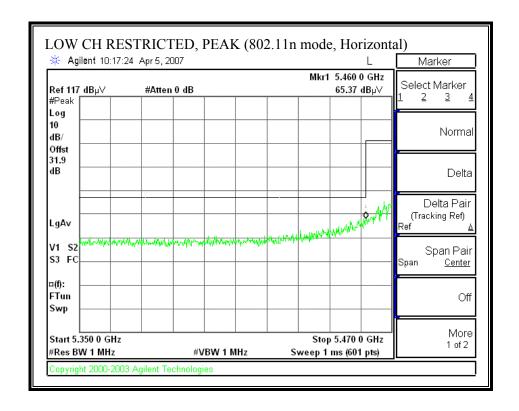
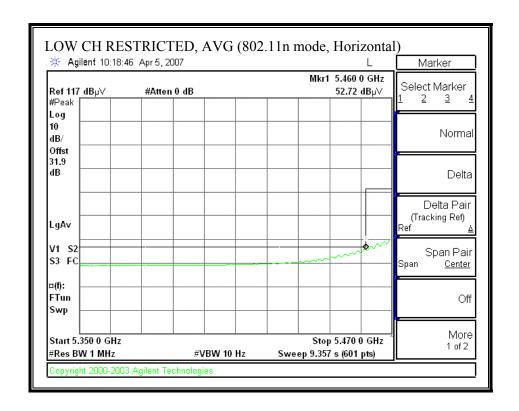
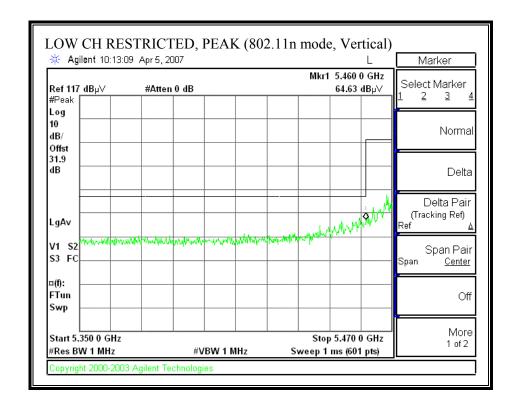
802.11n 40 MHz CDD MCS 32 MODE

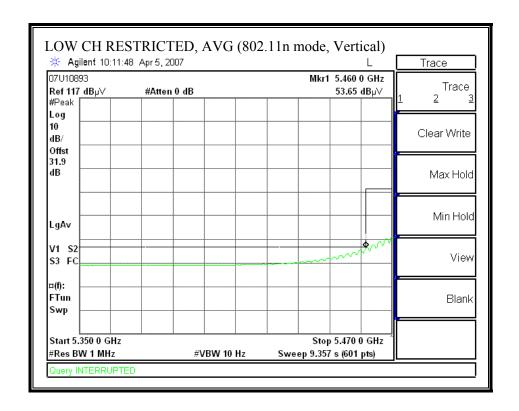
RESTRICTED BANDEDGE (LOW CHANNEL, 5510 MHz - HORIZONTAL)



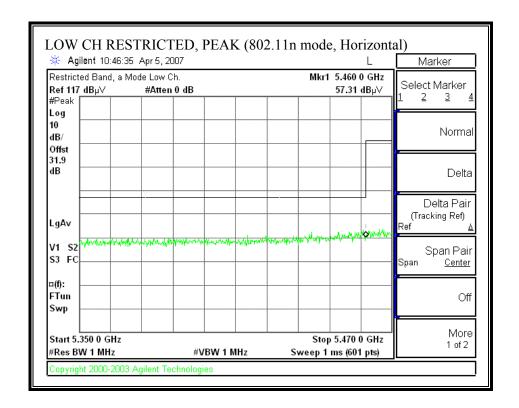


RESTRICTED BANDEDGE (802.11n MODE, LOW CHANNEL, 5510 MHz - VERTICAL)

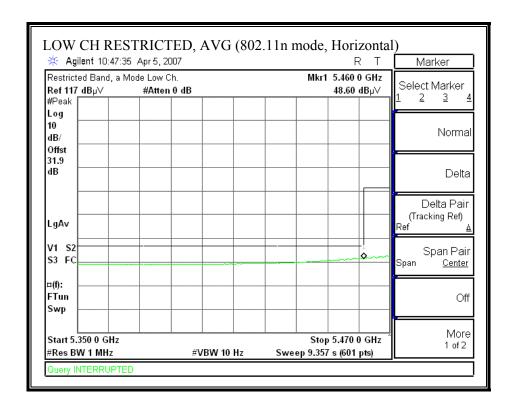




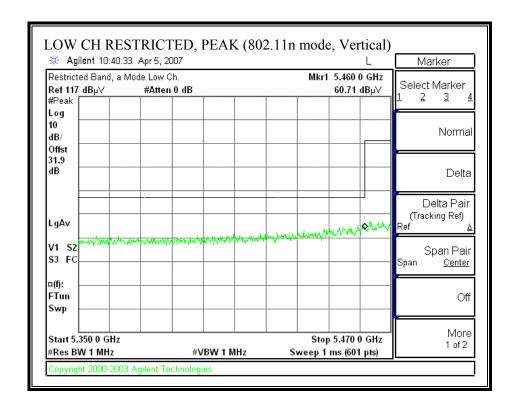
RESTRICTED BANDEDGE (LOW CHANNEL, 5550 MHz - HORIZONTAL)

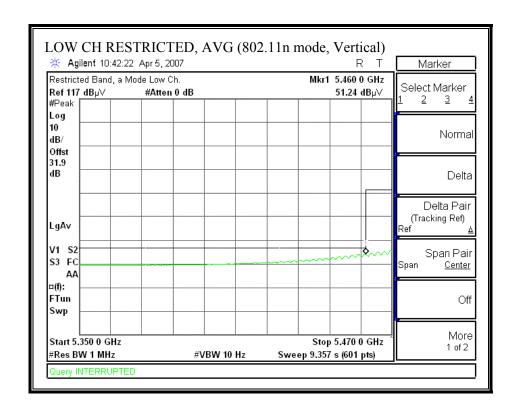


REPORT NO: 07U10893-2B

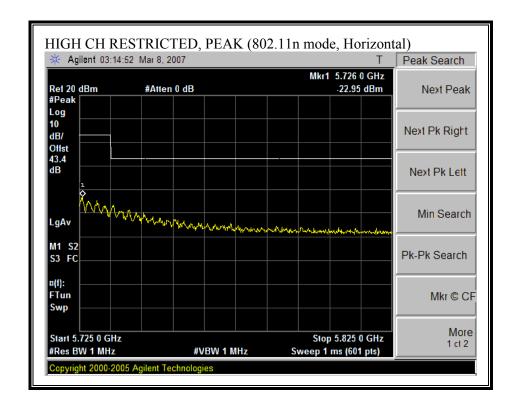


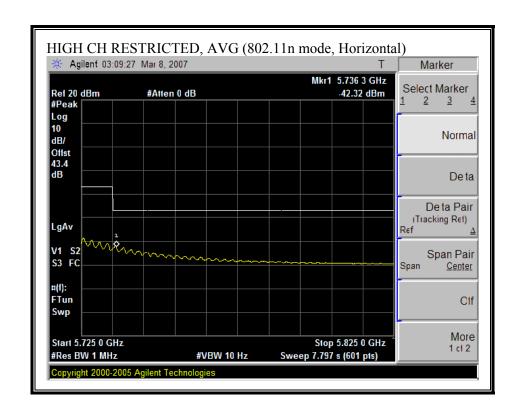
RESTRICTED BANDEDGE (802.11n MODE, LOW CHANNEL, 5550 MHz - VERTICAL)



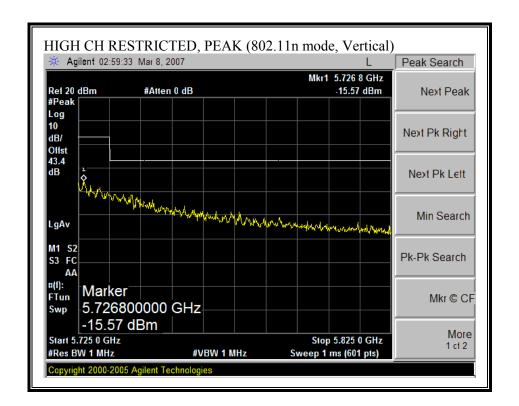


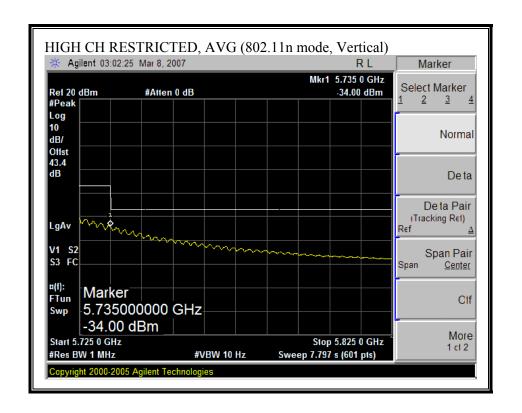
RESTRICTED BANDEDGE (802.11n MODE, HIGH CHANNEL, 5670 MHz - HORIZONTAL)



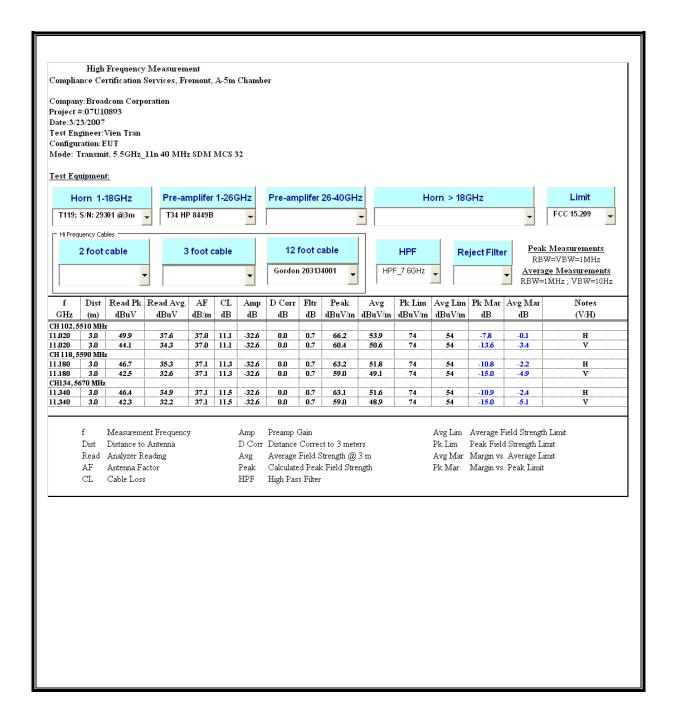


RESTRICTED BANDEDGE (802.11n MODE, HIGH CHANNEL, 5670 MHz - VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS (802.11n - 40 MHz TX BANDWIDTH)



5.2 & 5.5 GHz BANDS

7.5.6. WORST-CASE RADIATED EMISSIONS BELOW 1 GHz

5 GHz BAND

HORIZONTAL DATA



561F Monterey Road Morgan Hill, CA 95037 Tel: (408) 463-0888 Fax: (408) 463-0885

Data#: 13 File#: 06u10708.emi Date: 12-08-2006 Time: 15:47:39

Limit Over

Audix ATC

Condition: FCC CLASS-B HORIZONTAL

Test Operator:: Vien Tran
Company: : Broadcom
Project #: : 06U10708
Configuration:: EUT / Laptop

Mode of Oper.:: Tx Worst Case 5.2 GHz Band

Read

Target: : FCC Class B

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MHz dBuV dB dBuV/m dBuV/m dB dBuV/m dB dBuV/m dB dB dBuV/m dB dBuV/m dB dB dB dBuV/m dB		Freq	Level	Factor	Level	Line	Limit	Remark
2 337.490 20.55 16.56 37.11 46.00 -8.89 Peak 3 434.490 18.23 18.84 37.07 46.00 -8.93 Peak 4 516.940 16.85 20.48 37.32 46.00 -8.68 Peak 5 633.340 17.26 22.05 39.31 46.00 -6.69 Peak		MHz	dBuV	dB	$\overline{\mathtt{dBuV/m}}$	$\overline{\mathtt{dBuV/m}}$	dB	
	2 3 4 5	337.490 434.490 516.940 633.340	20.55 18.23 16.85 17.26	16.56 18.84 20.48 22.05	37.11 37.07 37.32 39.31	46.00 46.00 46.00 46.00	-8.89 -8.93 -8.68 -6.69	Peak Peak Peak Peak

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

VERTICAL DATA



561F Monterey Road Morgan Hill, CA 95037 Tel: (408) 463-0888 Fax: (408) 463-0885

Data#: 11 File#: 06u10708.emi Date: 12-08-2006 Time: 15:30:42

Audix ATC

Condition: FCC CLASS-B VERTICAL

Test Operator:: Vien Tran Company: : Broadcom Project #: : 06U10708 Configuration:: EUT / Laptop

Mode of Oper.:: Tx Worst Case 5.2 GHz Band

Target: : FCC Class B

Page: 1

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	$\overline{\mathtt{dBuV/m}}$	$\overline{\text{dBuV/m}}$	dB	
1	279.290	18.64	14.93	33.57	46.00	-12.43	Peak
2	402.480	18.35	18.11	36.46	46.00	-9.54	Peak
3	482.990	20.39	19.89	40.28	46.00	-5.72	Peak
4	516.940	18.58	20.48	39.05	46.00	-6.95	Peak
5	565.440	17.65	21.05	38.70	46.00	-7.30	Peak
6	997.090	14.38	26.91	41.29	54.00	-12.71	Peak

7.6. POWERLINE CONDUCTED EMISSIONS

LIMIT

 $\S15.207$ (a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

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The lower limit applies at the boundary between the frequency ranges.

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 resolution bandwidth is set to 9 kHz for both peak detection and quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

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

RESULTS

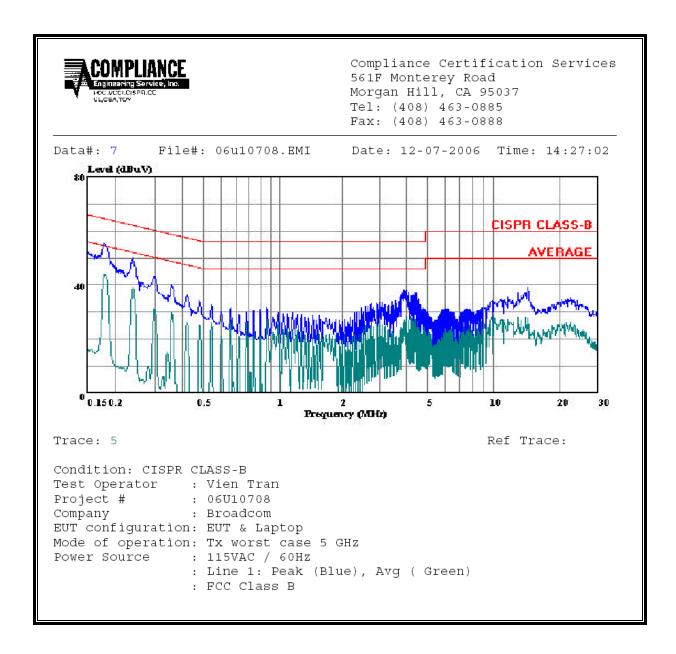
No non-compliance noted:

5 GHz BAND

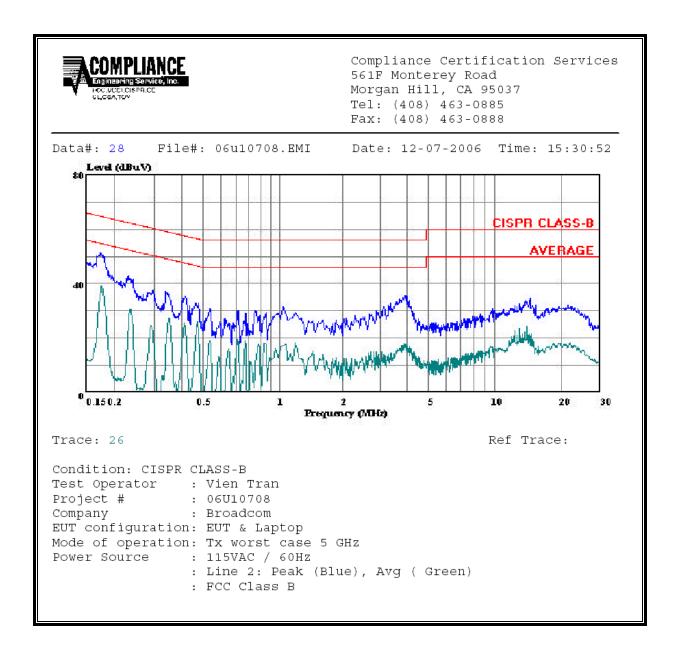
6 WORST EMISSIONS

	CONDUCTED EMISSIONS DATA (115VAC 60Hz)										
Freq.		Reading		Closs	Limit	FCC_B	Marg	in	Remark		
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV(dB)	L1/L2		
0.18	55.32		44.00	0.00	64.49	54.49	-9.17	-10.49	L1		
0.24	50.36		38.98	0.00	62.10	52.10	-11.74	-13.12	L1		
4.05	37.97		28.50	0.00	56.00	46.00	-18.03	-17.50	L1		
0.18	51.51		39.12	0.00	64.49	54.49	-12.98	-15.37	L2		
0.24	42.85		20.62	0.00	62.10	52.10	-19.25	-31.48	L2		
4.05	35.63		18.90	0.00	56.00	46.00	-20.37	-27.10	L2		
6 Worst Data											

LINE 1 RESULTS



LINE 2 RESULTS



8. DYNAMIC FREQUENCY SELECTION

8.1. OVERVIEW

8.1.1. 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	Client			
		(without DFS)	(with DFS)			
DFS Detection Threshold	Yes	Not required	Yes			
Channel Closing Transmission Time	Yes	Yes	Yes			
Channel Move Time	Yes	Yes	Yes			

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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	PRI	Pulses	Minimum	Minimum				
	(Microseconds)	(Microseconds)		Percentage of	Trials				
				Successful					
				Detection					
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 (Ra	adar Types 1-4)	80%	120						

Table 6 - Long Pulse Radar Test Signal

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

Table 7 – Frequency Hopping Radar Test Signal

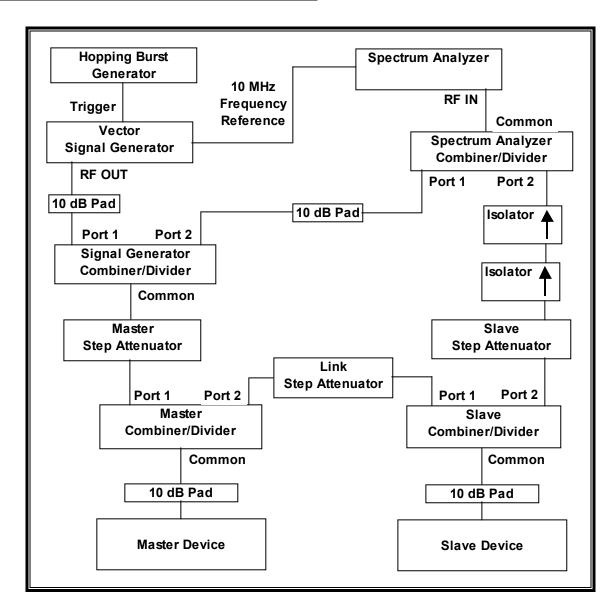
				/	·		
Radar	Pulse	PRI	Burst	Pulses	Hopping	Minimum	Minimum
Waveform	Width	(µsec)	Length	per	Rate	Percentage of	Trials
	(µsec)		(ms)	Нор	(kHz)	Successful Detection	
6	1	333	300	9	.333	70%	30

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8.1.2. TEST AND MEASUREMENT SYSTEM

CONDUCTED 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.

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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 Frequency 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.

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 pad connected to the Master Device (and/or between the Slave Combiner/Divider and the pad connected to the Slave Device). Additional pads are utilized such that there is one pad at each RF port on each EUT.

SYSTEM CALIBRATION

A 50 ohm load is connected in place of the spectrum analyzer, and the spectrum analyzer is connected in place of the master device and 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.

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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.

ADJUSTMENT OF DISPLAYED TRAFFIC LEVEL

Establish a link between the Master and Slave, adjusting the Link Step Attenuator as needed to provide a suitable received 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. For Master Device testing confirm that the displayed traffic does not include Slave Device traffic. For Slave Device testing confirm that the displayed traffic does not include Master Device traffic

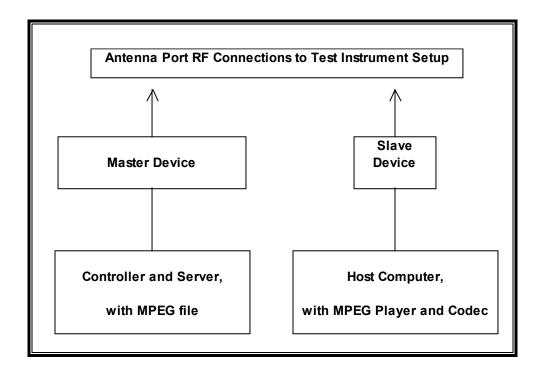
If a different setting of the Master Step Attenuator is required to meet the above conditions, perform a new System Calibration for the new Master Step Attenuator setting.

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 3 Hz ~ 44 GHz	Agilent / HP	E4446A	US42070220	7/29/2007					
Vector Signal Generator 250kHz-									
20GHz	Agilent / HP	E8267C	US43320336	11/2/2007					
	National								
High Speed Digital I/O Card	Instruments	PCI-6534	HA1612845	1/16/2008					

CONDUCTED METHOD EUT TEST SETUP



SUPPORT EQUIPMENT

The sample test was serial number 1112186.

SUPPORT EQUIPMENT

The following test and measurement equipment was utilized for the 20 MHz bandwidth DFS tests documented in this report:

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	on Manufacturer Model Serial Number		FCC ID	
Laptop	DELL	Dell Inspiron 4150	CN-04P449-48643-2CH-2011	DoC
AC Adapter	DELL	ADP-70EB	TH-09364U-17971-248-8PDP	DoC
Laptop	Compaq	Presario 3000	CNU327025L	DoC
AC Adapter	Compaq	PA-1900-05H	3300371601	DoC
Access Point	CISCO	AIR-AP1242AG-A-K9	FTX1042B5E0	LDK102056
AC Adapter	Delta	ADP-18PB	PZT0628359656	DoC

The following test and measurement equipment was utilized for the 40 MHz bandwidth DFS tests documented in this report:

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	HP	PA-1121-12HD	PPP017L	DoC
AC Adapter	HP	HP Pavilion zv6000	CND52904s1	DoC
Laptop	DELL	ADP-70EB	TH-09364U-17971-248-8PDP	DoC
AC Adapter	DELL	Dell Inspiron 4150	CN-04P449-48643-2CH-2011	DoC
Access Point	Broadcom	BCM94705LMP	Prototype	QDS-BRCM1025
AC Adapter	Bothhand	M1-10S05	R00031106975B	DoC

DATE: JUNE 29, 2007

FCC ID: QDS-BRCM1022HR1

8.1.3. DESCRIPTION OF EUT WITH RESPECT TO FCC 06-96 REQUIREMENTS

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

The EUT is a Slave Device without radar detection.

The highest power level within these bands is 27.37 dBm EIRP in the 5250-5350 MHz band and 28.5 dBm EIRP in the 5470-5725 MHz band.

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The main antenna assembly utilized with the EUT has a gain of 6.23 dBi for the 5250-5350 MHz band and 6.02 dBi in the 5470-5725 MHz band. The aux antenna assembly utilized with the EUT has a gain of 5.02 dBi for the 5250-5350 MHz band and 5.44 dBi in the 5470-5725 MHz band.

All antennas are integral.

Two non-identical antennas are utilized to meet the MIMO transmit diversity operational requirements.

The EUT uses two transmitters, each connected to a 50-ohm coaxial antenna port. Both antenna ports are connected to the test system via a power divider 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 required since the maximum EIRP is greater than 500 mW (27 dBm).

The EUT utilizes the 802.11a / 802.11Draft n architecture. Two nominal channel bandwidths, 20 MHz and 40 MHz, are implemented.

DESCRIPTION OF TPC FUNCTION

The power level can be reduced to a conducted level of 15 dBm, which yields a maximum EIRP of 23.7 dBm, which is less than the 24 dBm EIRP limit for TPC level.

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OVERVIEW OF MASTER DEVICE UTILIZED FOR 20 MHz BANDWIDTH TESTS WITH RESPECT TO §15.407 (h) REQUIREMENTS

The Master Device is a Cisco Access Point, FCC ID: LDK102056. The DFS software installed in the Master Device is revision 6.00.1. The minimum antenna gain for the Master Device is 3.5 dBi.

The rated output power of the Master unit is > 23 dBm (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 + 2 + 1 = -61 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.

OVERVIEW OF MASTER DEVICE UTILIZED FOR 40 MHz BANDWIDTH TESTS WITH RESPECT TO §15.407 (h) REQUIREMENTS

The Master Device is a Broadcom Access Point, FCC ID: QDS-BRCM1025. The DFS software installed in the Master Device is revision PO_4_100_22_2. The minimum antenna gain for the Master Device is 3 dBi.

The rated output power of the Master unit is < 23 dBm (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 + 3 + 1 = -58dBm.

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.

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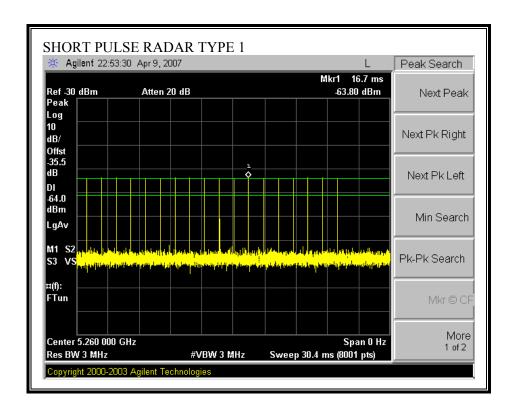
8.2. RESULTS FOR 20 MHz BANDWIDTH CONFIGURATION

8.2.1. TEST CHANNEL AND METHOD

All tests were performed at a channel center frequency of 5260 MHz. Measurements were performed using conducted test methods.

8.2.2. PLOTS OF RADAR WAVEFORM, AND WLAN TRAFFIC

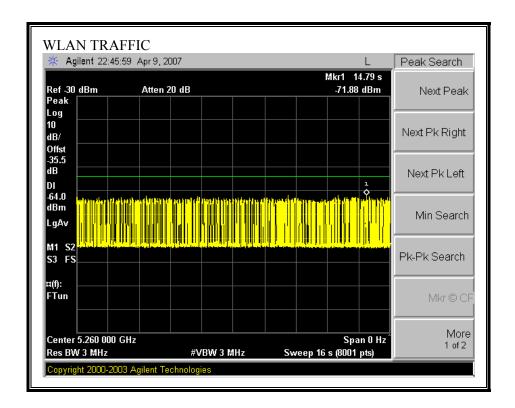
PLOTS OF RADAR WAVEFORMS



DATE: JUNE 29, 2007

FCC ID: QDS-BRCM1022HR1

PLOT OF WLAN TRAFFIC FROM SLAVE



8.2.3. CHANNEL MOVE TIME AND CHANNEL CLOSING TRANSMISSION TIME

DATE: JUNE 29, 2007

FCC ID: QDS-BRCM1022HR1

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:

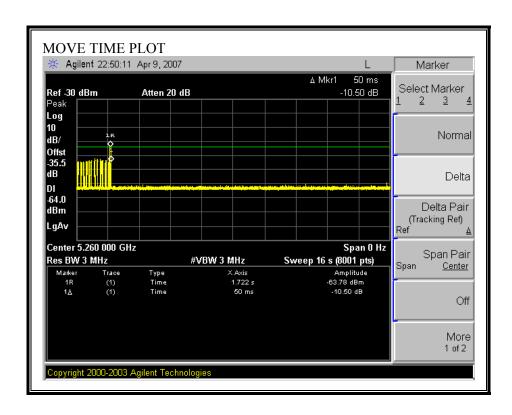
Aggregate Transmission Time = (Number of analyzer bins showing transmission) * (dwell time per bin)

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).

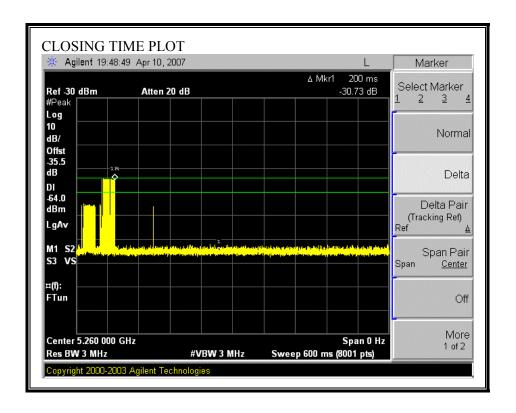
CHANNEL MOVE TIME RESULTS

No non-compliance noted:

Channel Move Time	Limit	
(s)	(s)	
0.000	10	



CHANNEL CLOSING TIME RESULTS

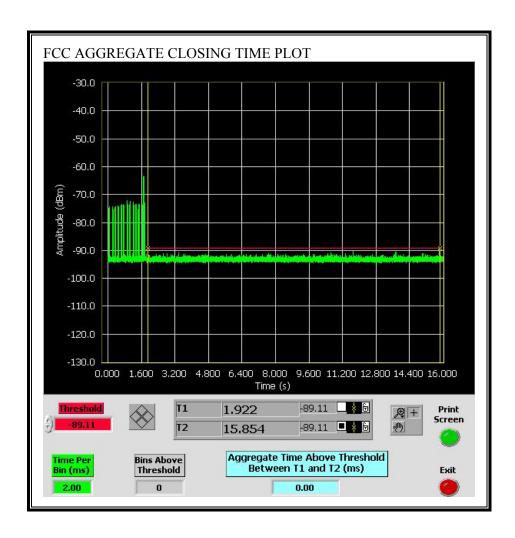


FCC AGGREGATE CHANNEL CLOSING TRANSMISSION TIME RESULTS

No non-compliance noted:

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

No transmissions are observed during the aggregate monitoring period.



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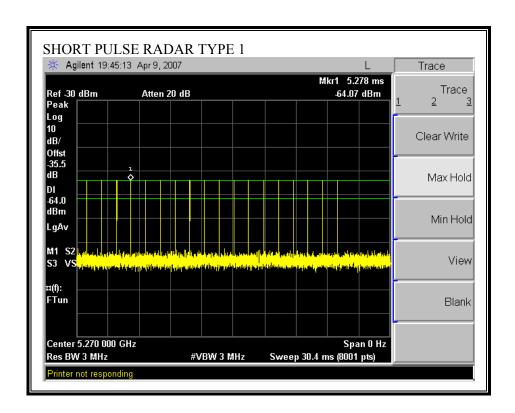
8.3. RESULTS FOR 40 MHz BANDWIDTH CONFIGURATION

8.3.1. TEST CHANNEL AND METHOD

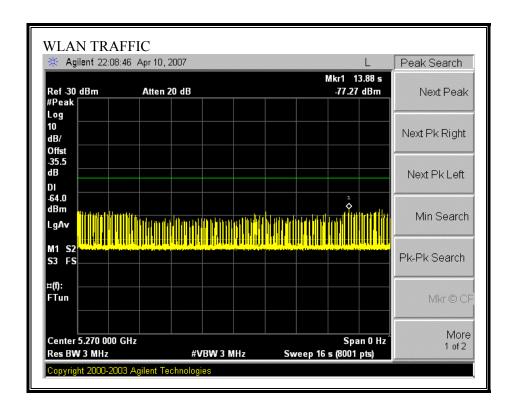
All tests were performed at a channel center frequency of 5270 MHz. Measurements were performed using conducted test methods.

8.3.2. PLOTS OF RADAR WAVEFORM, AND WLAN TRAFFIC

PLOTS OF RADAR WAVEFORMS



PLOT OF WLAN TRAFFIC FROM SLAVE



DATE: JUNE 29, 2007 FCC ID: QDS-BRCM1022HR1

8.3.3. MOVE TIME AND CHANNEL CLOSING TRANSMISSION 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)

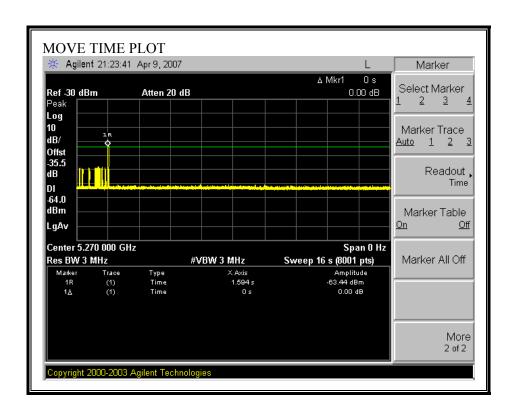
The observation period over which the aggregate time is calculated Begins at (Reference Marker + 200 msec) and Ends no earlier than (Reference Marker + 10 sec).

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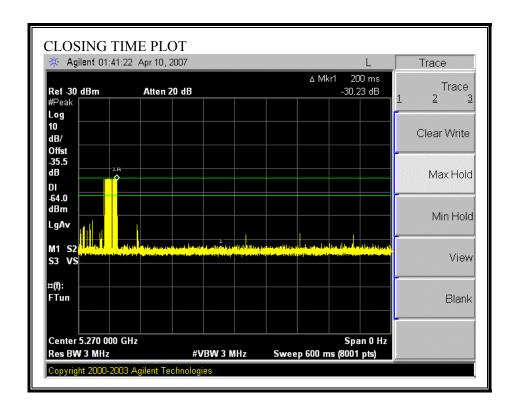
CHANNEL MOVE TIME RESULTS

No non-compliance noted:

Channel Move Time	Limit	
(s)	(s)	
0.000	10	



CHANNEL CLOSING TIME RESULTS

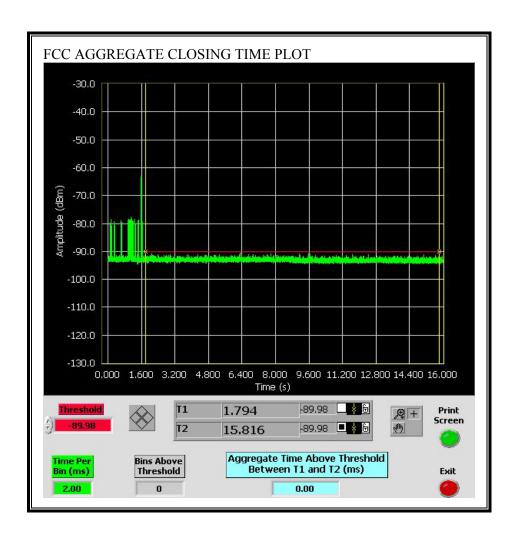


FCC AGGREGATE CHANNEL CLOSING TRANSMISSION TIME RESULTS

No non-compliance noted:

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

No transmissions are observed during the aggregate monitoring period.



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