

FCC 47 CFR PART 15 SUBPART C

TEST REPORT

For 802.11n VDSL2 4-port Gateway Model: P-870HN-51b Trade Name: ZyXEL Issued to

ZyXEL Communications Corporation

NO.6 Innovation Rd,II Science Based Industrial Park,Hsin-chu,Taiwan

Prepared by

COMPLIANCE CERTIFICATION SERVICES (KUNSHAN) INC. 10#Weiye Rd, Innovation Park Eco. & Tec. Development Zone Kunshan city JiangSu, (215300) CHINA TEL: 86-512-57355888 FAX: 86-512-57370818



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TEST RESULT CERTIFICATION

Applicant:	ZyXEL Communications Corporation NO.6 Innovation Rd,II Science Based Industrial Park, Hsin-chu Taiwan		
Equipment Under Test:	802.11n VDSL2 4-port Gateway		
Trade Name:	ZyXEL		
Model:	P-870HN-51b		
Date of Test:	September 4,2009 ~ October 13,2009		

APPLICABLE STANDARDS				
STANDARD TEST RESULT				
FCC 47 CFR Part 15 Subpart C No non-compliance noted				

We hereby certify that:

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4: 2003 and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 15.207, 15.209, 15.247.

The test results of this report relate only to the tested sample EUT identified in this report.

Approved by:

Miro Chueh EMC Manager Compliance Certification Service Inc.

Reviewed by:

" a part

Lin Zhang EMC Section Manager Compliance Certification Service Inc.



EUT DESCRIPTION

Product 802.11n VDSL2 4-port Gateway		
Trade Name	ZyXEL	
Model Number	P-870HN-51b	
Frequency Range	2412 ~ 2462 MHz	
EUT Power Rating	Powered from an AC/DC power adapter Model name: ADS0128-W 120100 Manufacturer: OEM Input: AC 100-240V, 50-60Hz, 0.5A Output: DC 12V, 1.0A	
Transmit Power	IEEE 802.11b mode: 20.35dBm IEEE 802.11g mode: 19.58dBm draft 802.11n Standard-20 MHz Channel mode: 19.14 dBm draft 802.11n Wide-40 MHz Channel mode: 17.53 dBm (the EUT transmitting and receiving with two antennas simultaneously working at n mode)	
Modulation Technique	IEEE 802.11b mode: DSSS (1, 2, 5.5 and 11 Mpbs) IEEE 802.11g mode: OFDM (6, 9, 12, 18, 24, 36, 48 and 54 Mpbs) draft 802.11n Standard-20 MHz Channel mode: OFDM (150,144, 130, 117, 104, 78, 52, 39, 26 and 13 Mpbs) draft 802.11n Wide-40 MHz Channel mode: OFDM (300, 270, 243, 216, 162, 108, 81, 54 and 27Mpbs)	
Number of Channels	IEEE 802.11b/g mode: 11 Channels draft 802.11n Standard-20 MHz Channel mode: 11 Channels draft 802.11n Wide-40 MHz Channel mode: 7 Channels	
Antenna Specification	an external dipole antenna gain 2.0 dBi and an internal RF PCB Antenna(S/N:C034-510726-A).gain 1.4 dBi /Total gain 4.72 dBi	

Remark:

- 1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.
- 2. This submittal(s) (test report) is intended for FCC ID: I88P870HN51B filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.



TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4 2003and FCC CFR 47 15.207, 15.209 and 15.247.

EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

EUT EXERCISE

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.

GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4 2003 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4 2003.



FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

(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 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	$\binom{2}{}$
13.36 - 13.41	322 - 335.4		

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

² Above 38.6

(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.



DESCRIPTION OF TEST MODES

The EUT transmitting and receiving with one antenna working at b/g mode.

The EUT transmitting and receiving with two antennas simultaneously working at n mode, so 2x2 configuration was used for all testing in this report.

The worst-case data rates are determined to be as follows for each mode based on investigation by measuring the average power, peak power and PPSD across all data rates, bandwidths, and modulations.

The worst-case data rates:

IEEE802.11b mode: Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 11Mbps data rate were chosen for full testing.

IEEE802.11g mode: Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 6Mbps data rate were chosen for full testing.

draft 802.11gn Standard-20 MHz Channel mode: Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with MCS15 data rate were chosen for full testing.

draft 802.11gn Wide-40 MHz Channel mode: Channel Low (2422MHz), Channel Mid (2437MHz) and Channel High (2452MHz) with MCS15 data rate were chosen for full testing.

The following test mode was scanned during the preliminary test:

Mode 1: Set the EUT stand-up on the table top

Mode 2: Set the EUT lie-down on the table top

After the preliminary scan, the following test mode was found to produce the highest emission level.

Mode 1:Set the EUT stand-up on the table top

Then, the EUT configuration and cable configuration of the above highest emission mode was recorded for all final test items.



INSTRUMENT CALIBRATION

MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

Equipment Used for Emissions Measurement

Remark: Each piece of equipment is scheduled for calibration once a year.

Conducted Emissions Test Site					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due	
Spectrum Analyzer	Agilent	E4446A	MY44020154	11/12/2009	
Peak and Avg Power Sensor	Agilent	E9327A	US40441788	09/11/2010	
EPM-P Series Power Meter	Agilent	E4416A	QB41292714	09/11/2010	

3M Semi Anechoic Chamber					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due	
Spectrum Analyzer	Agilent	E4446A	MY44020154	11/12/2009	
Pre-Amplfier	Miteq	NSP4000-NF	870731	01/21/2010	
Horn Antenna	Austriah	BBHA9120D	D267	05/09/2010	
SHF-EHF Horn Antenna	Schwarzbeck	BBHA9170	BBHA9170171	04/12/2010	
Turn Table	СТ	CT123	4162	N.C.R	
Antenna Tower	СТ	CTERG23	3253	N.C.R	
Controller	СТ	CT100	95635	N.C.R	
Coax Switch	Anitsu	MP 598	M 80094	N/A	
Site NSA	CCS Lab.	N/A	N/A	12/11/2009	
ESPI3 EMI RECEIVER	R&S	ESPI3	101026	05/06/2010	
Pre-Amplfier	MINI	ZFL-1000VH2	d041703	02/28/2010	
Bilog Antenna	Sunol Sciences	JB1	A110204-2	11/22/2009	

Remark: The measurement uncertainty is less than +/- 4.83dB (vertical 30MHz ~ 200MHz),+/- 4.70dB(vertical 200MHz ~1000MHz), +/- 4.72dB(Horizontal 30MHz ~ 1GHz) +/- 3.92dB (1000MHz ~5000MHz) +/- 3.94dB(5000MHz ~18000MHz) which is evaluated as per the NAMAS NIS 81 and CISPR/A/291/CDV. Expanded Uncertainty (95% CONFIDENCE INTERVAL): K=2

Power Line Conducted Emission Test Site A					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due	
EMI Test Receiver	SCHAFFNER	SCR3501	343	04/22/2010	
V (V-LISN)	Schwarzbeck	NNLK 8129	8129-143	04/11/2010	
LISN (EUT)	FCC	FCC-LISN-50/250- 50-2-02	SN:05012	04/11/2010	
TRANSIENT LIMITER	SCHAFFNER	CFL9206	1710	04/06/2010	

Remark: The measurement uncertainty is less than +/- 3.43dB dB, which is evaluated as per the NAMAS NIS 81 and CISPR/A/291/CDV.

Expanded Uncertainty (95% CONFIDENCE INTERVAL): K=2



FACILITIES AND ACCREDITATIONS FACILITIES

All measurement facilities used to collect the measurement data are located at CCS China Kunshan Lab at 10#Weiye Rd, Innovation Park Eco. & Tec. Development Zone

Kunshan city JiangSu, (215300), CHINA.

The sites are constructed in conformance with the requirements of ANSI C63.4 2003 and CISPR Publication 22.

EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

LABORATORY ACCREDITATIONS AND LISTING

The test facilities used to perform radiated and conducted emissions tests are accredited by American Association for Laboratory Accreditation Program for the specific scope accreditation under Lab Code: 2541.01 to perform Electromagnetic Interference tests according to FCC Part 15 and CISPR 22 requirements. In addition, the test facilities are listed with Industry Canada, Certification and Engineering Bureau, IC 2324E-1 for 3/10m Chamber.

TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	A2LA	47 CFR FCC Part 15/18 (using ANSI C63.4 :2003); VCCI V3; CNS 13438; CNS 13439; CNS 13803; CISPR 11; EN 55011; CISPR 13; EN 55013; CISPR 22:2005; CISPR 22:1997 +A1 :2000+A2 :2002; EN 55022:2006; EN55022 :1998 +A1 :2001+A2 :2003; EN 61000-6-3 (excluding discontinuous interference); EN 61000-6-4; AS/NZS CISPR 22; CAN/CSA-CEI/IEC CISPR 22; EN 61000-3-2; EN 61000-3-3; EN550024; EN 61000-4-2; EN 61000-4-3; EN61000-4-4; EN 61000-4-5; EN 61000-4-6; IEC 61000-4-8; EN 61000-4-5; IEC 61000-4-3; IEC 61000-4-8; IEC 61000-4-2; IEC 61000-4-6; IEC 61000-4-4; IEC 61000-4-5; IEC 61000-4-6; IEC 61000-4-8; IEC 61000-4-5; IEC 61000-4-6; IEC 61000-4-8; IEC 61000-4-11; EN 300 220-3; EN 300 328; EN 300 330-2; EN 300 440-1; EN 300-440-2; EN 300 893; EN 301 489-01; EN 301 489-3; EN 301 489-07; EN 301 489-17; 47 CFR FCC Part 15, 22, 24	ACCREDITED TESTING CERT #2541.01
USA	FCC	3/10 meter Sites to perform FCC Part 15/18 measurements	FC 93105, 90471
Japan	VCCI	3/10 meter Sites and conducted test sites to perform radiated/conducted measurements	VCCI R-1600 C-1707 T-1499

* No part of this report may be used to claim or imply product endorsement by A2LA or any agency of the US Government.



SETUP OF EQUIPMENT UNDER TEST

SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

SUPPORT EQUIPMENT

No.	Device Type	Brand	Model	Series No.	FCC ID
1.	Notebook pc	IBM	X31	32P4413	DOC

Remark:

- 1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
- 2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.



FCC PART 15.247 REQUIREMENTS

6DB BANDWIDTH

LIMIT

According to §15.247(a)(2), systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6dB bandwidth shall be at least 500 kHz.

Test Configuration



TEST PROCEDURE

- 1. Place the EUT on the table and set it in the transmitting mode.
- 2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 3. Set the spectrum analyzer as RBW = 100kHz, VBW = RBW, Sweep = auto.
- 4. Mark the peak frequency and –6dB (upper and lower) frequency.
- 5. Repeat until all the rest channels are investigated.



TEST RESULTS

No non-compliance noted

<u>Test Data</u>

IEEE 802.11b mode

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	8.088	>500	PASS
Mid	2437	8.250		PASS
High	2462	8.411		PASS

IEEE 802.11g mode

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	15.132	>500	PASS
Mid	2437	15.022		PASS
High	2462	15.449		PASS

TRANSMIT CHAIN 0

draft 802.11gn Standard-20 MHz Channel mode

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	15.124		PASS
Mid	2437	15.095	>500	PASS
High	2462	15.053		PASS

draft 802.11gn Wide-40 MHz Channel mode

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2422	35.142		PASS
Mid	2437	35.050	>500	PASS
High	2452	35.151		PASS



TRANSMIT CHAIN 1

draft 802.11gn Standard-20 MHz Channel mode

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	15.113		PASS
Mid	2437	15.051	>500	PASS
High	2462	15.134		PASS

draft 802.11gn Wide-40 MHz Channel mode

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2422	35.087		PASS
Mid	2437	35.133	>500	PASS
High	2452	35.105		PASS

TRANSMIT CHAIN 0+ CHAIN 1

draft 802.11gn Standard-20 MHz Channel mode

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	15.628		PASS
Mid	2437	15.633	>500	PASS
High	2462	15.492		PASS

draft 802.11gn Wide-40 MHz Channel mode

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2422	35.458		PASS
Mid	2437	35.146	>500	PASS
High	2452	35.442		PASS



Test Plot IEEE 802.11b MODE

6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

🔆 Agilent			RΤ	Freq/Channel
Ch Freq 2.43 Occupied Bandwidth	7 GHz	Т	rig Free	Center Freq 2.43700000 GHz
				Start Freq 2.42700000 GHz
Ref 20 dBm #Atten #Peak Log	30 dB	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		Stop Freq 2.44700000 GHz
dB/ 0ffst 1.5			the second second	CF Step 2.00000000 MHz <u>Auto</u> Man
dB Center 2.437 00 GHz		Spa	in 20 MHz	Freq Offset 0.00000000 Hz
+Res BW 100 kHz Occupied Bandwidt	*VBW 100 kHz :h осмц-	Sweep 2.44 ms (Occ BW % Pwr x dB -	(601 pts) 99.00 % -6.00 dB	Signal Track ^{On <u>Off</u>}
۲۵.۵۲ Transmit Freq Error 5 x dB Bandwidth	55.837 kHz 3.250 MHz			
Copyright 2000-2009 Ag	ilent Technologies			



6dB Bandwidth (CH High)



IEEE 802.11g MODE

6dB Bandwidth (CH Low)

🔆 Agilent			RΤ	Freq/Channel
Ch Freq 2.412 GH Occupied Bandwidth	z	Tr	ig Free	Center Freq 2.41200000 GHz
				Start Freq 2.40200000 GHz
Ref 20 dBm #Atten 30 d #Peak Log		lenna	*	Stop Freq 2.42200000 GHz
dB/ 0ffst 1.5				CF Step 2.00000000 MHz <u>Auto</u> Man
dB		Span	20 MHz	FreqOffset 0.00000000 Hz
Occupied Bandwidth	0CI 0CI	CBW % Pwr xdB	99.00 % 6.00 dB	Signal Track ^{On <u>Off</u>}
Transmit Freq Error 11.62 × dB Bandwidth 15.13	29 kHz 22 MHz			
Copyright 2000-2009 Agilent	: Technologies			



6dB Bandwidth (CH Mid)



6dB Bandwidth (CH High)

🔆 Agilent		R	Т	Freq/Channel
Ch Freq 2.46 Occupied Bandwidth	2 GHz	Trig	I Free	Center Freq 2.46200000 GHz
				Start Freq 2.45200000 GHz
Ref 20 dBm #Atten #Peak Log	30 dB	unter management	१ ←	Stop Freq 2.47200000 GHz
dB/ 45/ 45/ 45/ 45/ 45/ 45/ 45/ 45/ 45/ 45				CF Step 2.41266000 GHz Auto <u>Man</u>
dB Center 2.462 00 GHz		Span 2	20 MHz	Freq Offset 0.00000000 Hz
BW 100 kHz Occupied Bandwidt 16 46	*VBW 100 kHz	Sweep 2.44 ms (60 Occ BW % Pwr 99 x dB -6.0	1 pts) 1.00 % 00 dB	Signal Track On <u>Off</u>
LO.40 Transmit Freq Error (x dB Bandwidth (00 MINZ 3.441 kHz 5.449 MHz			
Copyright 2000-2009 Ag	ilent Technologies			



draft 802.11gn Standard-20 MHz Channel mode / Chain 0

6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

🔆 Agilent	RT	Freq/Channel
Ch Freq 2.437 GHz Occupied Bandwidth	Trig Free	Center Freq 2.43700000 GHz
		Start Freq 2.42700000 GHz
Ref 20 dBm #Atten 30 dB #Peak	Jahnmanna anna hanna	Stop Freq 2.44700000 GHz
10 dB/ 0ffst 1.5		CF Step 2.00000000 MHz <u>Auto</u> Man
dB	Span 20 MHz	Freq Offset 0.00000000 Hz
*Res BW 100 kHz #VBW 100 Occupied Bandwidth 17 4096 MHz	kHz Sweep 2.44 ms (601 pts) Осс ВМ % Рмг 99.00 % х dB -6.00 dB	Signal Track In <u>Off</u>
Transmit Freq Error 11.422 kHz x dB Bandwidth 15.095 MHz		
Copyright 2000-2009 Agilent Techno	logies	



6dB Bandwidth (CH High)



draft 802.11gn Standard-40 MHz Channel mode / Chain 0 6dB Bandwidth (CH Low)

🔆 Agilent	R T Freq/Channel
Ch Freq 2.422 GHz Occupied Bandwidth	Trig Free Center Freq 2.42200000 GHz
	Start Freq 2.40200000 GHz
Ref 20 dBm #Atten 30 dB #Peak Log 10 → Multinet discout day with the second day → Multinet discout day with the second day → Multinet d	Stop Freq 2.44200000 GHz
10 V dB/ V 0ffst 1.5	CF Step 4.0000000 MHz <u>Auto</u> Man
dB	Span 40 MHz
*Kes BW 100 KHz *VBW 100 KHz Occupied Bandwidth 35.7217 MHz	z Sweep 4.84 ms (601 pts) Осс ВЖ % Рыг 99.00 % х dB -6.00 dB
Transmit Freq Error9.472 kHzx dB Bandwidth35.142 MHz	
Copyright 2000-2009 Agilent Technolog	es



6dB Bandwidth (CH Mid)

🔆 Agilent			RΤ	Freq/Channel
Ch Freq 2.4 Occupied Bandwidth	437 GHz		Trig Free	Center Fred 2.43700000 GHz
				Start Fred 2.41700000 GHz
Ref 20 dBm #Atte #Peak Log	n 30 dB	Marture and the		Stop Fred 2.45700000 GHz
dB/ 0ffst				CF Step 4.00000000 MHz <u>Auto</u> Mar
dB Center 2.437 00 GHz			Span 40 MHz	Freq Offset 0.00000000 Hz
Occupied Bandwid		Sweep 4.84 m Occ BW % Pwr x dB	is (601 pts) 99.00 % –6.00 dB	Signal Track On <u>Of</u> i
JJ.O Transmit Freq Error x dB Bandwidth	33.877 kHz 35.050 MHz			
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6dB Bandwidth (CH High)

☆ Agilent R T [Freq/Channel
Ch Freq 2.452 GHz Trig Free Occupied Bandwidth	Center Freq 2.45200000 GHz
	Start Freq 2.43200000 GHz
Ref 20 dBm #Atten 30 dB #Peak Log 1.0 	Stop Freq 2.47200000 GHz
dB/ 0ffst 1.5	CF Step 4.00000000 MHz <u>Auto</u> Man
dB Center 2.452 00 GHz Span 40 MHz Span 40 MHz	FreqOffset 0.00000000 Hz
#Res BW 100 kHz #VBW 100 kHz Sweep 4.84 ms (601 pts) Occupied Bandwidth Осс ВМ % Рыг 99.00 % 35.8213 MHz × dB -6.00 dB	Signal Track On <u>Off</u>
Transmit Freq Error 38.989 kHz x dB Bandwidth 35.151 MHz	
cupyright 2000-2003 Agnent rechnologies	



draft 802.11gn Wide-20 MHz Channel mode / Chain 1



6dB Bandwidth (CH Mid)

* Agilent R T	Freq/Channel
Ch Freq 2.437 GHz Trig Free Occupied Bandwidth	Center Freq 2.43700000 GHz
	Start Freq 2.42700000 GHz
Ref 20 dBm #Atten 30 dB #Peak Log	Stop Freq 2.44700000 GHz
dB/ Offst	CF Step 2.00000000 MHz <u>Auto</u> Man
dB	FreqOffset 0.00000000 Hz
#Res BW 100 kHz #VBW 100 kHz Sweep 2.44 ms (601 pts) Occupied Bandwidth Occ BW % Pwr 99.00 % 17 22EE MU- × dB -6.00 dB	Signal Track ^{On <u>Off</u>}
Transmit Freq Error 15.792 kHz x dB Bandwidth 15.051 MHz	
Illegal parameter value	



6dB Bandwidth (CH High)

* Agilent	R T Freq/Channel
Ch Freq 2.462 GHz Occupied Bandwidth	Trig Free 2.46200000 GHz
Ref 20 dBm #Atten 30 dB #Peak Log	2.47200000 GHz
10	CF Step 2.00000000 MHz <u>Auto</u> Mar
dB	Span 20 MHz
#Res BW 100 kHz #VBW 100 kHz Sweep 2.4 Occupied Bandwidth Occ BW % Pw 17 / 200 MU- X d	4 ms (601 pts) Ir 99.00 % On <u>Of</u> IB -6.00 dB
Lf.4200 MID2 Transmit Freq Error 19.164 kHz x dB Bandwidth 15.134 MHz	
Illegal parameter value	

draft 802.11gn Wide-40 MHz Channel mode / Chain 1

6dB Bandwidth (CH Low)

* Agilent	R T Freq/Channel
Ch Freq 2.422 GHz Occupied Bandwidth	Trig Free 2.42200000 GHz
	Start Freq 2.40200000 GHz
Ref 20 dBm #Atten 30 dB #Peak Log Jan → Studie Manna Augusta Aug	Stop Freq 2.44200000 GHz
10 10 10 10 dB/ 10 10 10 10 0ffst 10 10 10 10	CF Step 4.0000000 MHz <u>Auto</u> Man
dB	Span 40 MHz
#Res BW 100 kHz #VBW 100 kHz Sweep 4 Occupied Bandwidth Occ BW % Cocc BW % Cocc BW %	I.84 ms (601 pts) Pwr 99.00 % GB -6.00 dB
JJ.JZ.JU MHZ " Transmit Freq Error 59.357 kHz x dB Bandwidth 35.087 MHz	
System error	



6dB Bandwidth (CH Mid)



6dB Bandwidth (CH High)

* Agilent R T	Freq/Channel
Ch Freq 2.452 GHz Trig Free Occupied Bandwidth	Center Freq 2.45200000 GHz
	Start Freq 2.43200000 GHz
Ref 20 dBm #Atten 30 dB #Peak Log Ja → St. A. Alaman A. A. Alaman A. A. Alaman A.	Stop Freq 2.47200000 GHz
dB/ Offst	CF Step 4.00000000 MHz <u>Auto</u> Man
dB Center 2.452 00 GHz Span 40 MHz	Freq Offset 0.00000000 Hz
#Res BW 100 kHz #VBW 100 kHz Sweep 4.84 ms (601 pts) Occupied Bandwidth Occ BW % Pwr 99.00 % 35 8229 MHz × dB -6.00 dB	Signal Track ^{On <u>Off</u>}
Transmit Freq Error 94.619 kHz x dB Bandwidth 35.105 MHz	
System error	



draft 802.11gn Standard-20 MHz Channel mode / Chain 0+ Chain 1 6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)





6dB Bandwidth (CH High)



draft 802.11gn Wide-40 MHz Channel mode / Chain 0+ Chain 1 6dB Bandwidth (CH Low)

🔆 Agilent			RL	Freq/Channel
Ch Freq 2.422 Occupied Bandwidth	GHz		Trig Free	Center Freq 2.42200000 GHz
				Start Freq 2.40200000 GHz
Ref 20 dBm #Atten 3 #Peak Log Ja	0 dB	unger Beller and an	whatan the the	Stop Freq 2.44200000 GHz
dB/ /				CF Step 2.41266000 GHz Auto <u>Man</u>
dB		\$	pan 40 MHz	FreqOffset 0.00000000 Hz
Occupied Bandwidth 35.917	איש 100 גאב 1 8 MHz	Occ BW % Pwr x dB	99.00 % 99.00 % -6.00 dB	Signal Track ^{On <u>Off</u>}
Transmit Freq Error50x dB Bandwidth35	0.709 kHz 5.458 MHz			
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6dB Bandwidth (CH Mid)



6dB Bandwidth (CH High)





PEAK POWER

LIMIT

The maximum peak output power of the intentional radiator shall not exceed the following:

- 1. According to \$15.247(b)(3), for systems using digital modulation in the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz: 1 Watt.
- 2. According to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Test Configuration



TEST PROCEDURE

- 1 Set span to encompass the entire emission bandwidth (EBW) of the signal.
- 2 Set RBW = 1 MHz.
- 3 Set VBW \geq 3 MHz.
- 4 Use sample detector mode if bin width (i.e., span/number of points in spectrum display) < 0.5 RBW. Otherwise use peak detector mode.
- 5 Use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at full control power for entire sweep of every sweep. If the device transmits continuously, with no off intervals or reduced power intervals, the trigger may be set to ôhichfree runöhich.
- 6 Trace average 100 traces in power averaging mode.
- 7 Compute power by integrating the spectrum across the 26 dB EBW of the signal. The integration can be performed using the spectrum analyzer's b and power measurement function with band limits set equal to the EBW band edges or by summing power levels in each 1 MHz band in linear power terms. The 1 MHz band power levels to be summed can be obtained by averaging, in linear power terms, power levels in each frequency bin across the 1 MHz.



TEST RESULTS

No non-compliance noted

<u>Test Data</u>

Test mode: IEEE 802.11b mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	20.30	0.1072		PASS
Mid	2437	20.24	0.1057	1.00	PASS
High	2462	20.35	0.1084		PASS

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Output Power (dBm)	tput Power Output Power (dBm) (W)		Result
Low	2412	19.58	0.0908		PASS
Mid	2437	19.12	0.0817	1.00	PASS
High	2462	19.31	0.0853		PASS

Test mode: draft 802.11n Standard-20 MHz Channel mode

Channel	Frequency (MHz)	Chain 0 Output Power (dBm)	Chain 1 Output Power (dBm)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	16.46	15.53	19.03	0.0800		PASS
Mid	2437	16.48	15.74	19.14	0.0820	1.00	PASS
High	2462	16.17	15.41	18.82	0.0762		PASS

Test mode: draft 802.11n Wide-40 MHz Channel mode

Channel	Frequency (MHz)	Chain 0 Output Power (dBm)	Chain 1 Output Power (dBm)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2422	14.84	13.95	17.43	0.0553		PASS
Mid	2437	14.99	13.99	17.53	0.0566	1.00	PASS
High	2452	14.60	13.44	17.07	0.0509		PASS



Test Plot

IEEE 802.11b mode

Peak Power (CH Low)



Peak Power (CH Mid)

* Agilent	R T Freq/Channel
Ch Freq 2.437 GHz Channel Power	Trig Free Center Freq 2.43700000 GHz
	Start Freq 2.42200000 GHz
Ref 30 dBm #Atten 40 dB #Peak Log	2.45200000 GHz
dB/ 0ffst	CF Step 3.0000000 MHz <u>Auto</u> Mar
dB Center 2.437 00 GHz	Span 30 MHz
*Kes BW 1 MHz *VBW 3 MHz Channel Power I	Sweep 1 ms (601 pts) Signal Track On <u>Off</u>
20.24 dBm /20.0000 MHz	-52.77 dBm/Hz
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Peak Power (CH High)



IEEE 802.11g mode

Peak Power (CH Low)





Peak Power (CH Mid)



Peak Power (CH High)

🔆 Agilent			R	Т	Freq/Channel
Ch Freq 2.462 GHz Channel Power			Trig	Free	Center Freq 2.46200000 GHz
					Start Freq 2.44700000 GHz
Ref 30 dBm #Atten 40 dB #Peak			*		Stop Freq 2.47700000 GHz
10 dB/ 0ffst 1.5			-	2~~ }_~\}	CF Step 3.00000000 MHz <u>Auto</u> Man
dB Center 2.462 00 GHz			Span 30	MHz	Freq Offset 0.00000000 Hz
*Res BW 1 MHz #VBW Channel Power	3 MHZ Pov	Sweep 1 r ver Spectr	al Dens	pts) sity	Signal Track ^{On <u>Off</u>}
19.31 dBm /20.0000 MH	z	-53.70 (dBm/H	z	
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draft 802.11gn Standard-20 MHz Channel mode / Chain 0

Peak Power (CH Low)

🔆 Agilent			RΤ	Freq/Channel
Ch Freq 2.412 GHz Channel Power		Tı	ig Free	Center Freq 2.41200000 GHz
				Start Freq 2.39700000 GHz
Ref 30 dBm #Atten 40 dB #Peak				Stop Freq 2.42700000 GHz
dB/ 0ffst 1.5			///www	CF Step 3.00000000 MHz <u>Auto</u> Man
dB Center 2.412 00 GHz		Spar	1 30 MHz	Freq Offset 0.00000000 Hz
#Res BW 1 MHz #VB Channel Power	W 3 MHz Po	Sweep 1 ms () wer Spectral D	601 pts) ensity	Signal Track ^{On <u>Off</u>}
16.46 dBm /20.0000 M	Hz	–56.55 dBn	ı/Hz	
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Peak Power (CH Mid)

* Agilent	R	T Freq/Channel
Ch Freq 2.437 GHz Channel Power	Trig	Free Center Freq 2.43700000 GHz
	_	Start Freq 2.42200000 GHz
Ref 30 dBm #Atten 40 dB #Peak		Stop Freq 2.45200000 GHz
10 dB/ 0ffst 1.5	- Luna	CF Step 3.00000000 MHz <u>Auto</u> Man
dB	Span 3	Freq Offset
*Res BW 1 MHz #VBW Channel Power	3 MHz Sweep 1 ms (60) Power Spectral Der	Signal Track
16.48 dBm /20.0000 MH	z -56.53 dBm/	Hz
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Peak Power (CH High)



draft 802.11gn Standard-20 MHz Channel mode / Chain 1 Peak Power (CH Low)

🔆 Agilent	R T Freq/Cha	annel
Ch Freq 2.412 GHz Channel Power	Trig Free 2.4120000	Freq 0 GHz
	Start 2.3970000	Freq 0 GHz
Ref 30 dBm #Atten 40 dB #Peak	Stop 2.4270000	Freq 0 GHz
10 dB/ 0ffst 1.5	CF 3.0000000 Auto	Step 0 MHz Man
dB Center 2.412 00 GHz	Span 30 MHz	ffset 10 Hz
#Res BW 1 MHz #VBW 3 MHz Channel Power	z Sweep 1 ms (601 pts) Power Spectral Density On	rack Off
15.53 dBm /20.0000 MHz	-57.48 dBm/Hz	
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Peak Power (CH Mid)

🔆 Agilent		F	۲L	Freq/Channel
Ch Freq 2.437 (Channel Power	ЭНz	Tris	g Free	Center Fred 2.43700000 GHz
				Start Frec 2.42200000 GHz
Ref 30 dBm #Atten 40 #Peak Log	dB			Stop Fred 2.45200000 GHz
dB/ 0ffst			194-1948 (Bally	CF Step 3.00000000 MHz <u>Auto</u> Mar
dB		Span	30 MHz	Freq Offset 0.00000000 Hz
#Res BW 1 MHz Channel Power	#VBW 3 MHz Po	Sweep 1 ms (60 wer Spectral De	nsity	Signal Track On <u>Off</u>
15.74 dBm /20.000	00 MHz	-57.27 dBm/	Ήz	
Copyright 2000-2009 Agile	nt Technologies			

Peak Power (CH High)





draft 802.11gn Wide-40 MHz Channel mode / Chain 0

Peak Power (CH Low)

* Agilent	R T Fr	req/Channel
Ch Freq 2.422 GHz Channel Power	Trig Free 2.	Center Freq .42200000 GHz
	2	Start Freq 39700000 GHz
Ref 30 dBm #Atten 40 dB #Peak	2.	Stop Freq 44700000 GHz
10 dB/ 0ffst 1.5	5. Au	CF Step .00000000 MHz <u>to</u> Man
dB Center 2.422 00 GHz	Span 50 MHz	FreqOffset
#Res BW 1 MHz #VBW 3 MHz Channel Power	Sweep 1 ms (601 pts) Power Spectral Density On	Signal Track <u>Off</u>
14.84 dBm /40.0000 MHz	-61.18 dBm/Hz	
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Peak Power (CH Mid)

* Agilent	RTF	req/Channel
Ch Freq 2.437 GHz Channel Power	Trig Free	Center Freq 2.43700000 GHz
		Start Freq 2.41200000 GHz
Ref 30 dBm #Atten 40 dB #Peak Log		Stop Freq 2.46200000 GHz
dB/ 0ffst 1.5		CF Step 5.00000000 MHz <u>uto</u> Man
dB	Span 50 MHz	FreqOffset 0.00000000 Hz
*Kes BW 1 MHZ *VBW 3 MHZ Channel Power	Power Spectral Density	Signal Track
14.99 dBm /40.0000 MHz	-61.03 dBm/Hz	
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Peak Power (CH High)



draft 802.11gn Wide-40 MHz Channel mode / Chain 1

Peak Power (CH Low)

🔆 Agilent	RT	Freq/Channel
Ch Freq 2.422 GHz Channel Power	Trig Free	Center Freq 2.42200000 GHz
		Start Freq 2.39700000 GHz
Ref 30 dBm #Atten 40 dB #Peak Log		Stop Freq 2.44700000 GHz
dB/ 0ffst 1.5		CF Step 5.00000000 MHz <u>Auto</u> Man
dB	Span 50 MHz	FreqOffset 0.00000000 Hz
*Kes BW 1 MHZ *VBW 3 MHZ Channel Power	Power Spectral Density	Signal Track ^{On <u>Off</u>}
13.95 dBm /40.0000 MHz	-62.07 dBm/Hz	
Copyright 2000-2009 Agilent Technologi	es	


Peak Power (CH Mid)

* Agilent R T	Freq/Channel
Ch Freq 2.437 GHz Trig Free Channel Power	Center Freq 2.43700000 GHz
	Start Freq 2.41200000 GHz
Ref 30 dBm #Atten 40 dB #Peak	Stop Freq 2.46200000 GHz
10 dB/ 0ffst 1.5	CF Step 5.00000000 MHz <u>Auto</u> Man
dB Center 2.437 00 GHz Span 50 MHz	Freq Offset 0.00000000 Hz
#Res BW 1 MHz #VBW 3 MHz Sweep 1 ms (601 pts) Channel Power Power Spectral Density	Signal Track ^{On <u>Off</u>}
13.99 dBm /40.0000 MHz -62.03 dBm/Hz	
Copyright 2000-2009 Agilent Technologies	

Peak Power (CH High)

🔆 Agilent		R	т	Freq/Channel
Ch Freq 2.452 GHz Channel Power		Trig	I Free	Center Freq 2.45200000 GHz
		•		Start Freq 2.42700000 GHz
Ref 30 dBm #Atten 40 dB #Peak		man hour man		Stop Freq 2.47700000 GHz
10 dB/ 0ffst 1.5			Second Contraction	CF Step 5.00000000 MHz <u>Auto</u> Mar
dB Center 2.452 00 GHz		Span 5	j0 MHz	Freq Offset 0.00000000 Hz
#Res BW 1 MHz #\ Channel Power	'BW 3 MHZ Po	Sweep 1 ms (60 wer Spectral Dei	1 pts) nsity	Signal Track On <u>Off</u>
13.44 dBm /40.0000				
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AVERAGE POWER

LIMIT

None; for reporting purposes only.

Test Configuration



TEST PROCEDURE

The transmitter output is connected to the Power meter.



TEST RESULTS

No non-compliance noted

Test Data

Test mode:	IEEE	802.11b	mode
------------	------	---------	------

Channel	Frequency (MHz)	Output Power (dBm)
Low	2412	17.97
Mid	2437	17.79
High	2462	17.81

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Output Power (dBm)		
Low	2412	18.06		
Mid	2437	18.13		
High	2462	18.03		

Test mode: draft 802.11gn Standard-20 MHz Channel mode

Channel	Frequency (MHz) Chain 0 Output Power (dBm)		Chain 1 Output Power (dBm)	Output Power (dBm)	
Low	2412	12.97	10.12	14.79	
Mid	2437	12.80	10.38	14.77	
High	2462	12.26	10.77	14.59	

Test mode: draft 802.11gn Wide-40 MHz Channel mode

Channel	Frequency (MHz)	Chain 0 Chain 1 Output Power (dBm) (dBm)		Output Power (dBm)
Low	2422	10.79	9.52	13.21
Mid	2437	10.35	9.19	12.82
High	2452	10.60	9.10	12.92



PEAK POWER SPECTRAL DENSITY

LIMIT

- 1. According to §15.247(e), for digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.
- 2. According to §15.247(f), the digital modulation operation of the hybrid system, with the frequency hopping turned off, shall comply with the power density requirements of paragraph (d) of this section.

Test Configuration



TEST PROCEDURE

- 1. Place the EUT on the table and set it in transmitting mode. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 2. Set the spectrum analyzer as RBW = 3 kHz, VBW = 10 kHz, Span = 300 kHz, Sweep = 100 s
- 3. Record the max reading.
- 4. Repeat the above procedure until the measurements for all frequencies are completed.



TEST RESULTS

No non-compliance noted <u>Test Data</u>

Test mode: IEEE 802.11b mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-3.41	8.00	PASS
Mid	2437	-3.77	8.00	PASS
High	2462	-2.54	8.00	PASS

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-6.93	8.00	PASS
Mid	2437	-7.45	8.00	PASS
High	2462	-7.92	8.00	PASS

Test mode: draft 802.11gn Standard-20 MHz Channel mode

Channel	Frequency (MHz)	PPSD Chain 0 (dBm)	hain 0 n) PPSD Chain 1 (dBm) PPSD Total (dBm) (dBm)		Limit (dBm)	Result
Low	2412	-7.30	-7.78	-4.52	8.00	PASS
Mid	2437	-6.67	-7.61	-4.10	8.00	PASS
High	2462	-7.80	-8.47	-5.11	8.00	PASS

Test mode: draft 802.11gn Wide-40 MHz Channel mode

Channel	Frequency (MHz)	PPSD Chain 0 (dBm)	PPSD Chain 0 (dBm) PPSD Chain 1 (dBm) (dBm) (Limit (dBm)	Result
Low	2422	-10.94	-13.95	-9.18	8.00	PASS
Mid	2437	-11.56	-13.82	-9.53	8.00	PASS
High	2452	-11.43	-14.98	-9.84	8.00	PASS



Test Plot

IEEE 802.11b mode

PPSD (CH Low)

🔆 Ag	ilent								F	? Т	Freq/Channel
Ref 20 Peak	dBm		#Atten	30 dB			Mk	(r1 2.4	12 001 -3.4	7 GHz 1 dBm	Center Freq 2.41200169 GHz
Log 10 dB/ Offst										*	Start Freq 2.41185169 GHz
1.5 dB	~~~~	-	m	with	- Mark	\sim	mh	www.	.^^.	m	Stop Freq 2.41215169 GHz
LgAv											CF Step 30.0000000 kHz <u>Auto</u> Man
M1 S2 S3 FC											FreqOffset 0.00000000 Hz
£ (f): f>50k Swp											Signal Track ^{On <u>Off</u>}
Center #Res B	2.412 W 3 kH:	001 7 z	GHz	#V{	 3W 10 k	,Hz	#Sw(eep 100	Span 3 0 s (60	00 kHz 1 pts)	
Copyri	ght 20	00-20)09 Ag	ilent T	echnol	ogies					

PPSD (CH Mid)

🔆 Aç	jilent								F	₹Т \$	Freq/Channel
Ref 20 Peak) dBm		#Atten	30 dB			Mi	<r1 2.4<="" td=""><td>137 001 -3.7</td><td>.9 GHz 7 dBm</td><td>Center Freq 2.43700191 GHz</td></r1>	137 001 -3.7	.9 GHz 7 dBm	Center Freq 2.43700191 GHz
Log 10 dB/ Offst										*	Start Freq 2.43685191 GHz
1.5 dB	~~~	n	m	wit	~~~		m	m	m	~~~	Stop Freq 2.43715191 GHz
LgAv											CF Step 2.43700191 GHz Auto <u>Man</u>
M1 S2 S3 FC											Freq Offset 0.00000000 Hz
£ (f): f>50k Swp											Signal Track ^{On <u>Off</u>}
Center #Res E	L • 2.437 3W 3 kH	0019 z	GHz	 #V	 BW 10	Hz	 #Sw	eep 10	 Span 3 0 s (60	00 kHz 1 pts)	
Copyr	ight 20	000-20	009 Ag	ilent T	echnol	ogies					



PPSD (CH High)

🔆 Ag	ilent								F	₹	Freq/Channel
Ref 20 Peak	dBm		#Atten	30 dB			Mł	kr1 2.4	162 002 -2.5	2 GHz 54 dBm	Center Freq 2.46200169 GHz
Log 10 dB/ Offst						1				*	Start Freq 2.46185169 GHz
1.5 dB		n	m	h	man	hrm	mmun	www	m	<u> </u>	Stop Freq 2.46215169 GHz
LgAv											CF Step 2.43700191 GHz Auto <u>Man</u>
M1 S2 S3 FC											Freq Offset 0.00000000 Hz
£ (f): f>50k Swp											Signal Track ^{On <u>Off</u>}
Center #Res B	2.462 W 3 kH	 001 7 z	(GHz	 #V{	 3W 10	(Hz	#Sw	 eep 10	 Span 3 0 s (60	00 kHz 1 pts)	
Copyri	ight 20	000-20)09 Ag	ilent T	echnol	ogies					

IEEE 802.11g mode

PPSD (CH Low)

🔆 Ag	ilent								F	? T	Freq/Channel
Ref 20 Peak	dBm		#Atten	30 dB			Mi	<r1 2.4<="" td=""><td>12 308 -6.9</td><td>0 GHz 3 dBm</td><td>Center Freq 2.41228992 GHz</td></r1>	12 308 -6.9	0 GHz 3 dBm	Center Freq 2.41228992 GHz
Log 10 dB/ Offst						1				*	Start Freq 2.41213992 GHz
1.5 dB	mar	ra georgeter	h			Ŵ	an a	- - 	⇜┯ᢍᠲ	t	Stop Freq 2.41243992 GHz
LgAv											CF Step 2.43700191 GHz Auto <u>Man</u>
M1 S2 S3 FC											FreqOffset 0.00000000 Hz
£ (f): f>50k Swp											Signal Track ^{On <u>Off</u>}
Center #Res B	2.412 W 3 kH:	 289 9 z	 GHz	 #V{	 3W 10 k	(Hz	#Sw	 eep 10	Span 3 0 s (60	00 kHz 1 pts)	
Copyri	ght 20	000-20	009 Ag	ilent T	echnol	ogies					



PPSD (CH Mid)



PPSD (CH High)

🔆 Ag	jilent								F	? T	Freq/Channel
Ref 20 Peak) dBm		#Atten	30 dB			Mł	kr1 2.4	162 302 -7.9	2 d GHz 2 dBm	Center Freq 2.46230139 GHz
Log 10 dB/ Offst										*	Start Freq 2.46215139 GHz
1.5 dB	-m	m	m	ventro	~~~	Ř. 1	www.	n y pro	mhu	~~\v\.	Stop Freq 2.46245139 GHz
LgAv											CF Step 2.43700191 GHz Auto <u>Man</u>
M1 S2 S3 FC											FreqOffset 0.00000000 Hz
£ (f): f>50k Swp											Signal Track On <u>Off</u>
Center #Res B	- 2.462 3W 3 kH	30î 4 z	 GHz	 #V	 BW 10 4	(Hz	 #Sw	 eep 10	 Span 3 0 s (60	00 kHz 1 pts)	
Copyr	ight 20	000-20)09 Ag	ilent T	echnol	ogies					



draft 802.11gn Standard-20 MHz Channel mode / Chain 0

PPSD (CH Low)



PPSD (CH Mid)

💥 Ag	ilent								F	? T	Freq/Channel
Ref 20 Peak	dBm		#Atten	30 dB			MI	kr1 2.4	37 001 -6.6	9 GHz 7 dBm	Center Freq 2.43700338 GHz
Log 10 dB/ Offst					1					*	Start Freq 2.43685338 GHz
1.5 dB	nhunde	What was	Marcan	A	S S	her on	a	Spins	SR MAA	un M	Stop Freq 2.43715338 GHz
LgAv				n batas.			(* 11) I		**	<u> </u>	CF Step 2.43700191 GHz Auto <u>Mar</u>
M1 S2 S3 FC											Freq Offset 0.00000000 Hz
£ (f): f>50k Swp											Signal Track On <u>Off</u>
Center #Res B	2.437 W 3 kH	003 4 z	 GHz	 #V	 BW 10	(Hz	#Sw	 eep 10	 Span 3 0 s (60	00 kHz 1 pts)	
Copyri	ight 20	000-20	009 Ag	ilent T	echnol	ogies					



PPSD (CH High)



draft 802.11gn Standard-20 MHz Channel mode / Chain 1

PPSD (CH Low)





PPSD (CH Mid)

*	Agilent								F	2 T	Freq/Channel
Ref (Peak	20 dBm		#Atten	30 dB			Mi	kr1 2.4	137 001 -7.6	7 GHz 1 dBm	Center Freq 2.43700169 GHz
Log 10 dB/ Offst										*	Start Freq 2.43685169 GHz
1.5 dB	-	undhur	1. 00			Þ			10A A	ware (Stop Freq 2.43715169 GHz
LgAv			NW" H	1 mil	Vum	- NWA	wrvr	www.ww	A. 1480 A		CF Step 30.0000000 kHz <u>Auto</u> Man
M1 (83 F	52 FC										Freq Offset 0.00000000 Hz
£ (f): f>50 Swp	k										Signal Track On <u>Off</u>
Cent #Res	er 2.437 BW 3 kH	 001 7^ z	 GHz	 #V	 BW 10 k	(Hz	 #Sw	 eep 10	Span 3 0 s (60	00 kHz 1 pts)	
Copy	right 2/	000-20	009 Ag	ilent T	echnol	ogies					

PPSD (CH High)





draft 802.11gn Wide-40 MHz Channel mode / Chain 0 PPSD (CH Low)



PPSD (CH Mid)

🔆 Ag	ilent								F	₹Т \$	Freq/Channel
Ref 20 Peak	dBm		#Atten	30 dB			Mł	kr1 2.4	37 001 -11.5	. 2 GHz 6 dBm	Center Freq 2.43700169 GHz
Log 10 dB/ Offst										*	Start Freq 2.43685169 GHz
1.5 dB						L 					Stop Freq 2.43715169 GHz
LgAv	-	mm		mm	www	h	an the second	mmyh	mm	mm	CF Step 2.42200169 GHz Auto <u>Man</u>
M1 S2 S3 FC											FreqOffset 0.00000000 Hz
£ (f): f>50k Swp											Signal Track ^{On <u>Off</u>}
Center #Res B	L 2.437 W 3 kH	001 7 z	GHz ´	 #V[BW 10	KHz	 #Sw	eep 10	 Span 3 0 s (60	00 kHz 1 pts)	
Copyri	ight 20	000-20)09 Ag	ilent T	echnol	ogies					



PPSD (CH High)



draft 802.11gn Wide-40 MHz Channel mode / Chain 1

PPSD (CH Low)





PPSD (CH Mid)



PPSD (CH High)





SPURIOUS EMISSIONS

Conducted Measurement

LIMIT

According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a) (see Section 15.205(c)).

Conducted power was measured based on the use of RMS averaging over a time interval, therefore the required attenuntion is 30 dB.

Test Configuration





TEST PROCEDURE

Conducted RF measurements of the transmitter output were 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 100 kHz. The video bandwidth is set to 100 kHz.

Measurements are made over the 30MHz to 26GHz range with the transmitter set to the lowest, middle, and highest channels.

TEST RESULTS

No non-compliance noted



Test Plot IEEE 802.11b mode **CH Low**

30MHz ~ 2.9GHz



🔆 Agilent				R	Т	Marker
Ref 120 dB µ V Peak	#Atten 30 dB		Mkr1	24.69 59.02 d	GHz B µ V	Select Marker <u>1</u> 234
Log 10 dB/ Offst						Normal
1.5 dB 2 DI 3	March March		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	1		Delta
dBµV						Delta Pair
LgAv					_	(Tracking Kef) Ref <u>A</u>
Start 2.90 GHz	~		Stop	26.50	GHz	Span Pair
#Res BW 100 kHz	#VBW 1	00 kHz 🛛 🕄	Sweep 2.846 :	s (601	pts)	Span Center
Marker Trace	Type Freg	XAxis 24696Hz	f 59	Amplitude N2 dBul		·
2 (1) 3 (1)	Freq Freq	3.21 GHz 4.83 GHz	58 53	.71 dBµl .76 dBµl	j J	Off
						More 1 of 2
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CH Mid









CH High









IEEE 802.11g mode

CH Low

$30MHz \sim 2.9GHz$



🔆 Agilent			F	₹ T	Marker
Ref 120 dB µ V Peak	#Atten 30 dB		Mkr1 24. 58.78	.93 GHz 3 dB µ V	Select Marker <u>1</u> 234
Log 10 dB/ Offst					Normal
1.5 dB 2 DI	and the second second				Delta
dBµV					Delta Pair (Tracking Ref) Ref <u>≜</u>
Start 2.90 GHz #Res BW 100 kHz Marker Trace	#VBW 100) kHz Swee X Axis	Stop 26. p 2.846 s (60 Amplit	50 GHz 1 pts) ude	Span Pair Span <u>Center</u>
$ \begin{array}{c} 1 & (1) \\ 2 & (1) \end{array} $	Freq 2 Freq	24.93 GHz 3.21 GHz	58.78 d 58.55 d	Вµ∪ Вµ∪	Off
					More 1 of 2
Copyright 2000-2	009 Agilent Techn	ologies			



CH Mid

$30 MHz \sim 2.9 GHz$



ዡ Agilent	Marker
Mkr1 24.85 GHz Ref 120 dB µ V #Atten 30 dB 58.38 dB µ V Peak	Select Marker <u>1</u> 234
Log 10 dB/ Offst	Normal
1.5 dB 2 d 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Delta
dBµV	Delta Pair (Tracking Ref) Ref <u>≜</u>
Start 2.90 GHz ^ Stop 26.50 GHz #Res BW 100 kHz #VBW 100 kHz Sweep 2.846 s (601 pts) Marker Trace Type X Axis Amplitude	Span Pair Span <u>Center</u>
1 (1) Freq 24.85 GHz 58.38 dBµU 2 (1) Freq 3.25 GHz 56.39 dBµU	Off
Commight 2000, 2000, Anilant Technologian	More 1 of 2



CH High 30MHz ~ 2.9GHz

🔆 Agile	ent									F	2	Т		larker
Ref 120 Peak	dBµV	+	ŧAtten	30 dB				Mk	(r1 11)	2.4 1.11 >	55 dl	GHz B µ V	Sele	ect Marker 2 3 4
Log - 10 - dB/ = Offst									1					Normal
1.5 dB DI									3 \$	2-				Delta
91.1 dB µ V LgAv -			*****		, A. Argenkynskryg								(T Ref	Delta Pair racking Ref) ≜
Start 30 #Res BW Marker) MHz 100 kł r Tra	łz ice	Туре	#VE	3W 100 ×	kHz Axis	Sweep	Si 346.1	top ms Aı	2.90 (60 mplit	00 1 p ude	GHz ots)	Span	Span Pair Center
1 2 3	(1 (1 (1	.) .) .)	Freq Freq Freq		2. 2. 2.	455 GHz 536 GHz 383 GHz		1	62.0 61.0	11 di 87 di 84 di	ΒµՍ ΒµՍ ΒµՍ			Off
														More 1 of 2
Copyrig	ht 200	0-20	109 Agi	ilent T	echnol	ogies								

🔆 Agilent				RΤ	Marker
Ref 120 dB µ V Peak	#Atten 30 dB		Mkr1 2 58.	24.81 GHz .37 dB µ V	Select Marker <u>1</u> 234
Log 10 dB/ Offst					Normal
1.5 dB DI 2 01 1	han an a	month of the second	and the second sec	1 • • • • • • • • • • • • • • • • • • •	Delta
dBµV					Delta Pair
LgAv					Ref <u>A</u>
Start 2.90 GHz		~ _	Stop 2	26.50 GHz	Snan Pair
#Res BW 100 kHz	#VBW 100) kHz – Swe	eep 2.846 s (601 pts)	Span <u>Center</u>
Marker Irace	lype Freg 2	X Hxis 24.81 GHz	Hmp 58.37	olitude 7 dB⊔V	
2 (1)	Freq	3.33 GHz	49.37	²dBµV	Off
					More 1 of 2
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draft 802.11gn Standard-20 MHz Channel mode / Chain 0

CH Low

30MHz ~ 2.9GHz







CH Mid









CH High

30MHz ~2.9GHz



🔆 Agilent				RТ	Marker
Ref 120 dB µ V Peak	#Atten 30 dB		Mkr1 24 58.5	.93 GHz 7 dB µ V	Select Marker <u>1</u> 234
Log 10 dB/ Offst					Normal
1.5 dB 2 DI Ý	and the second standard		John March	1	Delta
dBµV					Delta Pair (Tracking Ref) Ref <u>▲</u>
Start 2.90 GHz #Res BW 100 kHz Marker Trace	#VBW 100 Туре) kHz – Swe X Axis	Stop 26. ep 2.846 s (60 Amplit	.50^GHz 01 pts) :ude	Span Pair Span <u>Center</u>
$ \begin{array}{cccc} 1 & (1) \\ 2 & (1) \end{array} $	Freq 2 Freq	4.93 GHz 3.29 GHz	58.57 dBµV 55.97 dBµV		Off
					More 1 of 2
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draft 802.11gn Standard-20 MHz Channel mode / Chain 1

CH Low

30MHz~2.9GHz







CH Mid









CH High

30MHz ~2.9GHz







draft 802.11gn Standard-20 MHz Channel mode / Chain 0+ Chain 1

CH Low

30MHz~2.9GHz







CH Mid

$30 MHz \sim 2.9 GHz$







CH High

30MHz ~ 2.9GHz







draft 802.11gn Wide-40 MHz Channel mode / Chain 0

CH Low

30MHz~2.9GHz







CH Mid









CH High

30MHz ~2.9GHz







draft 802.11gn Wide-40 MHz Channel mode / Chain 1

CH Low

30MHz ~ 2.9GHz



$2.9 GHz \sim 26.5 GHz$





CH Mid

30MHz ~ 2.9GHz



$2.9 GHz \sim 26.5 GHz$




CH High

30MHz ~ 2.9GHz



2.9GHz ~ 26.5GHz





draft 802.11gn Wide-40 MHz Channel mode / Chain 0+ Chain 1

CH Low

30MHz ~ 2.9GHz



2.9GHz ~ 26.5GHz





CH Mid





2.9GHz ~ 26.5GHz

🔆 Agile	ent				R	Т	Marker
Ref 120 Peak	dBµV	#Atten 30 dB		Mkr	1 24.85 58.76 d	iGHz B µ V	Select Marker <u>1</u> 234
Log 10 — dB/ — Offst							Normal
1.5 dB 2 DI Ŷ			alan and a stranger			L L	Delta
90.0 - dB µ V - LgAv -	and a start and a start and a start and a start						Delta Pair (Tracking Ref) Ref <u>≜</u>
Start 2.9 #Res BW Marker	0 GHz 100 kHz Trace		3W 100 kHz X Axis	Sto Sweep 2.846	p 26.50 s (601 Amplitude	GHz pts) ⊇	Span Pair Span <u>Center</u>
1 2	(1) (1)	Freq Freq	24.85 GHz 3.25 GHz	51 51	8.76 dBµ\ 6.65 dBµ\))	Off
							More 1 of 2
Copyrig	ht 2000-2	009 Agilent T	echnologies				



CH High

30MHz ~ 2.9GHz



2.9GHz~26.5GHz





RADIATED EMISSIONS

LIMIT

1. According to §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 (µV/m)	Measurement Distance (m)
30-88	100*	3
88-216	150*	3
216-960	200*	3
Above 960	500	3

Remark: 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.

2. In the emission table above, the tighter limit applies at the band edges.

Frequency	Field Strength	Field Strength
(MHz)	(µV/m at 3-meter)	(dBµV/m at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54



Test Configuration

Below 1 GHz



Above 1 GHz





TEST PROCEDURE

- 1. The EUT is placed on a turntable, which is 0.8m above ground plane.
- 2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
- 3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
- 4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- 6. Set the spectrum analyzer in the following setting as:

Below 1GHz:

RBW=100kHz / VBW=300kHz / Sweep=AUTO

Above 1GHz:

(a) PEAK: RBW=VBW=1MHz / Sweep=AUTO

(b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO

7. Repeat above procedures until the measurements for all frequencies are complete.



TEST RESULTS

RESTRICTED BANDEDGE (b Mode, Low Channel, Horizontal)

PEAK

* Agilent	RT	Freq/Channel
Ref 120 dB µ V #Atten 40 dB Peak	Mkr1 2.379 47 GHz 54.81 dB µ V	Center Freq 2.35000000 GHz
Log 10 dB/		Start Freq 2.31000000 GHz
0ffst -11.7 dB DI		Stop Freq 2.39000000 GHz
74.0 dBµV LgAv		CF Step 8.00000000 MHz <u>Auto</u> Man
M1 S2 S3 FC		FreqOffset 0.00000000 Hz
£(f): FTun Swp		Signal Track ^{On <u>Off</u>}
Start 2.310 00 GHz #Res BW 1 MHz #S	Stop 2.390 00 GHz weep 1 ms (601 pts)	
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🔆 Ag	jilent								R	Т	Freq/Channel
Ref 12 Peak	0 dBµ\		#Atten	40 dB				Mkr1	2.390 44.33	00 GHz dB µ V	Center Freq 2.35000000 GHz
Log 10 dB/ Offst											Start Freq 2.31000000 GHz
–11.7 dB DI											Stop Freq 2.39000000 GHz
54.0 dB µ V LgAv											CF Step 8.00000000 MHz <u>Auto</u> Man
M1 S2 S3 FC AA											Freq Offset 0.00000000 Hz
£ (f): FTun Swp											Signal Track On <u>Off</u>
Start 2 #Res B	2.310 0 W 1 MH	0 GHz z		#V	BW 10	Hz	#Sγ	Stop Veep 1	2.390 0 ms (60:)0 GHz 1 pts)	
Copyri	ight 20	100-20	009 Ag	ilent T	echnol	ogies					



RESTRICTED BANDEDGE (b Mode, Low Channel, Vertical)

PEAK

🔆 Agilent						R	Т	Freq/Channel
Ref 120 dB µ V Peak	#Atten	40 dB			Mkr1	2.390 0 53.56	0 GHz dB µ V	Center Freq 2.35000000 GHz
Log 10 dB/								Start Freq 2.31000000 GHz
–11.7 dB DI								Stop Freq 2.39000000 GHz
74.0 dB µ V LgAv								CF Step 8.00000000 MHz <u>Auto</u> Man
M1 S2 S3 FC	and a star and a star and a star	Marin and and	n star was shown	Mayanna	a ta an	any, www.		Freq Offset 0.00000000 Hz
£(f): FTun Swp								Signal Track ^{On <u>Off</u>}
Start 2.310 00 #Res BW 1 MHz	 GHz 2	#VBW :	1 MHz	#Sv	Stop Weep 1	2.390 0 ms (601	0 GHz pts)	
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r1 2.390 0 44.31 0	0 GHz dB µ V	Center Freq 2.35000000 GHz Start Freq
		Start Fred
		2.31000000 GHz
		Stop Freq 2.39000000 GHz
		CF Step 8.00000000 MHz <u>Auto</u> Man
		Freq Offset
		Signal Track On <u>Off</u>
:op 2.390 00 1 1 ms (601	0 GHz pts)	I
	top 2.390 00 0 1 ms (601	top 2.390 00 GHz o 1 ms (601 pts)



RESTRICTED BANDEDGE (b Mode, High Channel, Horizontal)



								R	L T	Freq/Channel
Ref 120 dB Peak	V	#Atten	40 dB				Mkr1	2.483 0 53.99	00 GHz dB µ V	Center Freq 2.49150000 GHz
Log 10 dB/ Offst										Start Freq 2.48300000 GHz
-11.7 dB DI										Stop Freq 2.50000000 GHz
74.0 dB µ V LgAv										CF Step 1.70000000 MHz <u>Auto</u> Man
M1 S2 S3 FC AA	later langer (Prople	Landa	angungeter	er solar bergh	4.94.97.1944-1.444	******	vata nationalisma	4-19 ⁻¹ 0-19-19-19-	weether-addition	Freq Offset 0.00000000 Hz
£(f): FTun Swp										Signal Track On <u>Off</u>
Start 2.483 #Res BW 1 M	 000 GHz Hz	:	 #V	BW 1 M	Hz	#SI	Stop 2 Weep 1	2.500 00 ms (60	00 GHz 1 pts)	

🔆 Agilent					R	Т	Freq/Channel
Ref 120 dB µ V Peak	#Atten	40 dB		Mkr1	2.483 000 43.65 d) GHz IB µ V	Center Freq 2.49150000 GHz
Log 10 dB/							Start Freq 2.48300000 GHz
dB							Stop Freq 2.50000000 GHz
54.0 dB µ V LgAv							CF Step 1.70000000 MHz <u>Auto</u> Man
M1 S2 S3 FC AFts							Freq Offset 0.00000000 Hz
£(f): FTun Swp							Signal Track On <u>Off</u>
Start 2.483 0 #Res BW 1 MH	00 GHz z	#VBW	10 Hz	Stop #Sweep 1	2.500 000 1 ms (601	GHz pts)	
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RESTRICTED BANDEDGE (b Mode, High Channel, Vertical)

PEAK

🔆 🕀	jilent								I	R	Т	Freq/Channel
Ref 12 Peak	20 dBµ\		#Atten	40 dB				Mkr1	2.483 @ 53.32	000 2 dE	GHz 3 µ V	Center Freq 2.49150000 GHz
Log 10 dB/ Offst												Start Freq 2.48300000 GHz
–11.7 dB DI												Stop Freq 2.50000000 GHz
74.0 dB µ V LgAv											_	CF Step 1.70000000 MHz <u>Auto</u> Man
M1 S2 S3 FC AA	1 • •		water	william contract		and share and a second	as million was		-		when	Freq Offset 0.00000000 Hz
£ (f): FTun Swp												Signal Track On <u>Off</u>
Start 2 #Res E	2.483 0 3W 1 MH	 00 GHz z		 #V	 'BW 1 M	Hz	#\$	Stop 2 weep 1	2.500 0 ms (60	 100 01 p	GHz ots)	
Copyr	ight 20	000-20)09 Ag	ilent T	echnol	ogies						

🔆 Ag	ilent									R	Т	Freq/Channel
Ref 12 Peak	0 dBµV		#Atten	40 dB				Mkr1	2.483 43.I	000 63 d	GHz B µ V	Center Freq 2.49150000 GHz
Log 10 dB/ Offst												Start Freq 2.48300000 GHz
–11.7 dB DI												Stop Freq 2.50000000 GHz
54.0 dB µ V LgAv												CF Step 1.70000000 MHz <u>Auto</u> Man
M1 S2 S3 FC AR												Freq Offset 0.00000000 Hz
£ (f): FTun Swp												Signal Track On <u>Off</u>
Start 2 #Res B	2.483 00 W 1 MH:	00 GHz z	2	 #V	BW 10	Hz	#\$	Stop weep 3	2.500 1 ms (8	000 001	GHz pts)	
Copyri	ight 20	00-20	009 Ag	ilent T	echnol	ogies						



RESTRICTED BANDEDGE (g Mode, Low Channel, Horizontal)



🔆 Aç	gilent								F	2 1	Г	Freq/Channel
Ref 12 Peak	20 dBµ\	,	#Atten	40 dB				Mkr1	2.389 66.62	73 0 dB	iHz γι	Center Freq 2.35000000 GHz
Log 10 dB/ Offet												Start Freq 2.31000000 GHz
–11.7 dB DI												Stop Freq 2.39000000 GHz
74.0 dB µ V LgAv												CF Step 8.00000000 MHz <u>Auto</u> Man
M1 S2 S3 FC	-	whereas	-	-	unturtedan	yhen yn Ar	urititiinadaduraa	underender	weath	with the	₩ . "	FreqOffset 0.00000000 Hz
£ (f): FTun Swp												Signal Track On <u>Off</u>
Start 2 #Res E	2.310 0 3W 1 MH	 0 GHz z		 #V	 BW 1 M	Hz	#S1	Stop Weep 1	2.390 (ms (60	00 G 1 pt	Hz s)	
Copyr	ight 20	000-20	009 Ag	ilent T	echnol	ogies						

🔆 Ag	jilent								R	Т	Freq/Channel
Ref 12 Peak	0 dB µ V	l ,	#Atten	40 dB				Mkr1	2.390 44.64	00 GHz dB µ V	Center Freq 2.35000000 GHz
Log 10 dB/ Offst											Start Freq 2.31000000 GHz
–11.7 dB DI											Stop Freq 2.39000000 GHz
54.0 dB µ V LgAv											CF Step 8.00000000 MHz <u>Auto</u> Man
M1 S2 S3 FC AA											Freq Offset
€(f): FTun Swp											Signal Track On <u>Off</u>
Start 2 #Res B	L 2.310 0 3W 1 MH	0 GHz z		#\	 BW 10	Hz	#S1	Stop Yeep 1	2.390 0 ms (60:	0 GHz 1 pts)	
Copyr	ight 20	100-20	109 Ag	ilent T	echnol	ogies					



RESTRICTED BANDEDGE (g Mode, Low Channel, Vertical)



Mk	r1 2.388 27 GHz
Ref 120 dBµV #Atten 40 dB Peak	55.54 dBµV 2.35000000 GHz
Log 10 dB/	2.31000000 GHz
-11.7 dB DI	2.39000000 GHz
74.0 dBµV LgAv	CF Step 8.00000000 MHz <u>Auto</u> Mar
M1 S2 S3 FC AA	Freq Offset 0.00000000 Hz
£(f): FTun Swp	Signal Track
Start 2.310 00 GHz Start 2.310 00 GHz Start 2.310 MHz Star	op 2.390 00 GHz 1 ms (601 pts)

🔆 Ag	jilent								R	Т	Freq/Channel
Ref 12 Peak	20 dBµV		#Atten	40 dB				Mkr1	2.390 (44.44	00 GHz dB µ V	Center Freq 2.35000000 GHz
Log 10 dB/ Offet											Start Freq 2.31000000 GHz
–11.7 dB DI											Stop Freq 2.39000000 GHz
54.0 dB µ V LgAv											CF Step 8.00000000 MHz <u>Auto</u> Man
M1 S2 S3 FC AA											Freq Offset
€(f): FTun Swp											Signal Track On <u>Off</u>
Start 2 #Res B	L 2.310 0 3W 1 MH	0 GHz z		 #V	BW 10	Hz	#Sr	Stop Yeep 1	2.390 0 ms (601	10 GHz L pts)	
Copyr	ight 20	00-20)09 Ag	ilent T	echnol	ogies					



RESTRICTED BANDEDGE (g Mode, High Channel, Horizontal)

PEAK



🔆 Agilent	ł								R	Т	Freq/Channel
Ref 120 di Peak	BµV	#Atten 4	10 dB				Mkr1	2.483 49.3	000 5 dl	GHz B µ V	Center Freq 2.49150000 GHz
Log 10 dB/											Start Freq 2.48300000 GHz
–11.7 dB									-		Stop Freq 2.50000000 GHz
54.0 dB µ V LgAv											CF Step 1.70000000 MHz <u>Auto</u> Man
M1 S2 S3 FC											Freq Offset 0.00000000 Hz
£(f): FTun Swp											Signal Track On <u>Off</u>
Start 2.48 #Res BW 1	 3 000 GHz MHz	2	#V	BW 10	Hz	#SI	Stop Weep :	2.500 (1 ms (6	000 01 p	GHz ots)	
Copyright	: 2000-20	009 Agi	lent T	echnol	ogies						



RESTRICTED BANDEDGE (g Mode, High Channel, Vertical)

PEAK

🔆 Aç	jilent								F	2	Т	Freq/Channel
Ref 12 Peak	20 dBµ\		#Atten	40 dB				Mkr1	2.483 0 53.31	057 L dE	GHz ≩µV	Center Freq 2.49150000 GHz
Log 10 dB/ Offst												Start Freq 2.48300000 GHz
–11.7 dB DI												Stop Freq 2.50000000 GHz
74.0 dB µ V LgAv											_	CF Step 1.70000000 MHz <u>Auto</u> Man
M1 S2 S3 FC AA	1 Danabyla			·	hallenterror	martin		www	u-mananananananananananananananananananan	r*1¥r~	~~~	Freq Offset 0.00000000 Hz
£ (f): FTun Swp												Signal Track On <u>Off</u>
Start 2 #Res E	2.483 0 3W 1 MH	00 GHz z		 #V	 BW 1 M	Hz	#\$	 Stop 2 weep 1	 2.500 0 ms (60	 00)1 p	GHz ots)	
Copyr	ight 20	000-20)09 Ag	ilent T	echnol	ogies						

🔆 Agilent					R	Т	Freq/Channel
Ref 120 dB µ V Peak	#Atten	40 dB		Mkr1	2.483 05 44.00	7 GHz dB µ V	Center Freq 2.49150000 GHz
Log 10 dB/							Start Fred 2.48300000 GHz
-11.7 dB DI							Stop Fred 2.50000000 GHz
54.0 dB µ V LgAv							CF Step 1.70000000 MHz <u>Auto</u> Mar
M1 S2 S3 FC AA							Freq Offset 0.00000000 Hz
£(f): FTun Swp							Signal Track On <u>Off</u>
Start 2.483 00 #Res BW 1 MHz	0 GHz	#VBW 1	0 Hz	Stop #Sweep 1	2.500 000 ms (601	0 GHz pts)	
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RESTRICTED BANDEDGE (draft 802.11n Standard-20 MHz Channel mode, Low Channel, Horizontal)



Mkr1 2.389 87 GHz Ref 120 dBµV *Atten 40 dB 64.61 dBµV 2.35000000 Log 10 <	R T Freq/Channel
Log 10 dB/ Offst -11.7 dB DI DI DI DI DI DI DI DI DI DI	Mkr1 2.389 87 GHz 64.61 dBµV 2.35000000 GHz
-11.7 dB DI Z4.0	Start Freq 2.31000000 GHz
74.0	2.3900000 GHz
dBµV CF \$ LgAv 1 8.00000000 1	CF Step 1 8.0000000 MHz <u>Auto</u> Man
M1 S2 S3 FC AA	Freq Offset 0.00000000 Hz
£(f): Signal Tr FTun Image: Signal Tr	Signal Track
Start 2.310 00 GHz Stop 2.390 00 GHz #Res BW 1 MHz #VBW 1 MHz	Stop 2.390 00 GHz MHz #Sweep 1 ms (601 pts)

🔆 Ag	jilent								R	Т	Freq/Channel
Ref 12 Peak	0 dBµV		#Atten	40 dB				Mkr1	2.390 (44.52	00 GHz dB µ V	Center Freq 2.35000000 GHz
Log 10 dB/ Offet											Start Freq 2.31000000 GHz
–11.7 dB DI											Stop Freq 2.39000000 GHz
54.0 dB µ V LgAv											CF Step 8.00000000 MHz <u>Auto</u> Man
M1 S2 S3 FC AA											Freq Offset 0.00000000 Hz
€(f): FTun Swp											Signal Track On <u>Off</u>
Start 2 #Res B	 2.310 0 3W 1 MH	0 GHz z		 #V	BW 10	Hz	#Sγ	Stop Veep 1	2.390 0 ms (601	0 GHz L pts)	
Copyr	ight 20	00-20)09 Ag	ilent T	echnol	ogies					



RESTRICTED BANDEDGE (draft 802.11n Standard-20 MHz Channel mode, Low Channel, Vertical)

PEAK



🔆 Ag	jilent								R	Т	Freq/Channel
Ref 12 Peak	0 dBµ\		#Atten	40 dB				Mkr1	2.390 0 46.40)0 GHz dB µ V	Center Freq 2.35000000 GHz
Log 10 dB/ Offst											Start Freq 2.31000000 GHz
–11.7 dB DI											Stop Freq 2.39000000 GHz
54.0 dB µ V LgAv											CF Step 8.00000000 MHz <u>Auto</u> Man
M1 S2 S3 FC AA											Freq Offset
€(f): FTun Swp											Signal Track On <u>Off</u>
Start 2 #Res B	2.310 0 W 1 MH	0 GHz z		#V	BW 10	Hz	#S1	Stop Veep 1	2.390 0 ms (601	0 GHz . pts)	
Copyr	ight 20	000-20	009 Ag	illent T	echnol	ogies					



RESTRICTED BANDEDGE (draft 802.11n Standard-20 MHz Channel mode, High Channel, Horizontal)



🔆 Agiler	nt								R	Т	Freq/Channel
Ref 120 d Peak	dBµV	#Atten 4	10 dB				Mkr1	2.483 45.6	000 2 dl	GHz B µ V	Center Freq 2.49150000 GHz
Log 10 dB/											Start Freq 2.48300000 GHz
–11.7 dB											Stop Freq 2.50000000 GHz
54.0 dB µ V LgAv											CF Step 1.70000000 MHz <u>Auto</u> Man
M1 S2 S3 FC1											Freq Offset 0.00000000 Hz
€(f): FTun Swp											Signal Track On <u>Off</u>
Start 2.48 #Res BW 1	 83 000 GH: 1 MHz	z	#V	BW 10	Hz	#\$	Stop weep	2.500 (1 ms (6	000 01 p	GHz ots)	
Copyrigh	it 2000-2	009 Agi	lent T	echnol	ogies						



RESTRICTED BANDEDGE (draft 802.11n Standard-20 MHz Channel mode, High Channel, Vertical)



🔆 Agilent				R	Т	Freq/Channel
Ref 120 dB µ V Peak	#Atten 40 c	IB	Mkr1	2.483 028 46.71 c	3 GHz 38µV	Center Freq 2.49150000 GHz
Log 10 dB/						Start Freq 2.48300000 GHz
–11.7 dB DI						Stop Freq 2.50000000 GHz
54.0 dB µ V LgAv						CF Step 1.70000000 MHz <u>Auto</u> Man
M1 S2						FreqOffset 0.00000000 Hz
£(f): FTun Swp						Signal Track ^{On <u>Off</u>}
Start 2.483 000 #Res BW 1 MHz	GHz	#VBW 10 Hz	Stop #Sweep	2.500 000 1 ms (601	I GHz pts)	
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RESTRICTED BANDEDGE (draft 802.11n Wide -40 MHz Channel mode, Low Channel, Horizontal)



🔆 Ag	jilent								R	Т	Freq/Channel
Ref 12 Peak	0 dBµ\	,	#Atten	40 dB				Mkr1	2.389 4 44.42	47 GHz dB µ V	Center Freq 2.35000000 GHz
Log 10 dB/ Offst											Start Freq 2.31000000 GHz
–11.7 dB DI											Stop Freq 2.39000000 GHz
54.0 dB µ V LgAv											CF Step 8.00000000 MHz <u>Auto</u> Man
M1 S2 S3 FC AA										1	Freq Offset 0.00000000 Hz
£ (f): FTun Swp											Signal Track On <u>Off</u>
Start 2 #Res B	2.310 0 W 1 MH	0 GHz z		#V	BW 10	Hz	#Sv	Stop Veep 1	2.390 0 ms (601	10 GHz L pts)	
Copyri	ight 20	000-20	109 Ag	ilent T	echnol	ogies					



RESTRICTED BANDEDGE (draft 802.11n Wide -40 MHz Channel mode, Low Channel, Vertical)



🔆 Agilent	R T Freq/Channel
Ref 120 dB µ V #Atten 40 dB Peak	Mkr1 2.389 33 GHz 69.72 dBµV 2.35000000 GHz
Log 10 dB/	2.31000000 GHz
DI	2.39000000 GHz
74.0 dBµV LgAv	CF Step 8.0000000 MHz <u>Auto</u> Man
M1 S2 S3 FC	Freq Offset 0.00000000 Hz
£(f): FTun Swp	Signal Track
Start 2.310 00 GHz #Res BW 1 MHz	Stop 2.390 00 GHz #Sweep 1 ms (601 pts)
Copyright 2000–2009 Agilent Technologies	

🔆 Agi	ilent								R	2 T	Freq/Channel
Ref 120 Peak	0 dBµV	4	#Atten	40 dB				Mkr1	2.390 44.50	00 GHz dB µ V	Center Freq 2.35000000 GHz
Log 10 dB/ Offst											Start Fred 2.31000000 GHz
-11.7 dB DI											Stop Fred 2.39000000 GHz
54.0 dB µ V LgAv											CF Step 8.00000000 MHz <u>Auto</u> Mar
M1 S2 S3 FC AA											Freq Offset
€(f): FTun Swp											Signal Track
Start 2 #Res Bl	.310 00 W 1 MHz	GHz		 #V	BW 10	Hz	#S\	Stop Veep 1	2.390 (ms (60	00 GHz 1 pts)	
Copyri	ght 200	00-20)09 Ag	ilent T	echnol	ogies					



RESTRICTED BANDEDGE (draft 802.11n Wide -40 MHz Channel mode, High Channel, Horizontal)

PEAK



🔆 Ag	jilent									R	Т	Freq/Channel
Ref 12 Peak	0 dBµV		#Atten	40 dB				Mkr1	2.483 47.1	000 L0 d	GHz B µ V	Center Freq 2.49150000 GHz
Log 10 dB/ Offst												Start Freq 2.48300000 GHz
–11.7 dB DI												Stop Freq 2.50000000 GHz
54.0 dB µ V LgAv												CF Step 1.70000000 MHz <u>Auto</u> Man
M1 S2 S3 FC AA	1 1 P											FreqOffset 0.00000000 Hz
£ (f): FTun Swp												Signal Track On <u>Off</u>
Start 2 #Res B	L 2.483 0 W 1 MH	 00 GHz z		#\	 'BW 10	Hz	#\$	 Stop weep	2.500 1 ms (6	000 001	GHz pts)	
Copyri	ight 20	00-20	009 Ag	ilent T	echnol	ogies						



RESTRICTED BANDEDGE (draft 802.11n Wide -40 MHz Channel mode, High Channel, Vertical)



🔆 Ag	jilent									R	Т	Freq/Channel
Ref 12 Peak	0 dB µ V	#}	Atten	40 dB				Mkr1	2.483 (48.7)	000 8 dE	GHz 3 µ V	Center Freq 2.49150000 GHz
Log 10 dB/ Offet												Start Freq 2.48300000 GHz
–11.7 dB DI												Stop Freq 2.50000000 GHz
54.0 dB µ V LgAv												CF Step 1.70000000 MHz <u>Auto</u> Man
M1 S2 S3 FC												FreqOffset 0.00000000 Hz
£ (f): FTun Swp												Signal Track ^{On <u>Off</u>}
Start 2 #Res B	2.483 000 3W 1 MHz	I GHz		#\	BW 10	Hz	#\$	Stop weep 3	2.500 0 1 ms (6)00 01 p	GHz its)	
Copyr	ight 200	0-200)9 Ag	ilent T	echnol	ogies						



Below 1GHz

Operation Mode:	Normal Link	Test Date:	September29, 2009
Temperature:	22°C	Tested by:	Jeff
Humidity:	48% RH	Polarity:	Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
123.0610	V	41.38	-8.24	33.14	43.50	-10.36	Peak
199.3580	V	41.50	-9.23	32.27	43.50	-11.23	QP
250.2931	V	43.18	-9.22	33.96	46.00	-12.04	QP
307.0144	V	43.86	-7.34	36.52	46.00	-9.48	Peak
374.3456	V	43.59	-5.24	38.35	46.00	-7.65	Peak
500.6014	V	37.17	-2.44	34.73	46.00	-11.27	Peak
123.1623	Н	40.42	-8.24	32.18	43.50	-11.32	Peak
226.9078	Н	45.80	-10.03	35.77	46.00	-10.23	QP
250.7561	Н	41.30	-9.22	32.08	46.00	-13.92	QP
307.4327	Н	43.17	-7.34	35.83	46.00	-10.17	Peak
374.1245	Н	42.81	-5.24	37.57	46.00	-8.43	Peak
500.5431	Н	35.70	-2.44	33.26	46.00	-12.74	Peak

- 1. Measuring frequencies from 30 MHz to the 1GHz (No emission found between lowest internal used/generated frequency to 30 MH)z.
- 2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using peak/quasi-peak detector mode.
- 3. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 4. Margin(dB) = Result(dBuV/m) Limit(dBuV/m).



Above 1 GHz

Operation Mode:	TX / IEEE	802.11b/	CH Low
operation moute		002.110/	

Temperature: 22°C

Humidity: 48 % RH

Test Date: September 29, 2009

Tested by: Jeff

Polarity: Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
4825.00	V	26.56	17.44	12.42	38.98	29.86	74.00	54.00	-24.14	Average
7236.87	V	27.44	15.59	15.48	42.92	31.07	74.00	54.00	-22.93	Average
4824.23	Н	22.34	15.21	12.41	34.75	27.62	74.00	54.00	-26.38	Average
7233.72	Н	31.87	14.15	15.47	47.34	29.62	74.00	54.00	-24.38	Average
N/A										

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
- *3.* Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
- 4. Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 6. Margin(dB) = Remark result(dBuV/m) Average limit(dBuV/m).



Operation Mode: TX / IEEE 802.11b / CH Mid

Temperature: 22°C

Humidity: 48 % RH

Test Date: September29, 2009

Tested by: Jeff

Polarity: Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
4866.24	V	28.11	17.05	12.68	40.79	29.73	74.00	54.00	-24.27	Average
7308.43	V	26.64	15.26	15.72	42.36	30.98	74.00	54.00	-23.02	Average
N/A										
10.55.10			1	10 (0	44.50	a a a =	- 4 0 0	- 4 0 0		
4866.18	H	28.85	15.89	12.68	41.53	28.57	74.00	54.00	-25.43	Average
7320.52	Н	27.96	13.92	15.76	43.72	29.68	74.00	54.00	-24.32	Average
N/A										

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
- *3.* Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
- 4. Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 6. Margin(dB) = Remark result(dBuV/m) Average limit(dBuV/m).



Operation Mode: TX / IEEE 802.11b / CH High

22°C

Temperature:

Humidity: 48 % RH

Test Date: September 29, 2009

Tested by: Jeff

Polarity: Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
4923.24	V	29.61	17.91	12.93	42.54	30.84	74.00	54.00	-23.16	Average
7379.34	V	28.04	15.22	15.82	43.86	31.04	74.00	54.00	-22.96	Average
N/A										
4923.36	Н	27.51	15.54	12.93	40.44	28.47	74.00	54.00	-25.53	Average
7380.64	Н	25.37	13.71	15.82	41.19	29.53	74.00	54.00	-24.47	Average
N/A										

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
- 3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
- 4. Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 6. Margin(dB) = Remark result(dBuV/m) Average limit(dBuV/m).



Operation Mode:TX / IEEE 802.11g/ CH LowTemperature:24°CHumidity:48 % RH

Test Date: September29, 2009

Tested by: Jeff

Polarity: Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
4819.48	V	26.44	14.75	12.41	38.85	27.16	74.00	54.00	-26.84	Average
7234.56	V	32.05	17.84	15.48	47.53	33.32	74.00	54.00	-20.68	Average
N/A										
4922.25	II	25.15	14.24	10.41	27.50	26.65	74.00	54.00	27.25	A
4823.25	Н	25.15	14.24	12.41	37.36	26.65	/4.00	54.00	-27.35	Average
7237.36	Н	25.81	16.10	15.48	41.29	31.58	74.00	54.00	-22.42	Average
N/A										

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
- 3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
- 4. Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 6. Margin(dB) = Remark result(dBuV/m) Average limit(dBuV/m).



Operation Mode:TX / IEEE 802.11g/ CH MidTemperature:24°CHumidity:48 % RH

Test Date: September29, 2009

Tested by: Jeff

Polarity: Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
4875.34	V	29.83	17.80	12.68	42.51	30.48	74.00	54.00	-23.52	Average
7321.24	V	27.97	15.60	15.76	43.73	31.36	74.00	54.00	-22.64	Average
N/A										
4075.22		26.70	15.10	12 (0	20.47	27.06	74.00	54.00	26.14	
48/5.33	Н	26.79	15.18	12.68	39.47	27.86	/4.00	54.00	-26.14	Average
7319.21	Н	24.58	13.34	15.74	40.32	29.08	74.00	54.00	-24.92	Average
N/A										

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
- 3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
- 4. Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 6. Margin(dB) = Remark result(dBuV/m) Average limit(dBuV/m).



Operation Mode:TX / IEEE 802.11g/ CH HighTemperature:24°CHumidity:48 % RH

Test Date: September29, 2009

Tested by: Jeff

Polarity: Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
4930.46	V	29.61	17.69	12.94	42.55	30.63	74.00	54.00	-23.37	Average
7391.75	V	27.46	16.02	15.82	43.28	31.84	74.00	54.00	-22.16	Average
N/A										
										1
4929.28	Н	27.69	15.58	12.93	40.62	28.51	74.00	54.00	-25.49	Average
7389.45	Н	25.54	13.43	15.82	41.36	29.25	74.00	54.00	-24.75	Average
N/A										

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
- 3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
- 4. Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 6. Margin (dB) = Remark result (dBuV/m) Average limit (dBuV/m).



Operation Mode:	TX / draft 802.11n Standard-20 MHz Channel mode (Chain 0 + Chain 1) / CH Low	Test Date:	September29, 2009
Temperature:	24°C	Tested by:	Jeff
Humidity:	48 % RH	Polarity:	Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
4832.67	V	29.87	19.96	12.41	42.28	32.37	74.00	54.00	-21.63	Average
7230.32	V	27.57	18.05	15.48	43.05	33.53	74.00	54.00	-20.47	Average
N/A										
		1		1						1
4824.36	Н	28.35	16.64	12.41	40.76	29.05	74.00	54.00	-24.95	Average
7219.49	Н	26.85	14.68	15.48	42.33	30.16	74.00	54.00	-23.84	Average
N/A										

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental 1. frequency.
- Radiated emissions measured in frequency above 1000MHz were made with an 2. *instrument using peak/average detector mode.*
- 3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
- 4. Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 6. Margin (dB) = Remark result (dBuV/m) - Average limit (dBuV/m).



Operation Mode:	TX / draft 802.11n Standard-20 MHz Channel mode (Chain 0 + Chain 1) / CH Mid	Test Date:	September29, 2009
Temperature:	24°C	Tested by:	Jeff
Humidity:	48 % RH	Polarity:	Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
4876.14	V	31.15	21.15	12.68	43.83	33.83	74.00	54.00	-20.17	Average
7321.32	V	28.82	18.37	15.76	44.58	34.13	74.00	54.00	-19.87	Average
N/A										
4875.48	Н	27.86	17.90	12.68	40.54	30.58	74.00	54.00	-23.42	Average
7316.65	Н	27.00	15.81	15.72	42.72	31.53	74.00	54.00	-22.47	Average
N/A										

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
- 3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
- 4. Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 6. Margin(dB) = Remark result(dBuV/m) Average limit(dBuV/m).



Operation Mode:	TX / draft 802.11gn Standard-20 MHz Channel mode (Chain 0 + Chain 1) / CH High	Т
Temperature:	24°C	Т

Test Date: September29, 2009

Tested by: Jeff

Humidity: 48 % RH

Polarity: Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
4930.21	V	28.73	18.90	12.93	41.66	31.83	74.00	54.00	-22.17	Average
7387.57	V	26.21	16.73	15.82	42.03	32.55	74.00	54.00	-21.45	Average
N/A										
4924.63	Н	27.38	17.60	12.93	40.31	30.53	74.00	54.00	-23.47	Average
7384.72	Н	25.61	15.62	15.82	41.43	31.44	74.00	54.00	-22.56	Average
N/A										

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
- 3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
- 4. Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 6. Margin(dB) = Remark result(dBuV/m) Average limit(dBuV/m).



Operation Mode: Temperature:		TX / draf (Chain 0 24°C	t 802.11n + Chain 1)	Wide-40 M) / CH Low	el mode	Test Date: September29, 2009 Tested by: Jeff				
Humidity	7:	48 % RH				Polarity: Ver. / Hor.				
Frequency (MHz)	Ant. Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
4845.36	V	29.97	19.75	12.41	42.38	32.16	74	54	-21.84	Average
7385.63	V	27.98	18.28	15.48	43.46	33.76	74	54	-20.24	Average
N/A										
4850.21	Н	29.12	18.25	12.41	41.53	30.66	74.00	54.00	-23.34	Average
7389.45	Н	27.24	16.01	15.48	42.72	31.49	74.00	54.00	-22.51	Average
N/A										

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
- 3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
- 4. Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 6. Margin(dB) = Remark result(dBuV/m) Average limit(dBuV/m).



Operatio	n Mode:	TX / draf (Chain 0	t 802.11n + Chain 1	Wide-40 M) / CH Mid	el mode	Test Date: September29, 2009				
Temperature:		24°C				Tested by: Jeff				
Humidity	/:	48 % RH				Polarity: Ver. / Hor.				
Frequency (MHz)	Ant. Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
4874.54	V	29.63	18.64	12.68	42.31	31.32	74.00	54.00	-22.68	Average
7313.29	V	27.87	16.95	15.71	43.58	32.66	74.00	54.00	-21.34	Average
N/A										
4874.36	Н	27.94	18.07	12.68	40.62	30.75	74.00	54.00	-23.25	Average
7314.42	Н	25.82	15.51	15.71	41.53	31.22	74.00	54.00	-22.78	Average
N/A										

- 1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
- 2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
- 3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
- 4. Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 6. Margin(dB) = Remark result(dBuV/m) Average limit(dBuV/m).



Operation Mode: Temperature:		TX / draf (Chain 0 24°C	t 802.11n + Chain 1)	Wide-40 M) / CH Higł	el mode	Test Date: September29, 2009 Tested by: Jeff				
Humidity	/:	48 % RH				Polarity: Ver. / Hor.				
Frequency (MHz)	Ant. Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
4910.25	V	29.61	19.46	12.93	42.54	32.39	74.00	54.00	-21.61	Average
7360.46	V	28.10	17.81	15.83	43.93	33.64	74.00	54.00	-20.36	Average
N/A										
4911.18	Н	27.61	17.54	12.93	40.54	30.47	74.00	54.00	-23.53	Average
7359.54	Н	25.60	16.86	15.82	41.42	32.68	74.00	54.00	-21.32	Average
N/A										

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
- 3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
- 4. Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 6. Margin(dB) = Remark result(dBuV/m) Average limit(dBuV/m).
POWERLINE CONDUCTED EMISSIONS

LIMIT

According to \$15.207(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. The lower limit applies at the boundary between the frequency ranges.

Frequency Range	Limits (dBµV)			
(IVIIIZ)	Quasi-peak	Average		
0.15 to 0.50	66 to 56*	56 to 46*		
0.50 to 5	56	46		
5 to 30	60	50		

* Decreases with the logarithm of the frequency.

Test Configuration

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

TEST PROCEDURE

- 1. The EUT was placed on a table, which is 0.8m above ground plane.
- 2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 3. Repeat above procedures until all frequency measured were complete.



TEST RESULTS

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

<u>Test Data</u>

Operation Mode:	Normal Link	Test Date:	September 4, 2009
Temperature:	23°C	Tested by:	Jeff
Humidity:	50% RH		

Frog	PEAK.	Q.P.	AVG	Q.P.	AVG	Margin	Factor		
(MH ₇)	Raw	Raw	Raw	Limit	Limit	(dB)	(dB)	Remark	
(11112)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dBuV)				
0.172	48.24	41.15	24.19	65.37	55.37	-31.18	10.06	Line	
3.616	41.78	36.39	29.72	56.00	46.00	-16.28	11.74	Line	
8.048	45.42	39.80	33.58	60.00	50.00	-16.42	11.59	Line	
10.832	44.44	38.21	31.57	60.00	50.00	-18.43	11.52	Line	
20.272	52.01	50.16	43.52	60.00	50.00	-6.48	11.36	Line	
23.120	51.98	50.95	47.71	60.00	50.00	-2.29	11.35	Line	
0.175	47.80	42.55	26.03	65.26	55.26	-29.23	10.08	Neutral	
3.560	41.82	36.73	30.12	56.00	46.00	-15.88	11.75	Neutral	
8.384	46.41	40.26	33.91	60.00	50.00	-16.09	11.59	Neutral	
10.992	45.43	39.03	32.37	60.00	50.00	-17.63	11.53	Neutral	
20.272	53.21	50.60	43.86	60.00	50.00	-6.14	11.35	Neutral	
23.120	52.88	51.49	48.21	60.00	50.00	-1.79	11.34	Neutral	

Remark:

- 1. Measuring frequencies from 0.15 MHz to 30MHz.
- 2. The emissions measured in frequency range from 0.15 MHz to 30MHz were made with an instrument using Quasi-peak detector and average detector.
- 3. The IF bandwidth of SPA between 0.15MHz and 30MHz was 10 kHz; the IF bandwidth of Test Receiver between 0.15MHz and 30MHz was 9 kHz;
- 4. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)



Test Plots

Conducted emissions (Line 1)



Conducted emissions (Line 2)

