

FCC CFR47 PART 15 SUBPART C CLASS II PERMISSIVE CHANGE

TEST REPORT

FOR

WIRELESS MOBILE ROUTER

MODEL NUMBER: C101S

FCC ID: U4D-C101S

REPORT NUMBER: 07U10892-1

ISSUE DATE: MARCH 19, 2007

Prepared for

FEENEY WIRELESS, LLC PO BOX 50415 EUGENE, OR 97405, USA

Prepared by

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REPORT NO: 07U10892-1 DATE: MARCH 19, 2007 FCC ID: U4D-C101S EUT: WIRELESS MOBILE ROUTER

Revision History

	Issue		
Rev.	Date	Revisions	Revised By
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REPORT NO: 07U10892-1 EUT: WIRELESS MOBILE ROUTER

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: FEENEY WIRELESS, LLC

PO BOX 50415

EUGENE, OR 97405, USA

EUT DESCRIPTION: WIRELESS MOBILE ROUTER

MODEL: C101S

SERIAL NUMBER: 1876

DATE TESTED: MARCH 4-7, 2007

APPLICABLE STANDARDS

STANDARD TEST RESULTS

FCC PART 15 SUBPART C 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:

Tested By:

THU CHAN
EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

CHIN PANG EMC ENGINEER

Chin Pany

COMPLIANCE CERTIFICATION SERVICES

DATE: MARCH 19, 2007

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%.

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5. EQUIPMENT UNDER TEST

5.1. **DESCRIPTION OF EUT**

The EUT is a Wireless Mobile Router.

The radio module is manufactured by AboCom Systems, Inc.

5.2. **DESCRIPTION OF CLASS II PERMISSIVE CHANGE**

Change #1	Change original antenna from 2dBi Dipole, to 2dBi flat Microsphere
Change #2	Change EUT housing from plastic to metal
Change #3	Co-locate EUT in new metal case with FCC ID: N7N-MC5725

5.3. **DESCRIPTION OF AVAILABLE ANTENNAS**

The radio utilizes a microsphere antenna with a maximum gain of 2 dBi.

5.4. SOFTWARE AND FIRMWARE

The EUT driver software installed in the host support equipment during testing was MP TEST.EXE V1.0.0.3.

The test utility software used during testing was Windows XP, HyperTerminal.

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 was at high channel for b/g mode.

The worst-case data rate for this channel is determined to be 1Mb/s for b mode and 6Mb/s for g mode based on previous experience with 2.4GHz WLAN product design architectures.

Also X, Y, and Z positions have been investigated and the worst-case configuration has been determined at Y position.

All the tests were performed on radiated emissions @ Y-position.

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5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST								
Description Manufacturer Model Serial Number FCC ID								
Notebook PC	Panasonic	CF-51	CF-51PCLDFBM	DoC				
Notebook AC Adapter	Panasonic	CF-AA1653A	1653AJ406X00100D	DoC				
Diagnostic Test PCBA	Zyxel	NA	NA	NA				
EUT AC Adapter	Not Marked	MW48-1200800	Not Marked	DoC				

I/O CABLES

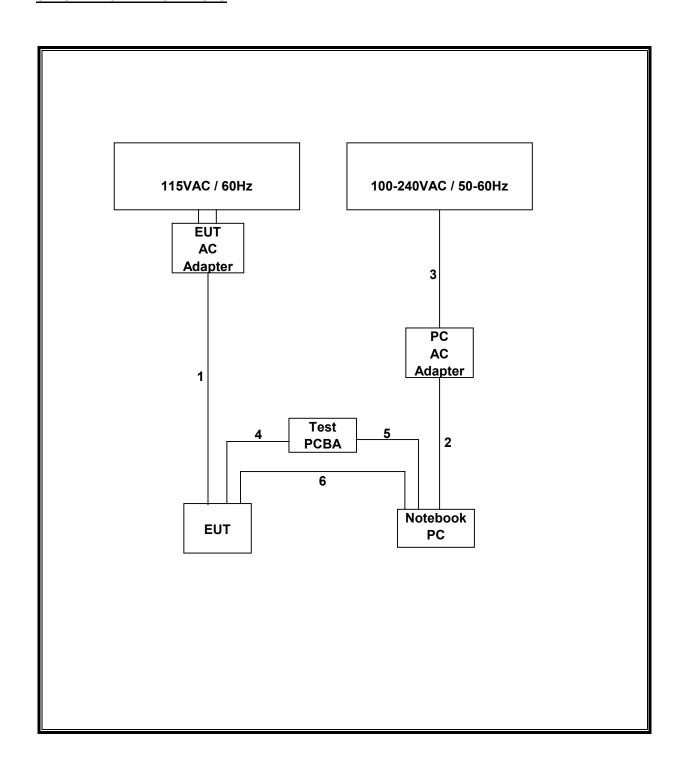
	I/O CABLE LIST							
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks		
1	DC Power Input	1	None	Un-shielded	2m	NA		
2	DC Power Input	1	Mini-jack	Un-shielded	2m	Ferrite at PC End		
3	AC Input	1	IEC-320	Un-shielded	1.5m	NA		
4	RS-232	1	Molex 1x4	Un-shielded	.1m	NA		
5	RS-232	1	DB-9	Shielded	1.5m	NA		
6	10/100 Base-T	1	RJ-45	Un-shielded	1m	NA		

TEST SETUP

The EUT is connected to a host laptop computer via a RJ45 cable during the tests. Test software exercised the radio card.

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SETUP DIAGRAM FOR TESTS



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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, Bilog 30 MHz ~ 2 Ghz	Sunol Sciences	JB1	A121003	9/3/2007		
Preamplifier, 1 ~ 26.5 GHz	Agilent / HP	8449B	3008A00931	6/24/2007		
Antenna, Horn 1 ~ 18 GHz	ETS	3117	29301	4/22/2007		
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		
Peak Power Meter	Agilent / HP	E4416A	GB41291160	12/2/2007		
Peak / Average Power Sensor	Agilent	E9327A	US40440755	12/2/2007		
4.0 High Pass Filter	Micro Tronics	HPM13351	3	CNR		

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7. LIMITS AND RESULTS

7.1. CHANNEL TESTS FOR THE 2400 TO 2483.5 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 11B (including 10 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

802.11b Mode

Channel	Frequency	Power
	(MHz)	(dBm)
Low	2412	18.00
Middle	2437	18.04
High	2462	18.10

802.11g Mode

Channel	Frequency	Power		
	(MHz)	(dBm)		
Low	2412	20.90		
Middle	2437	21.40		
High	2462	21.50		

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7.2. RADIATED EMISSIONS

7.2.1. 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	$\binom{2}{}$
13.36 - 13.41			

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

§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.

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² Above 38 6

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§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:

3 3 3 3	
•	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.

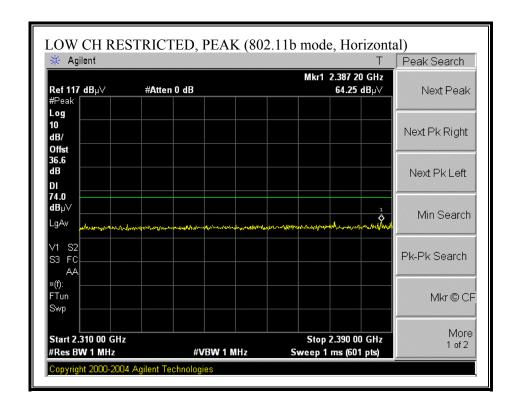
For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

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

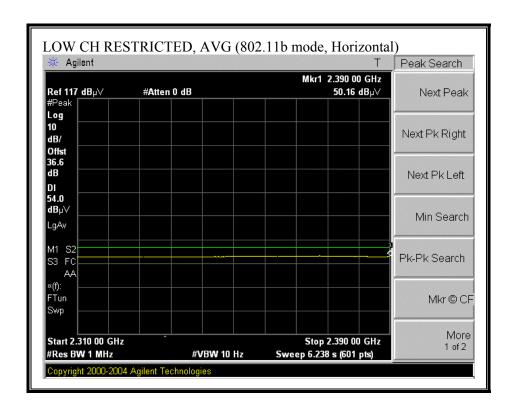
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each 5 GHz band.

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.

RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, HORIZONTAL)

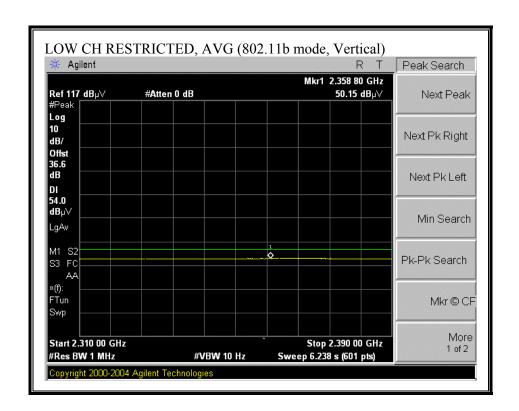


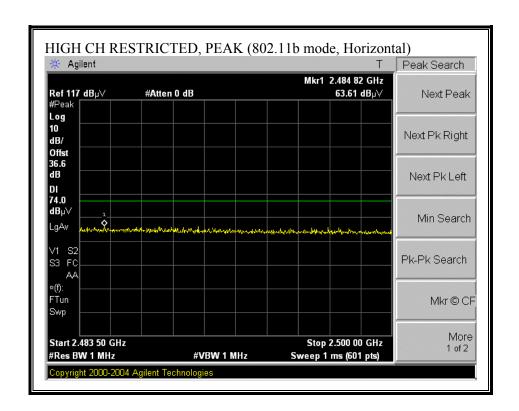
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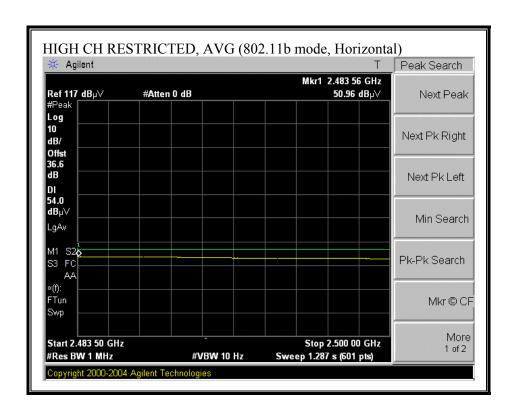
LOW CH RESTRICTED, PEAK (802.11b mode, Vertical) Peak Search Mkr1 2.369 07 GHz Ref 117 dBµ∀ #Atten 0 dB 63.60 dBµ∨ Next Peak Log 10 Next Pk Right dB/ Offst 36.6 dB Next Pk Left DI 74.0 dBµ∨ __1__ Min Search LgAv M1 S2 Pk-Pk Search S3 FC ∞(f): FTun Mkr @ CF Swp More Start 2.310 00 GHz Stop 2.390 00 GHz 1 of 2 #Res BW 1 MHz #VBW 1 MHz Sweep 1 ms (601 pts) Copyright 2000-2004 Agilent Technologies

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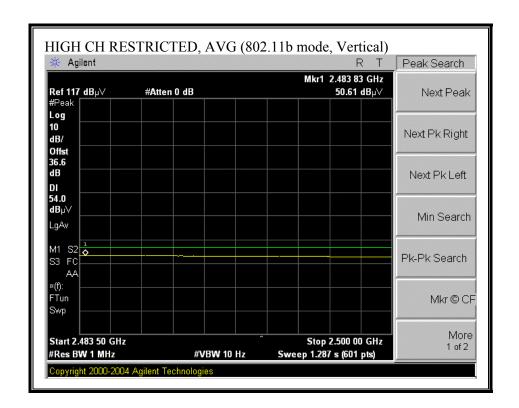


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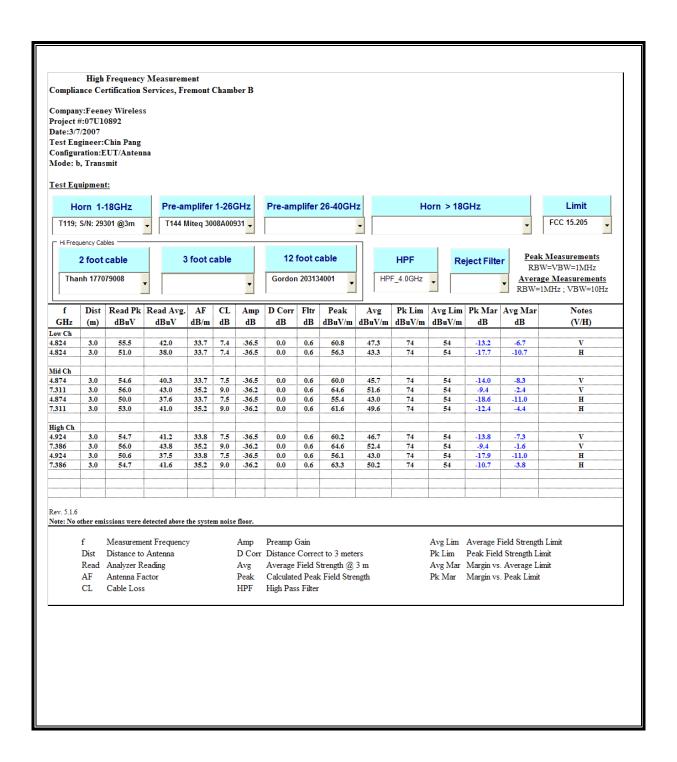


HIGH CH RESTRICTED, PEAK (802.11b mode, Vertical) Peak Search Mkr1 2.486 58 GHz Ref 117 dBµ∀ #Atten 0 dB 63.97 dBµ∨ Next Peak Log 10 Next Pk Right dB/ Offst 36.6 dΒ Next Pk Left DI 74.0 dBµ∨ Min Search LgAv V1 S2 Pk-Pk Search S3 FC ∞(f): FTun Mkr @ CF Swp More Start 2.483 50 GHz Stop 2.500 00 GHz 1 of 2 #Res BW 1 MHz #VBW 1 MHz Sweep 1 ms (601 pts) Copyright 2000-2004 Agilent Technologies

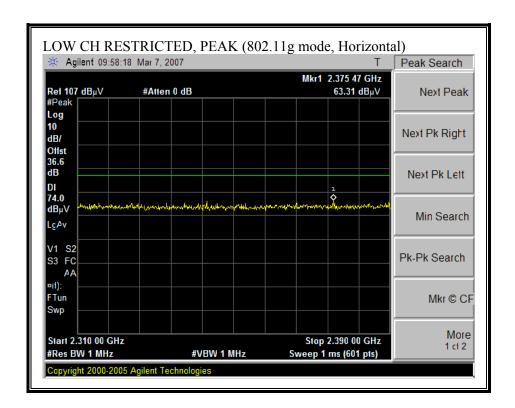
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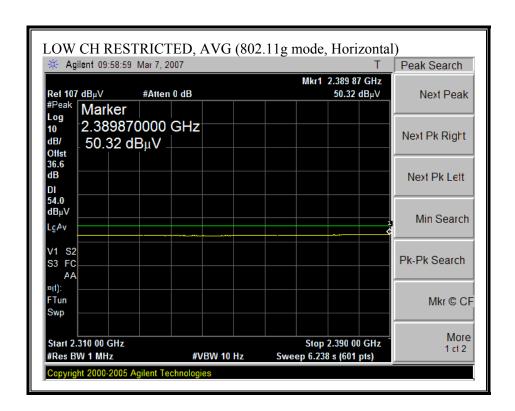
HARMONICS AND SPURIOUS EMISSIONS (b MODE)

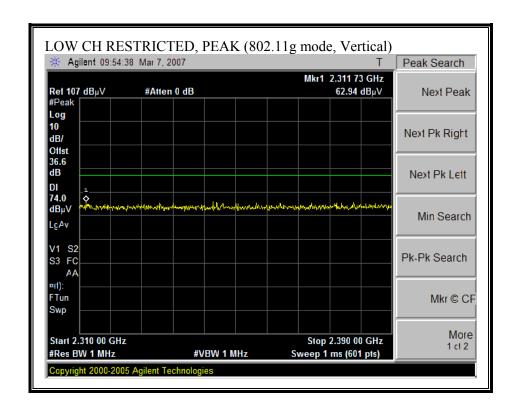


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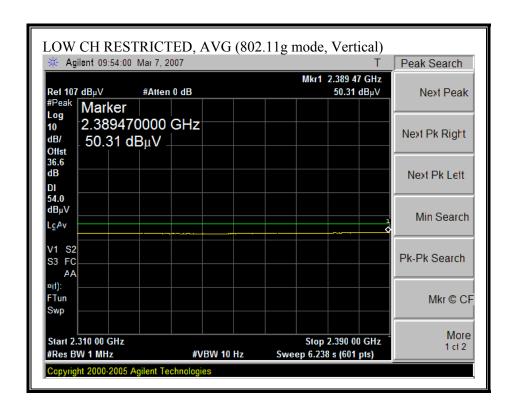


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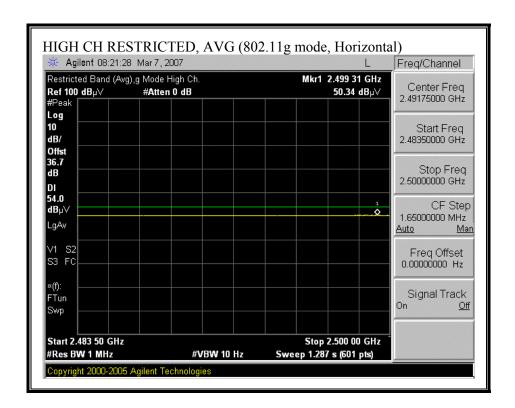


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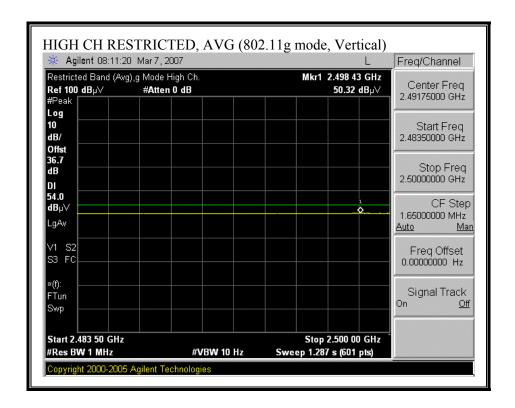
HIGH CH RESTRICTED, PEAK (802.11g mode, Horizontal) Agilent 08:20:48 Mar 7, 2007 Freq/Channel Mkr1 2.496 42 GHz Restricted Band (Pk), g Mode High Ch. Center Freq Ref 100 dBµ∀ #Atten 0 dB 62.84 dBµ∨ 2.49175000 GHz #Peak Log 10 Start Freq dB/ 2.48350000 GHz Offst 36.7 Stop Freq dΒ 2.50000000 GHz DI 74.0 CF Step dBμ∀ 1.65000000 MHz LgAv Auto Man V1 S2 Freq Offset 0.00000000 Hz S3 FC ×(f): Signal Track FTun On Swp Start 2.483 50 GHz Stop 2.500 00 GHz #Res BW 1 MHz #VBW 1 MHz Sweep 1 ms (601 pts) Copyright 2000-2005 Agilent Technologies

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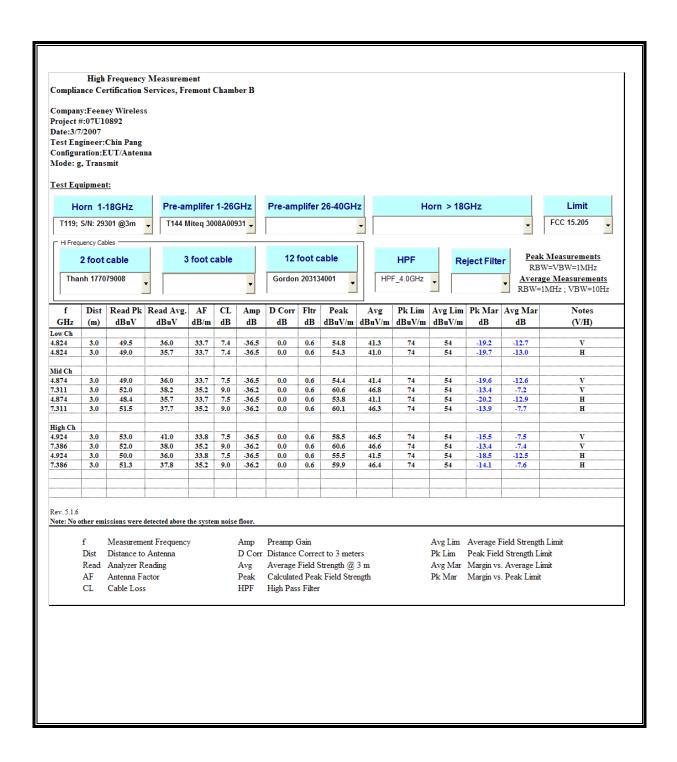


HIGH CH RESTRICTED, PEAK (802.11g mode, Vertical) Agilent 08:10:28 Mar 7, 2007 Freq/Channel Mkr1 2.488 94 GHz Restricted Band (Pk), g Mode High Ch. Center Freq Ref 100 dBµ∀ #Atten 0 dB 62.38 dBµ∨ 2.49175000 GHz #Peak Log 10 Start Freq dB/ 2.48350000 GHz Offst 36.7 Stop Freq dΒ 2.50000000 GHz DI 74.0 CF Step dBµ∨ 1.65000000 MHz LgAv <u>Auto</u> Man V1 S2 Freq Offset 0.00000000 Hz S3 FC ×(f): Signal Track FTun On Swp Start 2.483 50 GHz Stop 2.500 00 GHz #Res BW 1 MHz Sweep 1 ms (601 pts) #VBW 1 MHz Copyright 2000-2005 Agilent Technologies

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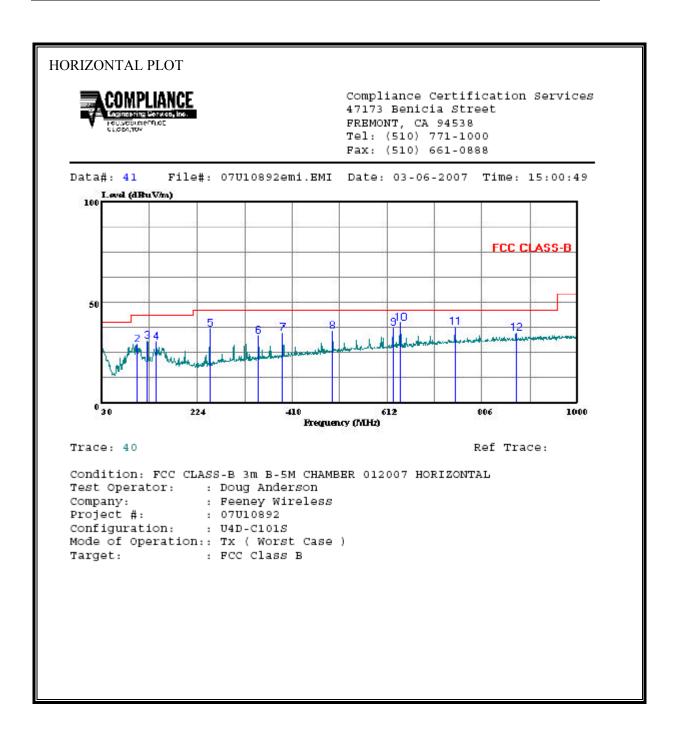
HARMONICS AND SPURIOUS EMISSIONS (g MODE)



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7.2.3. WORST-CASE RADIATED EMISSIONS BELOW 1 GHz

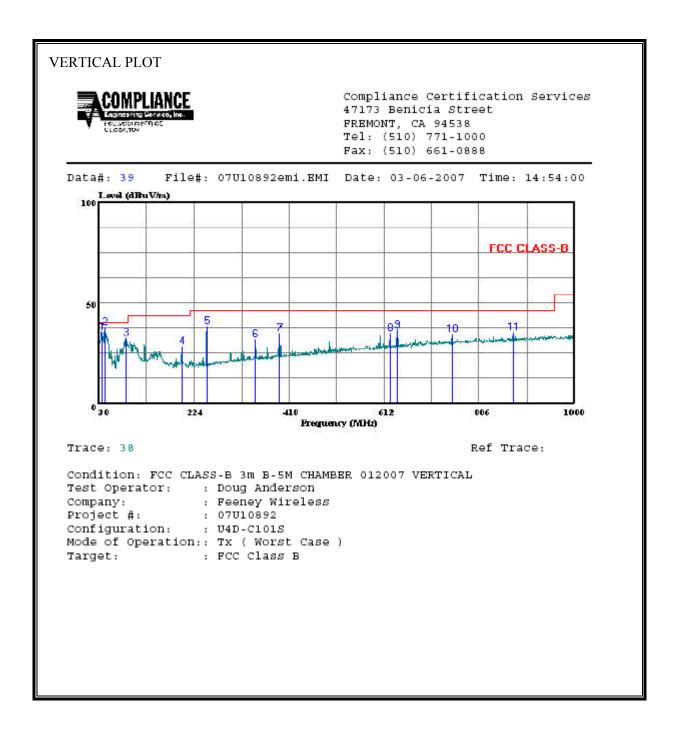
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)



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HORIZONT	AL DATA							
	Freq	Read Level		Level	Limit Line	Over Limit	Remark	Page: 1
	MHz	dBuV	dB	$\overline{\mathtt{dBuV/m}}$	$\overline{\mathtt{dBuV}/\mathtt{m}}$	dB		
1 2	30.970					-12.35 -14.68		
3	100.810 123.120					-14.68		
4	141.550					-13.25		
5	249.220					-9.09		
6	349.130	44.20	-11.03	33.17	46.00	-12.83	Peak	
7	399.570	44.50	-9.92	34.58		-11.42		
8	499.480			35.60		-10.40		
9	624.610			37.26				
10	640.130			40.00		-6.00		
11	750.710							
12	875.840	36.00	-1.32	34.68	46.00	-11.32	Peak	

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

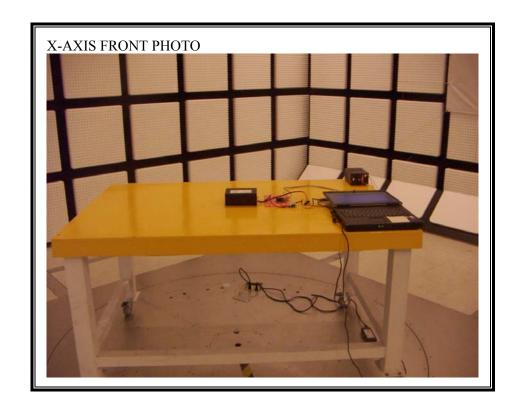


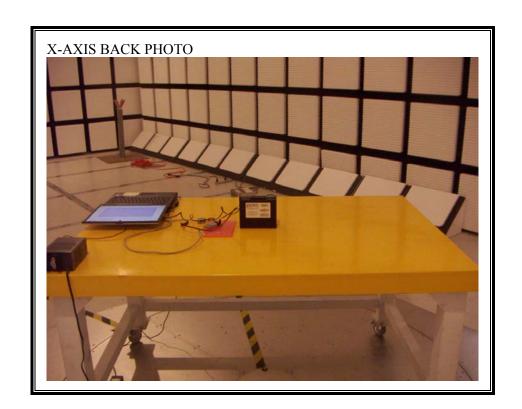
DATE: MARCH 19, 2007

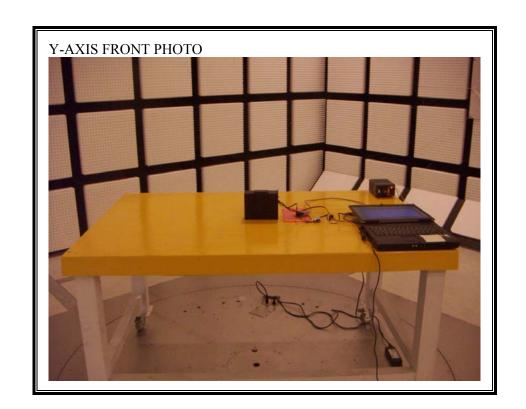
								Page: 1
	_	Read				Over		
	Freq	revel	Factor	Level	Line	Limit	Remark	
	MHz	dBuV	dB	$\overline{\mathtt{dBuV/m}}$	$\overline{\mathtt{dBuV}/\mathtt{m}}$	db		
1	35.820	43.74	-8.76	34.98	40.00	-5.02	Peak	
2	42.610	52.10	-14.27	37.83	40.00	-2.17	Peak	
3					40.00			
4					43.50			
5					46.00			
6	349.130							
7	399.570							
8					46.00			
9	639.160							
10					46.00			
11	875.840	36.50	-1.32	35.18	46.00	-10.82	Peak	

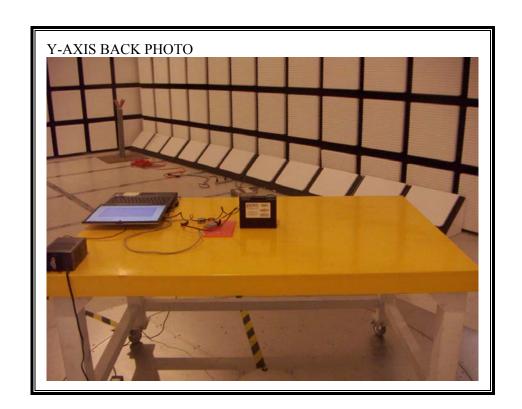
8. SETUP PHOTOS

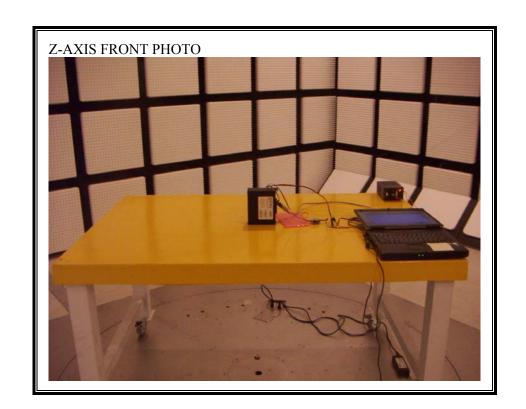
RADIATED RF MEASUREMENT SETUP FOR PORTABLE CONFIGURATION

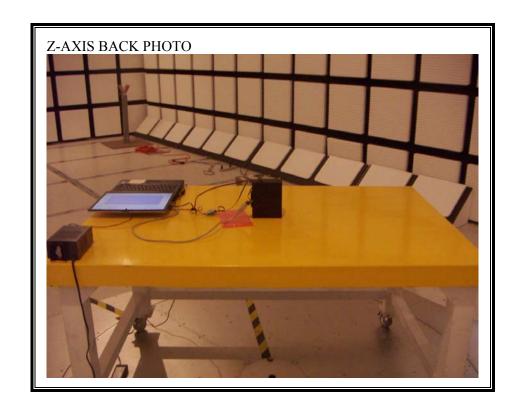












END OF REPORT