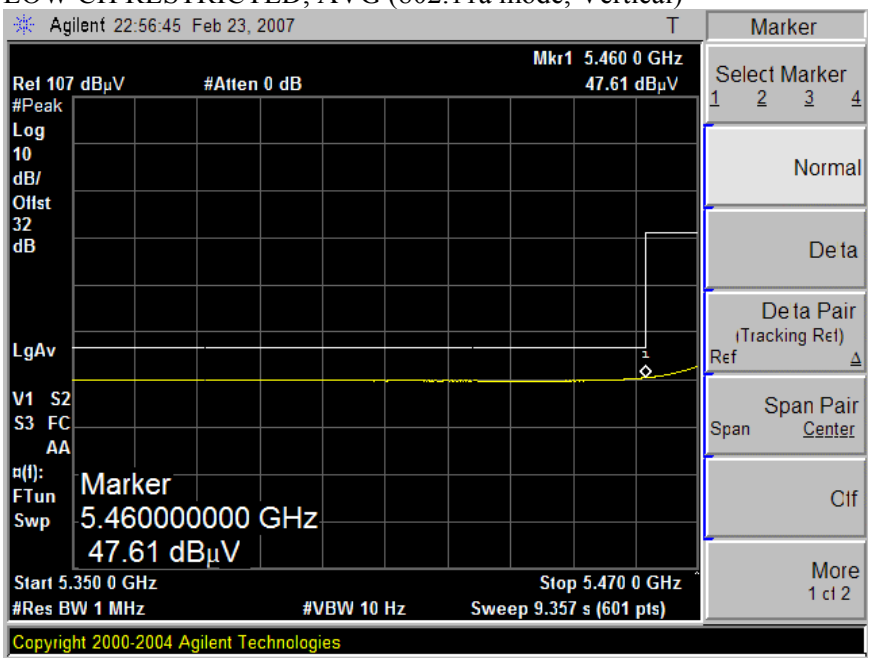


RESTRICTED BANDEDGE (802.11a MODE, LOW CHANNEL, VERTICAL)

LOW CH RESTRICTED, PEAK (802.11a mode, Vertical)

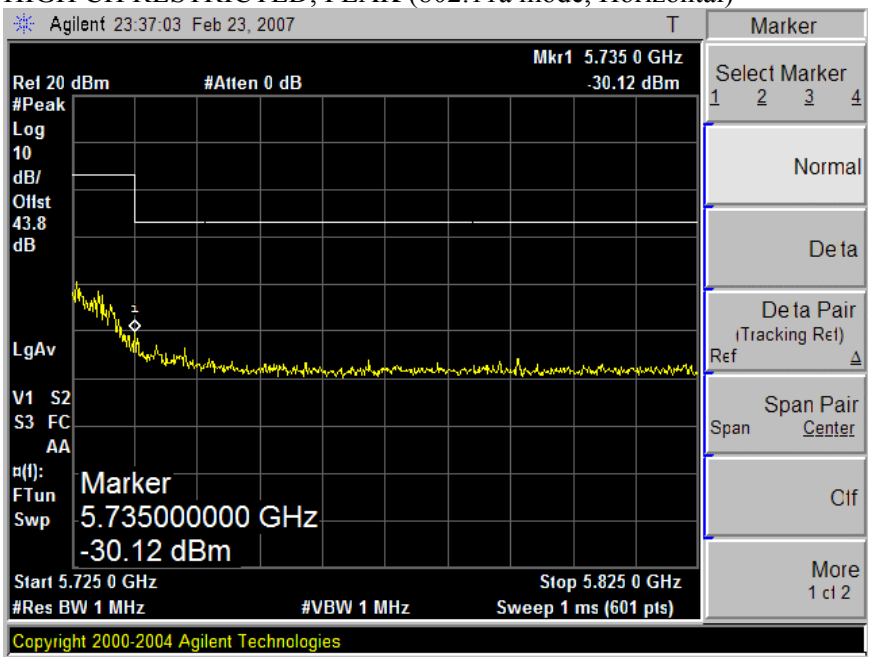


LOW CH RESTRICTED, AVG (802.11a mode, Vertical)

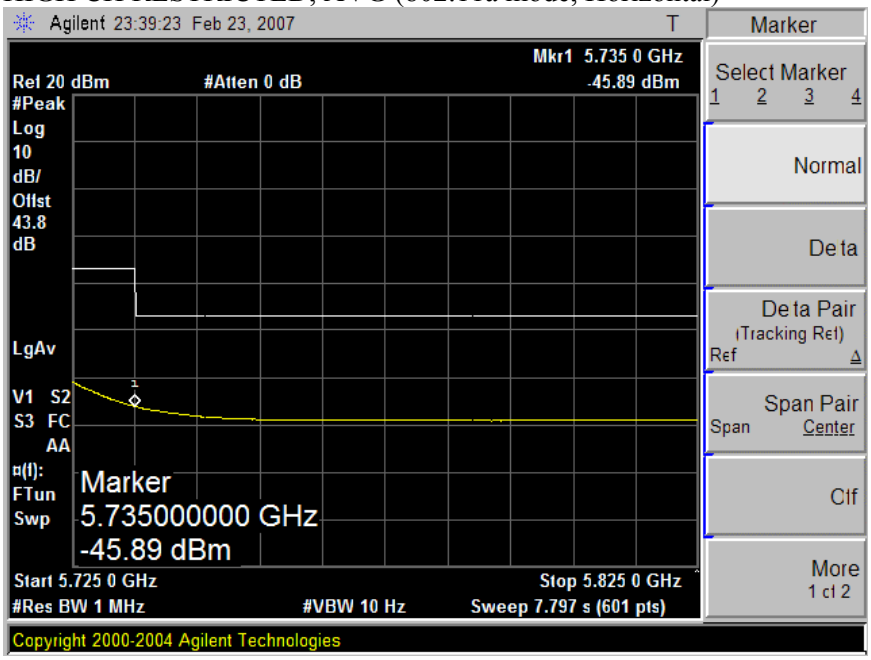


RESTRICTED BANDEDGE (802.11a MODE, HIGH CHANNEL, HORIZONTAL)

HIGH CH RESTRICTED, PEAK (802.11a mode, Horizontal)

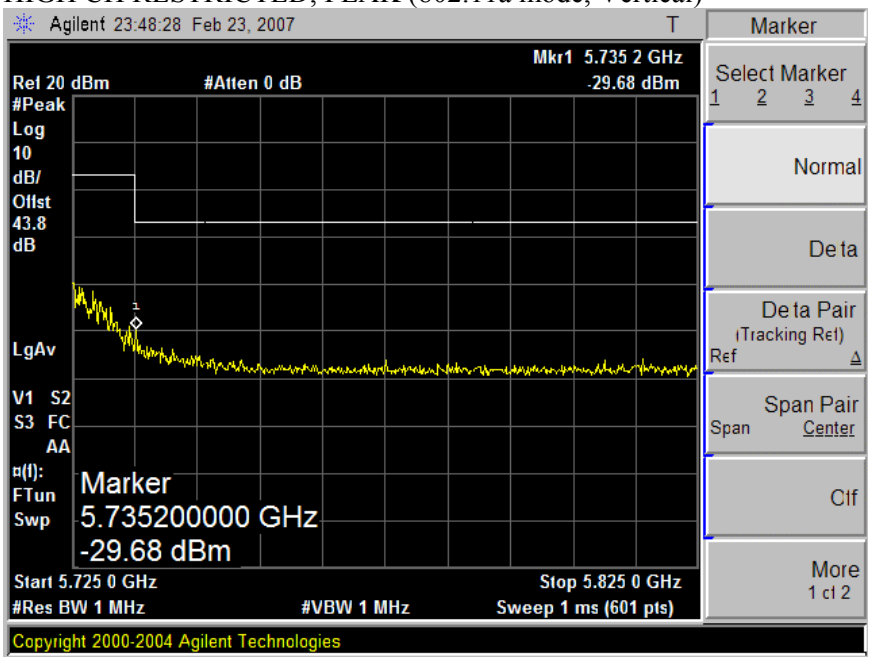


HIGH CH RESTRICTED, AVG (802.11a mode, Horizontal)

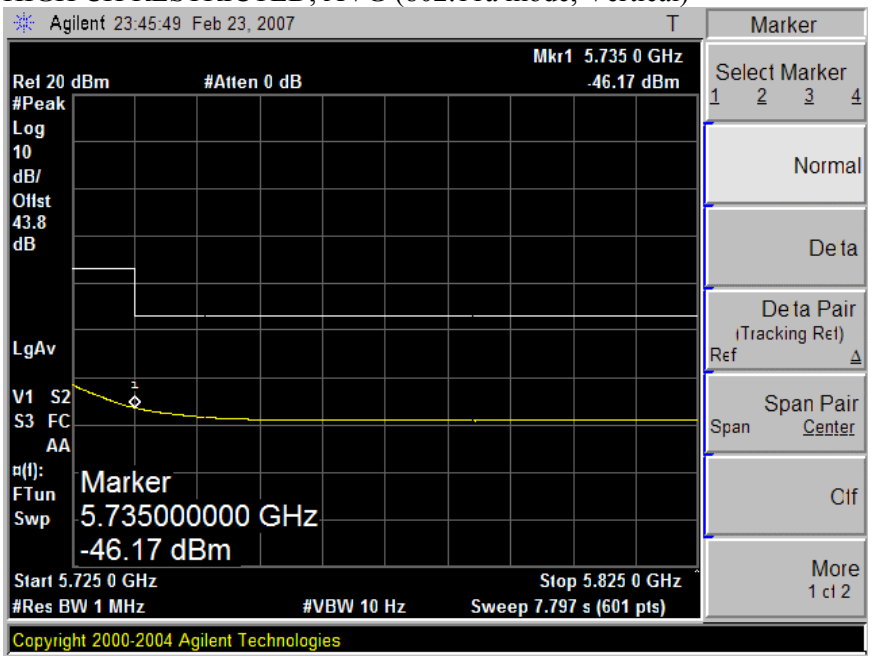


RESTRICTED BANDEDGE (802.11a MODE, HIGH CHANNEL, VERTICAL)

HIGH CH RESTRICTED, PEAK (802.11a mode, Vertical)



HIGH CH RESTRICTED, AVG (802.11a mode, Vertical)



HARMONICS AND SPURIOUS EMISSIONS (802.11a MODE)

High Frequency Measurement
Compliance Certification Services, Fremont Chamber A

Company: Hospira
Project #: 07U10885
Date: 2/24/2007
Test Engineer: Chin Pang
Configuration: EUT inside the Pump/Laptop
Mode: 5.5GHz Band, Transmit

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T60; S/N: 2238 @3m	T34 HP 8449B	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
Thanh 177079008		Gordon 203134001	HPF_7.6GHz	

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)
Low Ch, 5500MHz															
11.000	3.0	45.1	32.5	37.3	11.8	-32.6	0.0	0.7	62.4	49.8	74	54	-11.6	-4.2	V
11.000	3.0	45.6	33.6	37.3	11.8	-32.6	0.0	0.7	62.9	50.9	74	54	-11.1	-3.1	H
Mid Ch, 5600MHz															
11.200	3.0	44.6	32.0	37.3	12.0	-32.6	0.0	0.7	62.1	49.5	74	54	-11.9	-4.5	V
11.200	3.0	45.0	32.4	37.3	12.0	-32.6	0.0	0.7	62.5	49.9	74	54	-11.5	-4.1	H
High Ch, 5700MHz															
11.400	3.0	44.8	32.0	37.4	12.2	-32.5	0.0	0.7	62.5	49.7	74	54	-11.5	-4.3	V
11.400	3.0	45.2	32.8	37.4	12.2	-32.5	0.0	0.7	62.9	50.5	74	54	-11.1	-3.5	H

Rev. 1.24.7
Note: No other emissions were detected above the 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		

7.3.6. WORST-CASE RADIATED EMISSIONS BELOW 1 GHz

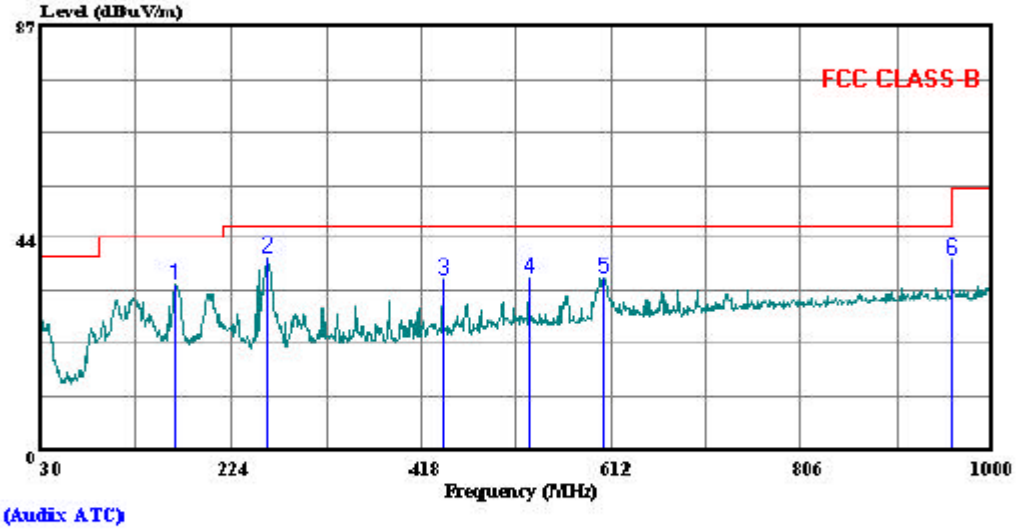
EUT MODULE WITH EXTERNAL ANTENNA:

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

HORIZONTAL PLOT

47173 Benicia Street
Fremont, CA 94538
Tel: (510) 771-1052
Fax: (510) 661-0888

Data#: 5 File#: 30-1000MHz.EMI Date: 02-23-2007 Time: 14:43:12



Trace: 4 Ref Trace:

Condition: FCC CLASS-B 3m B-5M CHAMBER 012007 HORIZONTAL
Test Operator: : William Zhuang
Company: : Hospira
Project #: : 07U10885
Configuration: : EUT with Laptop
Mode of Operation:: Transmit (Worst Case)
Target: : FCC Class B

HORIZONTAL DATA

Page: 1

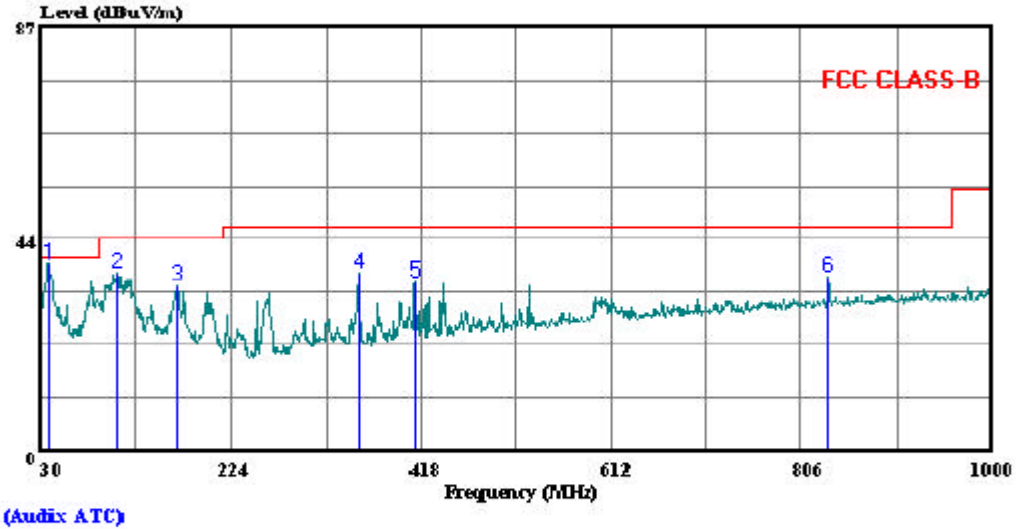
	Freq	Read Level	Probe Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dB	dBuV/m	dBuV/m	dB	
1	166.770	48.30	12.32	1.35	28.17	33.80	43.50	-9.70	Peak
2	260.860	53.23	12.56	1.72	28.05	39.47	46.00	-6.53	Peak
3	440.310	44.00	16.84	2.30	27.95	35.19	46.00	-10.81	Peak
4	527.610	42.10	18.37	2.47	27.68	35.27	46.00	-10.73	Peak
5	604.240	40.60	19.33	2.73	27.38	35.29	46.00	-10.71	Peak
6	960.230	40.00	23.31	3.61	27.59	39.33	54.00	-14.67	Peak

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

VERTICAL PLOT

47173 Benicia Street
Fremont, CA 94538
Tel: (510) 771-1052
Fax: (510) 661-0888

Data#: 7 File#: 30-1000MHz.EMI Date: 02-23-2007 Time: 14:52:49



Trace: 6 Ref Trace:

Condition: FCC CLASS-B 3m B-5M CHAMBER 012007 VERTICAL
Test Operator: : William Zhuang
Company: : Hospira
Project #: : 07U10885
Configuration: : EUT with Laptop
Mode of Operation:: Transmit (Worst Case)
Target: : FCC Class B

VERTICAL DATA

Page: 1

	Freq	Read Level	Probe Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dB	dBuV/m	dBuV/m	dB	
1	37.760	49.20	16.96	0.65	28.42	38.40	40.00	-1.60	Peak
2	107.600	52.30	11.56	1.09	28.27	36.67	43.50	-6.83	Peak
3	168.710	48.60	12.23	1.36	28.17	34.02	43.50	-9.48	Peak
4	353.980	47.40	15.10	2.02	28.05	36.47	46.00	-9.53	Peak
5	411.210	44.20	16.23	2.21	28.03	34.62	46.00	-11.38	Peak
6	833.160	37.60	22.06	3.26	27.06	35.87	46.00	-10.13	Peak

7.4. DYNAMIC FREQUENCY SELECTION

7.4.1. LIMITS

§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

7.4.2. TEST AND MEASUREMENT SYSTEM

SYSTEM OVERVIEW

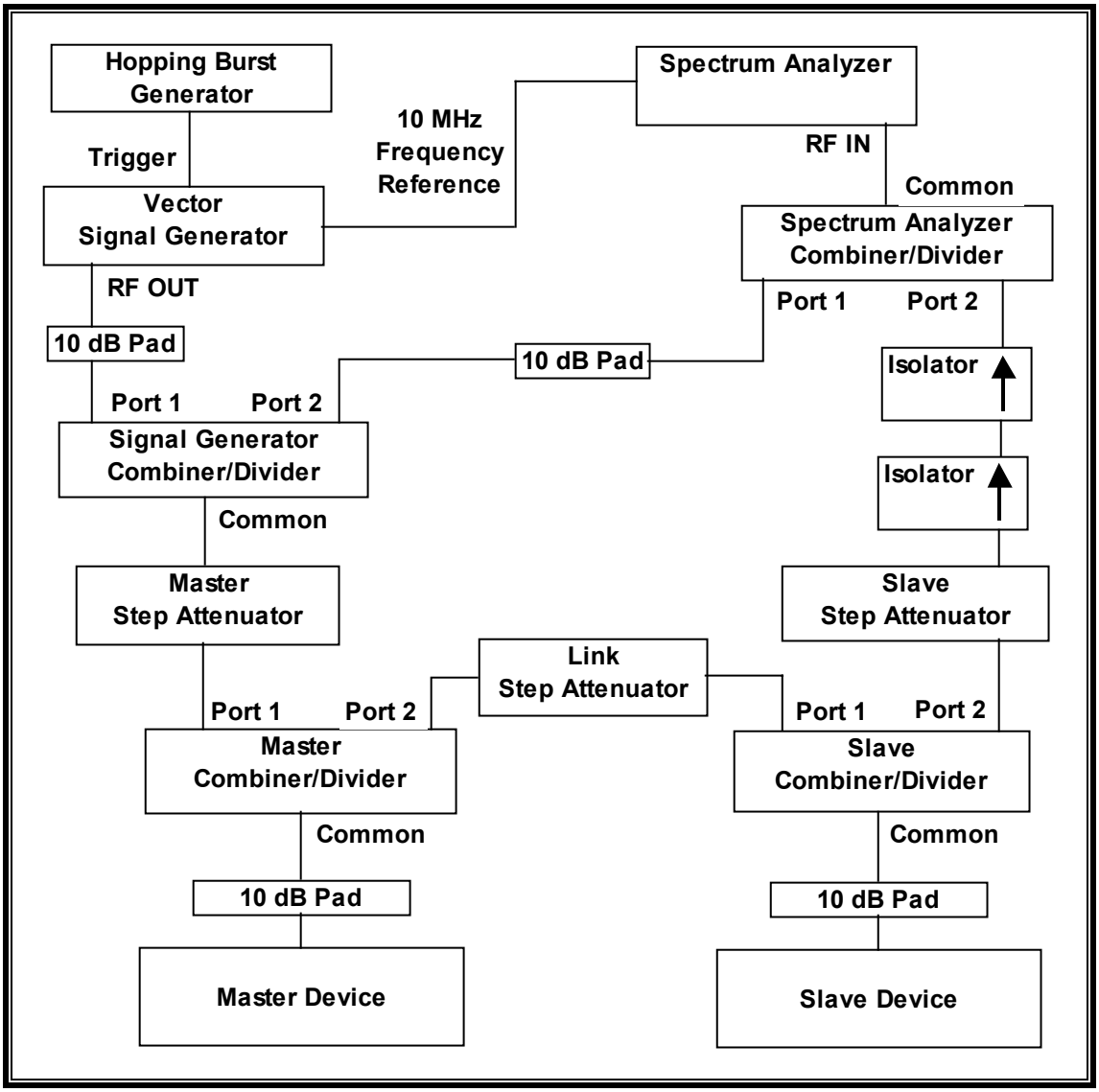
The measurement system is based on a conducted test method.

The short pulse and long pulse signal generating system utilizes the NTIA software.

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.

Should multiple RF ports be utilized for the Master and/or Slave devices (for example, for diversity or MIMO implementations), additional combiner/dividers are inserted between the Master Combiner/Divider and the 10 dB pad connected to the Master Device (and/or between the Slave Combiner/Divider and the 10 dB pad connected to the Slave Device). Additional 10 dB pads are connected as needed, such that there is one pad at each RF port on each EUT.

CONDUCTED METHOD SYSTEM BLOCK DIAGRAM



SYSTEM CALIBRATION

Connect the spectrum analyzer to the test system in place of the master device. Set the signal generator to CW mode. Adjust the amplitude of the signal generator to yield a measured level of –64 dBm on the spectrum analyzer.

Without changing any of the instrument settings, reconnect the spectrum analyer to the Common port of the Spectrum Analyzer Combiner/Divider and connect a 50 ohm load to the Master Device port of the test system.

Measure the amplitude and calculate the difference from –64 dBm. Adjust the Reference Level Offset of the spectrum analyzer to this difference. Confirm that the signal is displayed at –64 dBm. Readjust the RBW and VBW to 3 MHz, set the span to 10 MHz, and confirm that the signal is still displayed at –64 dBm.

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 the specified radar waveform, trigger a burst manually and measure the amplitude 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.

ADJUSTMENT OF DISPLAYED TRAFFIC LEVEL

Establish a link between the Master and Slave, adjusting the Link Step Attenuator as needed to provide an adequate RSSI level at the Master and Slave devices. Stream the video test file to generate WLAN traffic. Confirm that the WLAN traffic level, as displayed on the spectrum analyzer, is at lower amplitude than the radar detection threshold. Confirm that the displayed traffic is from the Slave Device. Confirm that the displayed traffic does not include Master Device traffic.

If a different setting of the Master Step Attenuator is required to meet the above conditions, perform a new System Calibration for the new Master Step Attenuator setting.

7.4.3. 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**	**Serial Number**	**Cal Due**
Spectrum Analyzer 3 Hz ~ 44 GHz	Agilent / HP	E4446A	US42070220	11/26/2007
Vector Signal Generator 250kHz-20GHz	Agilent / HP	E8267C	US43320336	11/2/2007

7.4.4. DESCRIPTION OF EUT

OVERVIEW OF EUT SLAVE DEVICE

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

The EUT is a Client Device that does not have radar detection capability.

The highest power level within these bands is 18.04 dBm EIRP in the 5250-5350 MHz band and 18.89 dBm EIRP in the 5470-5725 MHz band.

The antenna assembly utilized with the EUT has a gain of 2 dBi in the 5250-5350 MHz and 5470-5725 MHz bands.

The 50-ohm Tx/Rx antenna port is connected to the test system to perform conducted tests.

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 an 802.11a IP based architecture. One nominal channel bandwidth, 20 MHz, is implemented.

OVERVIEW OF MASTER DEVICE

The Master Device is an Atheros Access Point, FCC ID: PPD-AR5BAP-00032.

The rated output power of the Master unit is > 23dBm (EIRP). Therefore the required interference threshold level is –64 dBm. After correction for antenna gain and procedural adjustments, the required conducted threshold at the antenna port is –64 + 4 + 1 = -59 dBm.

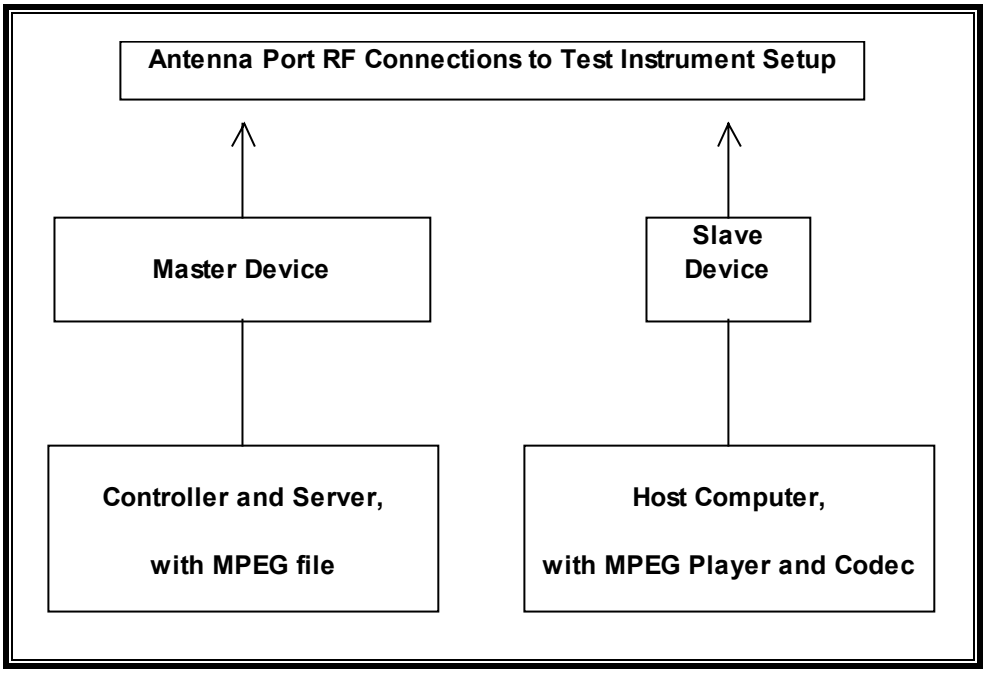
The calibrated conducted DFS Detection Threshold level is set to –64 dBm. The tested level is lower than the required level hence it provides margin to the limit.

7.4.5. SETUP OF EUT AND SUPPORT EQUIPMENT

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Access Point	Atheros	AP 30	AP 30-50-D7323	PPD-AR5BAP-00032
AC Adapter	CUI	DSA-0151A	4403	DoC
Laptop	Compaq	Thinkpad T42	ZZ-27004	DoC
AC Adapter	Compaq	08K8204	85910TF	DoC
Laptop	Dell	Latitude D610	F5673A02	DoC
AC Adapter	Dell	AA22850	CN-OT2357162914AF04LC	DoC

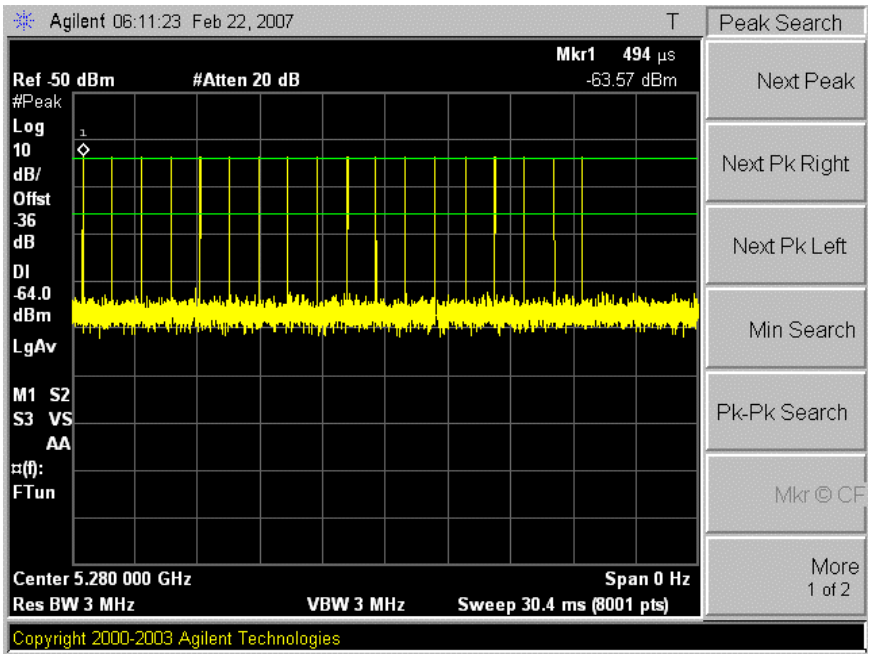
TEST SETUP



7.4.6. PLOTS OF RADAR WAVEFORM AND WLAN TRAFFIC

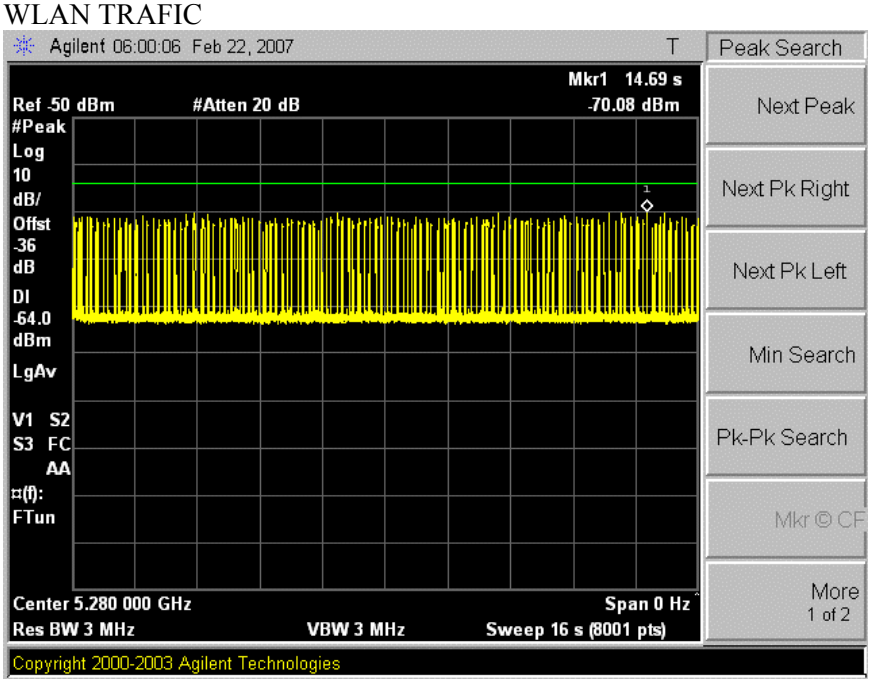
PLOT OF RADAR WAVEFORM

SHORT PULSE RADAR TYPE 1



PLOT OF WLAN TRAFFIC FROM SLAVE

WLAN TRAFIC



7.4.7. TEST CHANNEL AND METHOD

All tests were performed at a channel center frequency of 5280 MHz utilizing a conducted test method.

7.4.8. CHANNEL MOVE TIME AND CHANNEL CLOSING TRANSMISSION TIME

GENERAL 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)

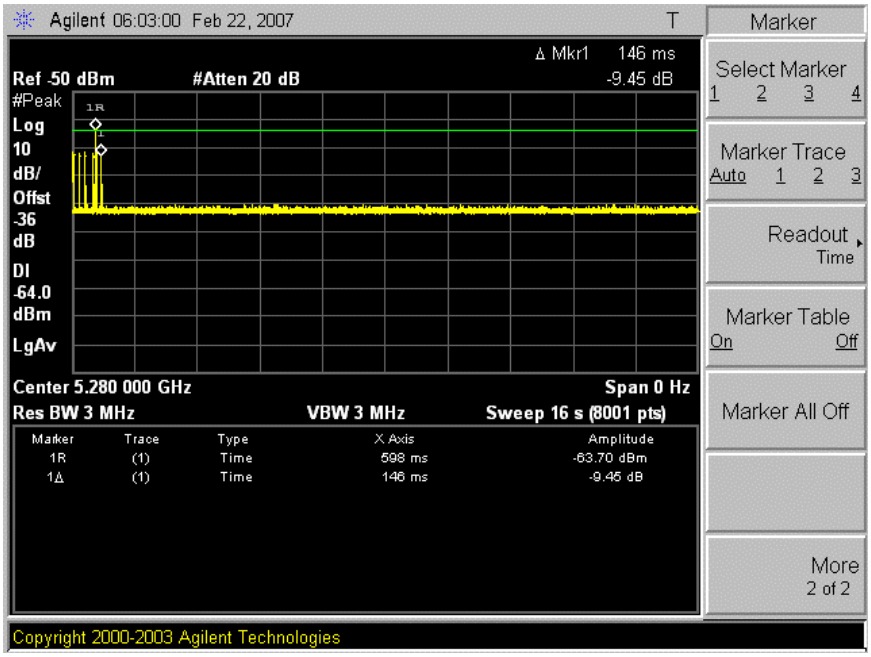
The observation period over which the aggregate time is calculated
Begins at (Reference Marker + 200 msec)
and
Ends no earlier than (Reference Marker + 10 sec).

CHANNEL MOVE TIME RESULTS

No non-compliance noted:

Channel Move Time (s)	Limit (s)
0.146	10

MOVE TIME PLOT



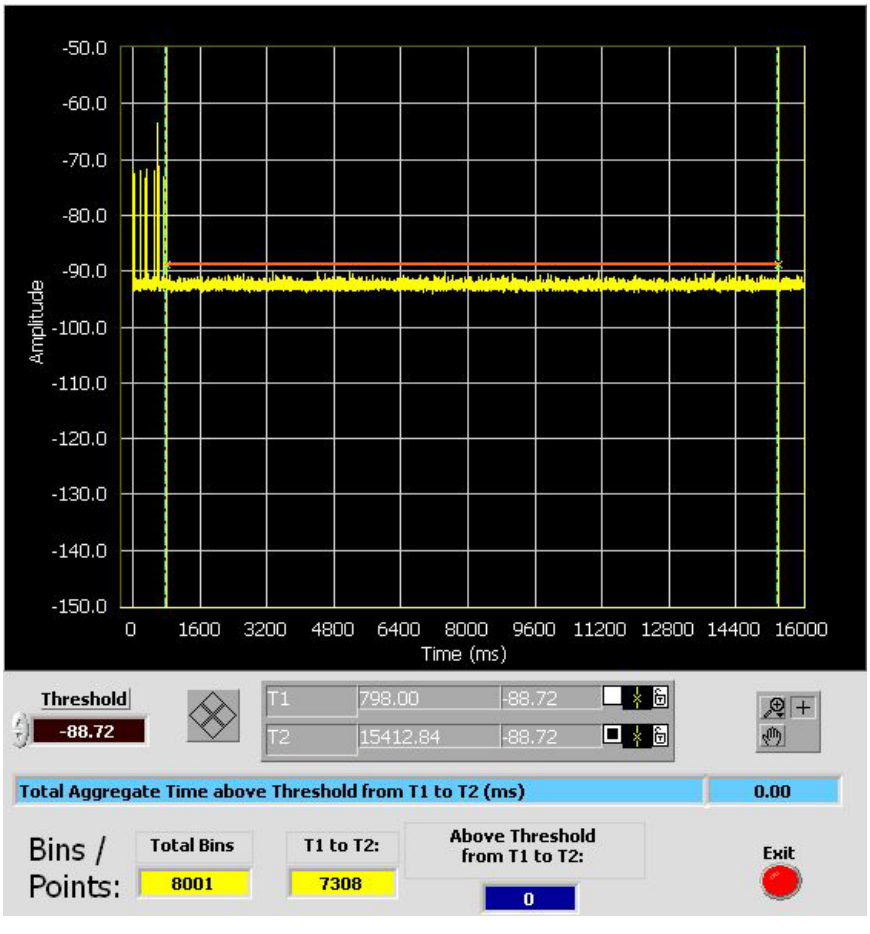
AGGREGATE CHANNEL CLOSING TRANSMISSION TIME RESULTS

No non-compliance noted:

FCC Aggregate Transmission Time (ms)	Limit (ms)	Margin (ms)
0.00	60	60.00

Only intermittent transmissions are observed during the aggregate monitoring period.

FCC AGGREGATE CLOSING TIME PLOT



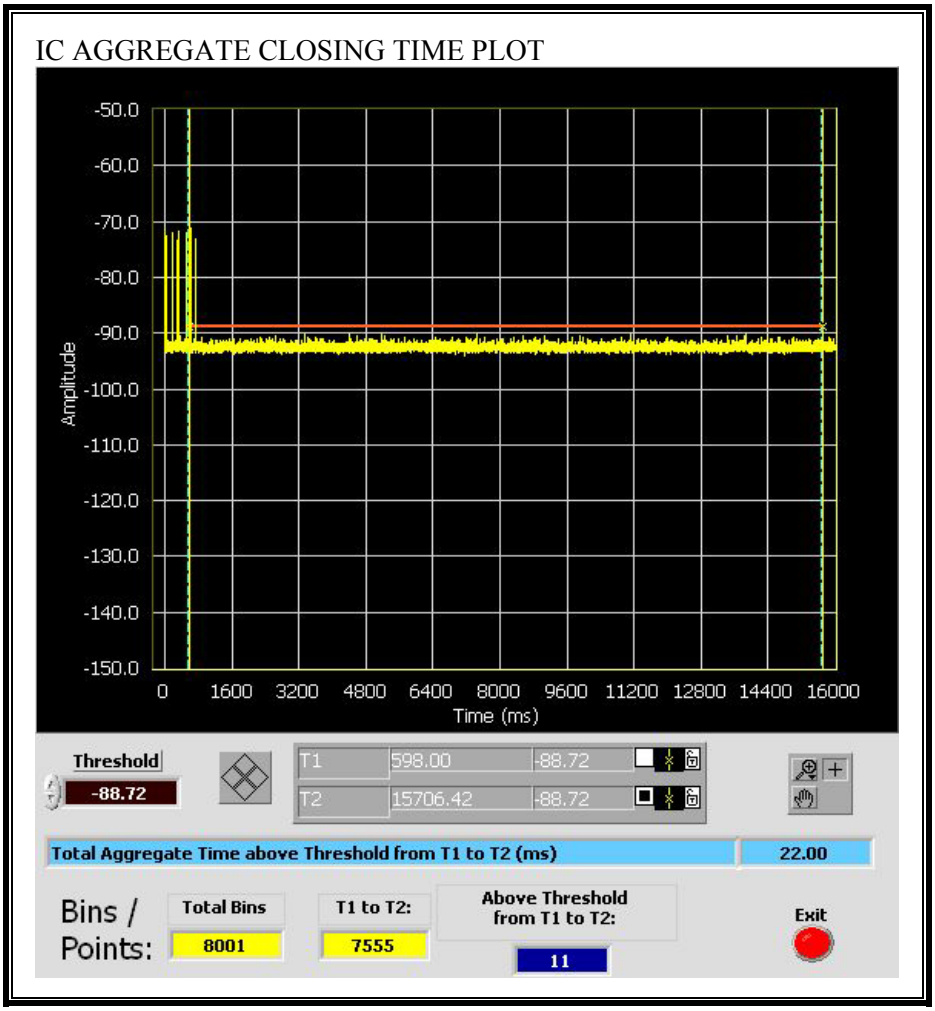
CHANNEL CLOSING TRANSMISSION TIME RESULTS

No non-compliance noted:

IC Aggregate Transmission Time (ms)	Limit (ms)	Margin (ms)
22.00	60	38.00

Only intermittent transmissions are observed during the aggregate monitoring period.

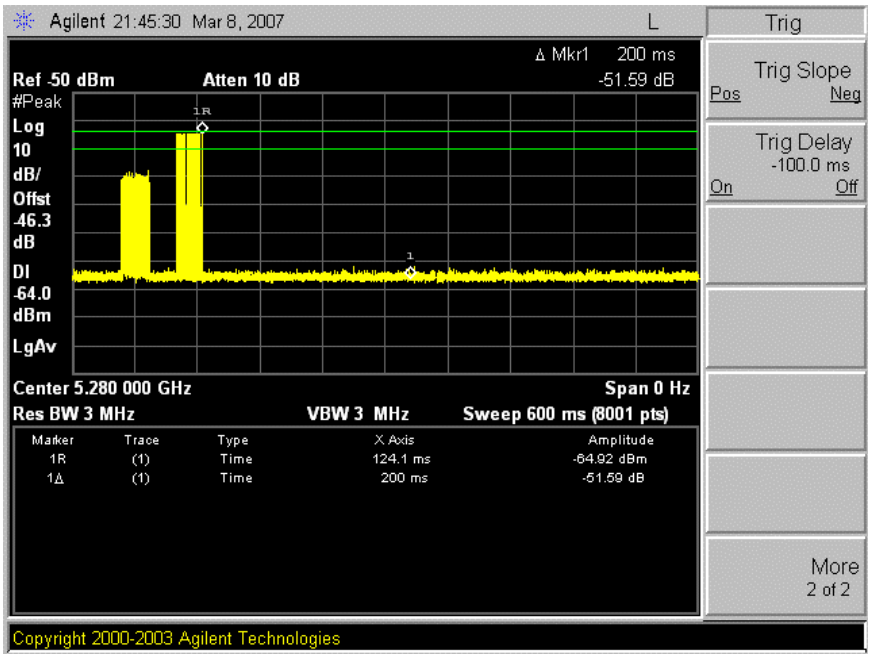
IC AGGREGATE CLOSING TIME PLOT



200 MSEC CHANNEL CLOSING TIME RESULTS

No non-compliance noted:

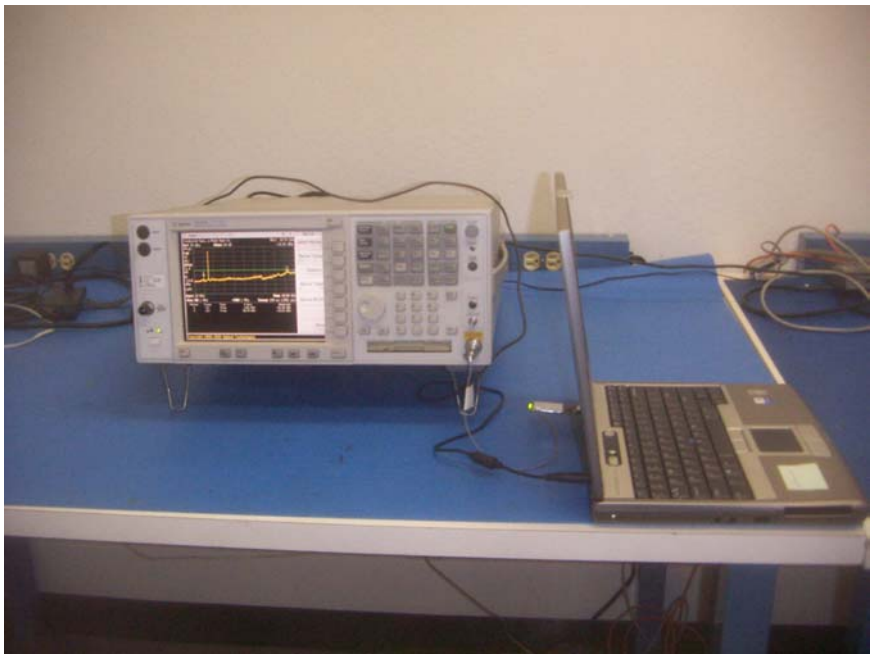
CLOSING TIME PLOT



8. SETUP PHOTOS

ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP

ANTENNA PORT CONDUCTED PHOTO

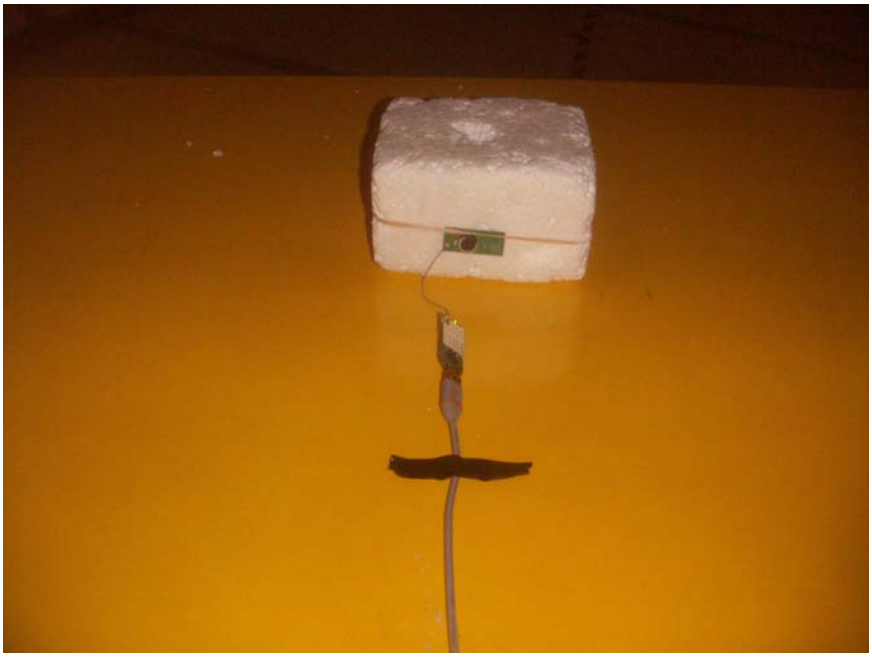


RADIATED RF MEASUREMENT SETUP FOR PORTABLE CONFIGURATION

X-AXIS PHOTO

Y-AXIS PHOTO

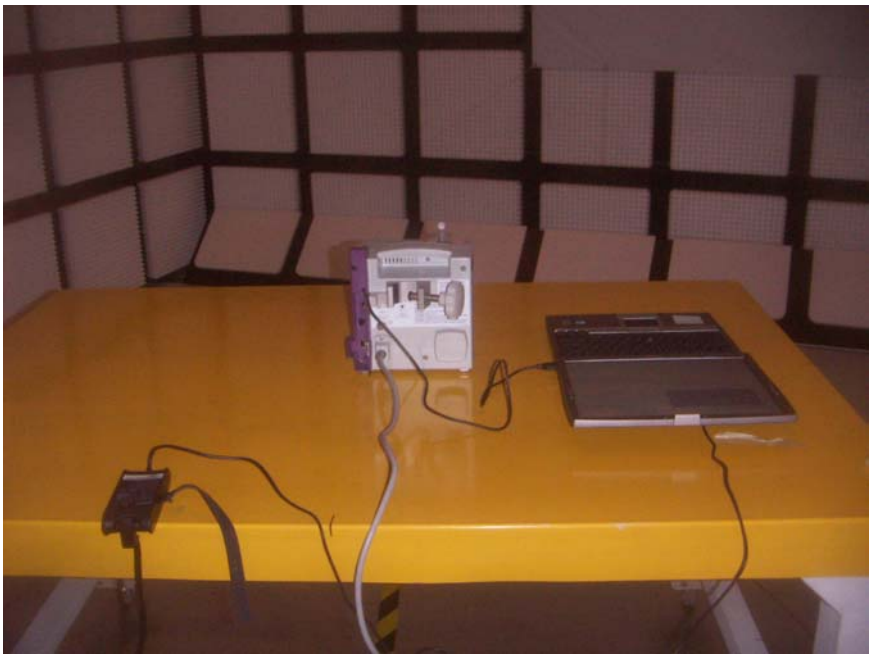
Z-AXIS PHOTO



RADIATED RF MEASUREMENT SETUP (EUT MODULE INSIDE THE PUMP)

RADIATED FRONT PHOTO

RADIATED BACK PHOTO



DFS SETUP PHOTO

END OF REPORT