FCC 47 CFR PART 15 SUBPART C AND ANSI C63.4:2003
TEST REPORT

For

3G / Wireless-N Dual WAN ADSL2+ Firewall Router

Model : BiPAC 7800NEXL

**Data Applies To : BiPAC 7800NEL; BiPAC 7800NL;
BiPAC 6800NEXL; BiPAC 6800NEL; BiPAC 6800NL;
BEC 7800TNR2; BEC 6800NR2**

Issued for

Billion Electric Co., Ltd.

**8F., No.192, Sec.2, Chung -Hsing Road, Hsin-Tien City,
Taipei Hsien, Taiwan, R.O.C.**

Issued by

**Compliance Certification Services Inc.
Hsinchu Lab.
NO. 989-1 Wen Shan Rd., Shang Shan Village,
Qionglin Shiang Hsinchu County 30741, Taiwan, R.O.C
TEL: +886-3-5921698
FAX: +886-3-5921108**

**http://www.ccsrf.com
E-Mail : service@ccsrf.com**

Testing Laboratory
0240

Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	10/27/2010	Initial Issue	All Page 127	Kate Shi

TABLE OF CONTENTS

TITLE PAGE NO.

1. TEST REPORT CERTIFICATION **4**

2. EUT DESCRIPTION **5**

2.1 DESCRIPTION OF EUT & POWER 5-6

3. DESCRIPTION OF TEST MODES **7**

4. TEST METHODOLOGY **7**

5. FACILITIES AND ACCREDITATION **8**

5.1 FACILITIES 8

5.2 ACCREDITATIONS 8

5.3 MEASUREMENT UNCERTAINTY 9

6. SETUP OF EQUIPMENT UNDER TEST **10-11**

7. FCC PART 15.247 REQUIREMENTS **12**

7.1 6dB BANDWIDTH 12-25

7.2 MAXIMUM PEAK OUTPUT POWER 26-28

7.3 AVERAGE POWER 29-31

7.4 POWER SPECTRAL DENSITY 32-51

7.5 CONDUCTED SPURIOUS EMISSION 52-76

7.6 RADIATED EMISSION 77-111

7.7 CONDUCTED EMISSION 112-120

APPENDIX I MAXIMUM PERMISSIBLE EXPOSURE **121-122**

APPENDIX II SETUP PHOTOS **123-127**

1. TEST REPORT CERTIFICATION

Applicant ： Billion Electric Co., Ltd.

Address ： 8F., No.192, Sec.2, Chung -Hsing Road, Hsin-Tien City, Taipei Hsien, Taiwan, R.O.C.

Equipment Under Test ： 3G / Wireless-N Dual WAN ADSL2+ Firewall Router

Model ： BiPAC 7800NEXL

Data Applies To ： BiPAC 7800NEL; BiPAC 7800NL; BiPAC 6800NEXL; BiPAC 6800NEL; BiPAC 6800NL; BEC 7800TNR2; BEC 6800NR2

Tested Date ： June 03 ~ October 26, 2010

APPLICABLE STANDARD	
Standard	**Test Result**
FCC Part 15 Subpart C AND ANSI C63.4:2003	PASS

WE HEREBY CERTIFY THAT: The above equipment has been tested by Compliance Certification Services Inc., and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Approved by:

Alex Chiu
Director

Reviewed by:

Gundam Lin
Team Leader

2. EUT DESCRIPTION

2.1 DESCRIPTION OF EUT & POWER

Product Name	3G / Wireless-N Dual WAN ADSL2+ Firewall Router
Model Number	BiPAC 7800NEXL
Data Applies To	BiPAC 7800NEL; BiPAC 7800NL; BiPAC 6800NEXL; BiPAC 6800NEL; BiPAC 6800NL; BEC 7800TNR2; BEC 6800NR2
Received Date	June 03, 2010
Frequency Range	IEEE 802.11b/g, 802.11n HT20 : 2412MHz～2462MHz IEEE 802.11n HT40 : 2422MHz～2452MHz
Transmit Power	IEEE 802.11b : 18.98 dBm (0.0.791W) IEEE 802.11g : 22.19 dBm (0.1656W) IEEE 802.11n HT20 : 25.39 dBm (0.3461W) IEEE 802.11n HT40 : 24.20 dBm (0.2628W)
Channel Spacing	IEEE 802.11b/g, 802.11n HT20/HT40 : 5MHz
Channel Number	IEEE 802.11b/g : 11 Channels IEEE 802.11n HT40 : 7 Channels
Transmit Data Rate	IEEE 802.11b : 11, 5.5, 2, 1 Mbps IEEE 802.11g : 54, 48, 36, 24, 18, 12, 9, 6 Mbps IEEE 802.11n HT20: 130, 117 ,104, 78, 65, 58.5, 52, 39, 26, IEEE 802.11n HT40: 270, 243 ,216, 162, 135, 121.5, 108, 81,
Type of Modulation	IEEE 802.11b : DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g : OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20/40 : OFDM (64QAM, 16QAM, QPSK, BPSK)
Frequency Selection	by software / firmware
Antenna Type	Dipole Antenna × 2, Antenna Gain 2 dBi
DC Power Cord Type	Unshielded cable 1.5m (no detachable)
Power Source	12VDC (From Power Adapter)
I/O Port	DSL× 1, WAN port × 1, LAN port × 4, USB port × 1, Power port × 1

Power Adapter :

No.	Manufacturer	Model No.	Power Input	Power Output
1	EGB	PAW012A12UL	100-240VAC, 0.5A, 50/60Hz	12V, 1.0A
2	EGB	PAW018A12UL 8066	100-240VAC, 0.5A, 50/60Hz	12V, 1.2A
3	EGB	PAW018A12UL	100-240VAC, 0.5A, 50/60Hz	12V, 1.5A

The difference of the series model:

Model / Different Item	BiPAC 7800NEXL	BiPAC 7800NEL	BiPAC 7800NL	BiPAC 6800NEXL
External Feature	With WiFi Antenna With RJ-45 EWAN With USB 2.0 Host With RJ-11	With WiFi Antenna With RJ-45 EWAN No USB 2.0 Host With RJ-11	With WiFi Antenna No RJ-45 EWAN No USB 2.0 Host With RJ-11	With WiFi Antenna With RJ-45 EWAN With USB 2.0 Host No RJ-11
External Color	white	white	white	white
Housing Drawing	D3	D3	D3	D3
Support 802.11n	O	O	O	O
VPN	X	X	X	X
ADSL function	O	O	O	X
Circuits Design	O	O	O	O
Model Module	Flash 8MB DDRII SDRAM 128MB	Flash 8MB DDRII SDRAM 128MB	Flash 8MB DDRII SDRAM 128MB	Flash 8MB DDRII SDRAM 128MB
Power Supply	DC12V/1.2A	DC12V/1A	DC12V/1A	DC12V/1.2A
Note: “O” means all the same and “X” means the difference.				

The difference of the series model:

Model / Different Item	BiPAC 6800NEL	BiPAC 6800NL	BEC 7800TNR2	BEC 6800NR2
External Feature	With WiFi Antenna With RJ-45 EWAN No USB 2.0 Host No RJ-11	With WiFi Antenna No RJ-45 EWAN No USB 2.0 Host No RJ-11	With WiFi Antenna With RJ-45 EWAN No USB 2.0 Host With RJ-11	With WiFi Antenna With RJ-45 EWAN No USB 2.0 Host No RJ-11
External Color	white	white	Black	Black
Housing Drawing	D3	D3	D3	D3
Support 802.11n	O	O	O	O
VPN	X	X	X	X
ADSL function	X	X	O	X
Circuits Design	O	O	O	O
Model Module	Flash 8MB DDRII SDRAM 128MB	Flash 8MB DDRII SDRAM 128MB	Flash 8MB DDRII SDRAM 128MB	Flash 8MB DDRII SDRAM 128MB
Power Supply	DC12V/1A	DC12V/1A	DC12V/1A or DC12V/1.5A	DC12V/1A or DC12V/1.5A
Note: “O” means all the same and “X” means the difference.				

Remark :

1. *The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.*
2. *For more details, please refer to the User’s manual of the EUT.*
3. *This submittal(s) (test report) is intended for FCC ID: QI3BIL-7800NEX filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.*

3. DESCRIPTION OF TEST MODES

The EUT is an 802.11n MIMO transceiver in BiPAC 7800NEXL form factor. It has two transmitter chains and two receive chains (2×2 configurations).
11b mode, only Chain 0 transmitter.
11g mode, only Chain 1 transmitter.

IEEE 802.11b, 802.11g, 802.11n HT20 mode
The EUT had been tested under operating condition.
There are three channels have been tested as following :

Channel	Frequency (MHz)
Low	2412
Middle	2437
High	2462

IEEE 802.11b mode : 1Mbps data rate (worst case) were chosen for full testing.
IEEE 802.11g mode : 6Mbps data rate (worst case) were chosen for full testing.
IEEE 802.11n HT20 mode : 6.5Mbps data rate (worst case) were chosen for full testing.

IEEE 802.11n HT40 mode
The EUT had been tested under operating condition.
There are three channels have been tested as following :

Channel	Frequency (MHz)
Low	2422
Middle	2437
High	2452

IEEE 802.11n HT40 mode : 13.5Mbps data rate (worst case) were chosen for full testing.

4. TEST METHODOLOGY

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

5. FACILITIES AND ACCREDITATION

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

NO. 989-1 Wen Shan Rd., Shang Shan Village,
Qionglin Shiang Hsinchu County 30741, Taiwan, R.O.C

The sites are constructed in conformance with the requirements of ANSI C63.4 :2003 and CISPR 22. All receiving equipment conforms to CISPR 16-1-1, CISPR 16-1-2, CISPR 16-1-3, CISPR 16-1-4, CISPR 16-1-5.

5.2 ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

Taiwan	TAF

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

Taiwan	BSMI
USA	FCC MRA

Copies of granted accreditation certificates are available for downloading from our web site, http:///www.ccsrf.com

5.3 MEASUREMENT UNCERTAINTY

The following table is for the measurement uncertainty, which is calculated as per the document CISPR 16-4-2.

PARAMETER	UNCERTAINTY
Open Area Test Site (OATS No.3) / Radiated Emission, 30 to 200 MHz	+/- 3.9267
Open Area Test Site (OATS No.3) / Radiated Emission, 200 to 1000 MHz	+/- 3.6899
Semi Anechoic Chamber (966 Chamber) / Radiated Emission, 30 to 200 MHz	+/- 3.6878
Semi Anechoic Chamber (966 Chamber) / Radiated Emission, 200 to 1000 MHz	+/- 3.0885
Semi Anechoic Chamber (966 Chamber) / Radiated Emission, 1 to 26.5GHz	+/- 3.2000
Conducted Emission, 9kHz to 30MHz	+/- 1.7468

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
Consistent with industry standard (e.g. CISPR 22: 2006, clause 11, Measurement Uncertainty) determining compliance with the limits shall be base on the results of the compliance measurement. Consequently the measure emissions being less than the maximum allowed emission result in this be a compliant test or passing test.
The acceptable measurement uncertainty value without requiring revision of the compliance statement is base on conducted and radiated emissions being less than U_{CISPR} which is 3.6dB and 5.2dB respectively. CCS values (called U_{Lab} in CISPR 16-4-2) is less than U_{CISPR} as shown in the table above. Therefore, MU need not be considered for compliance.

6. SETUP OF EQUIPMENT UNDER TEST

SUPPORT EQUIPMENT

No.	Product	Manufacturer	Model No.	Serial No.	FCC ID
1	Notebook PC	DELL	Latitude D610	CN-0C4708-48643 -625-5565	E2K24BNHM
2	Notebook PC	Lenovo ideaPad	S10e_4068-RZ1	L3CEV2D	HFS-FL
3	Notebook PC	IBM	ThinkPad T61 7663-AS6	L3F3864	DoC
4	Usb Flash disk	Transcend	Jet Flash V10(4G)	258909 0094	---
5	Ethernet Switch	ASUS	GX1008B	90-Q872AN1N0NAM A0-88QSA1003522	---
6	ADSL iDSLAM	TECOM	M801	HIL0017	---
7	ADSL iDSLAM	ZyXEL	IES-1000	S2Z3322195	---

No.	Signal Cable Description
1	Unshielded RJ-45 cable, 12m × 1
2	Unshielded RJ-45 cable, 1.2 m × 3
3	Unshielded RJ-11 cable, 12 m × 1

SETUP DIAGRAM FOR TESTS

EUT & peripherals setup diagram is shown in appendix setup photos.

EUT OPERATING CONDITION

RF Mode

1. Set up all computers like the setup diagram.

TX Mode:

⇨ **Tx Data Rate:** 1Mbps Bandwidth 20 (IEEE 802.11b mode)
6Mbps Bandwidth 20 (IEEE 802.11g mode)
6.5Mbps Bandwidth 20 (IEEE 802.11n HT20 mode)
13.5Mbps Bandwidth 40 (IEEE 802.11n HT40 mode)

⇨ **Power control**

IEEE 802.11b Channel Low (2412MHz) TX 0 Power=15 (only chain0 TX)
IEEE 802.11b Channel Mid (2437MHz) TX 0 Power=15 (only chain0 TX)
IEEE 802.11b Channel High (2462MHz) TX 0 Power=15 (only chain0 TX)
IEEE 802.11g Channel Low (2412MHz) TX 1 Power=10 (only chain1 TX)

IEEE 802.11g Channel Mid (2437MHz) TX 1 Power=12 (only chain1 TX)
IEEE 802.11g Channel High (2462MHz) TX 1 Power=09 (only chain1 TX)
IEEE 802.11n HT20 Channel Low (2412MHz) TX 0/1 Power=10
IEEE 802.11n HT20 Channel Mid (2437MHz) TX 0/1 Power=12
IEEE 802.11n HT20 Channel High (2462MHz) TX 0/1 Power=08
IEEE 802.11n HT40 Channel Low (2422MHz) TX 0/1 Power=09
IEEE 802.11n HT40 Channel Mid (2437MHz) TX 0/1 Power=11
IEEE 802.11n HT40 Channel High (2452MHz) TX 0/1 Power=08

2. All of the function are under run.
3. Start test.

Normal Mode

1. Setup whole system for test as shown on diagram.
2. Power on all equipments.
3. Notebook PC_ping EUT IP 192.168.0.100 through WAN connected by RJ45 cable.
4. Notebook PC_ping EUT IP 192.168.1.254 through LAN connected by RJ45 cable.
5. Notebook PC_ping EUT IP 192.168.1.254 through wireless LAN.
6. LAN 2~3 port link ethernet switch load.
7. USB port link USB flash disk load.
8. ADSL iDSLAM Link DSL.
9. All of the function are under run.
10. Start test.

7. FCC PART 15.247 REQUIREMENTS

7.1 6dB BANDWIDTH

LIMITS

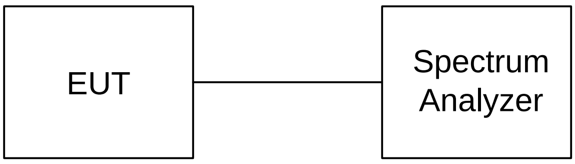
§ 15.247(a) (2) For direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz.

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	AGILENT	E4446A	MY43360132	06/20/2011
Spectrum Analyzer	AGILENT	E4446A	MY46180323	05/02/2011

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

TEST SETUP



TEST PROCEDURE

The transmitter output was connected to a spectrum analyzer. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100 KHz RBW and 300 KHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

TEST RESULTS

IEEE 802.11b Mode

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (kHz)	Pass / Fail
Low	2412	6.83	500	PASS
Middle	2437	8.58	500	PASS
High	2462	6.83	500	PASS

IEEE 802.11g Mode

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (kHz)	Pass / Fail
Low	2412	15.92	500	PASS
Middle	2437	14.00	500	PASS
High	2462	15.08	500	PASS

IEEE 802.11n HT20 mode (Two TX)

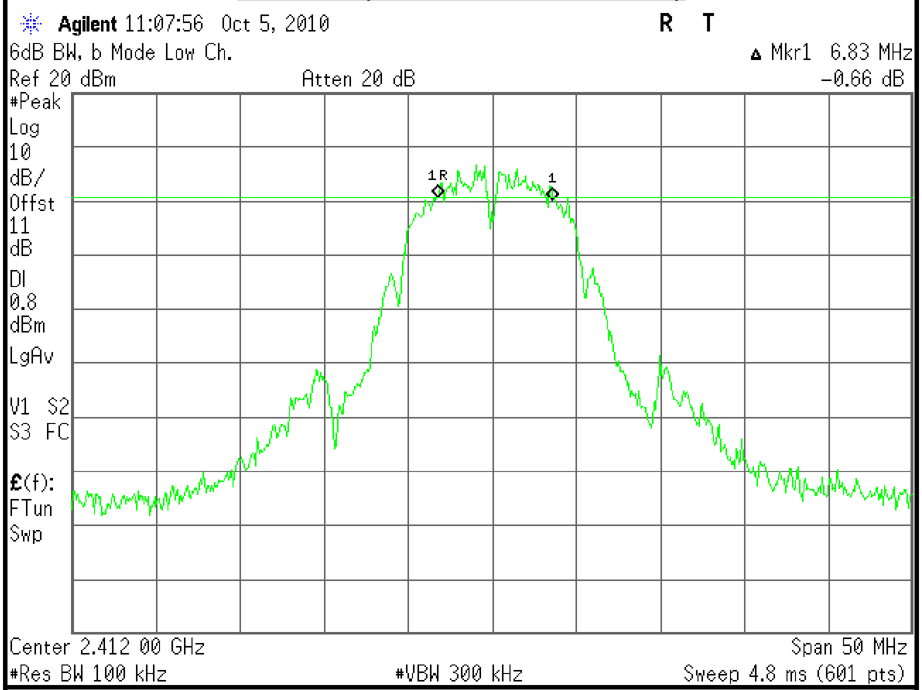
Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (kHz)	Pass / Fail
		Chain 0	Chain 1		
Low	2412	14.67	13.33	500	PASS
Middle	2437	15.67	15.08	500	PASS
High	2462	13.42	17.25	500	PASS

IEEE 802.11n HT40 Mode (Two TX)

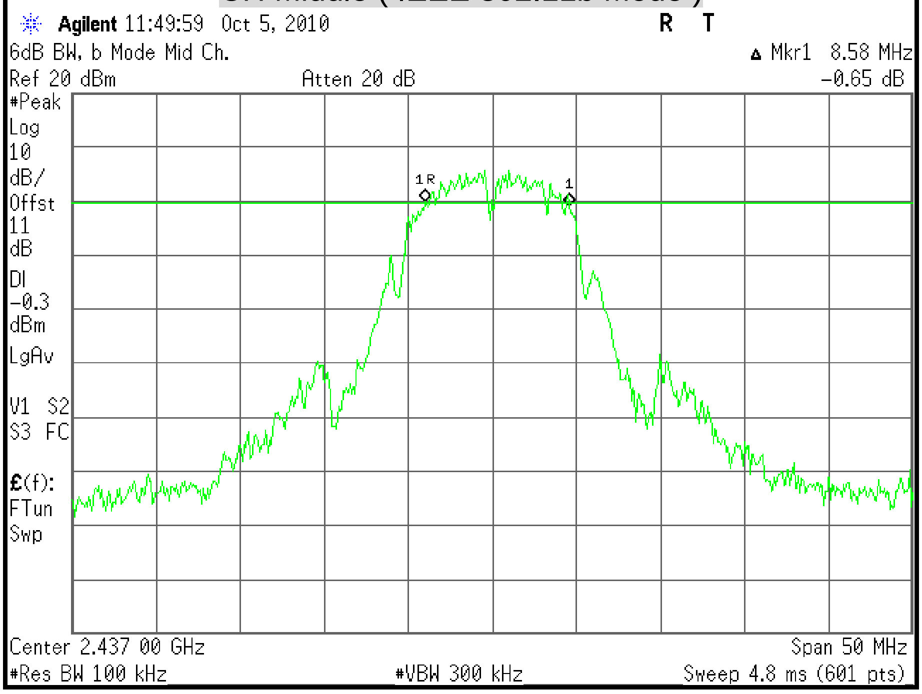
Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (kHz)	Pass / Fail
		Chain 0	Chain 1		
Low	2422	36.33	35.83	500	PASS
Middle	2437	36.25	36.00	500	PASS
High	2452	36.42	36.33	500	PASS

6dB BANDWIDTH

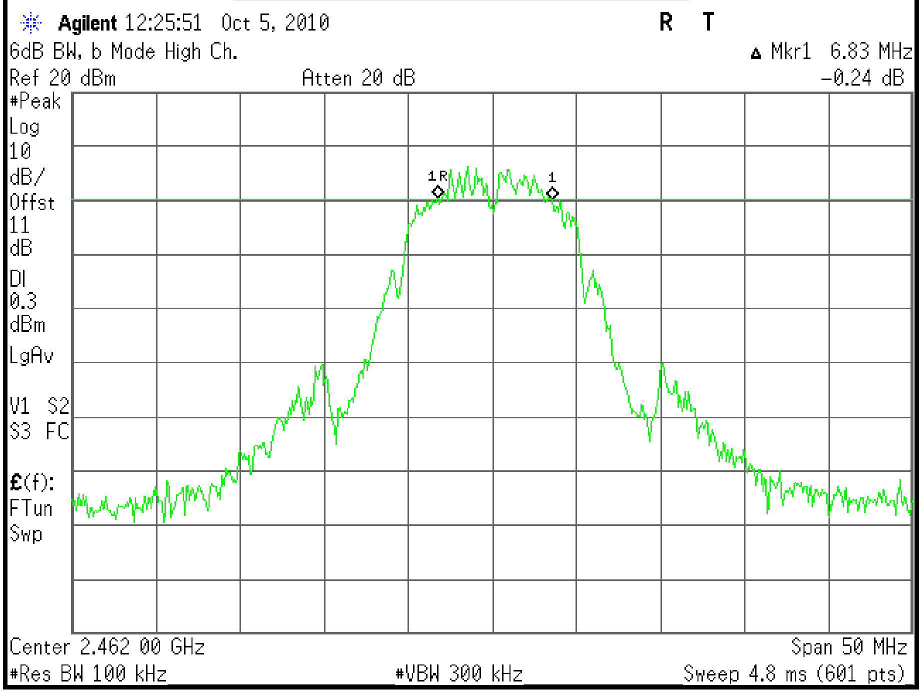
CH Low (IEEE 802.11b Mode)



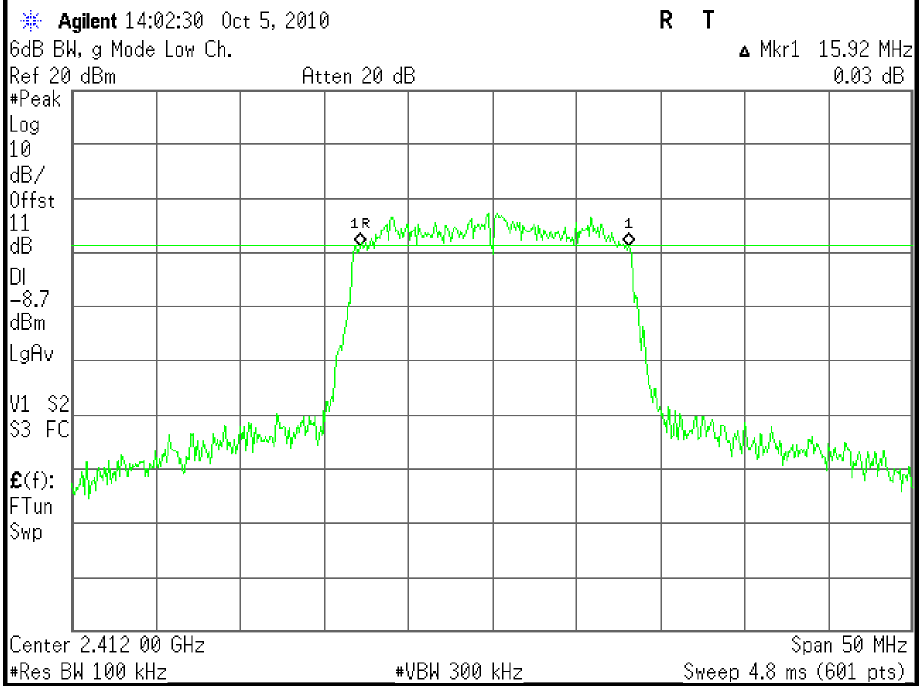
CH Middle (IEEE 802.11b Mode)



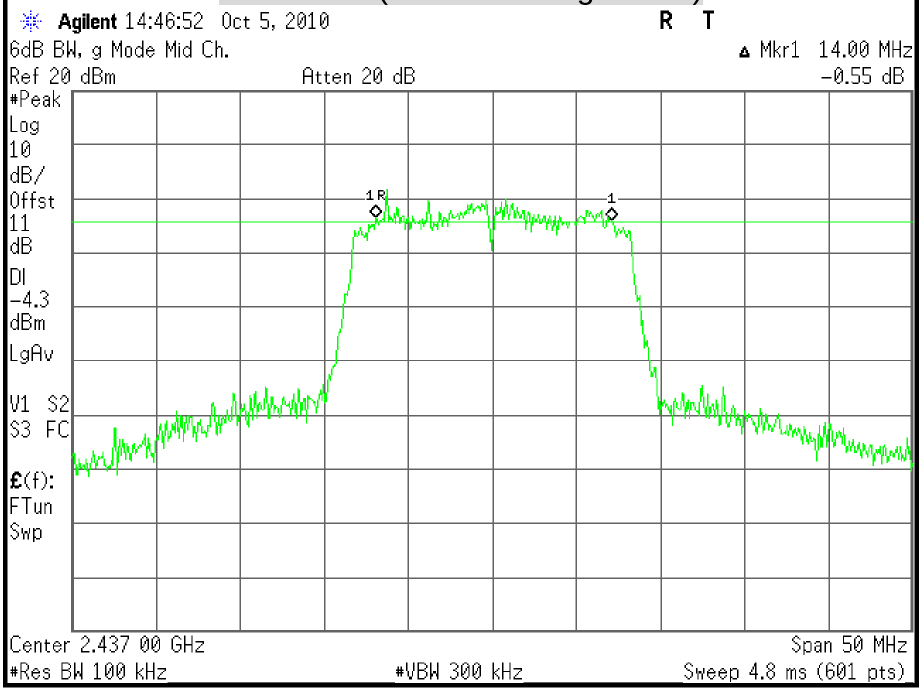
CH High (IEEE 802.11b Mode)



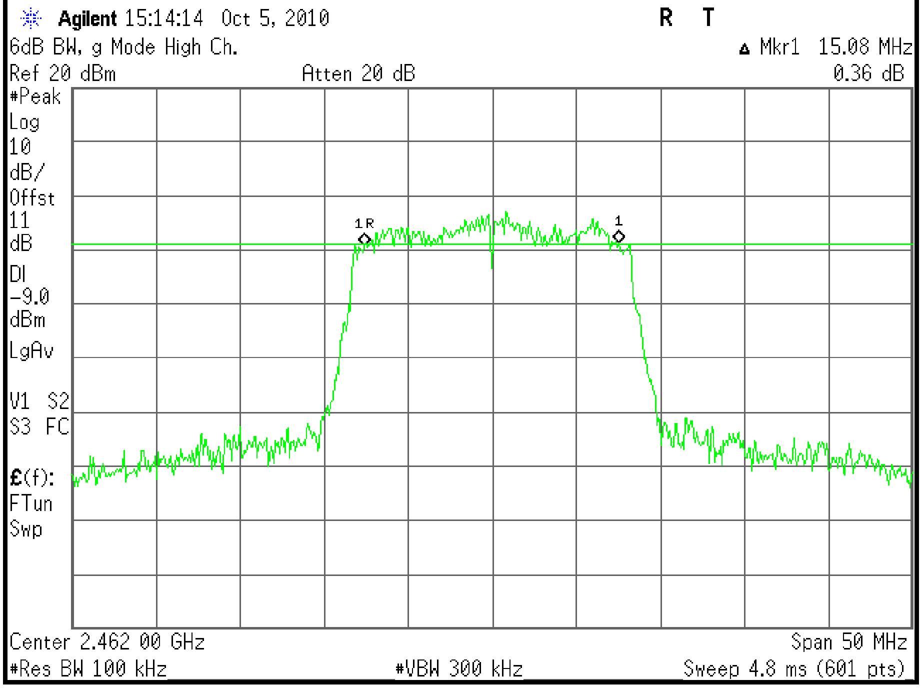
CH Low (IEEE 802.11g Mode)



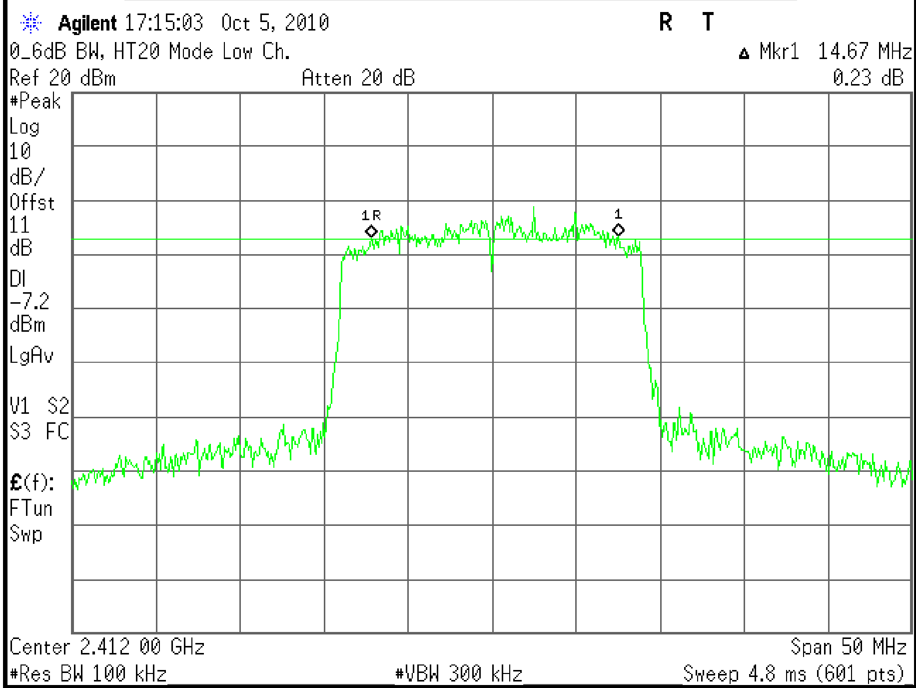
CH Middle (IEEE 802.11g Mode)



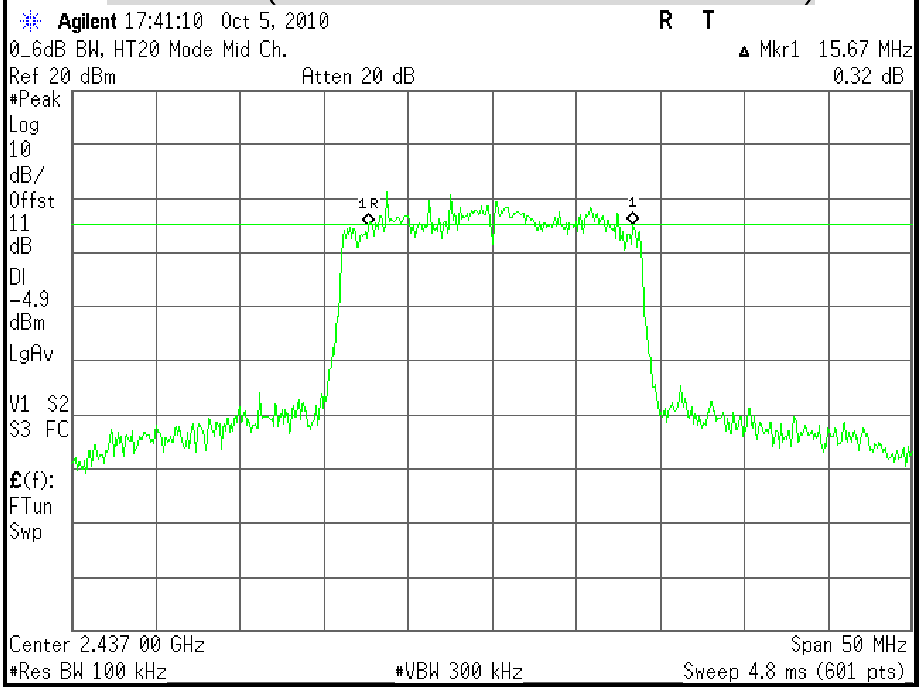
CH High (IEEE 802.11g Mode)



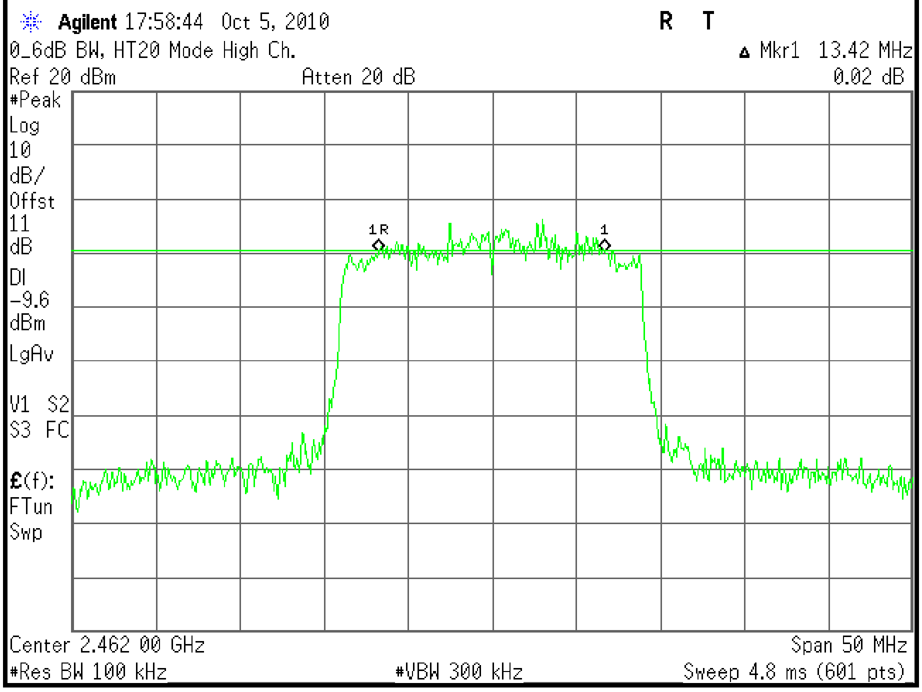
CH Low (IEEE 802.11n HT20 Mode / Chain 0)



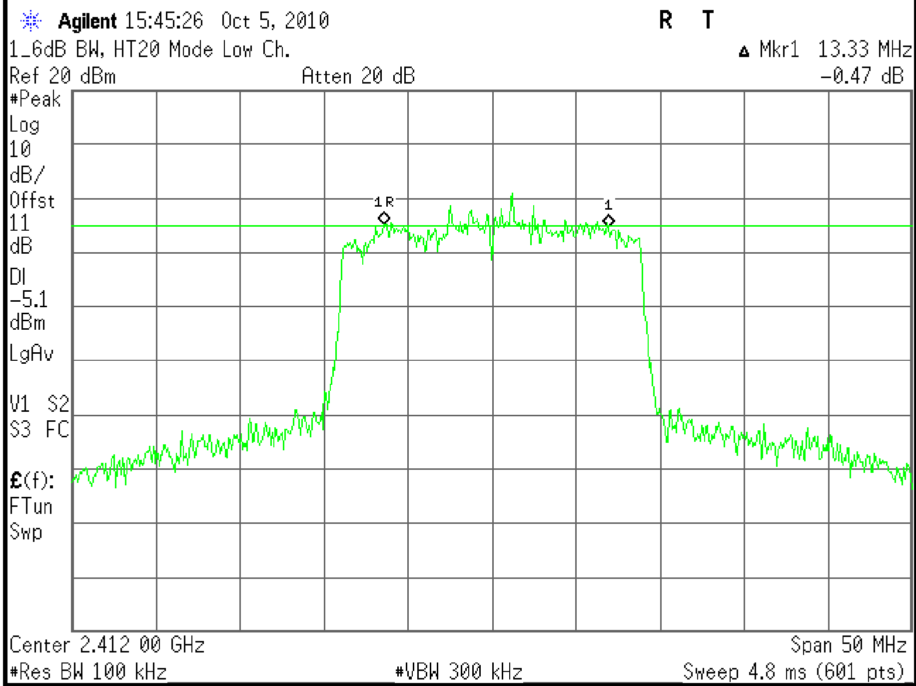
CH Middle (IEEE 802.11n HT20 Mode / Chain 0)



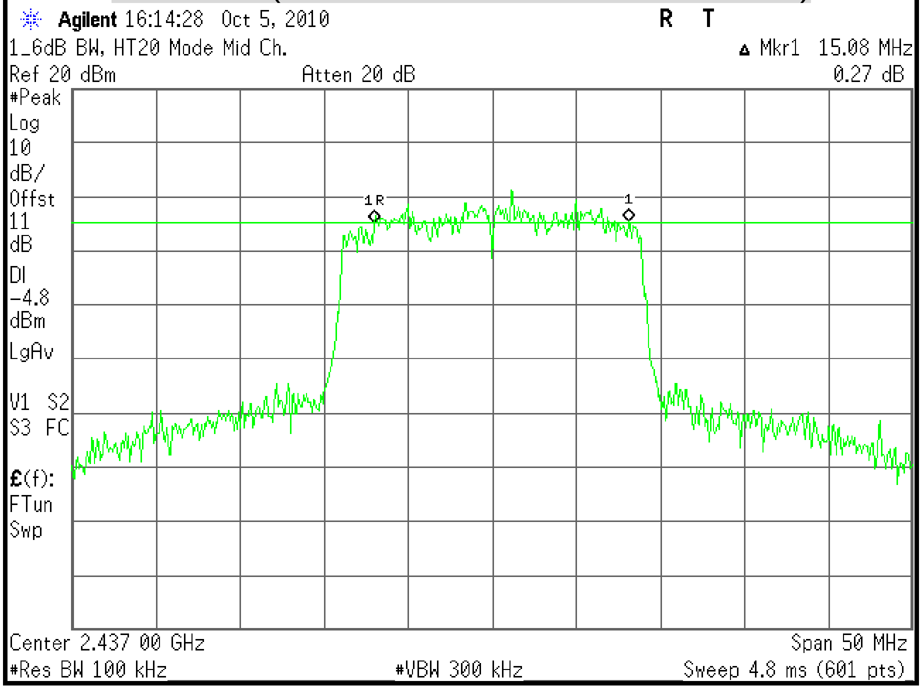
CH High (IEEE 802.11n HT20 Mode / Chain 0)



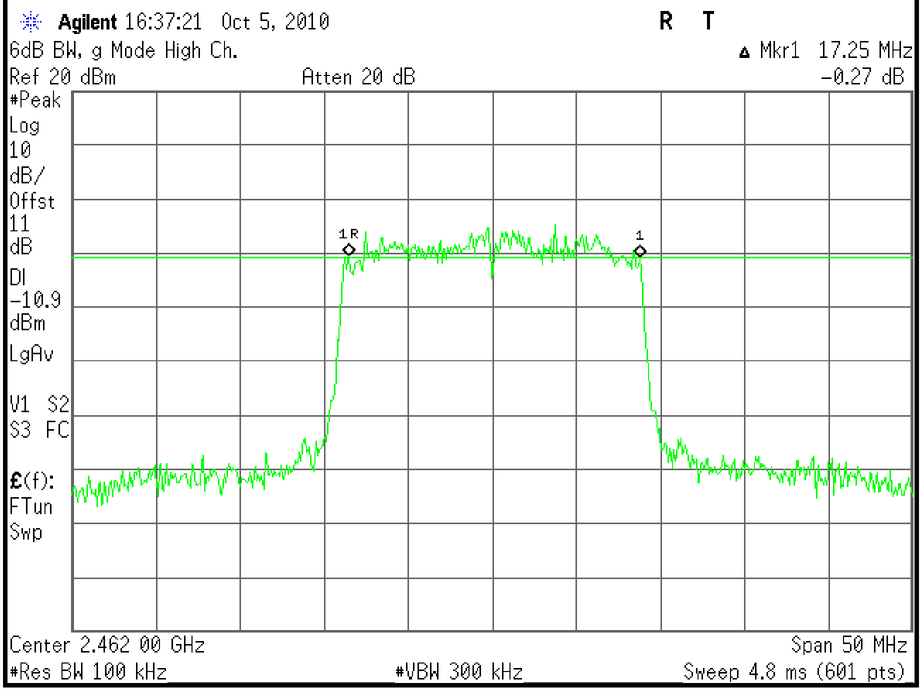
CH Low (IEEE 802.11n HT20 Mode / Chain 1)



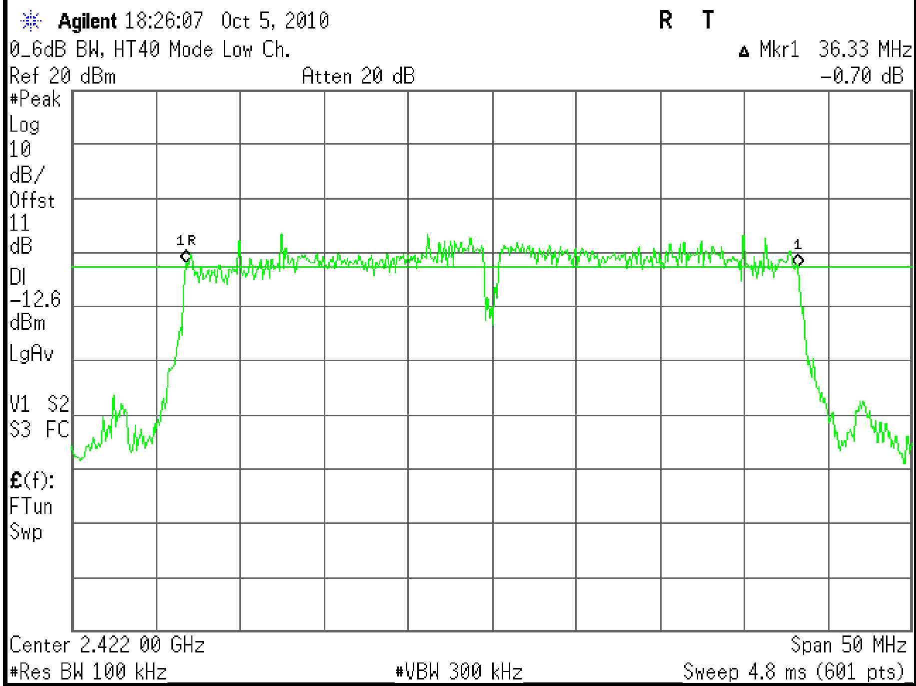
CH Middle (IEEE 802.11n HT20 Mode / Chain 1)



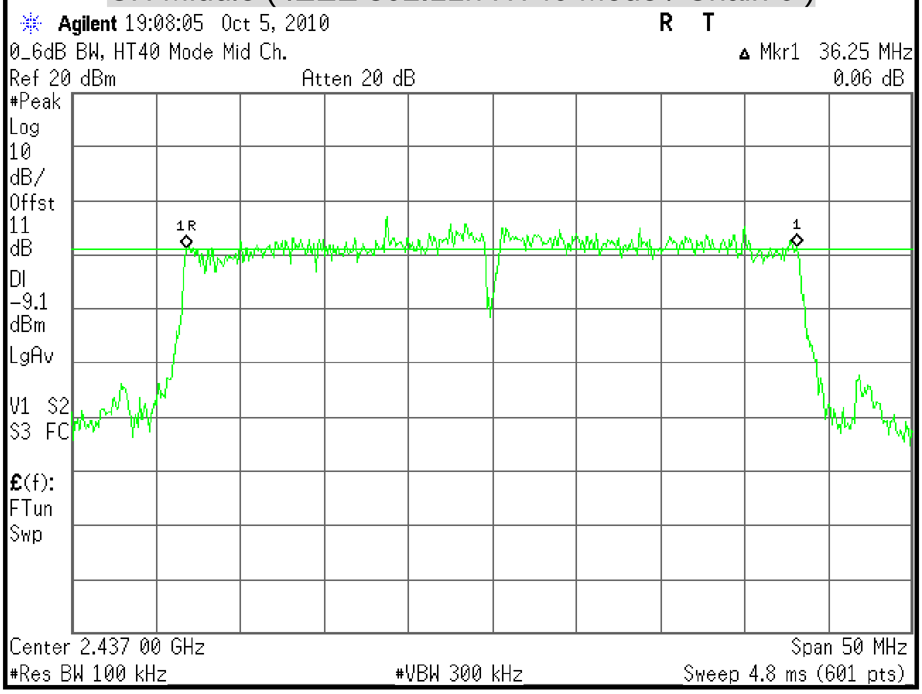
CH High (IEEE 802.11n HT20 Mode / Chain 1)



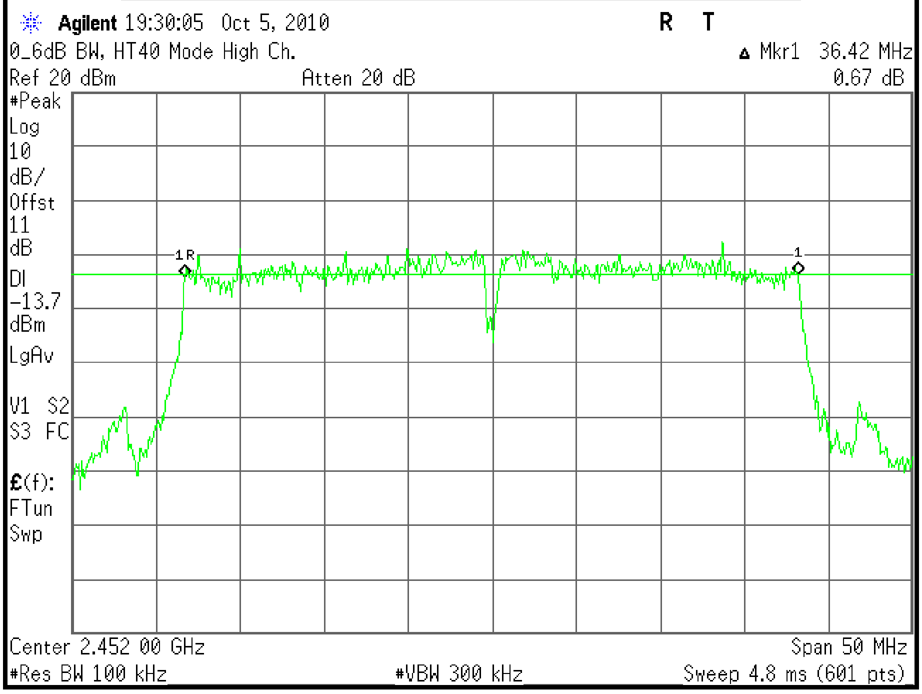
CH Low (IEEE 802.11n HT40 Mode / Chain 0)



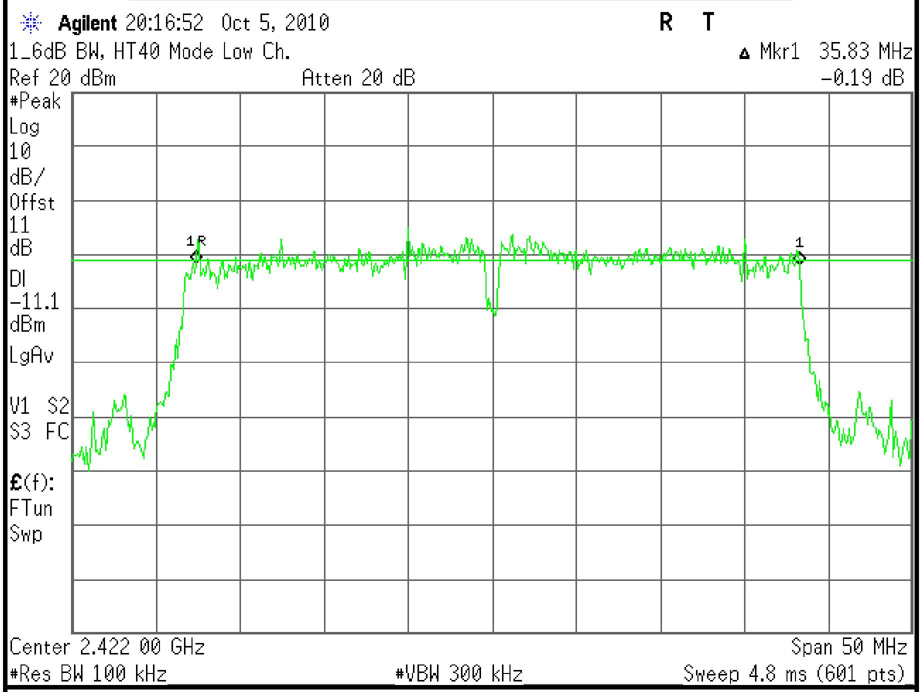
CH Middle (IEEE 802.11n HT40 Mode / Chain 0)



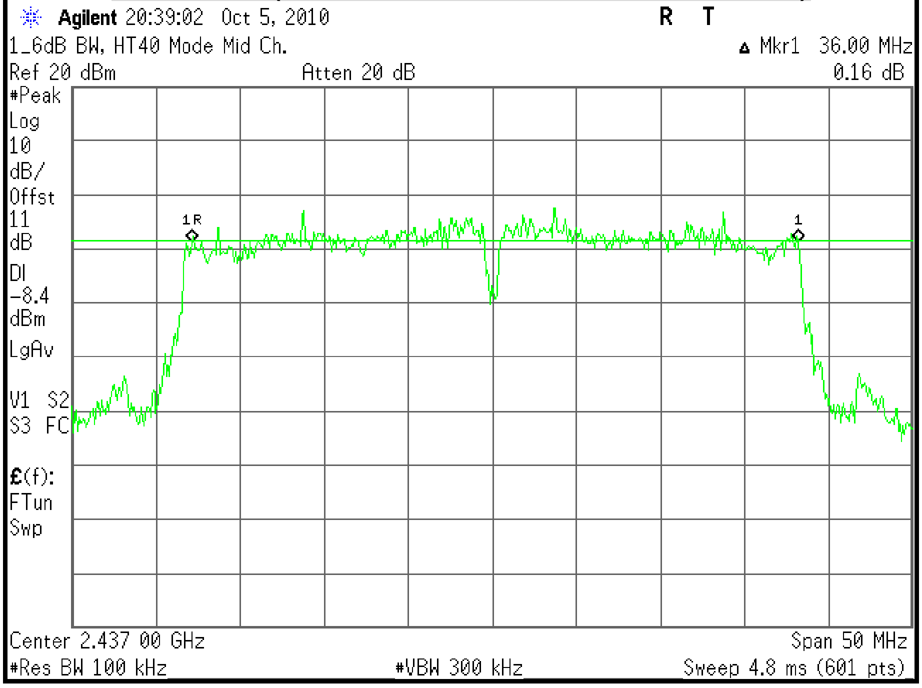
CH High (IEEE 802.11n HT40 Mode / Chain 0)



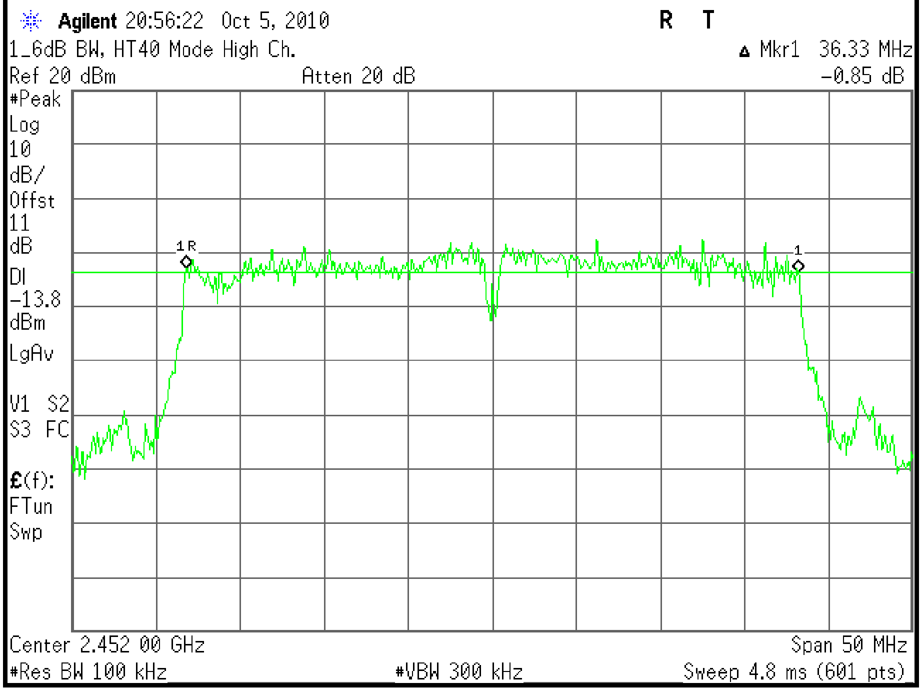
CH Low (IEEE 802.11n HT40 Mode / Chain 1)



CH Middle (IEEE 802.11n HT40 Mode / Chain 1)



CH High (IEEE 802.11n HT40 Mode / Chain 1)



7.2 MAXIMUM PEAK OUTPUT POWER

LIMITS

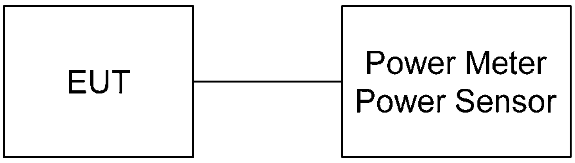
§ 15.247(b) The maximum peak output power of the intentional radiator shall not exceed the following :
§ 15.247(b) (3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands : 1 watt.
§ 15.247(b) (4) Except as shown in paragraphs (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (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 EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Power Meter	Anritsu	ML2495A	1012009	03/28/2011
Power Sensor	Agilent	E9327A	US40441097	09/16/2011

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

TEST SETUP



TEST PROCEDURE

The transmitter output is connected to the Power Meter. The Power Meter is set to the peak power detection.

TEST RESULTS

Total peak power calculation formula:
10 log (10^ (Chain 0 Power / 10) + 10^ (Chain 1 Power / 10)).

The maximum antenna gain is 2 dBi, therefore the limit is 30 dBm.
In the legacy mode, the effective antenna gain is 2 + 10 × Log (2) = 5.01 dBi.

IEEE 802.11b Mode

Channel	Channel Frequency (MHz)	Peak Power		Peak Power Limit		Pass / Fail
		(dBm)	(W)	(dBm)	(W)	
Low	2412	18.92	0.0780	30	1	PASS
Middle	2437	18.97	0.0789	30	1	PASS
High	2462	18.98	0.0791	30	1	PASS

Remark:
1. *At finial test to get the worst-case emission at 1Mbps.*
2. *This test item is test by CCS- Wugu.*

IEEE 802.11g Mode

Channel	Channel Frequency (MHz)	Peak Power		Peak Power Limit		Pass / Fail
		(dBm)	(W)	(dBm)	(W)	
Low	2412	19.89	0.0975	30	1	PASS
Middle	2437	22.19	0.1656	30	1	PASS
High	2462	18.78	0.0755	30	1	PASS

Remark:
1. *At finial test to get the worst-case emission at 6Mbps.*
2. *This test item is test by CCS- Wugu.*

IEEE 802.11n HT20 Mode (Two TX)

Channel	Channel Frequency (MHz)	Peak Power (dBm)		Peak Power Total		Peak Power Limit		Pass / Fail
		Chain 0	Chain 1	(dBm)	(W)	(dBm)	(W)	
Low	2412	19.36	19.21	22.30	0.1697	30	1	PASS
Middle	2437	22.51	22.25	25.39	0.3461	30	1	PASS
High	2462	17.06	16.66	19.87	0.0972	30	1	PASS

Remark:

1. *At finial test to get the worst-case emission at 6.5Mbps.*
2. *This test item is test by CCS- Wugu.*

IEEE 802.11n HT40 Mode (Two TX)

Channel	Channel Frequency (MHz)	Peak Power (dBm)		Peak Power Total		Peak Power Limit		Pass / Fail
		Chain 0	Chain 1	(dBm)	(W)	(dBm)	(W)	
Low	2422	18.46	17.89	21.19	0.1317	30	1	PASS
Middle	2437	21.26	21.11	24.20	0.2628	30	1	PASS
High	2452	15.97	16.77	19.40	0.0871	30	1	PASS

Remark:

1. *At finial test to get the worst-case emission at 13.5Mbps.*
2. *This test item is test by CCS- Wugu.*

7.3 AVERAGE POWER

LIMITS

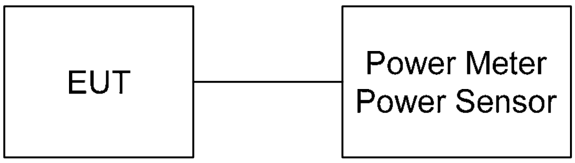
None; for reporting purposes only.

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Power Meter	Agilent	E4416A	GB41291611	06/27/2011
Power Sensor	Agilent	E9327A	US40441097	06/27/2011

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

TEST SETUP



TEST PROCEDURE

The transmitter output is connected to the Power Meter. The Power Meter is set to the peak power detection.

TEST RESULTS

Total avg power calculation formula:
10 log (10^ (Chain 0 Power / 10) + 10^ (Chain 1 Power / 10)).

IEEE 802.11b Mode

Channel	Channel Frequency (MHz)	Average Power Output (dBm)
Low	2412	15.06
Middle	2437	15.18
High	2462	15.21

Remark:

1. *At finial test to get the worst-case emission at 1Mbps.*
2. *This test item is test by CCS- Wugu.*

IEEE 802.11g Mode

Channel	Channel Frequency (MHz)	Average Power Output (dBm)
Low	2412	9.41
Middle	2437	12.24
High	2462	8.55

Remark:

1. *At finial test to get the worst-case emission at 6Mbps.*
2. *This test item is test by CCS- Wugu.*

IEEE 802.11n HT20 Mode (Two TX)

Channel	Channel Frequency (MHz)	Average Power Output (dBm)		Peak Power Total (dBm)
		Chain 0	Chain 1	
Low	2412	9.41	8.96	12.20
Middle	2437	11.97	11.68	14.84
High	2462	5.97	6.28	9.14

Remark:

1. *At finial test to get the worst-case emission at 6.5Mbps.*
2. *This test item is test by CCS- Wugu.*

IEEE 802.11n HT40 Mode (Two TX)

Channel	Channel Frequency (MHz)	Average Power Output (dBm)		Peak Power Total (dBm)
		Chain 0	Chain 1	
Low	2422	7.40	6.89	10.16
Middle	2437	10.22	10.17	13.21
High	2452	5.06	6.54	8.87

Remark:

1. *At finial test to get the worst-case emission at 13.5Mbps.*
2. *This test item is test by CCS- Wugu.*

7.4 POWER SPECTRAL DENSITY

LIMITS

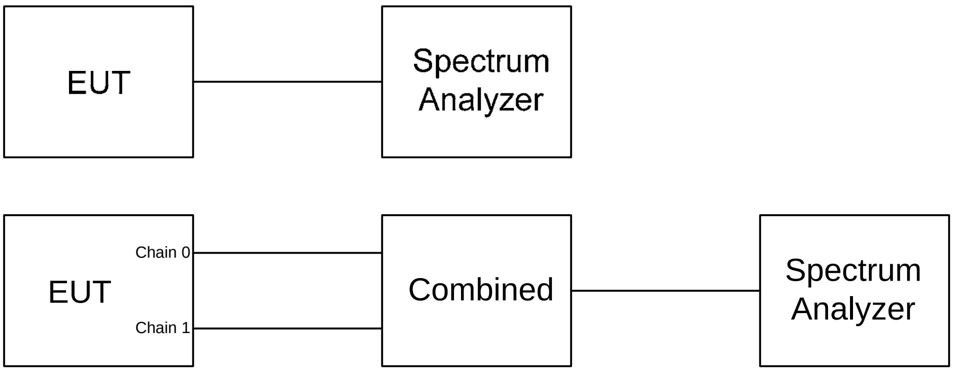
§ 15.247(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	AGILENT	E4446A	MY43360132	06/20/2011
Spectrum Analyzer	AGILENT	E4446A	MY46180323	05/02/2011

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

TEST SETUP



TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using RBW＝3KHz and VBW≧RBW, set sweep time＝span / 3KHz.

The power spectral density was measured and recorded.

The sweep time is allowed to be longer than span / 3KHz for a full response of the mixer in the spectrum analyzer.

TEST RESULTS

Total power spectral density calculation formula:

10 log (10^ (Chain 0 PPSD / 10) + 10^ (Chain 1 PPSD / 10)).

IEEE 802.11b Mode

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)	Minimum Limit (dBm)	Pass / Fail
Low	2412	-6.98	8	PASS
Middle	2437	-4.05	8	PASS
High	2462	-5.78	8	PASS

Remark:

1. *At finial test to get the worst-case emission at 1Mbps.*
2. *The cable assembly insertion loss of 11dB (including 10 dB pad and 1 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

IEEE 802.11g Mode

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)	Minimum Limit (dBm)	Pass / Fail
Low	2412	-11.73	8	PASS
Middle	2437	-10.54	8	PASS
High	2462	-12.91	8	PASS

Remark:

1. *At finial test to get the worst-case emission at 6Mbps.*
2. *The cable assembly insertion loss of 11dB (including 10 dB pad and 1 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

IEEE 802.11n HT20 Mode (Two TX)

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)		PPSD Total (dBm)	Minimum Limit (dBm)	Pass / Fail
		Chain 0	Chain 1			
Low	2412	-11.26	-12.90	-8.99	8	PASS
Middle	2437	-8.99	-9.77	-6.35	8	PASS
High	2462	-13.81	-15.96	-11.74	8	PASS

Remark:
1. *At finial test to get the worst-case emission at 6.5Mbps.*
2. *The cable assembly insertion loss of 11dB (including 10 dB pad and 1 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

IEEE 802.11n HT20 Combined Mode (Two TX)

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)	Minimum Limit (dBm)	Pass / Fail
Low	2412	-8.93	8	PASS
Middle	2437	-6.21	8	PASS
High	2462	-11.94	8	PASS

Remark:
1. *At finial test to get the worst-case emission at 6.5Mbps.*
2. *The cable assembly insertion loss of 14.1dB (including 10 dB pad + Combiner 3.1 dB + 1 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

IEEE 802.11n HT40 Mode (Two TX)

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)		PPSD Total (dBm)	Minimum Limit (dBm)	Pass / Fail
		Chain 0	Chain 1			
Low	2422	-14.09	-6.57	-5.86	8	PASS
Middle	2437	-10.61	-15.62	-9.42	8	PASS
High	2452	-14.77	-17.87	-13.04	8	PASS

Remark:

1. *At finial test to get the worst-case emission at 13.5Mbps.*
2. *The cable assembly insertion loss of 11dB (including 10 dB pad and 1 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

IEEE 802.11n HT40 Combined Mode (Two TX)

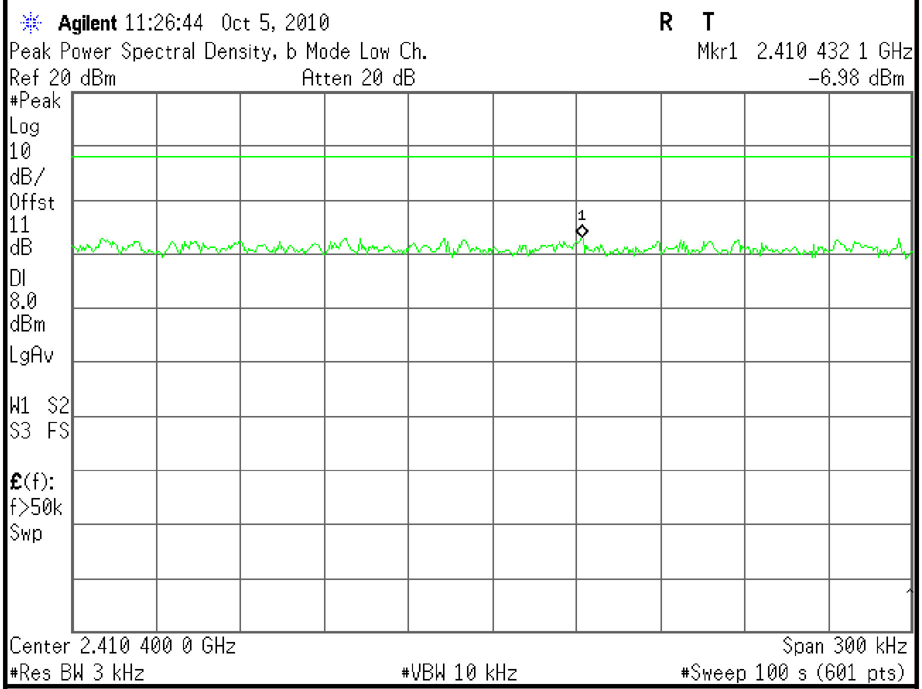
Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)	Minimum Limit (dBm)	Pass / Fail
Low	2422	-14.42	8	PASS
Middle	2437	-10.48	8	PASS
High	2452	-13.95	8	PASS

Remark:

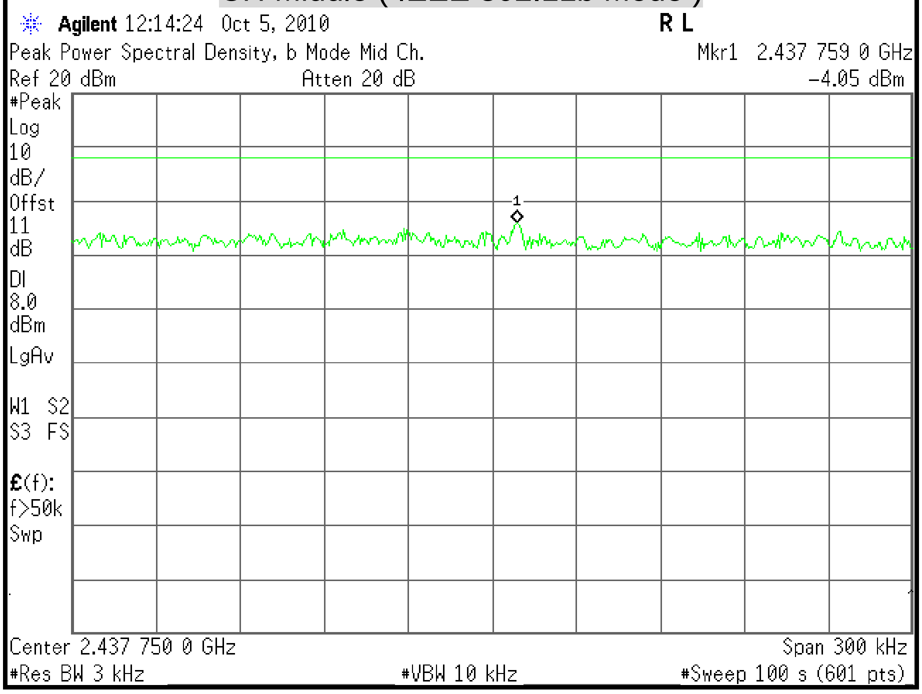
1. *At finial test to get the worst-case emission at 13.5Mbps.*
2. *The cable assembly insertion loss of 14.1dB (including 10 dB pad + Combiner 3.1 dB + 1 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

POWER SPECTRAL DENSITY

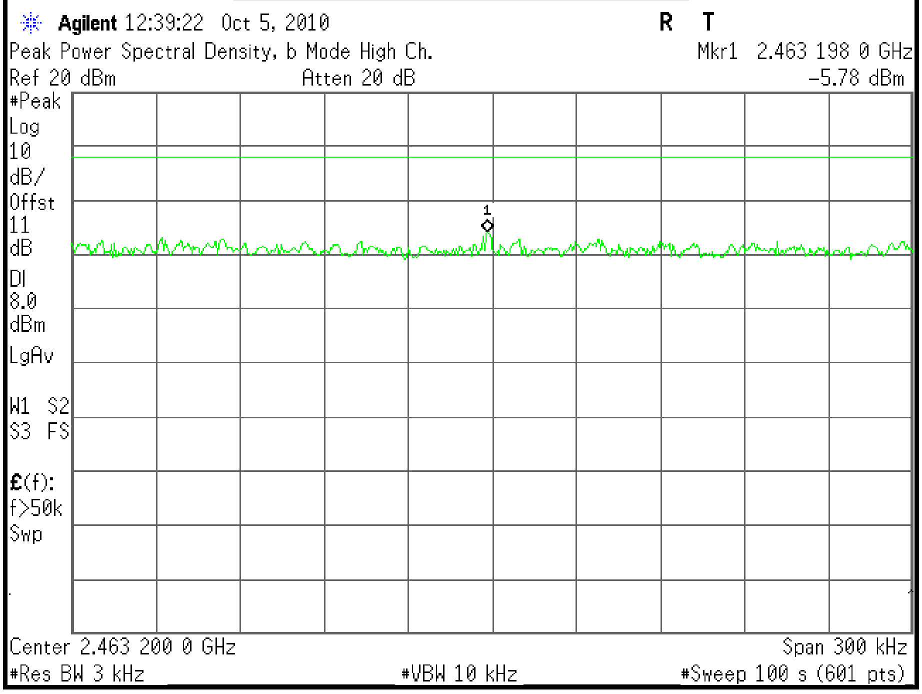
CH Low (IEEE 802.11b Mode)



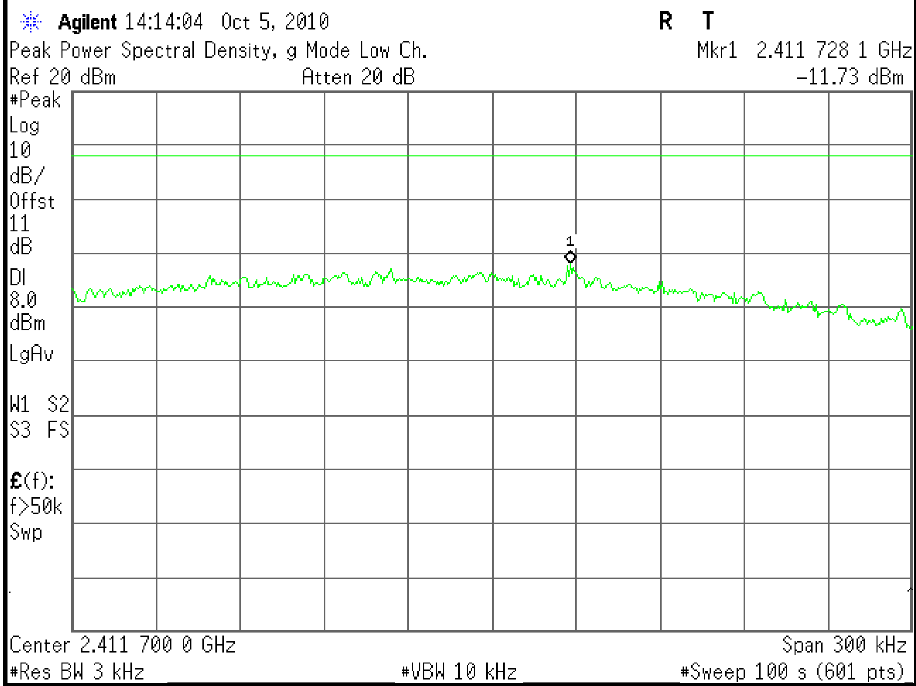
CH Middle (IEEE 802.11b Mode)



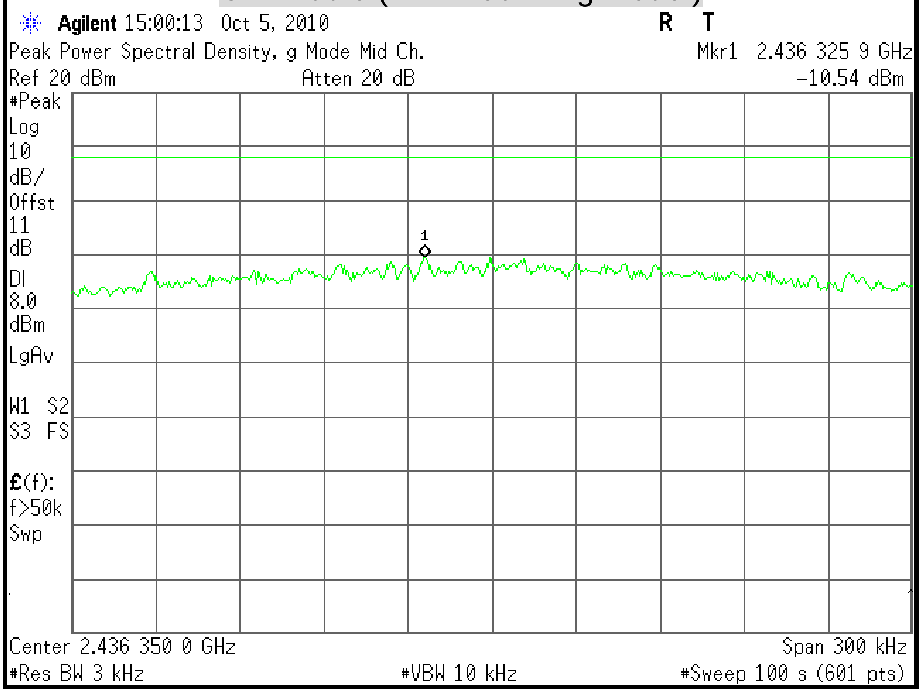
CH High (IEEE 802.11b Mode)



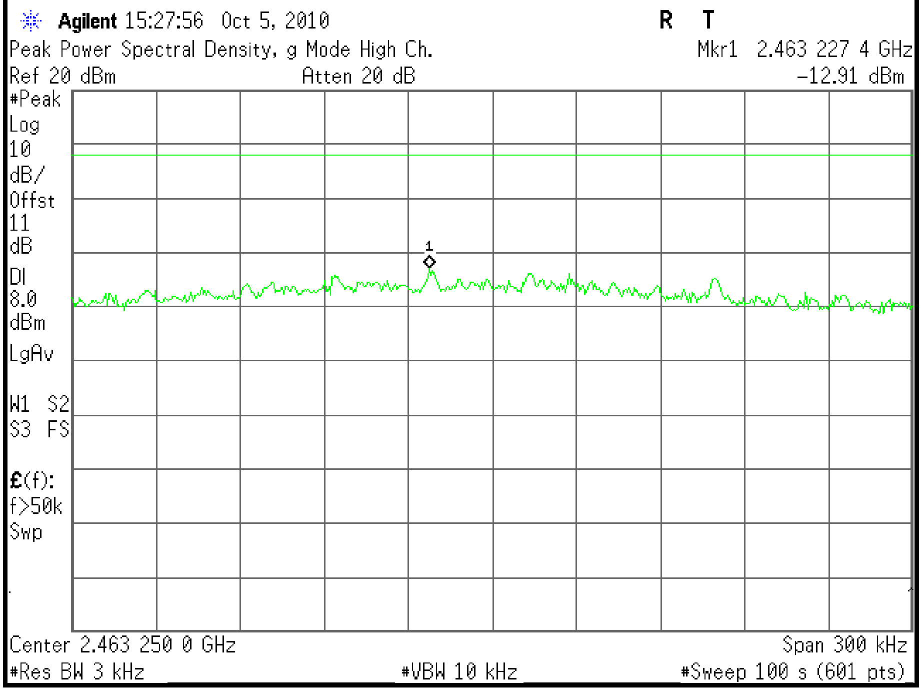
CH Low (IEEE 802.11g Mode)



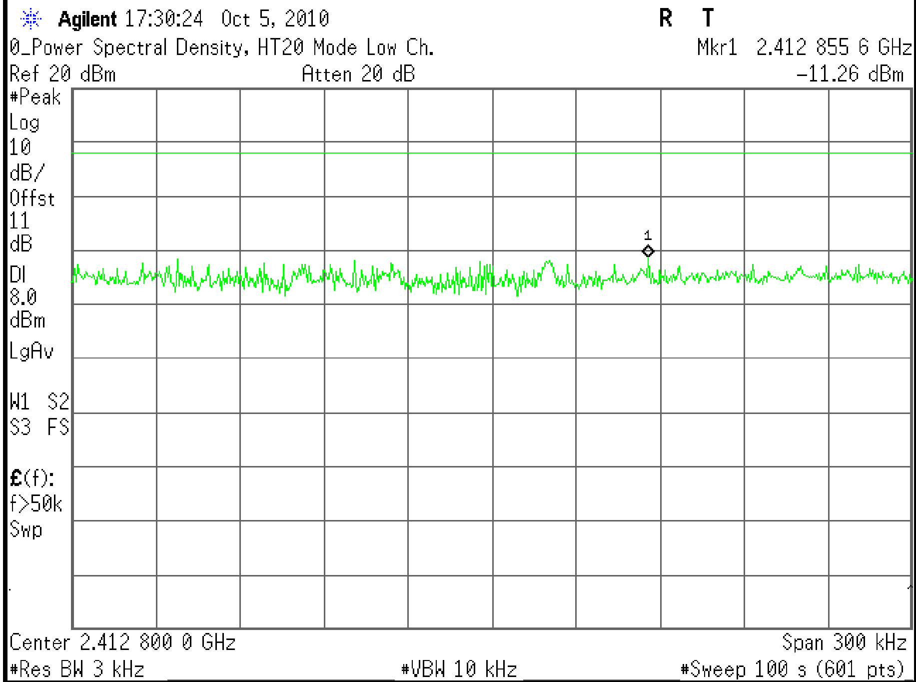
CH Middle (IEEE 802.11g Mode)



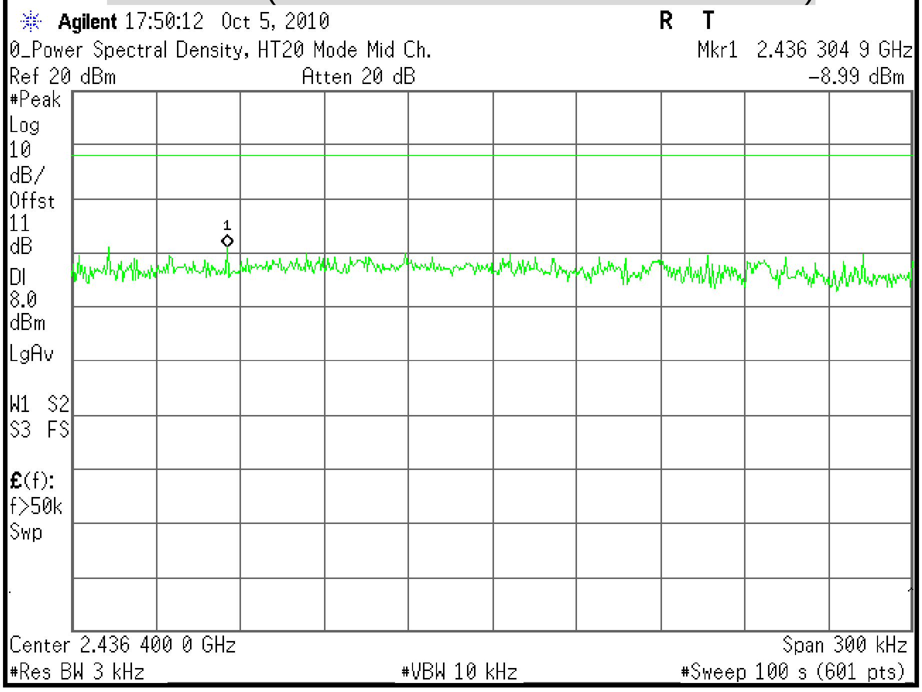
CH High (IEEE 802.11g Mode)



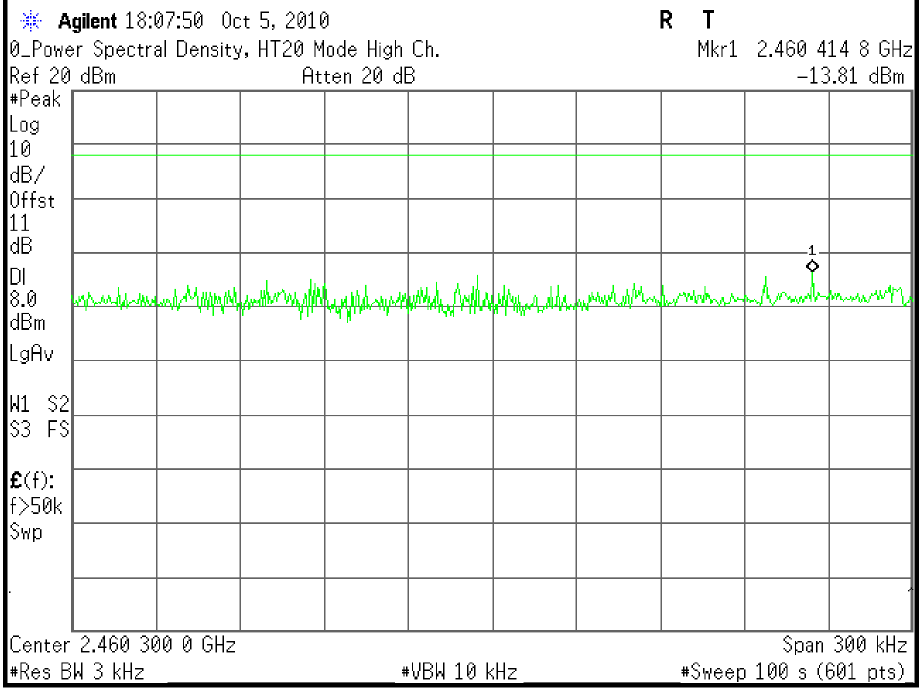
CH Low (IEEE 802.11n HT20 Mode / Chain 0)



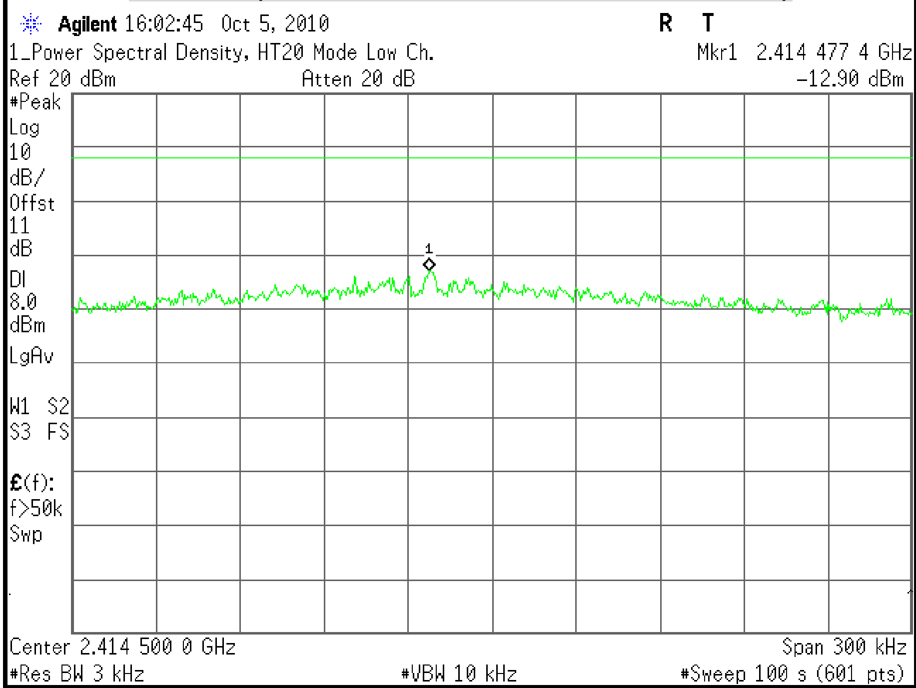
CH Middle (IEEE 802.11n HT20 Mode / Chain 0)



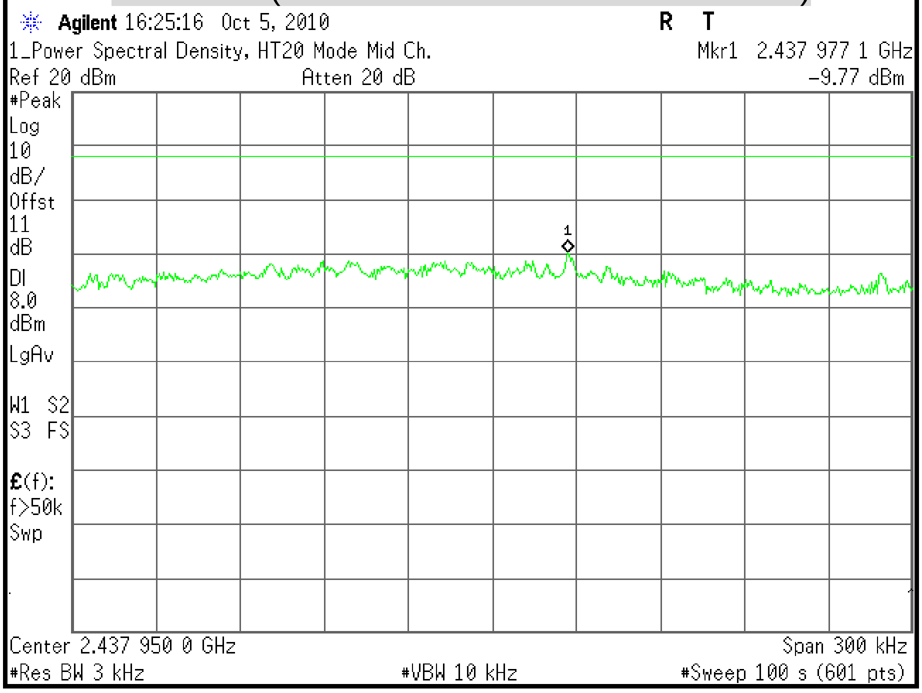
CH High (IEEE 802.11n HT20 Mode / Chain 0)



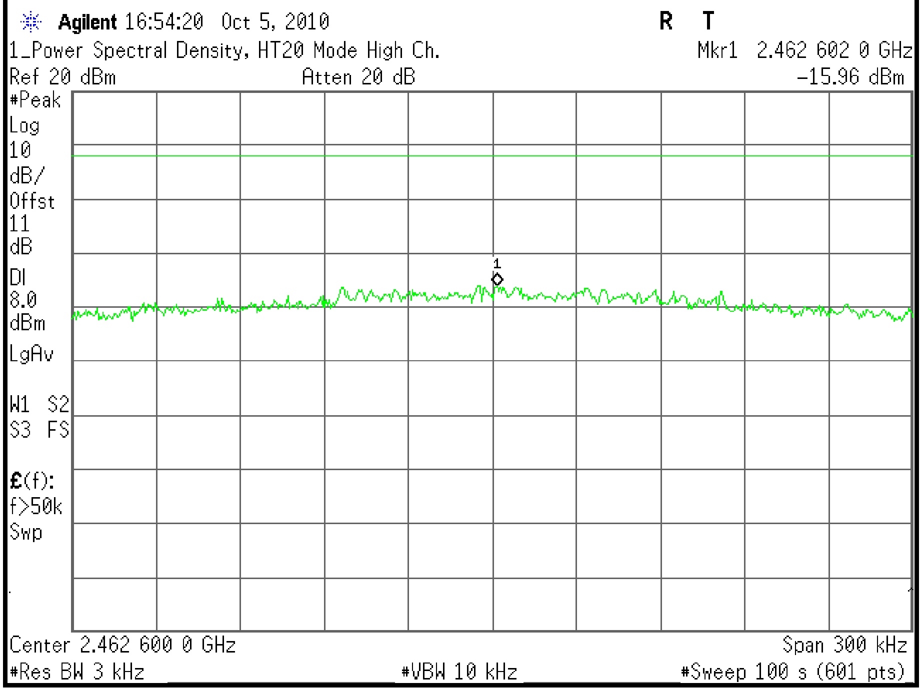
CH Low (IEEE 802.11n HT20 Mode / Chain 1)



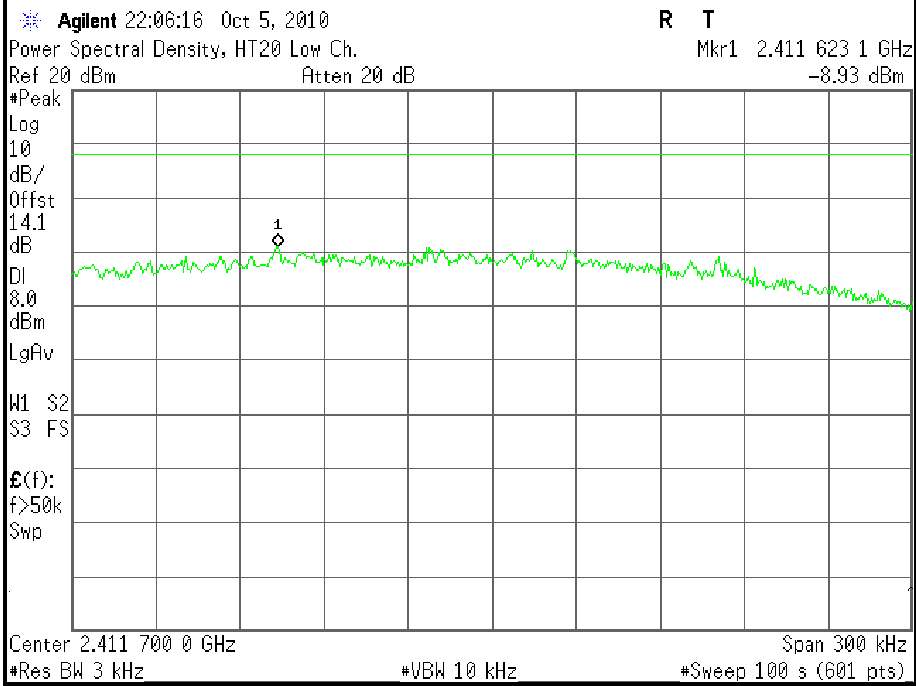
CH Middle (IEEE 802.11n HT20 Mode / Chain 1)



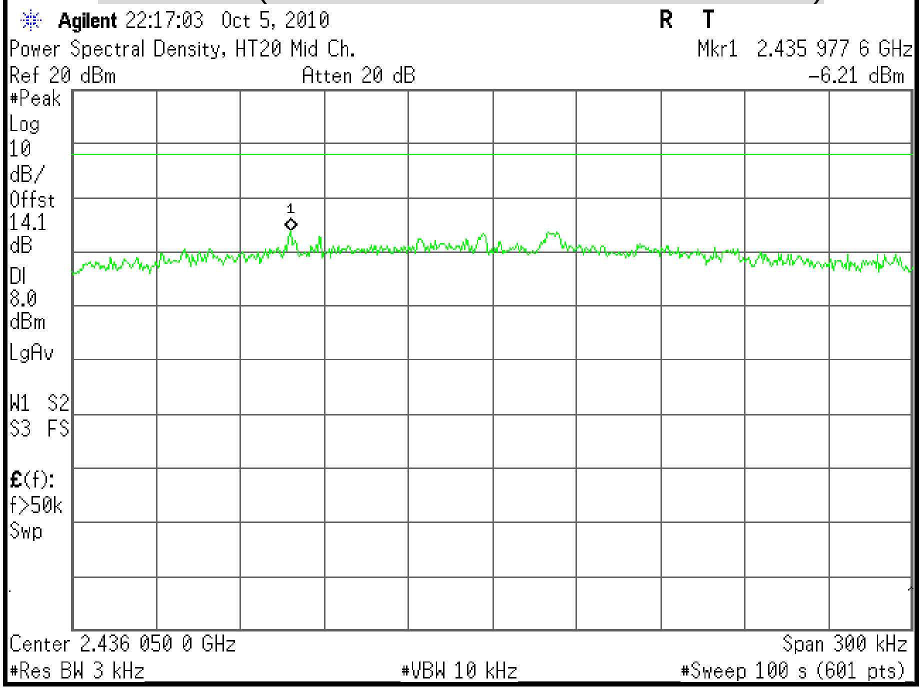
CH High (IEEE 802.11n HT20 Mode / Chain 1)



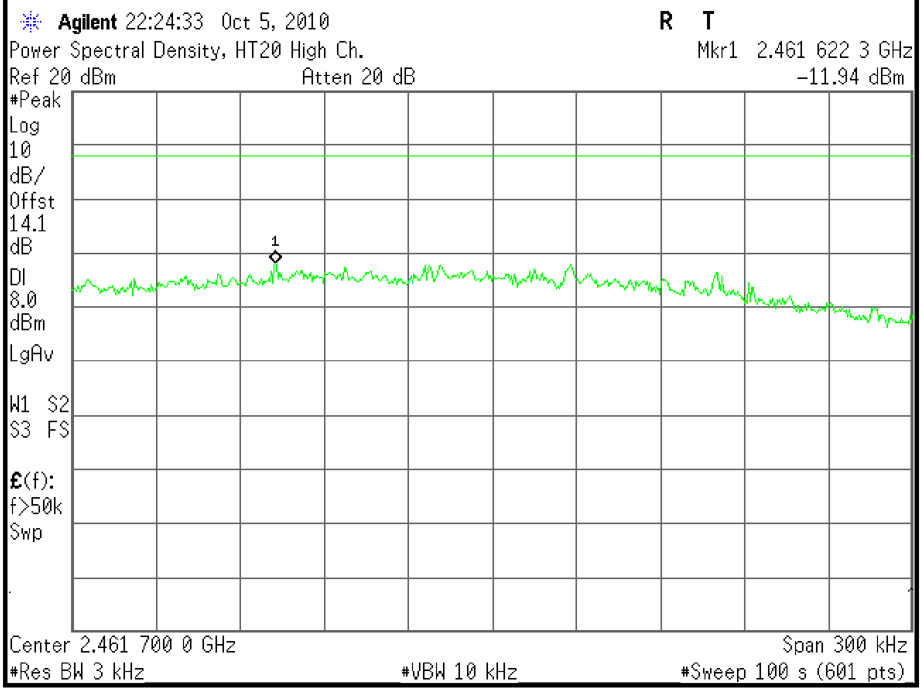
CH Low (IEEE 802.11n HT20 Combined Mode)



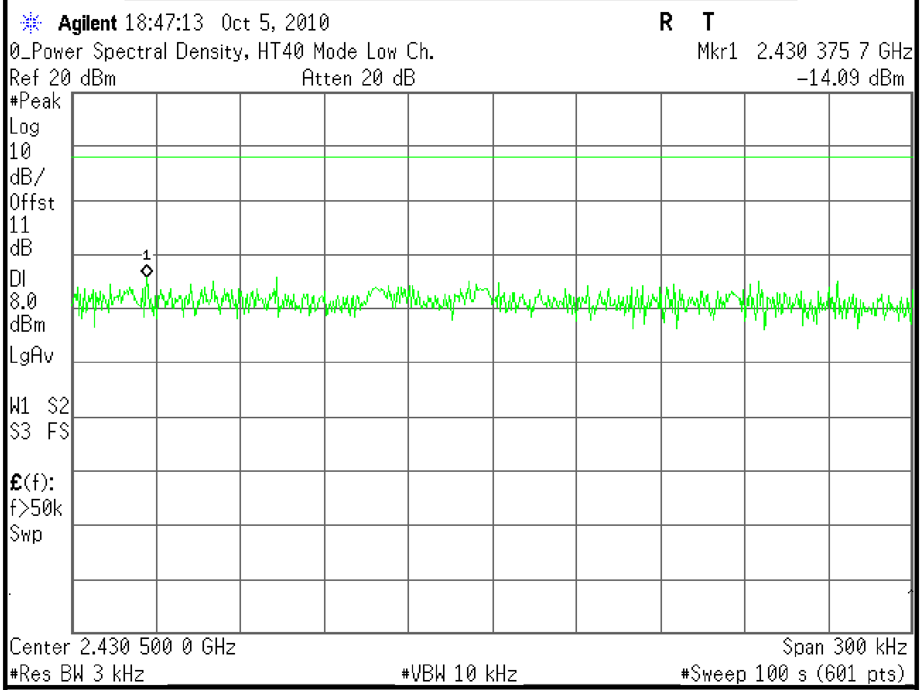
CH Middle (IEEE 802.11n HT20 Combined Mode)



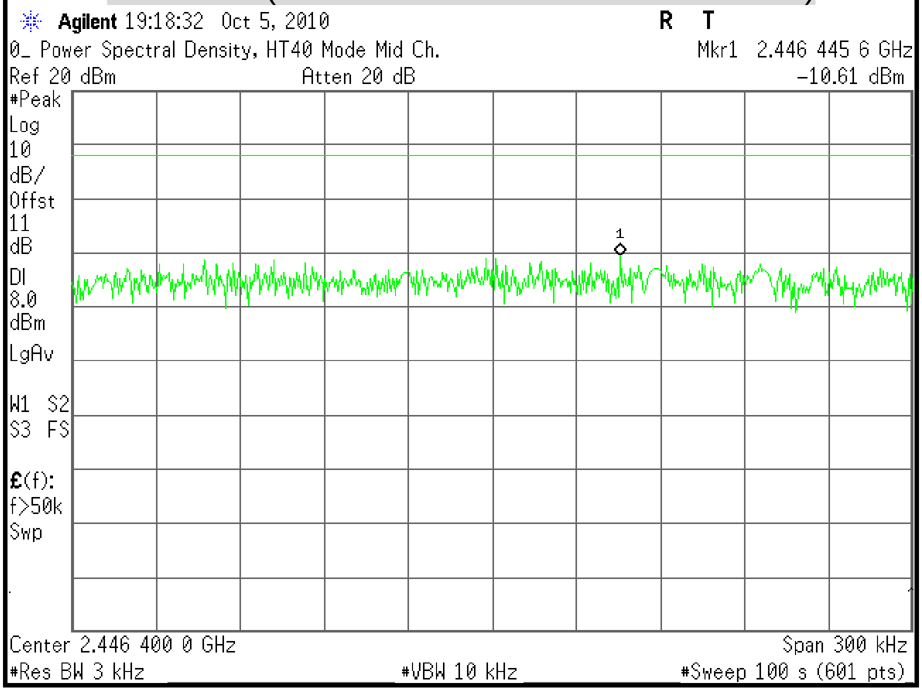
CH High (IEEE 802.11n HT20 Combined Mode)



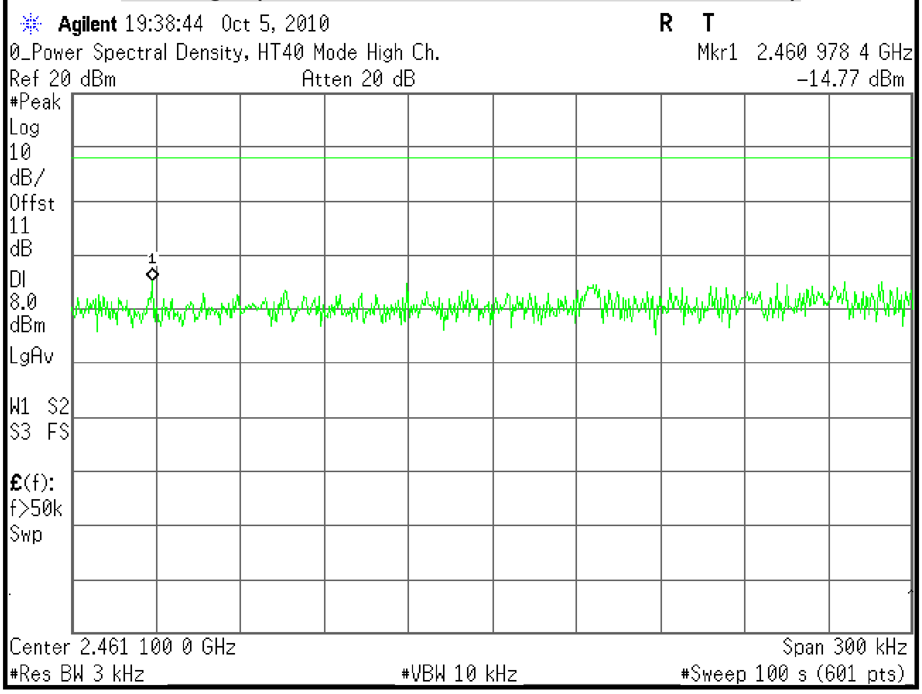
CH Low (IEEE 802.11n HT40 Mode / Chain 0)



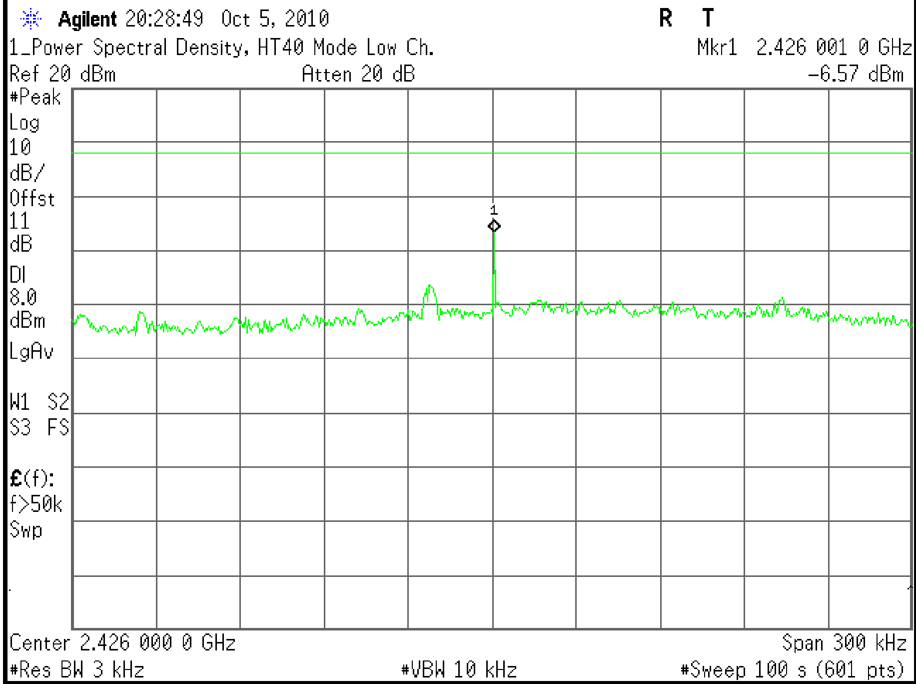
CH Middle (IEEE 802.11n HT40 Mode / Chain 0)



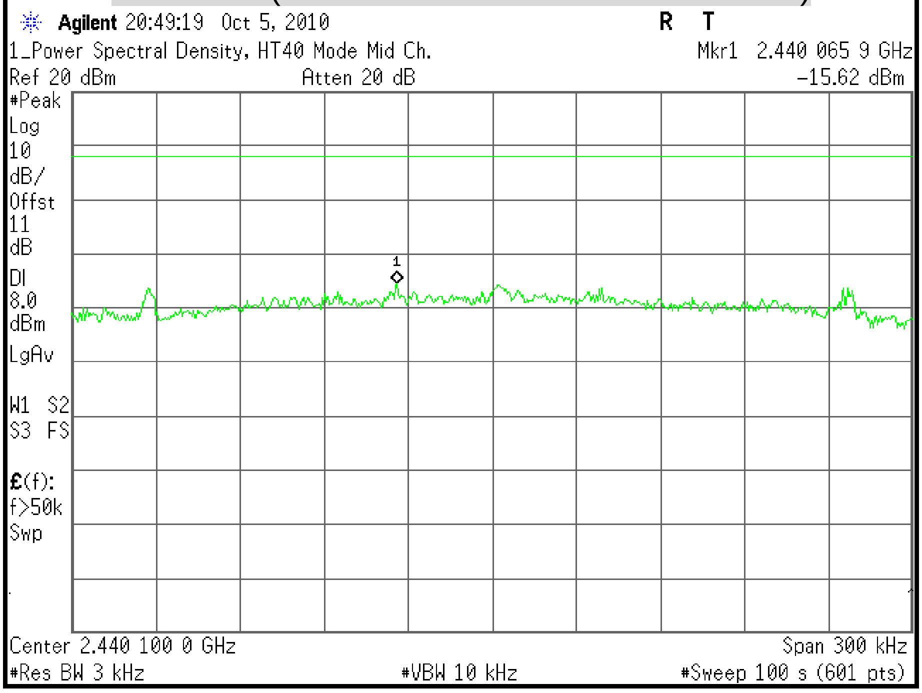
CH High (IEEE 802.11n HT40 Mode / Chain 0)



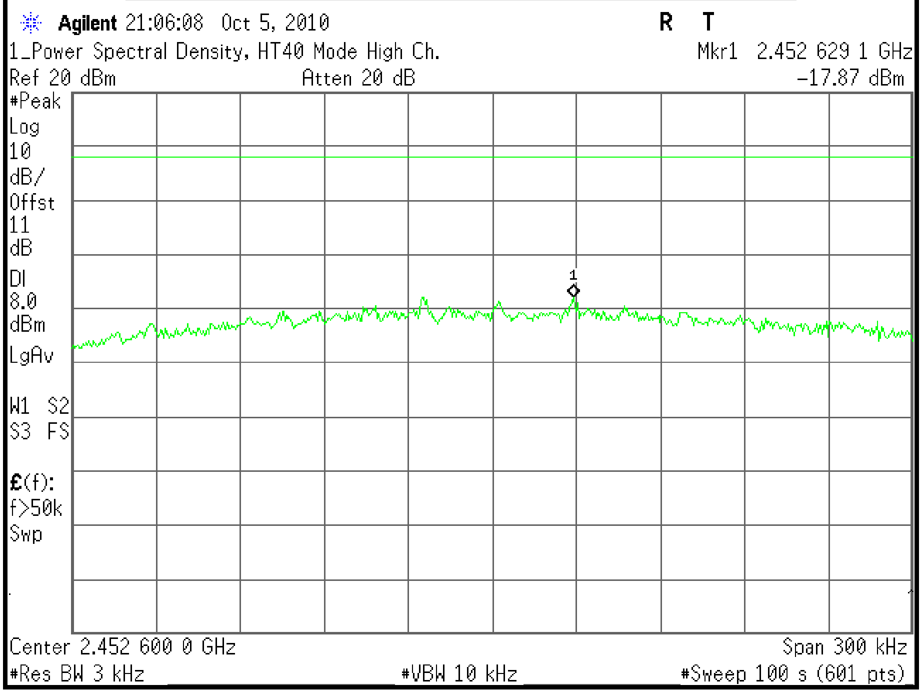
CH Low (IEEE 802.11n HT40 Mode / Chain 1)



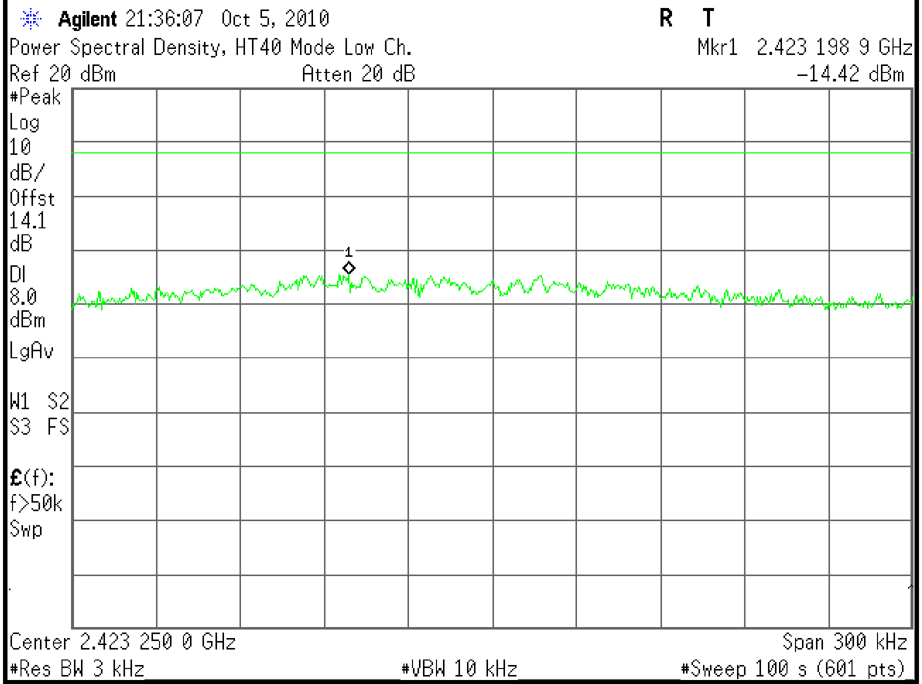
CH Middle (IEEE 802.11n HT40 Mode / Chain 1)



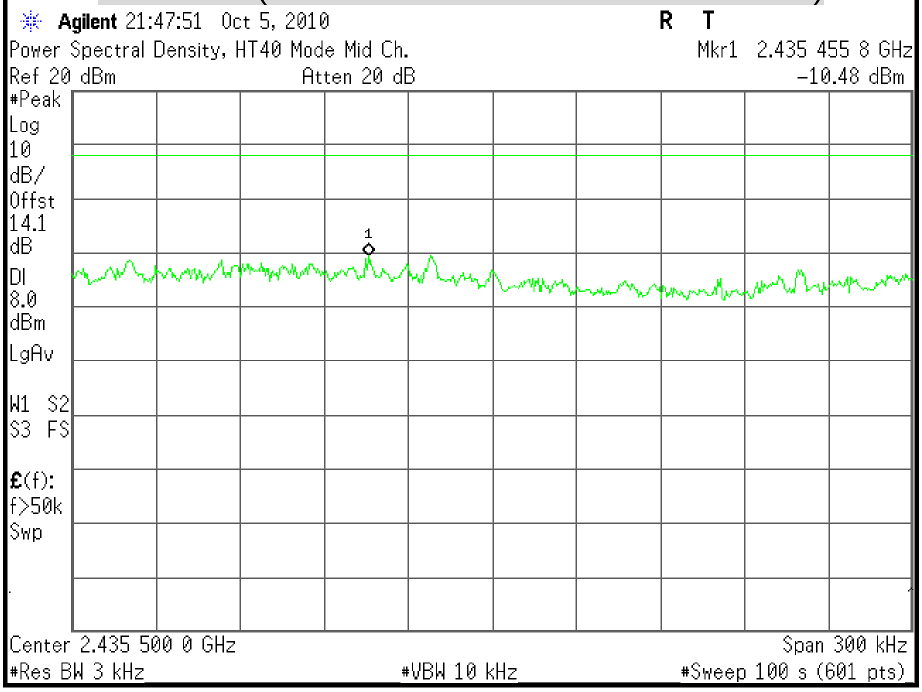
CH High (IEEE 802.11n HT40 Mode / Chain 1)



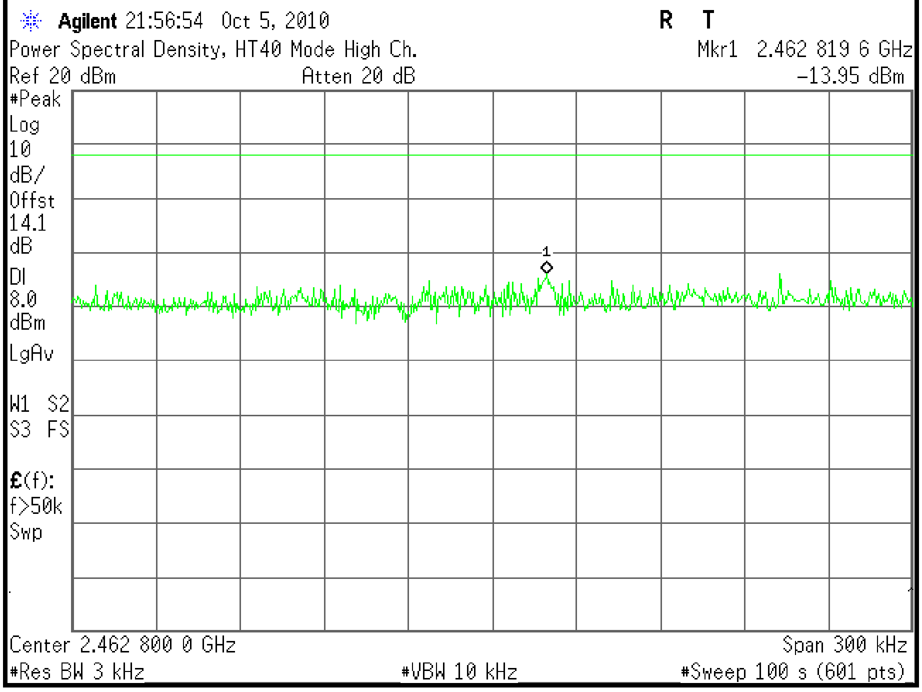
CH Low (IEEE 802.11n HT40 Combined Mode)



CH Middle (IEEE 802.11n HT40 Combined Mode)



CH High (IEEE 802.11n HT40 Combined Mode)



7.5 CONDUCTED SPURIOUS EMISSION

LIMITS

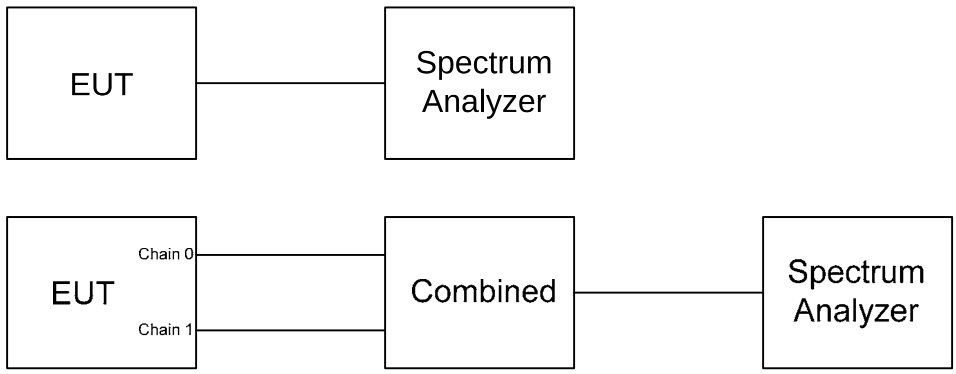
§ 15.247(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the and that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in § 15.209(a) is not required. 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 § 15.205(c)).

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	AGILENT	E4446A	MY43360132	06/20/2011
Spectrum Analyzer	AGILENT	E4446A	MY46180323	05/02/2011

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

TEST SETUP



TEST PROCEDURE

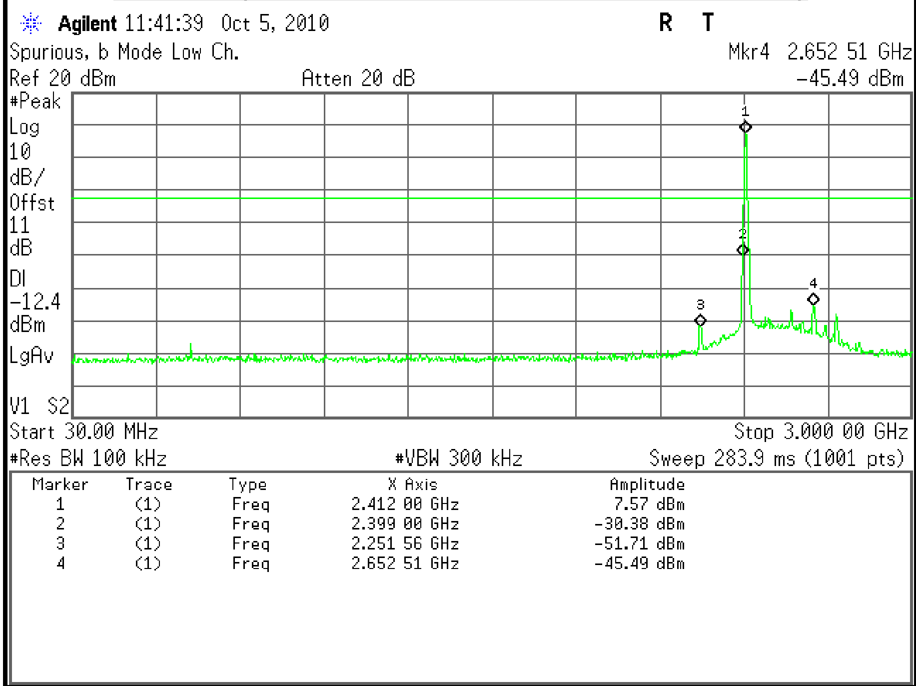
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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.

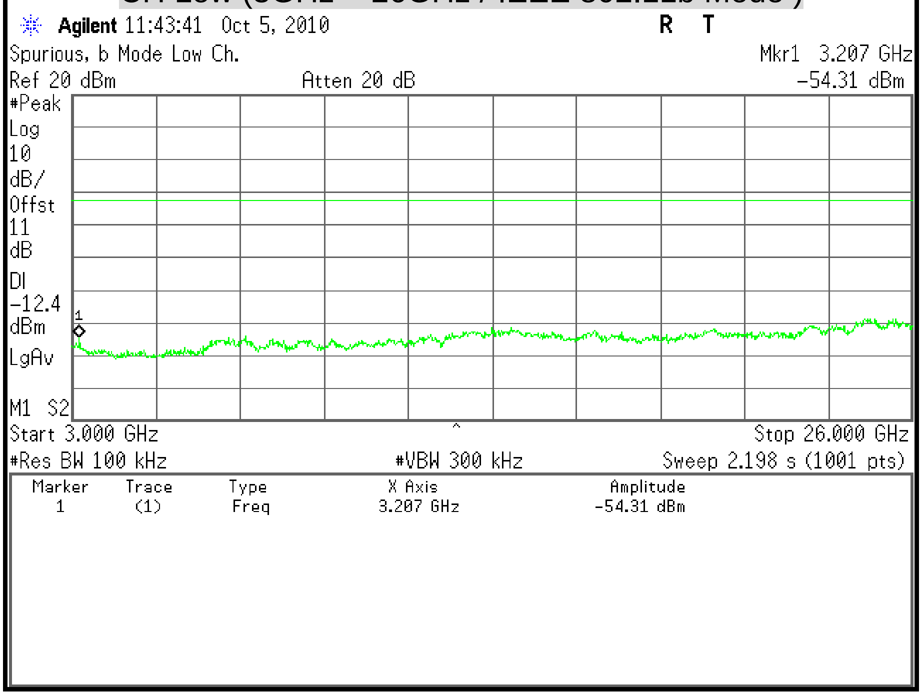
TEST RESULTS

OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT

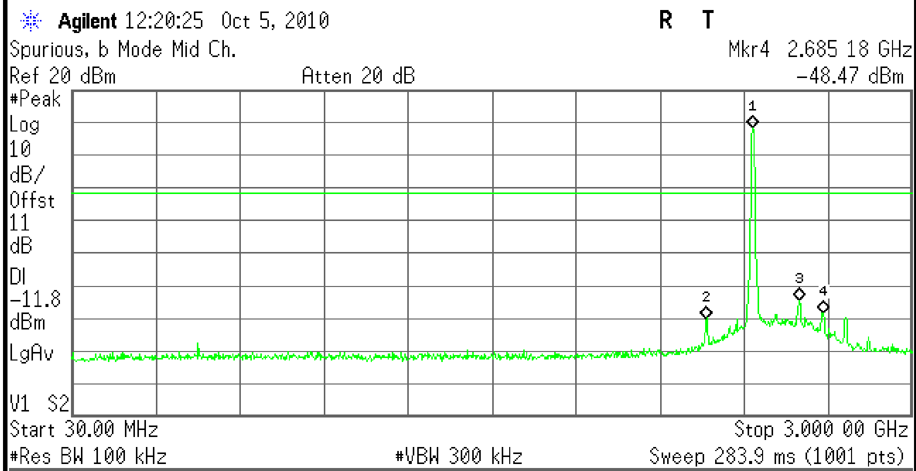
CH Low (30MHz ~ 3GHz / IEEE 802.11b Mode)



CH Low (3GHz ~ 26GHz / IEEE 802.11b Mode)

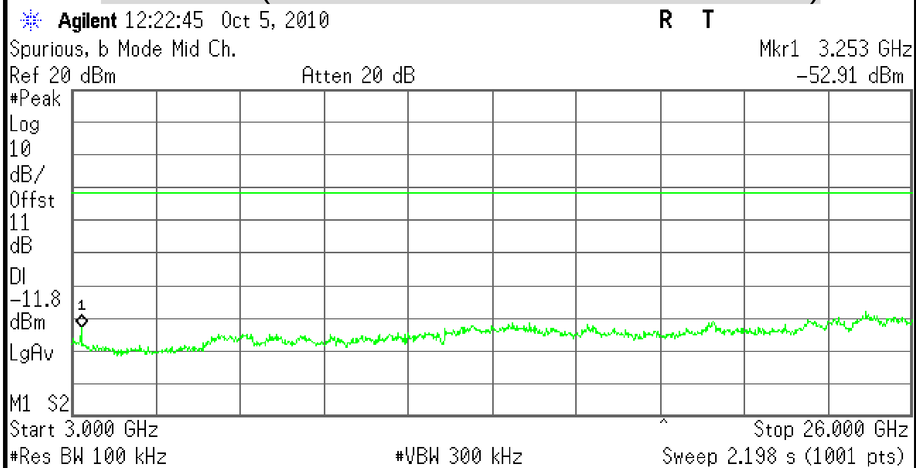


CH Middle (30MHz ~ 3GHz / IEEE 802.11b Mode)



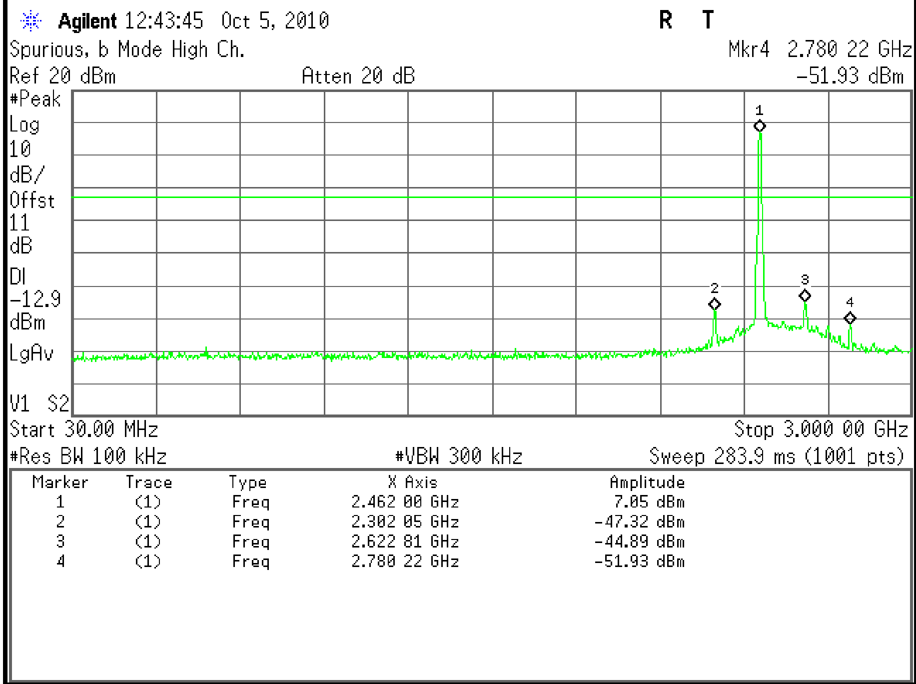
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.437 00 GHz	8.23 dBm
2	(1)	Freq	2.272 35 GHz	-50.35 dBm
3	(1)	Freq	2.602 02 GHz	-44.56 dBm
4	(1)	Freq	2.685 18 GHz	-48.47 dBm

CH Middle (3GHz ~ 26GHz / IEEE 802.11b Mode)

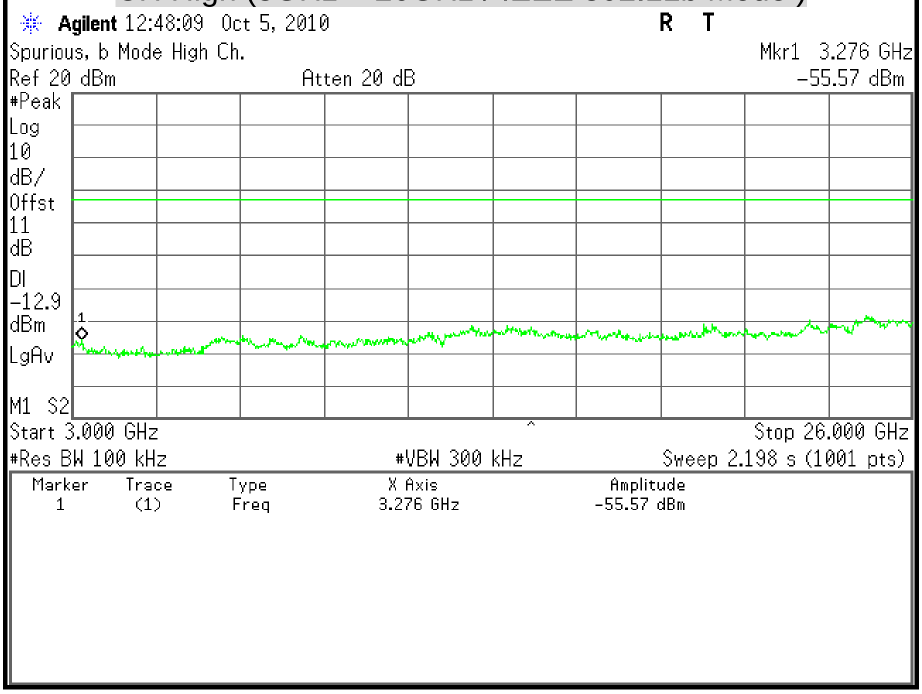


Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	3.253 GHz	-52.91 dBm

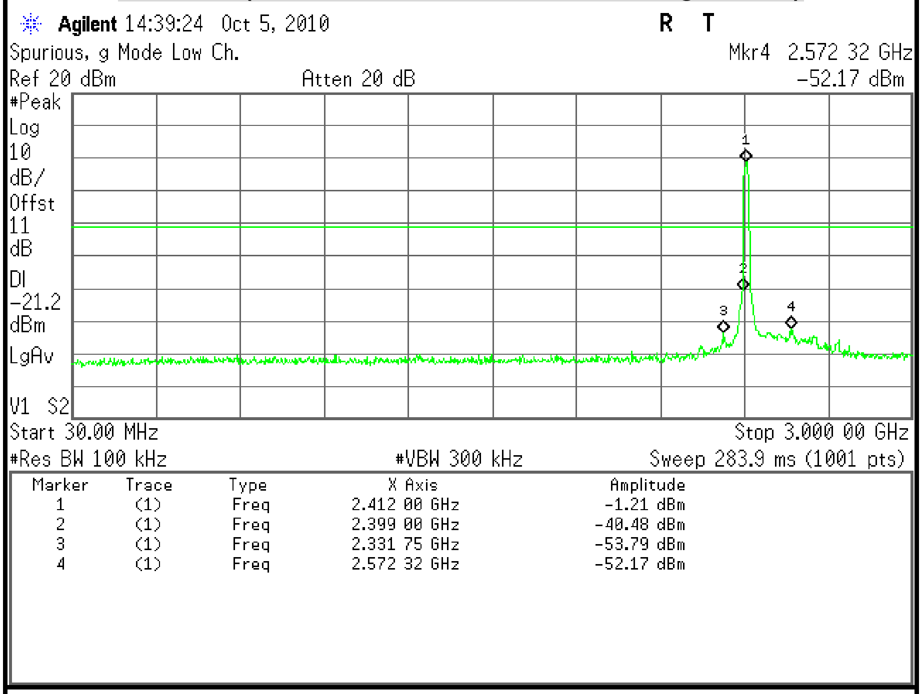
CH High (30MHz ~ 3GHz / IEEE 802.11b Mode)



CH High (3GHz ~ 26GHz / IEEE 802.11b Mode)

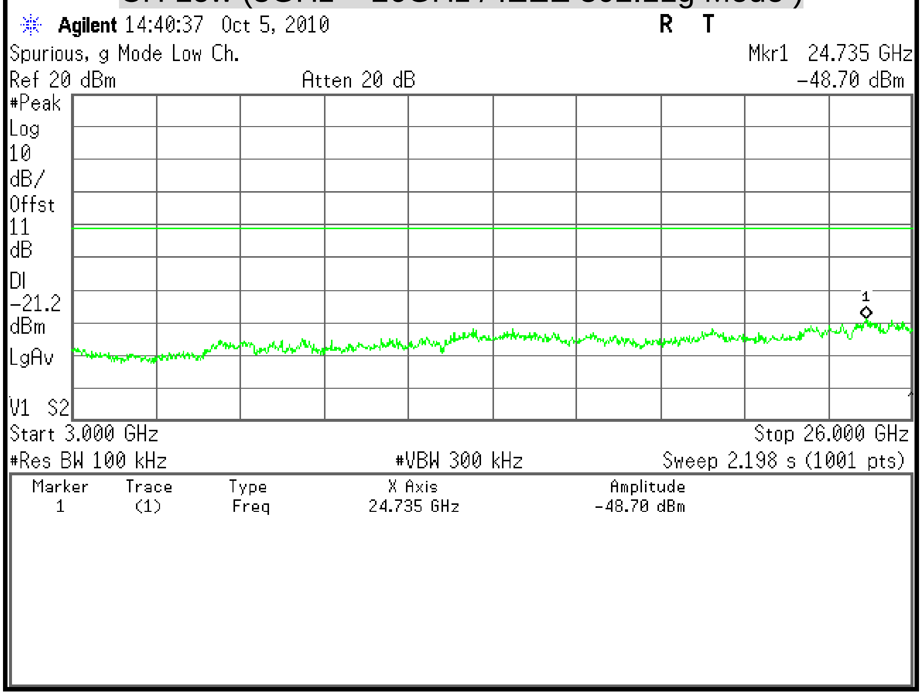


CH Low (30MHz ~ 3GHz / IEEE 802.11g Mode)



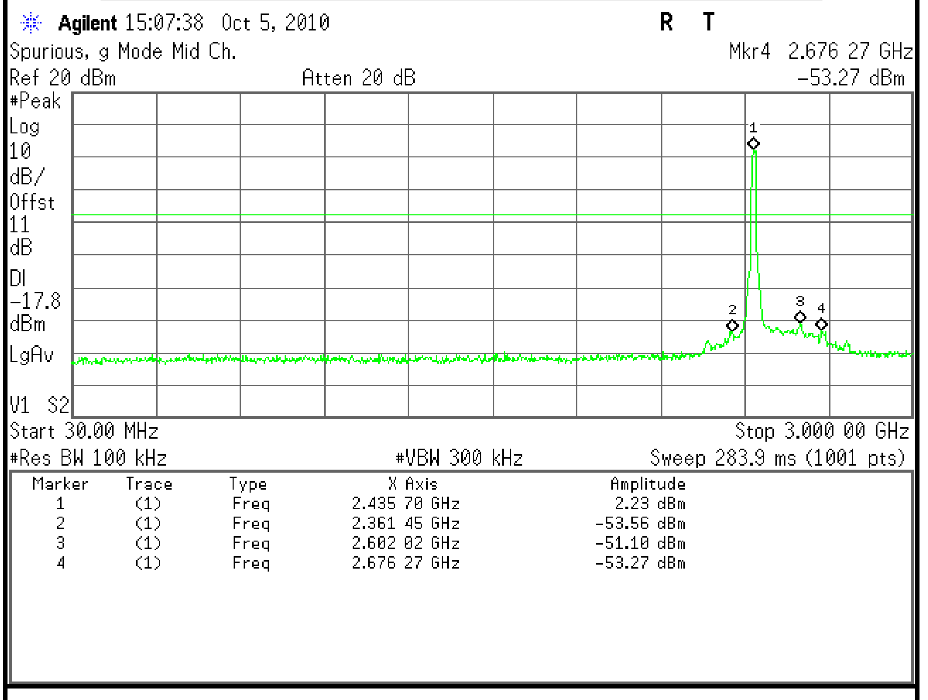
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.412 00 GHz	-1.21 dBm
2	(1)	Freq	2.399 00 GHz	-40.48 dBm
3	(1)	Freq	2.331 75 GHz	-53.79 dBm
4	(1)	Freq	2.572 32 GHz	-52.17 dBm

CH Low (3GHz ~ 26GHz / IEEE 802.11g Mode)

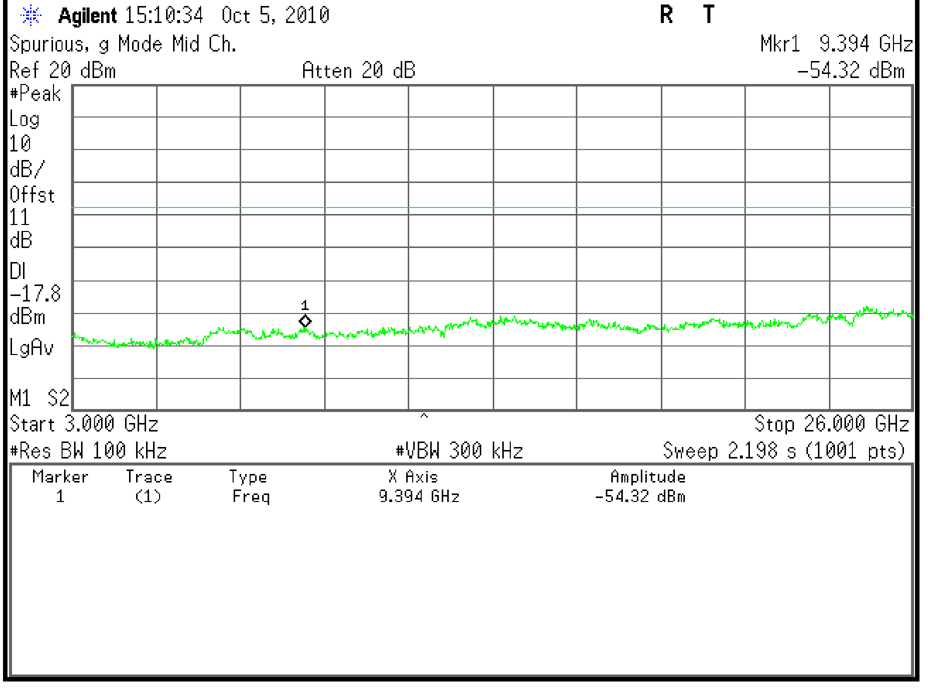


Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	24.735 GHz	-48.70 dBm

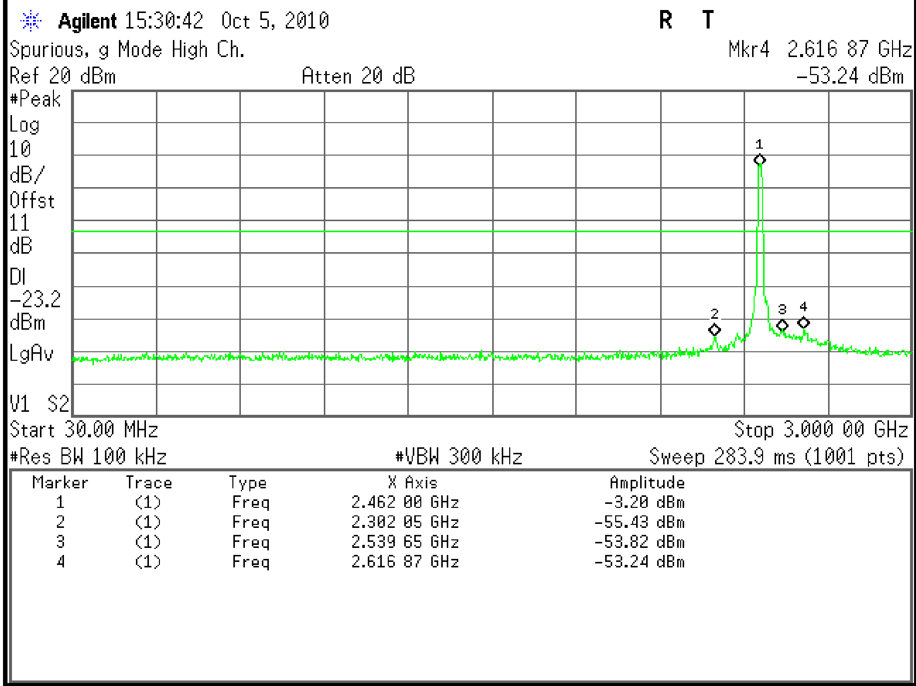
CH Middle (30MHz ~ 3GHz / IEEE 802.11g Mode)



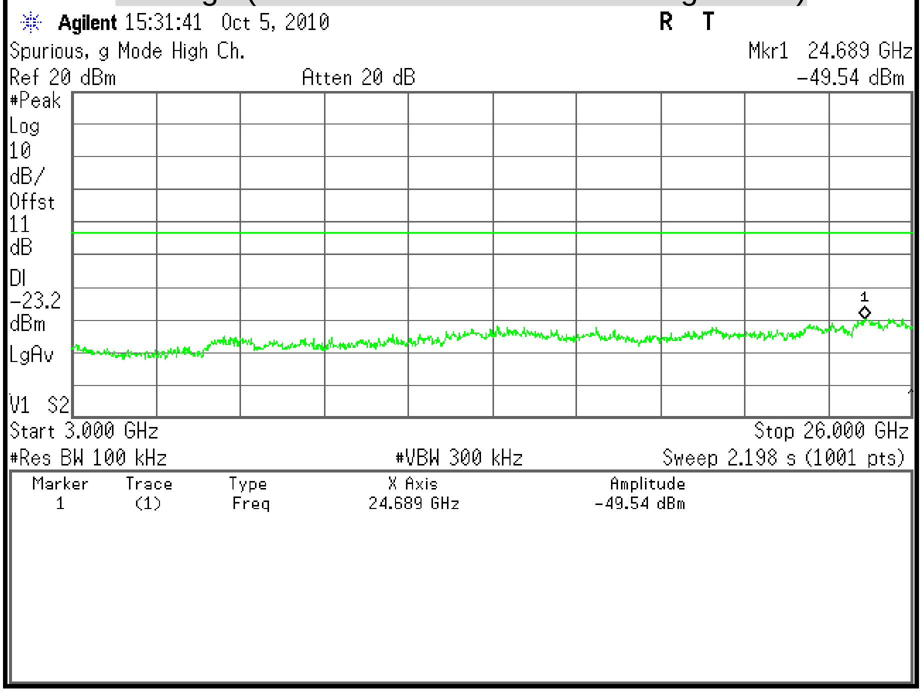
CH Middle (3GHz ~ 26GHz / IEEE 802.11g Mode)



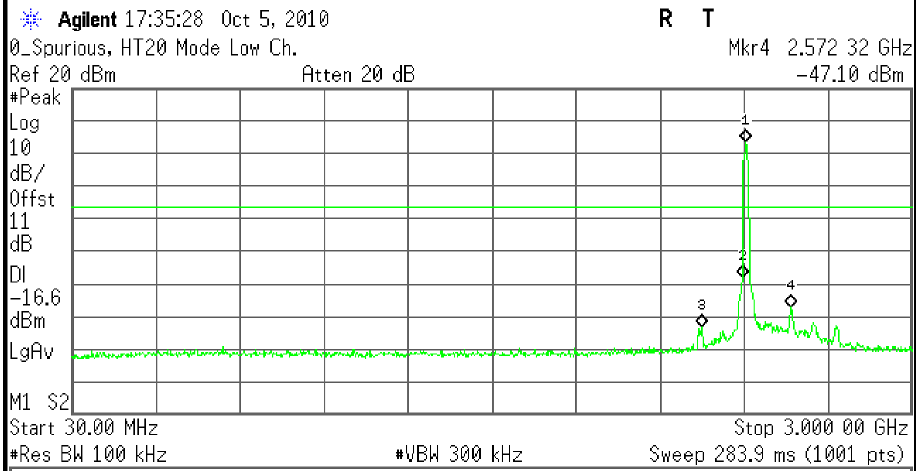
CH High (30MHz ~ 3GHz / IEEE 802.11g Mode)



CH High (3GHz ~ 26GHz / IEEE 802.11g Mode)

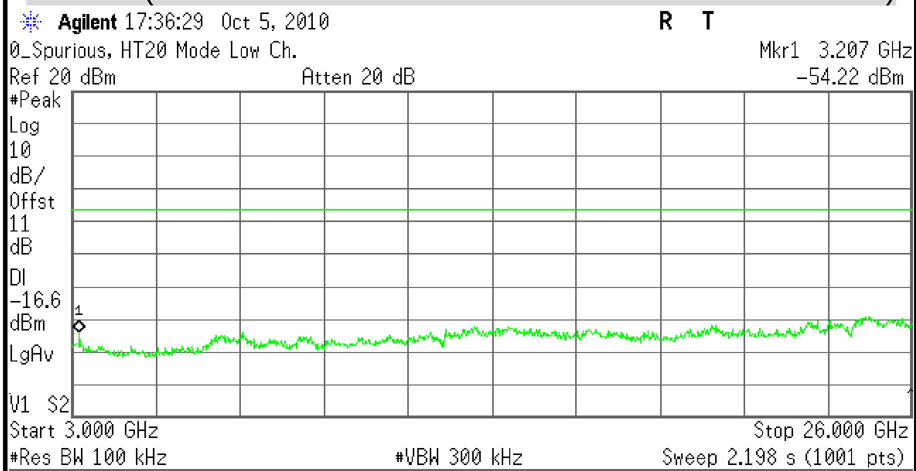


CH Low (30MHz ~ 3GHz / IEEE 802.11n HT20 Mode / Chain 0)



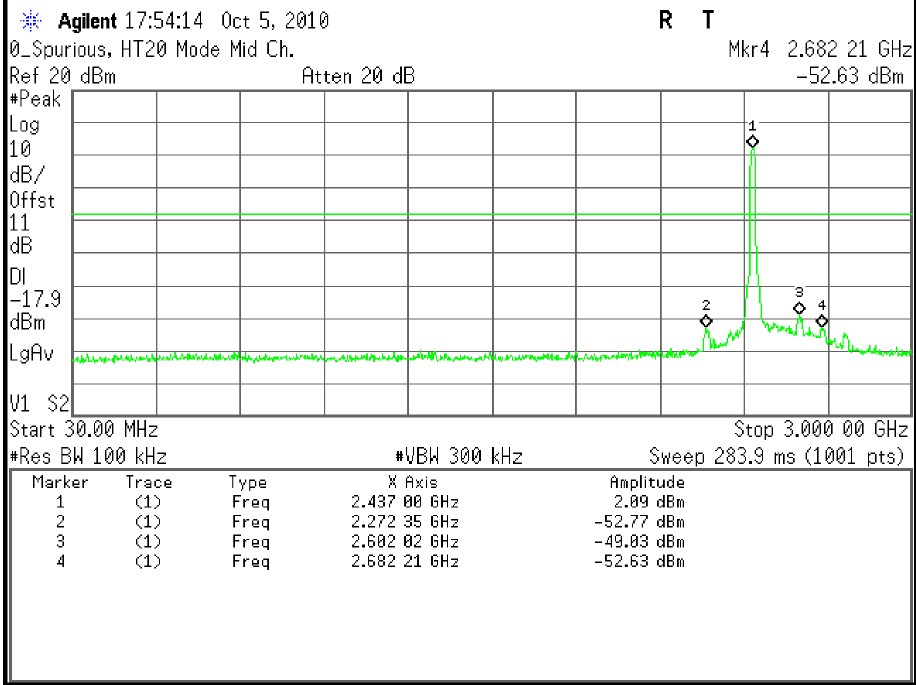
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.412 00 GHz	3.43 dBm
2	(1)	Freq	2.399 00 GHz	-37.95 dBm
3	(1)	Freq	2.254 53 GHz	-53.27 dBm
4	(1)	Freq	2.572 32 GHz	-47.10 dBm

CH Low (3GHz ~ 26GHz / IEEE 802.11n HT20 Mode / Chain 0)

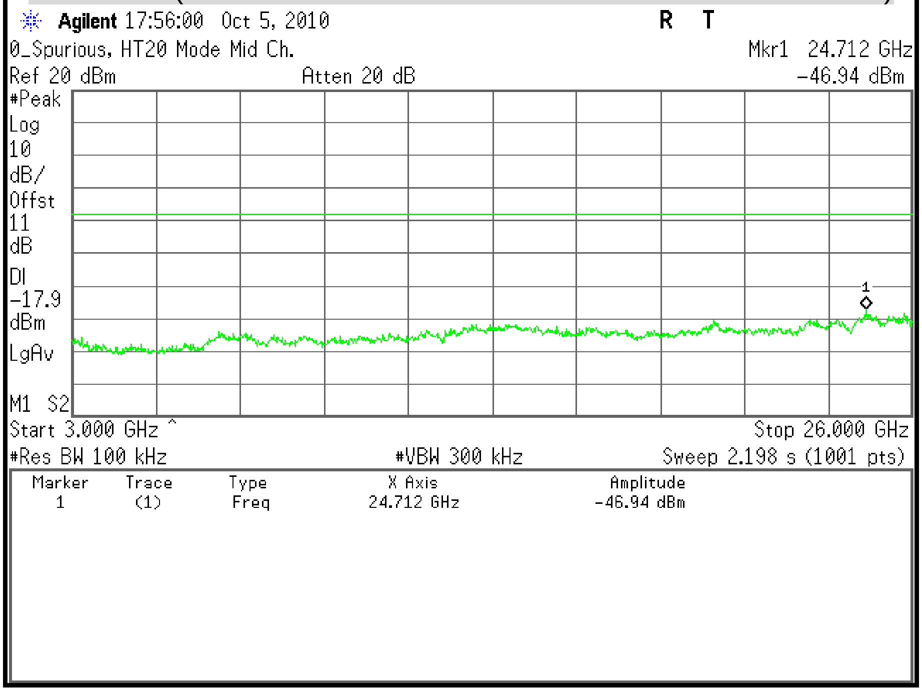


Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	3.207 GHz	-54.22 dBm

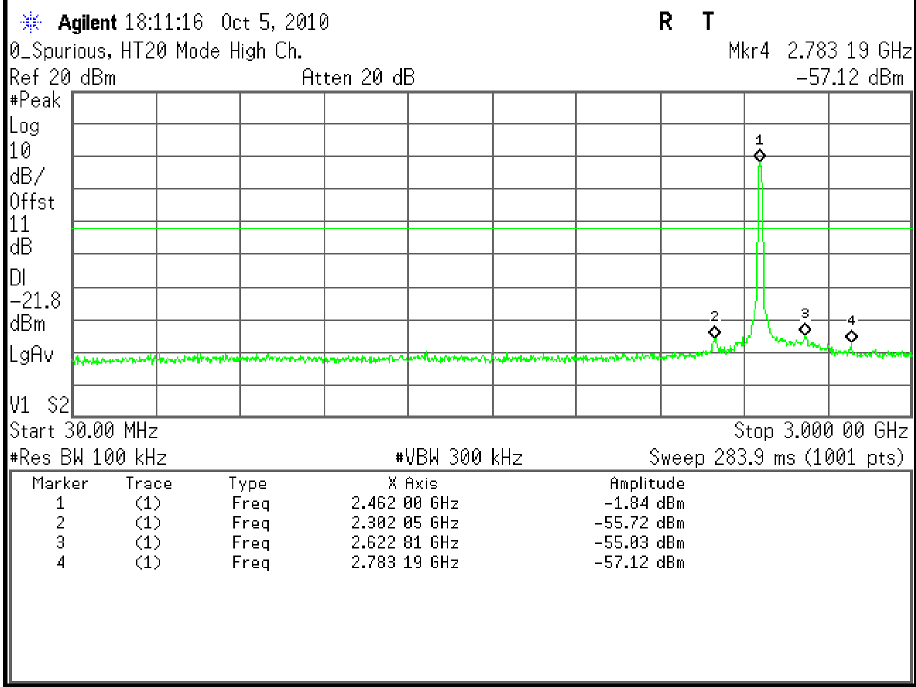
CH Middle (30MHz ~ 3GHz / IEEE 802.11n HT20 Mode / Chain 0)



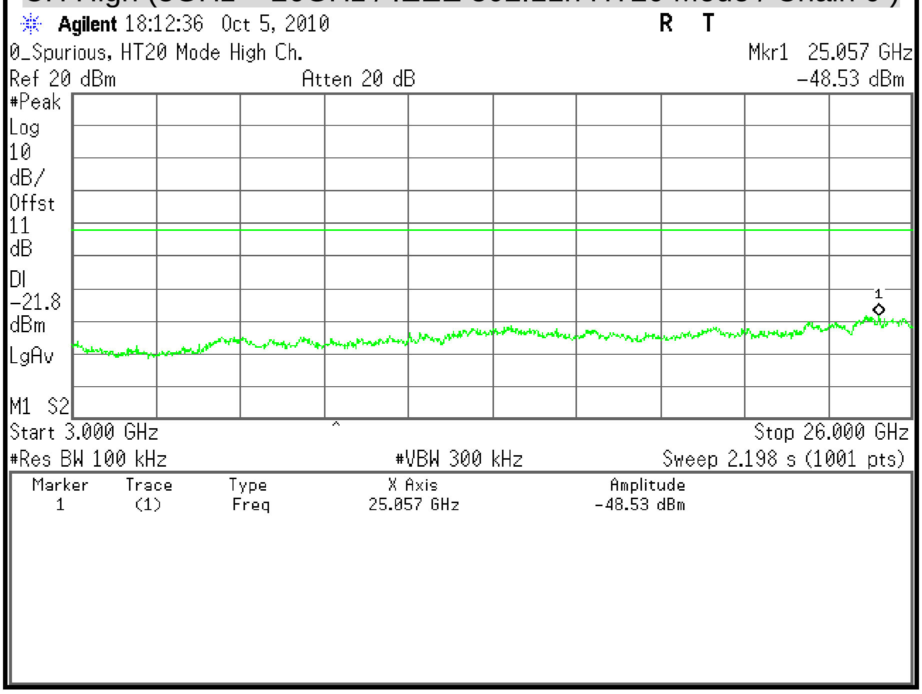
CH Middle (3GHz ~ 26GHz / IEEE 802.11n HT20 Mode / Chain 0)



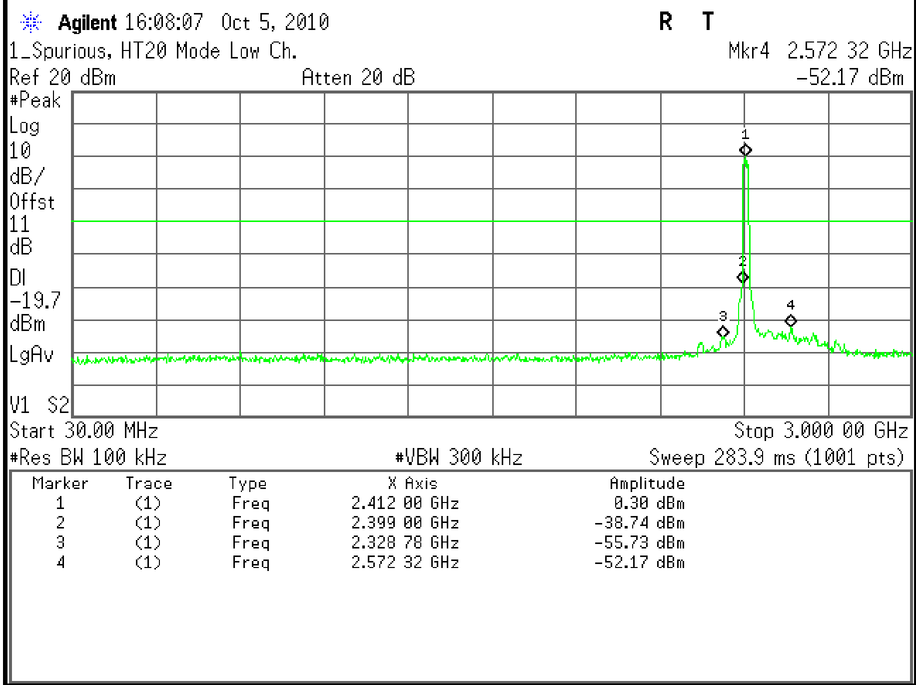
CH High (30MHz ~ 3GHz / IEEE 802.11n HT20 Mode / Chain 0)



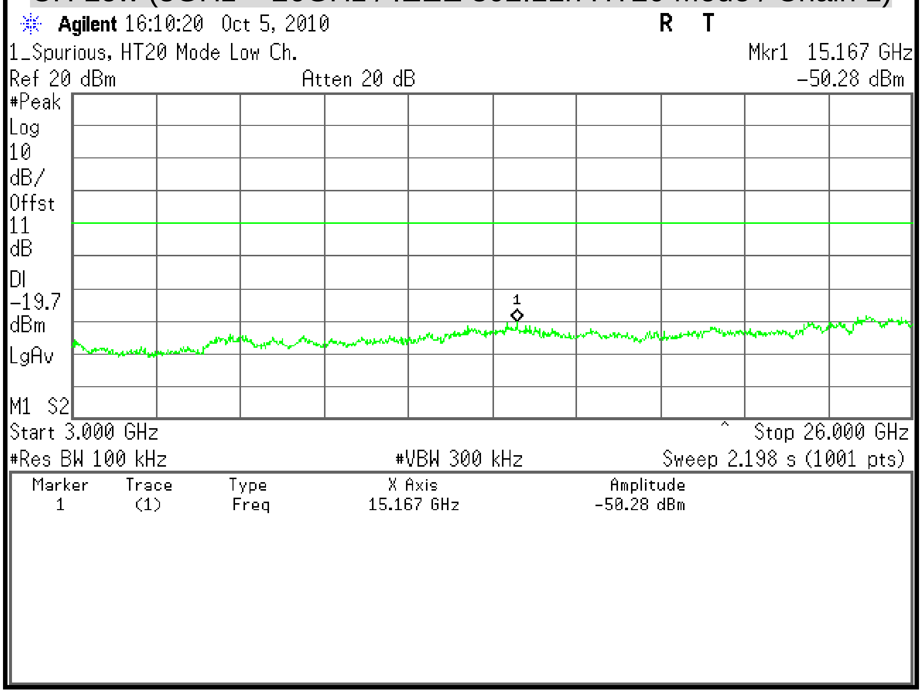
CH High (3GHz ~ 26GHz / IEEE 802.11n HT20 Mode / Chain 0)



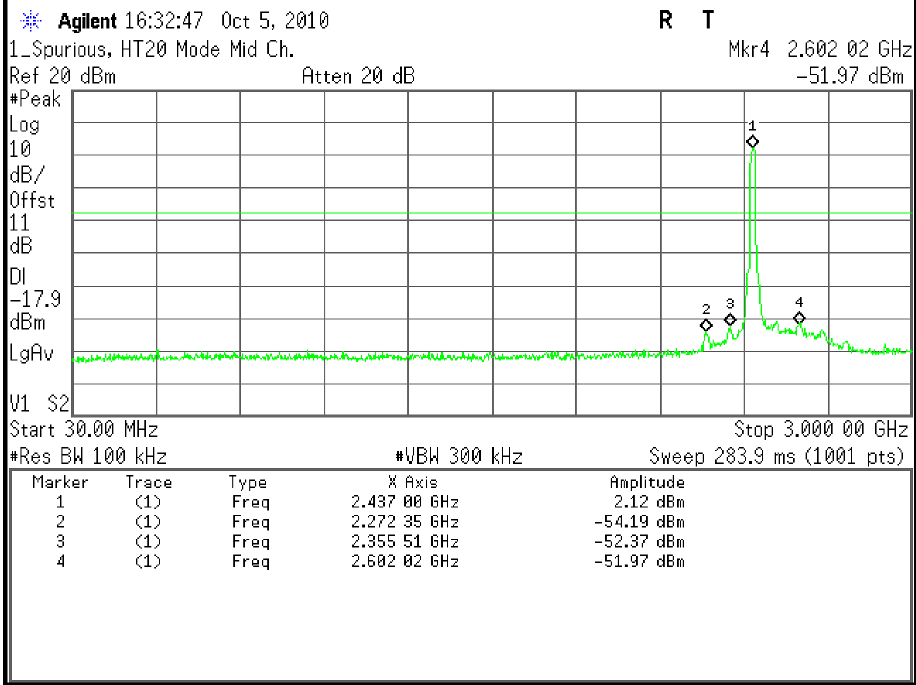
CH Low (30MHz ~ 3GHz / IEEE 802.11n HT20 Mode / Chain 1)



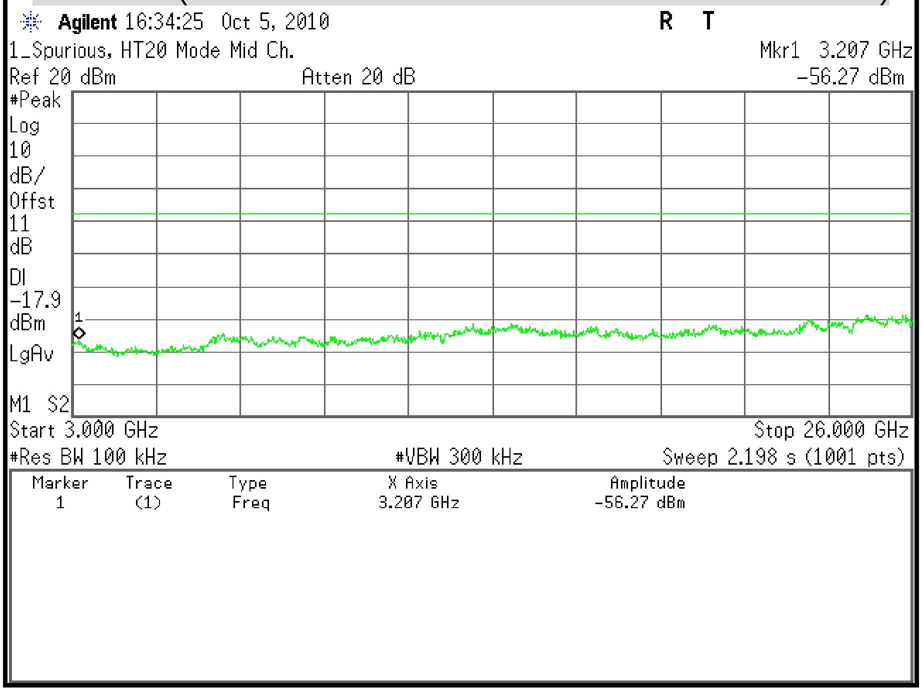
CH Low (3GHz ~ 26GHz / IEEE 802.11n HT20 Mode / Chain 1)



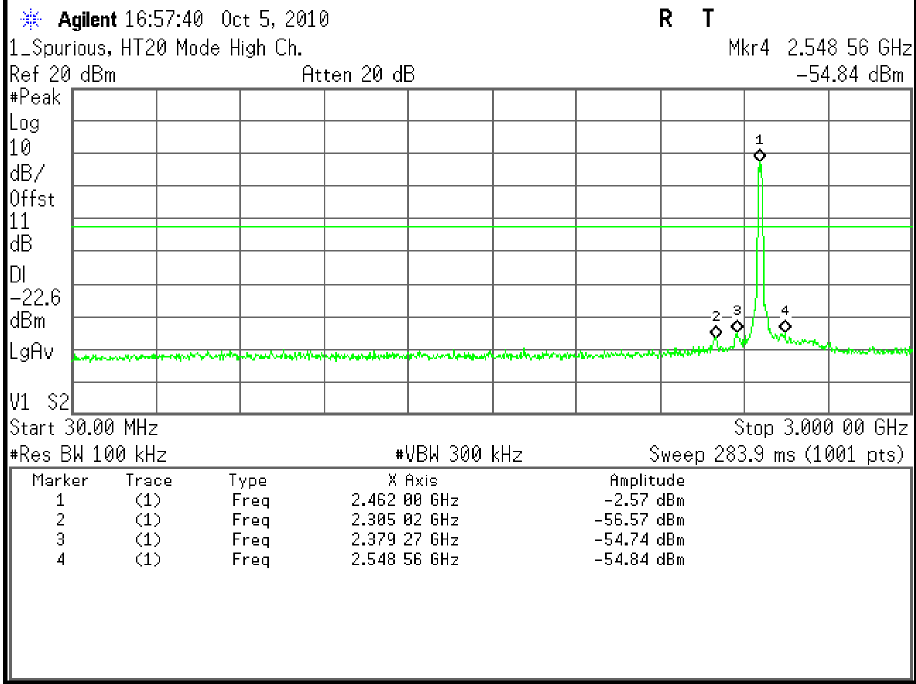
CH Middle (30MHz ~ 3GHz / IEEE 802.11n HT20 Mode / Chain 1)



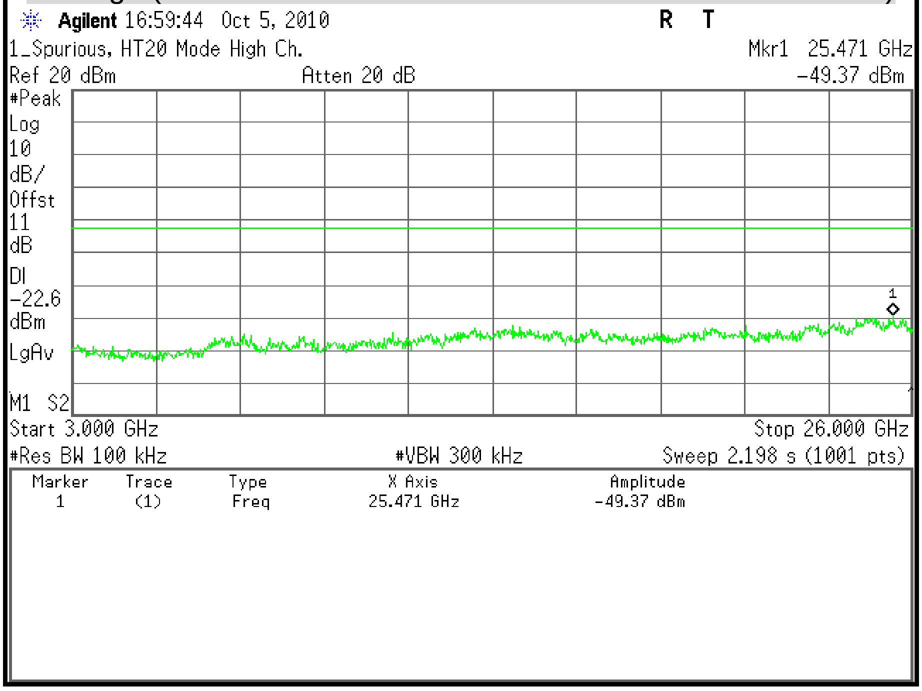
CH Middle (3GHz ~ 26GHz / IEEE 802.11n HT20 Mode / Chain 1)



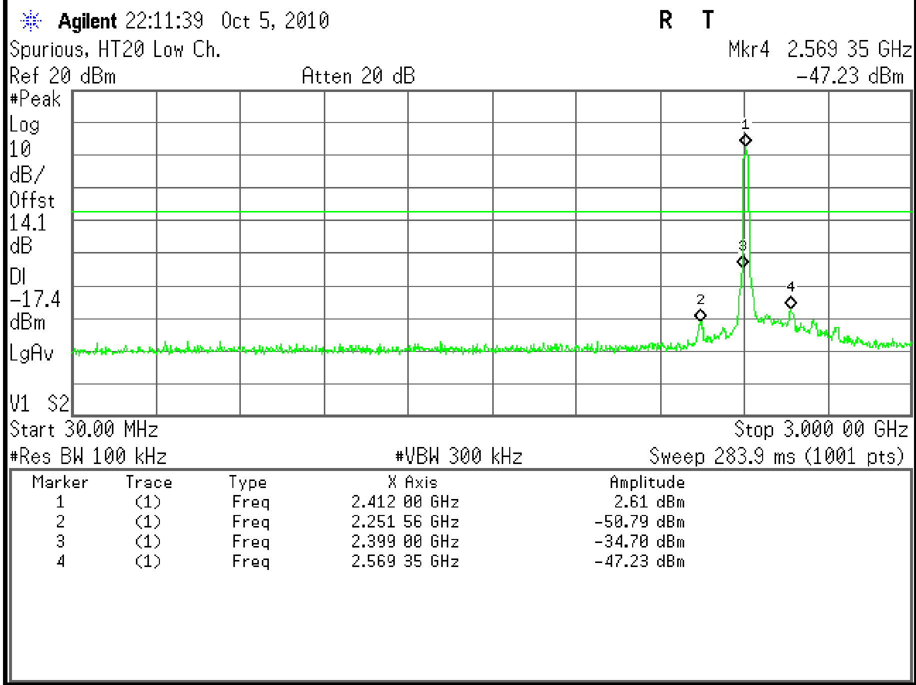
CH High (30MHz ~ 3GHz / IEEE 802.11n HT20 Mode / Chain 1)



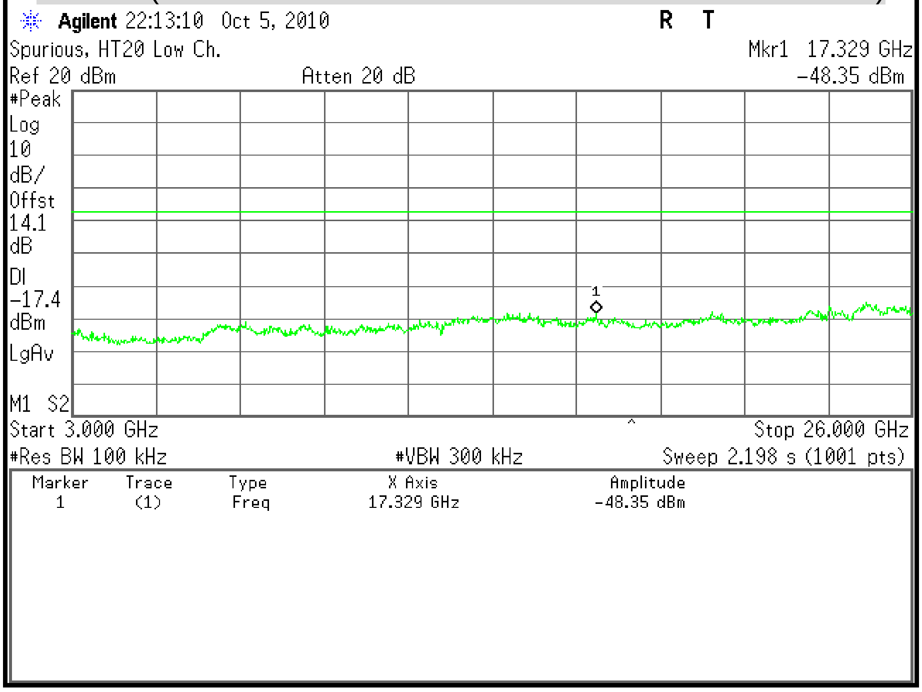
CH High (3GHz ~ 26GHz / IEEE 802.11n HT20 Mode / Chain 1)



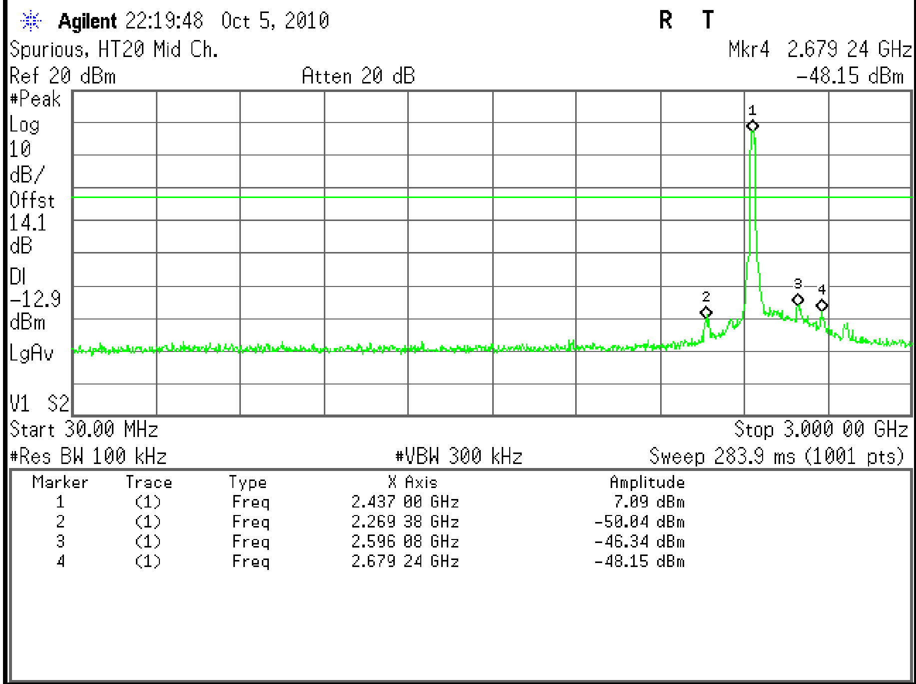
CH Low (30MHz ~ 3GHz / IEEE 802.11n HT20 Combined Mode)



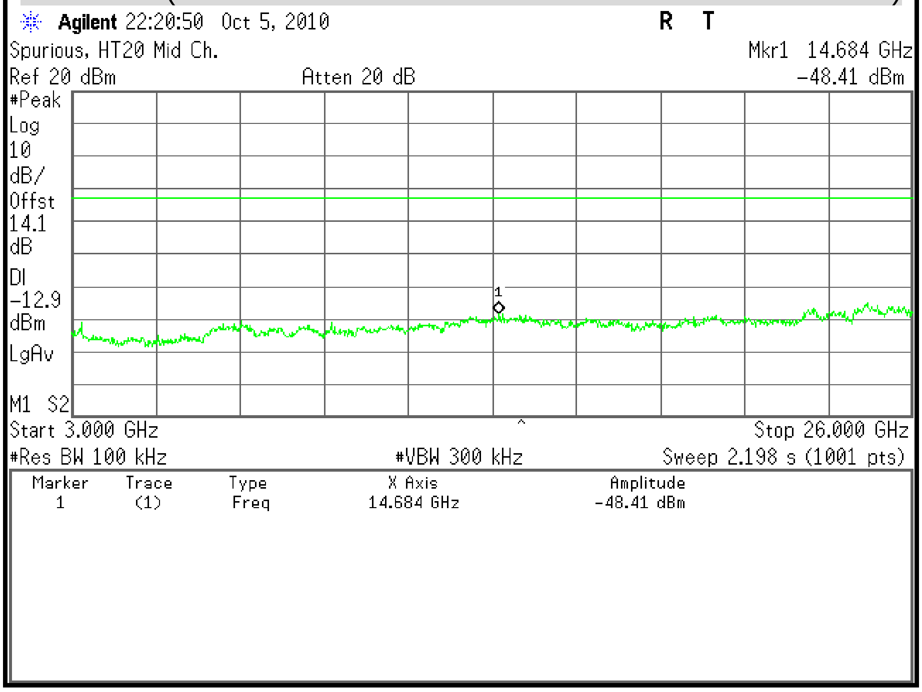
CH Low (3GHz ~ 26GHz / IEEE 802.11n HT20 Combined Mode)



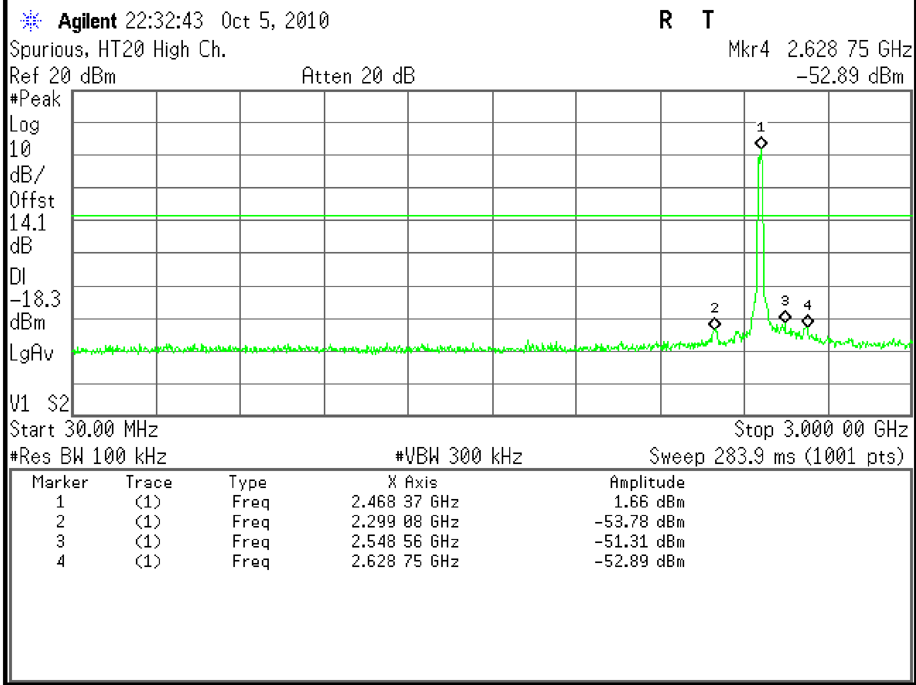
CH Middle (30MHz ~ 3GHz / IEEE 802.11n HT20 Combined Mode)



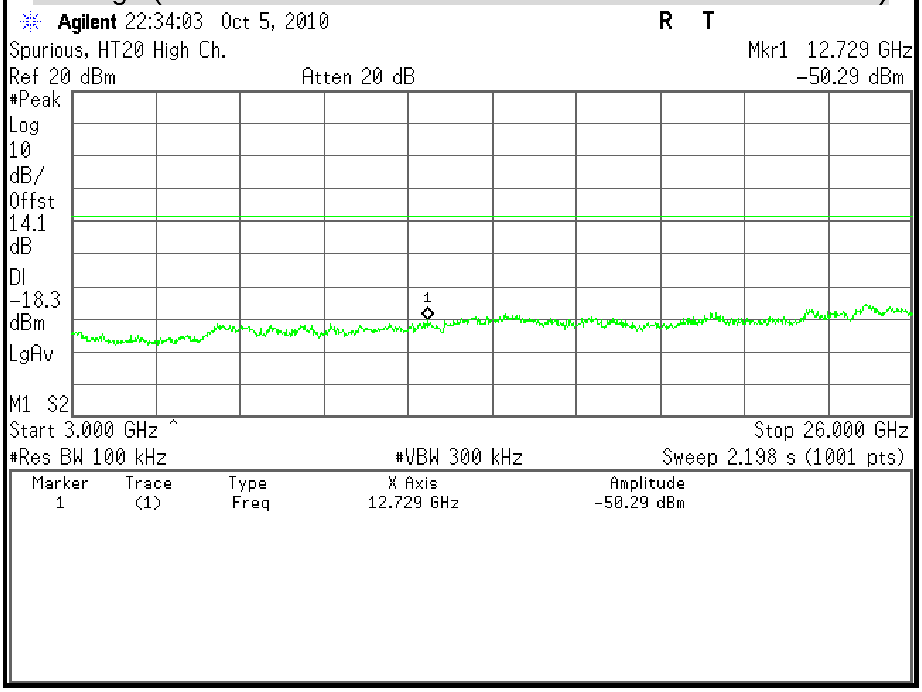
CH Middle (3GHz ~ 26GHz / IEEE 802.11n HT20 Combined Mode)



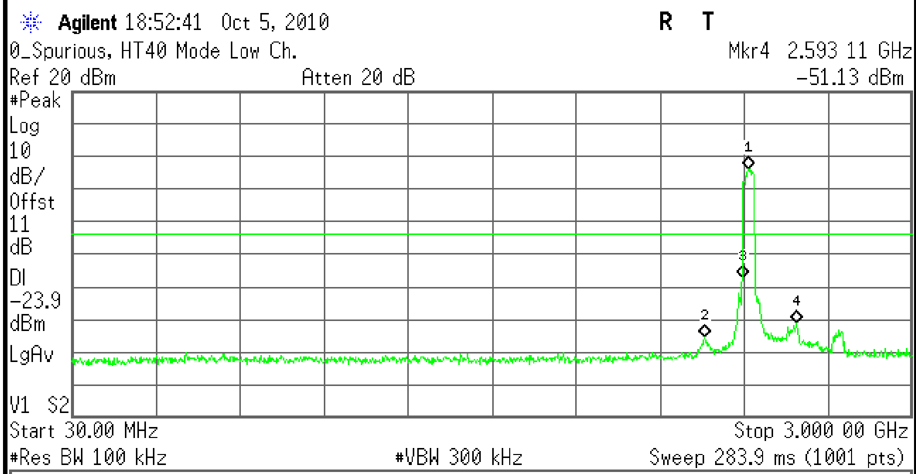
CH High (30MHz ~ 3GHz / IEEE 802.11n HT20 Combined Mode)



CH High (3GHz ~ 26GHz / IEEE 802.11n HT20 Combined Mode)

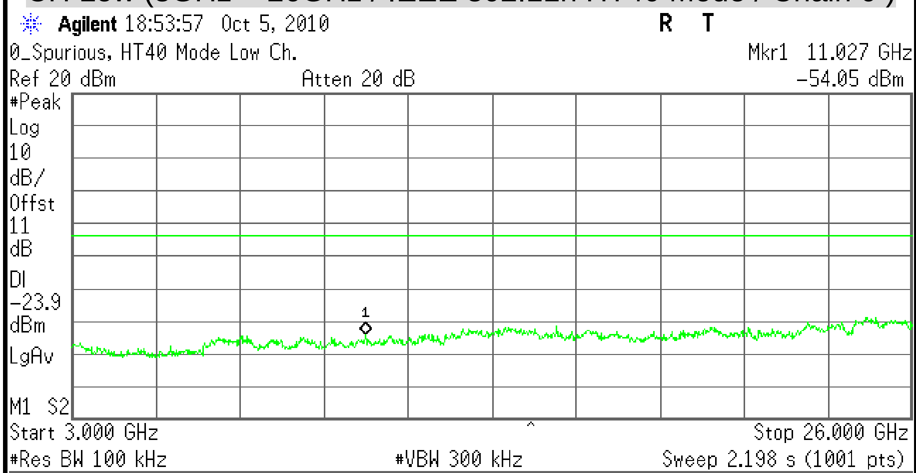


CH Low (30MHz ~ 3GHz / IEEE 802.11n HT40 Mode / Chain 0)



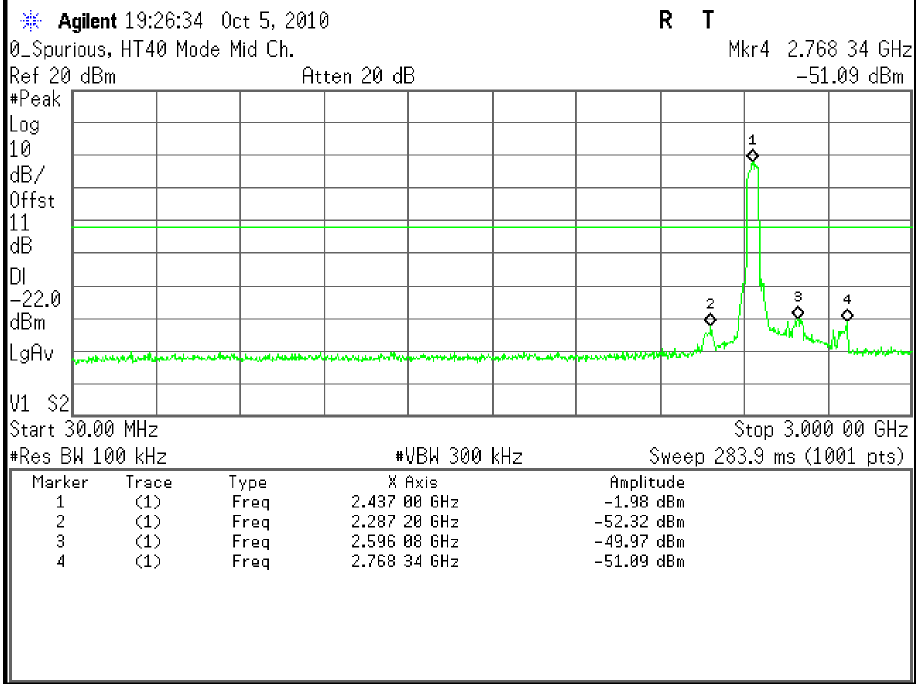
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.422 00 GHz	-3.92 dBm
2	(1)	Freq	2.265 35 GHz	-55.32 dBm
3	(1)	Freq	2.399 00 GHz	-37.17 dBm
4	(1)	Freq	2.593 11 GHz	-51.13 dBm

CH Low (3GHz ~ 26GHz / IEEE 802.11n HT40 Mode / Chain 0)

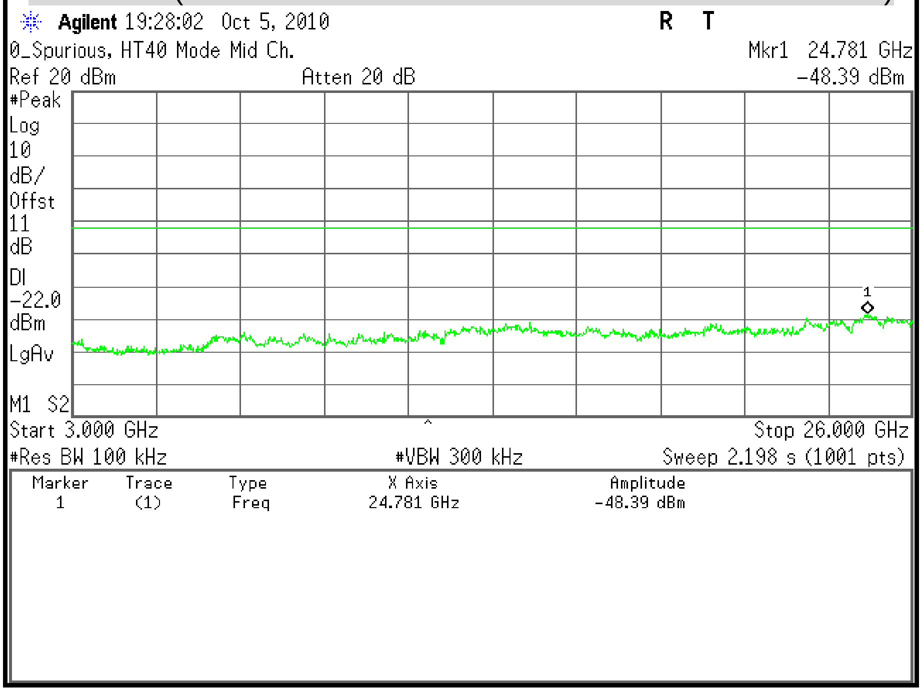


Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	11.027 GHz	-54.05 dBm

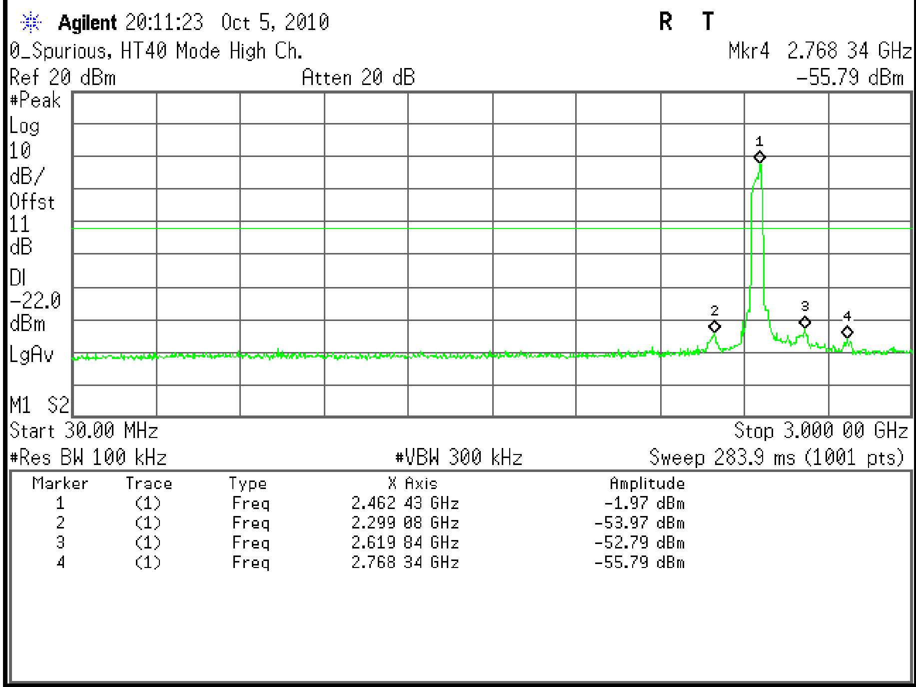
CH Middle (30MHz ~ 3GHz / IEEE 802.11n HT40 Mode / Chain 0)



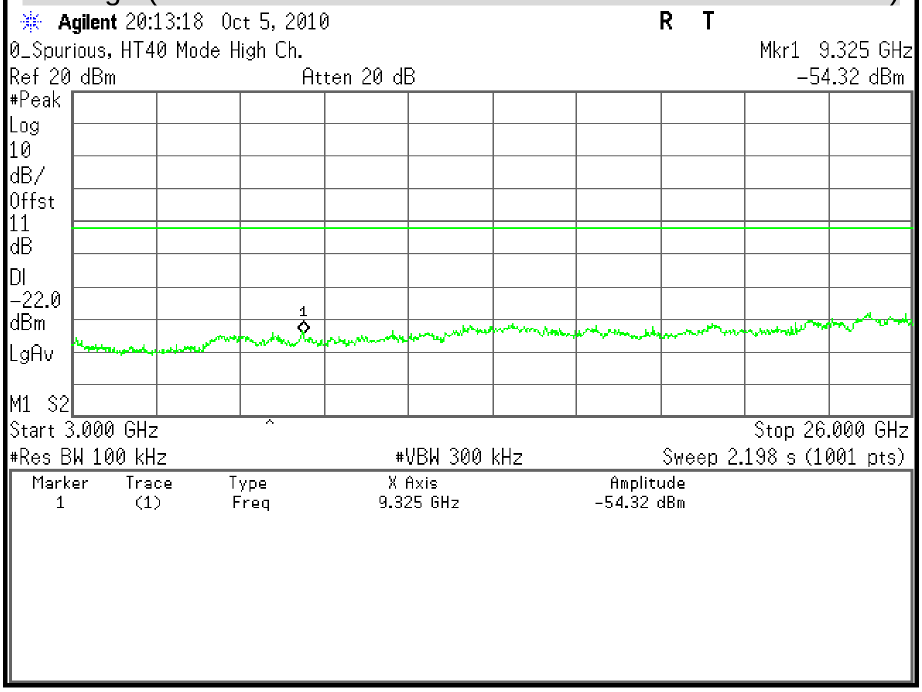
CH Middle (3GHz ~ 26GHz / IEEE 802.11n HT40 Mode / Chain 0)



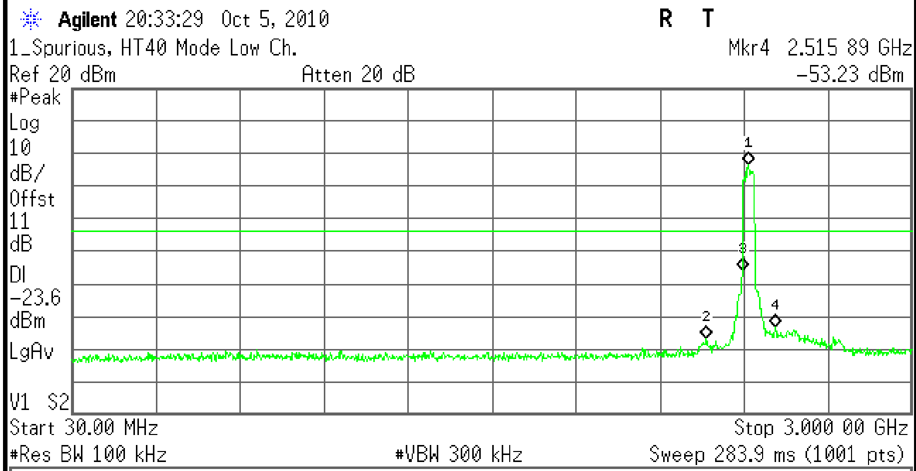
CH High (30MHz ~ 3GHz / IEEE 802.11n HT40 Mode / Chain 0)



CH High (3GHz ~ 26GHz / IEEE 802.11n HT40 Mode / Chain 0)

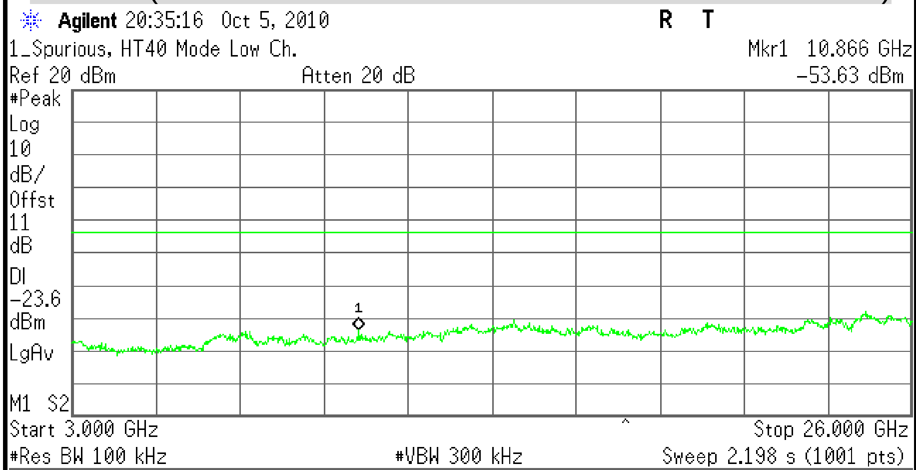


CH Low (30MHz ~ 3GHz / IEEE 802.11n HT40 Mode / Chain 1)



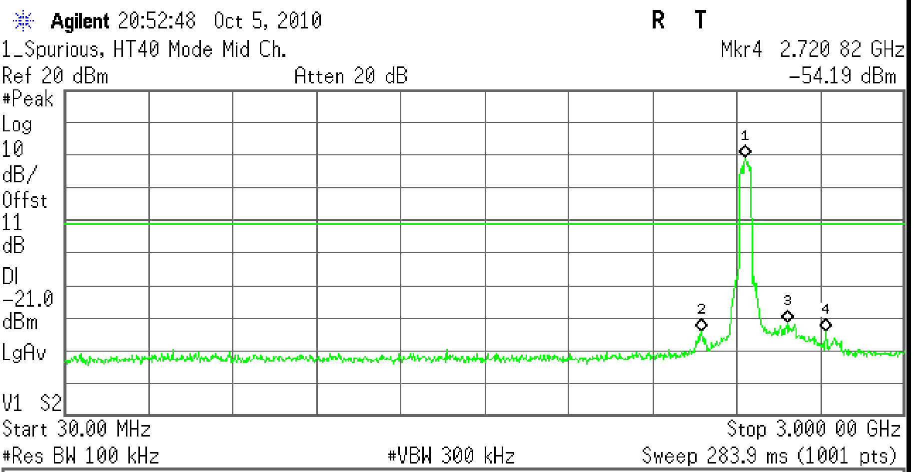
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.422 00 GHz	-3.58 dBm
2	(1)	Freq	2.272 35 GHz	-56.49 dBm
3	(1)	Freq	2.399 00 GHz	-35.93 dBm
4	(1)	Freq	2.515 89 GHz	-53.23 dBm

CH Low (3GHz ~ 26GHz / IEEE 802.11n HT40 Mode / Chain 1)



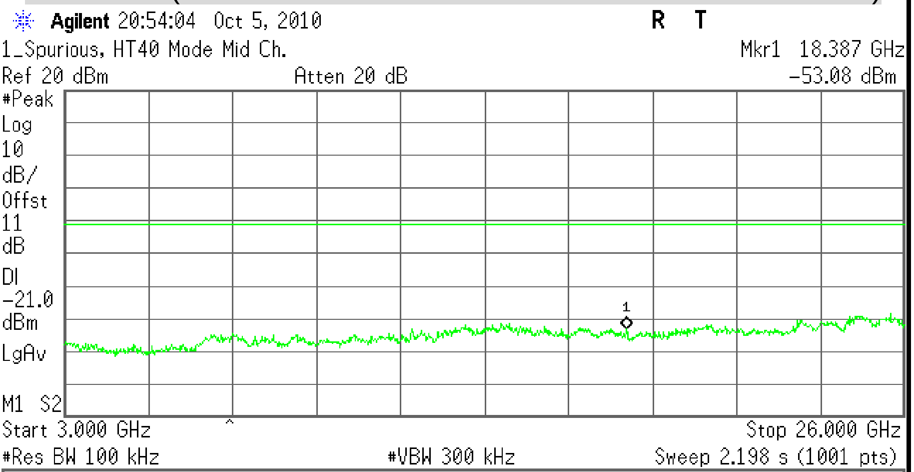
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	10.866 GHz	-53.63 dBm

CH Middle (30MHz ~ 3GHz / IEEE 802.11n HT40 Mode / Chain 1)



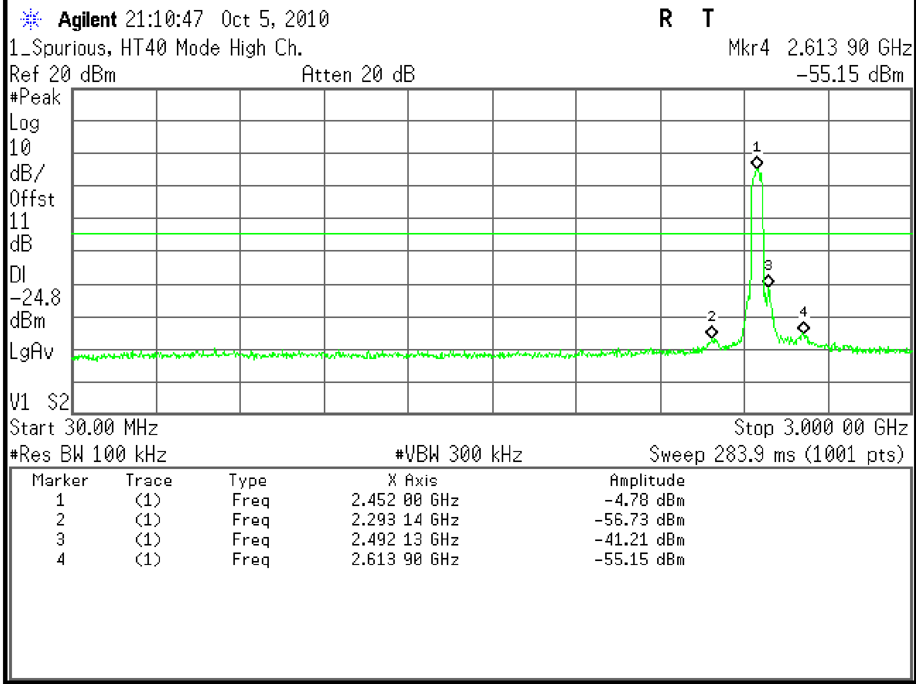
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.437 00 GHz	-0.99 dBm
2	(1)	Freq	2.281 26 GHz	-54.02 dBm
3	(1)	Freq	2.587 17 GHz	-51.54 dBm
4	(1)	Freq	2.720 82 GHz	-54.19 dBm

CH Middle (3GHz ~ 26GHz / IEEE 802.11n HT40 Mode / Chain 1)

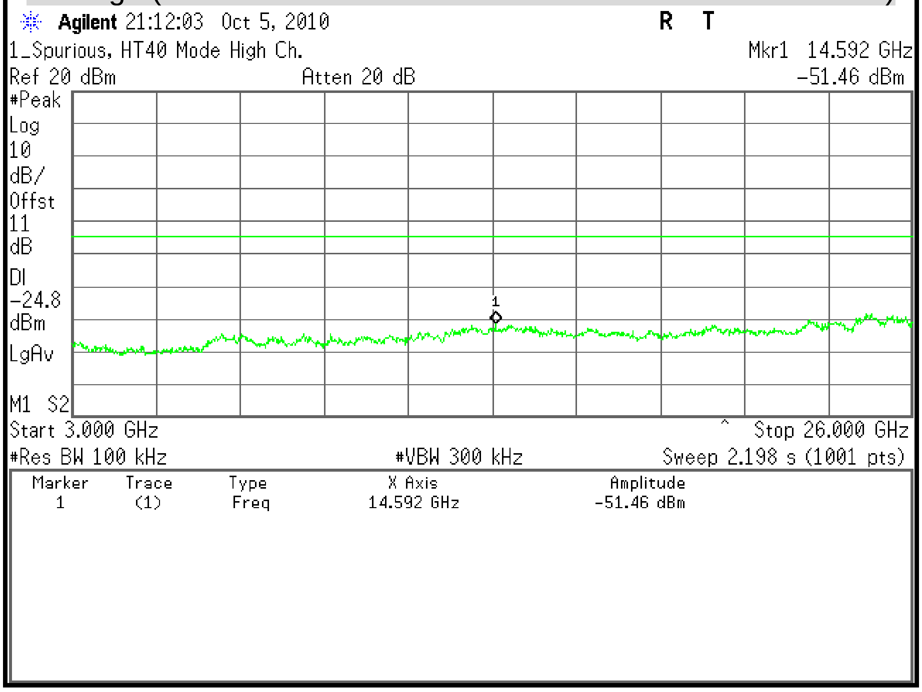


Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	18.387 GHz	-53.08 dBm

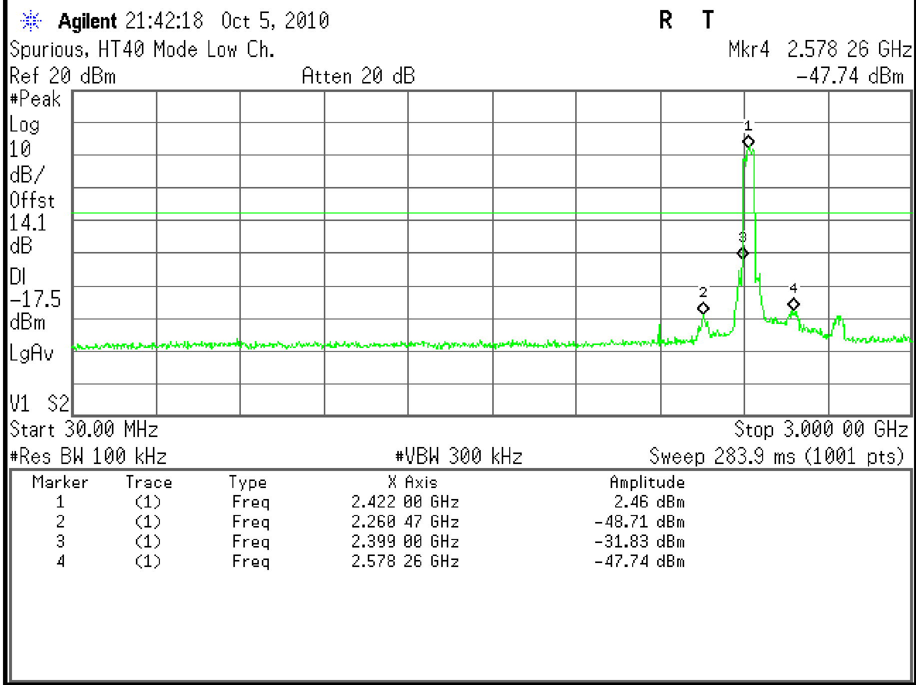
CH High (30MHz ~ 3GHz / IEEE 802.11n HT40 Mode / Chain 1)



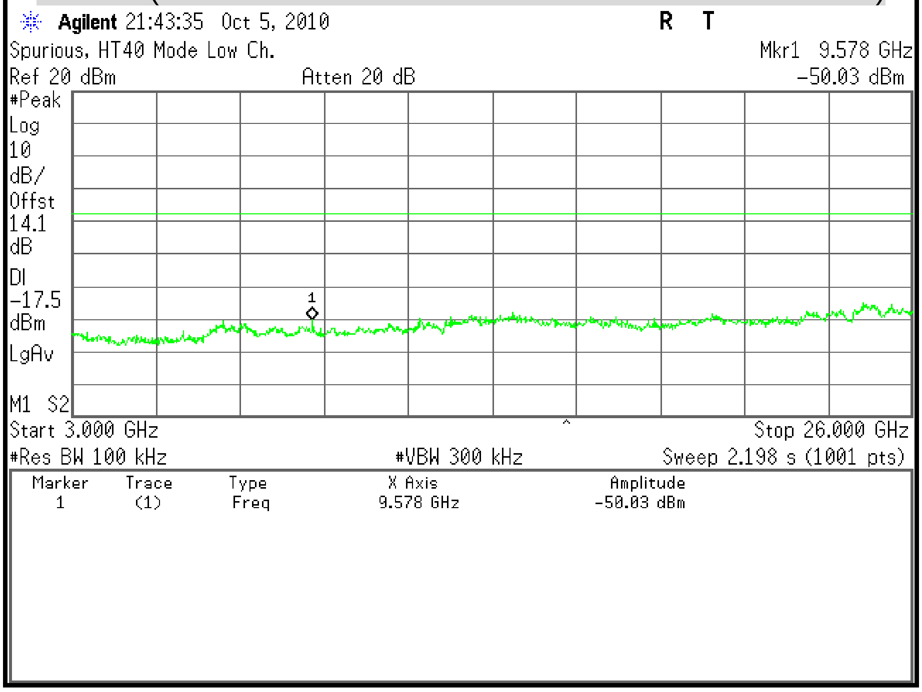
CH High (3GHz ~ 26GHz / IEEE 802.11n HT40 Mode / Chain 1)



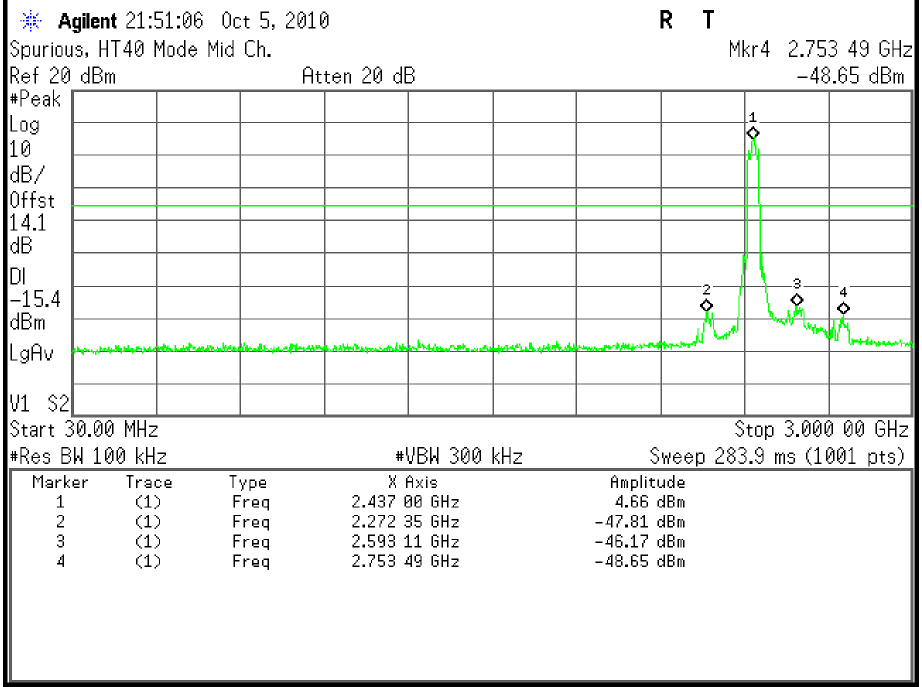
CH Low (30MHz ~ 3GHz / IEEE 802.11n HT40 Combined Mode)



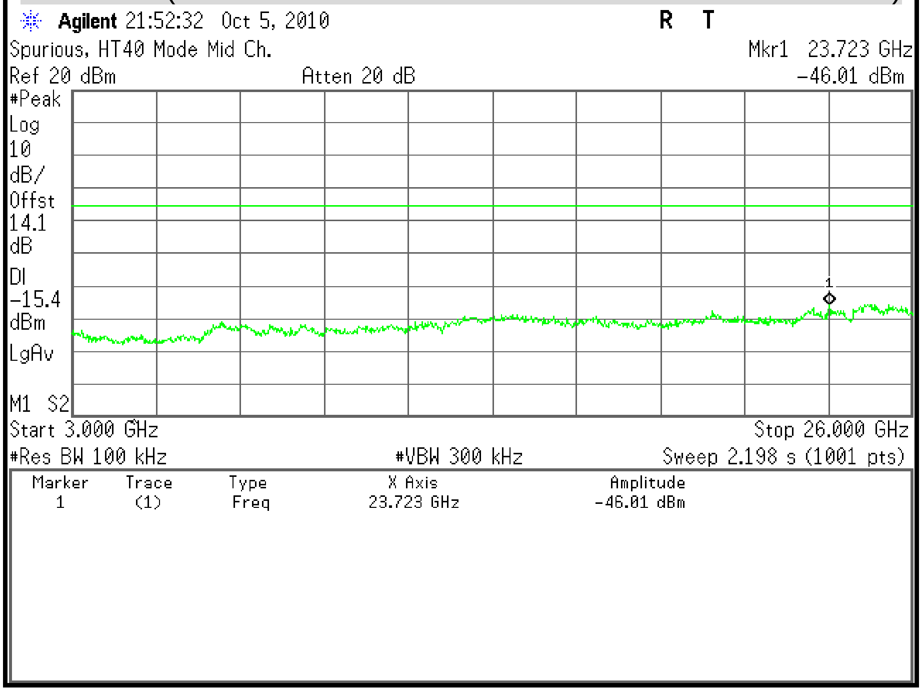
CH Low (3GHz ~ 26GHz / IEEE 802.11n HT40 Combined Mode)



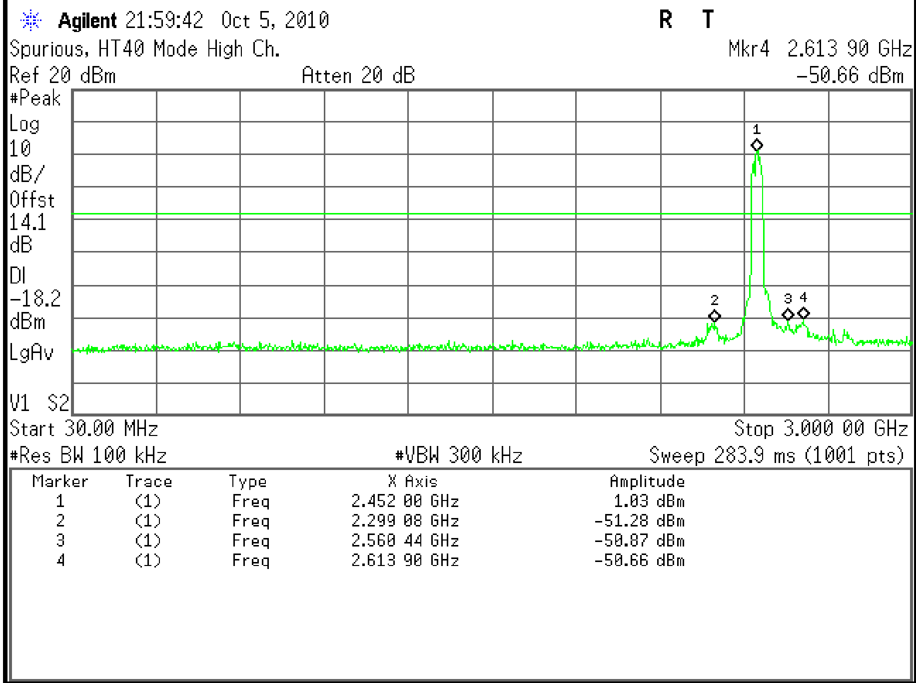
CH Middle (30MHz ~ 3GHz / IEEE 802.11n HT40 Combined Mode)



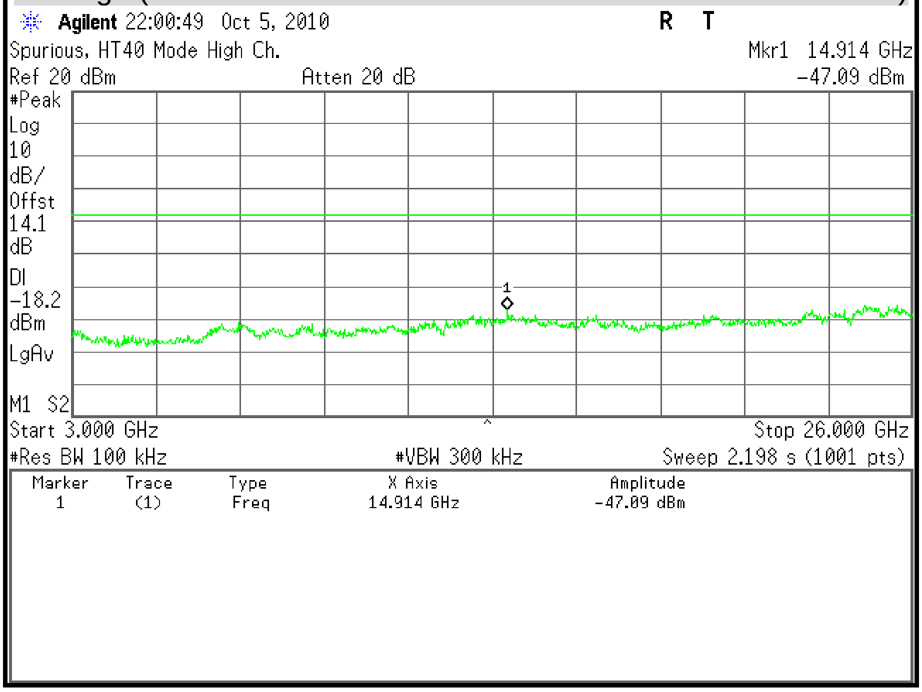
CH Middle (3GHz ~ 26GHz / IEEE 802.11n HT40 Combined Mode)



CH High (30MHz ~ 3GHz / IEEE 802.11n HT40 Combined Mode)



CH High (3GHz ~ 26GHz / IEEE 802.11n HT40 Combined Mode)



7.6 RADIATED EMISSION

LIMITS

(1) § 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 - 3338	36.43 - 36.5
12.57675 - 12.57725	322 -335.4	3600 - 4400	([2])
13.36 - 13.41			

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

(2) § 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 is 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.

(3) 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 (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(KHz)	300
0.490 – 1.705	24000/F(KHz)	30
1.705 – 30.0	30	30
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.*

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

TEST EQUIPMENT

966Chamber_A

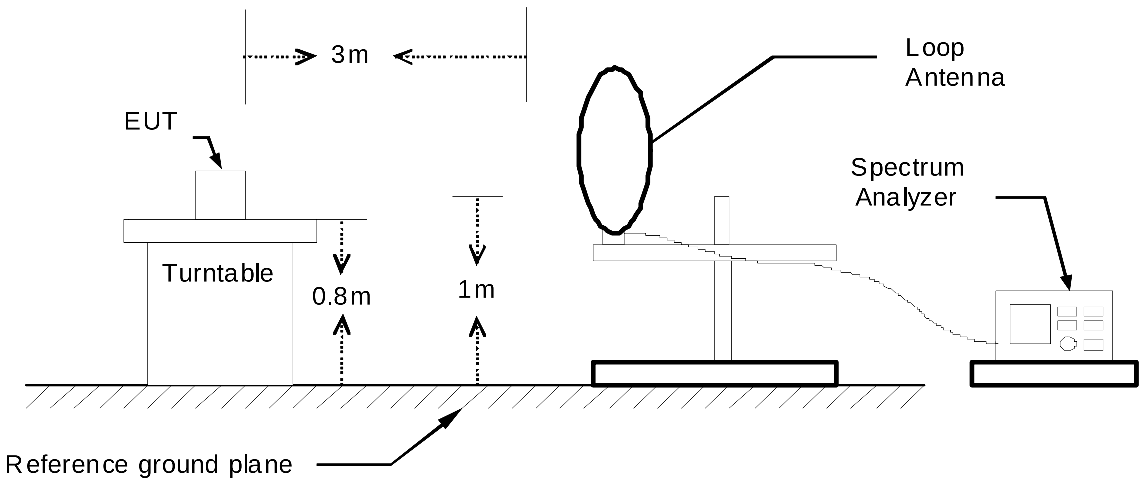
Name of Equipment	Manufacture	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360132	06/20/2011
EMI Test Receiver	ROHDE & SCHWARZ	ESCI	100221	05/03/2011
Bilog Antenna	SCHWARZBECK	VULB 9168	9168-249	10/04/2011
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00078732	07/05/2011
Pre-Amplifier	Agilent	8449B	3008A01471	08/02/2011
Pre-Amplifier	HP	8447F	2944A03748	09/23/2011
RF Coaxial Cable	HUBER-SUHNER	SUCOFLEX 104PEA	SN31347	07/21/2011
RF Coaxial Cable	HUBER-SUHNER	SUCOFLEX 104PEA	SN31350	07/21/2011
RF Coaxial Cable	HUBER-SUHNER	SUCOFLEX 104PEA	SN31355	07/21/2011
LOOP Antenna	EMCO	6502	8905-2356	06/09/2011
Notch Filters Band Reject	Micro-Tronics	BRM05702-01	009	N.C.R

Remark: *1. Each piece of equipment is scheduled for calibration once a year.*
2. N.C.R = No Calibration Request.

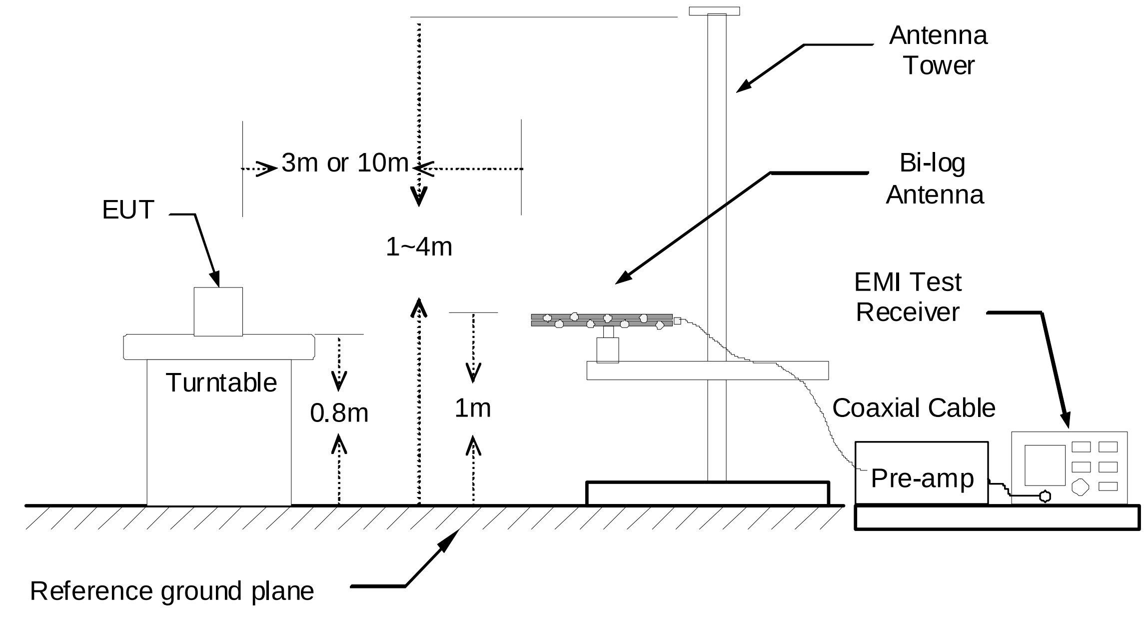
TEST SETUP

The diagram below shows the test setup that is utilized to make the measurements for emission from below 1GHz.

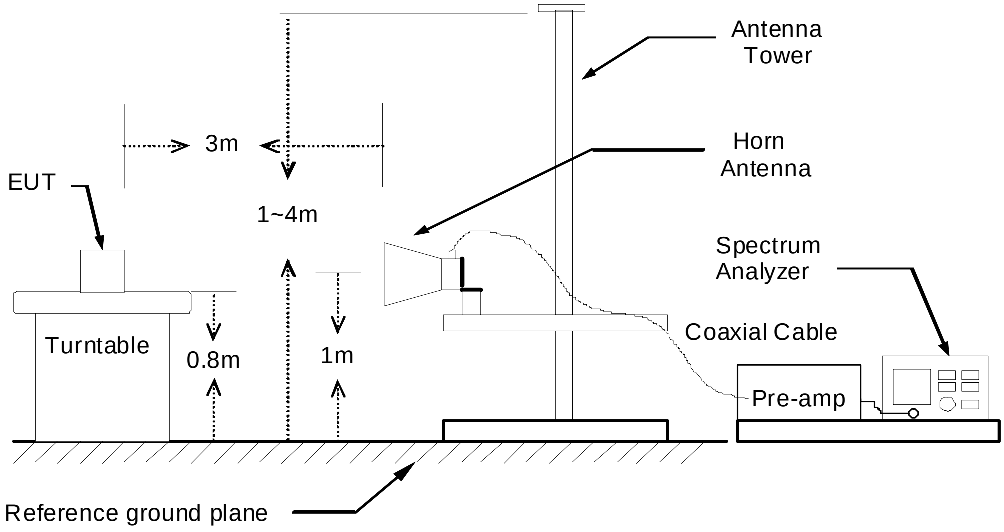
9kHz ~ 30MHz



30MHz ~ 1GHz



The diagram below shows the test setup that is utilized to make the measurements for emission above 1GHz.



TEST PROCEDURE

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
2. White measuring the radiated emission below 1GHz, the EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. White measuring the radiated emission above 1GHz, the EUT was set 3 meters away from the interference-receiving antenna
3. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarization of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Remark：

1. *The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.*
2. *The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection and frequency above 1GHz.*
3. *The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.*

TEST RESULTS

Below 1 GHz (9kHz ~ 30MHz)

No emission found between lowest internal used/generated frequency to 30MHz.

Below 1 GHz (30MHz ~ 1GHz)

Product Name	3G / Wireless-N Dual WAN ADSL2+ Firewall Router	Test By	Julon Liu
Model	BiPAC 7800NEXL	Test Date	2010/10/26
Test Mode	Normal operating / Adapter PAW012A12UL	TEMP & Humidity	26°C, 53%

966 Chamber_A at 3Meter / Horizontal						
Frequency (MHz)	Reading (dBµV)	Correction Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Remark
125.06	44.80	-12.33	32.48	43.50	-11.02	Peak
250.19	49.75	-11.46	38.29	46.00	-7.71	Peak
500.45	50.10	-4.39	45.71	46.00	-0.29	QP
624.61	43.80	-1.62	42.18	46.00	-3.82	QP
749.74	40.80	0.28	41.08	46.00	-4.92	QP
960.23	42.30	3.69	45.99	54.00	-8.01	Peak
966 Chamber_A at 3Meter / Vertical						
Frequency (MHz)	Reading (dBµV)	Correction Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Remark
59.10	46.20	-11.07	35.13	40.00	-4.87	QP
68.80	48.20	-12.57	35.63	40.00	-4.37	QP
90.14	53.11	-16.26	36.85	43.50	-6.65	Peak
125.06	48.10	-12.33	35.77	43.50	-7.73	QP
250.19	50.01	-11.46	38.55	46.00	-7.45	Peak
500.45	46.60	-4.39	42.21	46.00	-3.79	QP
624.61	40.40	-1.62	38.78	46.00	-7.22	QP
960.23	38.92	3.69	42.61	54.00	-11.39	Peak

Remark:

1. *Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit.*
2. *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.*
3. *Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) – PreAmp.Gain (dB)*
4. *Result (dBuV/m) = Reading (dBuV) + Correction Factor (dB/m)*
5. *Margin (dB) = Remark result (dBuV/m) - Quasi-peak limit (dBuV/m).*

Product Name	3G / Wireless-N Dual WAN ADSL2+ Firewall Router	Test By	Julon Liu
Model	BiPAC 7800NEXL	Test Date	2010/10/26
Test Mode	Normal operating / Adapter PAW018A12UL 8066	TEMP & Humidity	26°C, 53%

966 Chamber_A at 3Meter / Horizontal

Frequency (MHz)	Reading (dBµV)	Correction Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Remark
125.06	45.24	-12.33	32.91	43.50	-10.59	Peak
250.19	49.09	-11.46	37.63	46.00	-8.37	Peak
500.45	48.10	-4.39	43.71	46.00	-2.29	QP
624.61	41.30	-1.62	39.68	46.00	-6.32	QP
749.74	39.10	0.28	39.38	46.00	-6.62	QP
874.87	35.10	2.57	37.67	46.00	-8.33	Peak
960.23	39.41	3.69	43.10	54.00	-10.90	Peak

966 Chamber_A at 3Meter / Vertical

Frequency (MHz)	Reading (dBµV)	Correction Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Remark
59.10	48.00	-11.07	36.93	40.00	-3.07	QP
125.06	48.49	-12.33	36.16	43.50	-7.34	Peak
191.99	49.33	-13.00	36.33	43.50	-7.17	Peak
250.19	48.80	-11.46	37.34	46.00	-8.66	QP
500.45	44.80	-4.39	40.41	46.00	-5.59	QP
624.61	41.46	-1.62	39.83	46.00	-6.17	Peak
749.74	39.51	0.28	39.78	46.00	-6.22	Peak
960.23	40.31	3.69	44.01	54.00	-9.99	Peak

Remark:

1. *Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit.*
2. *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.*
3. *Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) – PreAmp.Gain (dB)*
4. *Result (dBuV/m) = Reading (dBuV) + Correction Factor (dB/m)*
5. *Margin (dB) = Remark result (dBuV/m) - Quasi-peak limit (dBuV/m).*

Product Name	3G / Wireless-N Dual WAN ADSL2+ Firewall Router	**Test By**	Julon Liu
Model	BiPAC 7800NEXL	**Test Date**	2010/10/26
Test Mode	Normal operating / Adapter PAW018A12UL	**TEMP & Humidity**	26°C, 53%

966 Chamber_A at 3Meter / Horizontal

Frequency (MHz)	Reading (dBµV)	Correction Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Remark
125.06	45.97	-12.33	33.65	43.50	-9.85	Peak
250.19	50.28	-11.46	38.82	46.00	-7.18	Peak
500.45	47.40	-4.39	43.01	46.00	-2.99	QP
624.61	44.20	-1.62	42.58	46.00	-3.42	QP
749.74	40.30	0.28	40.58	46.00	-5.42	QP
960.23	39.01	3.69	42.71	54.00	-11.29	Peak

966 Chamber_A at 3Meter / Vertical

Frequency (MHz)	Reading (dBµV)	Correction Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Remark
59.10	46.60	-11.07	35.53	40.00	-4.47	QP
125.06	49.50	-12.33	37.17	43.50	-6.33	QP
250.19	51.04	-11.46	39.57	46.00	-6.43	Peak
500.45	47.50	-4.39	43.11	46.00	-2.89	QP
624.61	41.50	-1.62	39.88	46.00	-6.12	QP
749.74	39.10	0.28	39.37	46.00	-6.63	Peak
960.23	39.20	3.69	42.89	54.00	-11.11	Peak

Remark:

1. *Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit.*
2. *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.*
3. *Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) – PreAmp.Gain (dB)*
4. *Result (dBuV/m) = Reading (dBuV) + Correction Factor (dB/m)*
5. *Margin (dB) = Remark result (dBuV/m) - Quasi-peak limit (dBuV/m).*

Above 1 GHz

Product Name	3G / Wireless-N Dual WAN ADSL2+ Firewall Router	Test By	WaterNil Guan
Model	BiPAC 7800NEXL	Test Date	2010/10/02
Test Mode	IEEE 802.11b TX / CH Low	TEMP & Humidity	25°C, 54%

966 Chamber_A at 3Meter / Horizontal									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1444.00	54.24	---	-3.13	51.10	---	74.00	54.00	-2.90	Peak
1968.00	53.37	46.39	0.88	54.25	47.27	74.00	54.00	-6.73	AVG
2412.00	100.91	97.37	1.96	102.87	99.33	---	---	---	Carrier
2774.00	52.68	46.73	2.73	55.41	49.46	74.00	54.00	-4.54	AVG
4642.50	41.26	---	6.36	47.62	---	74.00	54.00	-6.38	Peak
6427.50	40.84	---	9.38	50.22	---	74.00	54.00	-3.78	Peak
7687.50	41.96	---	10.33	52.28	---	74.00	54.00	-1.72	Peak

966 Chamber_A at 3Meter / Vertical									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
2412.00	107.84	104.43	1.96	109.80	106.39	---	---	---	Carrier
2570.00	55.74	49.88	2.29	58.03	52.17	74.00	54.00	-1.83	AVG
2652.00	56.29	50.03	2.47	58.76	52.50	74.00	54.00	-1.50	AVG
2730.00	58.30	49.01	2.63	60.93	51.64	74.00	54.00	-2.36	AVG
6450.00	41.07	---	9.45	50.52	---	74.00	54.00	-3.48	Peak
7237.50	47.22	40.40	10.19	57.41	50.59	74.00	54.00	-3.41	AVG
8617.50	42.38	---	10.56	52.94	---	74.00	54.00	-1.06	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *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.*
4. *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.*
5. *In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.*
6. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	3G / Wireless-N Dual WAN ADSL2+ Firewall Router	Test By	WaterNil Guan
Model	BiPAC 7800NEXL	Test Date	2010/10/02
Test Mode	IEEE 802.11b TX / CH Middle	TEMP & Humidity	25°C, 54%

966 Chamber_A at 3Meter / Horizontal

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1296.00	54.94	---	-3.59	51.35	---	74.00	54.00	-2.65	Peak
1982.00	52.96	47.58	0.99	53.95	48.57	74.00	54.00	-5.43	AVG
2437.00	98.59	95.22	2.01	100.60	97.23	---	---	---	Carrier
2670.00	53.11	46.28	2.50	55.61	48.78	74.00	54.00	-5.22	AVG
4402.50	41.39	---	6.25	47.64	---	74.00	54.00	-6.36	Peak
5497.50	40.62	---	6.84	47.47	---	74.00	54.00	-6.53	Peak
6862.50	41.11	---	10.17	51.29	---	74.00	54.00	-2.71	Peak

966 Chamber_A at 3Meter / Vertical

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
2274.00	54.48	50.25	1.69	56.17	51.94	74.00	54.00	-2.06	AVG
2437.00	106.89	103.50	2.01	108.90	105.51	---	---	---	Carrier
2600.00	56.89	50.12	2.35	59.24	52.47	74.00	54.00	-1.53	AVG
2686.00	54.79	49.13	2.54	57.33	51.67	74.00	54.00	-2.33	AVG
4455.00	41.26	---	6.42	47.68	---	74.00	54.00	-6.32	Peak
5670.00	40.69	---	7.22	47.91	---	74.00	54.00	-6.09	Peak
7305.00	42.54	---	10.13	52.67	---	74.00	54.00	-1.33	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *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.*
4. *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.*
5. *In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.*
6. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	3G / Wireless-N Dual WAN ADSL2+ Firewall Router	Test By	WaterNil Guan
Model	BiPAC 7800NEXL	Test Date	2010/10/02
Test Mode	IEEE 802.11b TX / CH High	TEMP & Humidity	25°C, 54%

966 Chamber_A at 3Meter / Horizontal

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1448.00	55.06	---	-3.12	51.94	---	74.00	54.00	-2.06	Peak
1734.00	54.49	48.58	-1.04	53.45	47.54	74.00	54.00	-6.46	AVG
2462.00	97.25	94.27	2.07	99.32	96.34	---	---	---	Carrier
2804.00	51.82	47.52	2.79	54.61	50.31	74.00	54.00	-3.69	AVG
5977.50	41.76	---	7.90	49.66	---	74.00	54.00	-4.34	Peak
7110.00	41.24	---	10.29	51.53	---	74.00	54.00	-2.47	Peak
7740.00	42.00	---	10.43	52.42	---	74.00	54.00	-1.58	Peak

966 Chamber_A at 3Meter / Vertical

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1322.00	54.48	---	-3.51	50.98	---	74.00	54.00	-3.02	Peak
2302.00	54.08	50.12	1.74	55.82	51.86	74.00	54.00	-2.14	AVG
2462.00	103.76	100.62	2.06	105.82	102.68	---	---	---	Carrier
2620.00	54.48	49.22	2.40	56.88	51.62	74.00	54.00	-2.38	AVG
4590.00	41.07	---	6.44	47.50	---	74.00	54.00	-6.50	Peak
7005.00	41.48	---	10.38	51.86	---	74.00	54.00	-2.14	Peak
7387.50	43.21	---	10.06	53.27	---	74.00	54.00	-0.73	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *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.*
4. *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.*
5. *In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.*
6. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	3G / Wireless-N Dual WAN ADSL2+ Firewall Router	Test By	WaterNil Guan
Model	BiPAC 7800NEXL	Test Date	2010/10/02
Test Mode	IEEE 802.11g TX / CH Low	TEMP & Humidity	25°C, 54%

966 Chamber_A at 3Meter / Horizontal

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1314.00	53.75	---	-3.53	50.22	---	74.00	54.00	-3.78	Peak
1752.00	53.32	---	-0.89	52.43	---	74.00	54.00	-1.57	Peak
2412.00	94.81	82.70	1.96	96.77	84.66	---	---	---	Carrier
2682.00	52.23	48.22	2.53	54.76	50.75	74.00	54.00	-3.25	AVG
5175.00	41.01	---	6.19	47.20	---	74.00	54.00	-6.80	Peak
6292.50	40.80	---	8.93	49.73	---	74.00	54.00	-4.27	Peak
6885.00	41.37	---	10.21	51.57	---	74.00	54.00	-2.43	Peak

966 Chamber_A at 3Meter / Vertical

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1482.00	53.43	---	-3.02	50.41	---	74.00	54.00	-3.59	Peak
1906.00	52.42	---	0.37	52.78	---	74.00	54.00	-1.22	Peak
2412.00	104.67	91.34	1.96	106.63	93.30	---	---	---	Carrier
2812.00	51.72	47.12	2.81	54.53	49.93	74.00	54.00	-4.07	AVG
5272.50	40.78	---	6.39	47.17	---	74.00	54.00	-6.83	Peak
6682.50	40.95	---	9.90	50.85	---	74.00	54.00	-3.15	Peak
7132.50	41.26	---	10.27	51.53	---	74.00	54.00	-2.47	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *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.*
4. *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.*
5. *In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.*
6. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	3G / Wireless-N Dual WAN ADSL2+ Firewall Router	Test By	WaterNil Guan
Model	BiPAC 7800NEXL	Test Date	2010/10/02
Test Mode	IEEE 802.11g TX / CH Middle	TEMP & Humidity	25°C, 54%

966 Chamber_A at 3Meter / Horizontal

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1306.00	53.63	---	-3.56	50.07	---	74.00	54.00	-3.93	Peak
2042.00	52.34	---	1.22	53.56	---	74.00	54.00	-0.44	Peak
2437.00	96.71	85.34	2.02	98.73	87.36	---	---	---	Carrier
2780.00	51.89	46.63	2.74	54.63	49.37	74.00	54.00	-4.63	AVG
4717.50	40.78	---	6.25	47.03	---	74.00	54.00	-6.97	Peak
5497.50	40.53	---	6.84	47.38	---	74.00	54.00	-6.62	Peak
6270.00	39.80	---	8.85	48.65	---	74.00	54.00	-5.35	Peak

966 Chamber_A at 3Meter / Vertical

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1356.00	54.48	---	-3.40	51.08	---	74.00	54.00	-2.92	Peak
1912.00	52.73	---	0.42	53.15	---	74.00	54.00	-0.85	Peak
2437.00	105.65	94.41	2.02	107.67	96.43	---	---	---	Carrier
2894.00	51.77	46.61	2.98	54.75	49.59	74.00	54.00	-4.41	AVG
4470.00	41.41	---	6.47	47.88	---	74.00	54.00	-6.12	Peak
4935.00	41.64	---	5.93	47.56	---	74.00	54.00	-6.44	Peak
5977.50	41.35	---	7.90	49.25	---	74.00	54.00	-4.75	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *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.*
4. *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.*
5. *In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.*
6. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	3G / Wireless-N Dual WAN ADSL2+ Firewall Router	Test By	WaterNil Guan
Model	BiPAC 7800NEXL	Test Date	2010/10/02
Test Mode	IEEE 802.11g TX / CH High	TEMP & Humidity	25°C, 54%

966 Chamber_A at 3Meter / Horizontal

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1398.00	53.49	---	-3.27	50.22	---	74.00	54.00	-3.78	Peak
2054.00	52.45	---	1.25	53.69	---	74.00	54.00	-0.31	Peak
2462.00	94.83	81.64	2.07	96.90	83.71	---	---	---	Carrier
2808.00	51.73	46.26	2.80	54.53	49.06	74.00	54.00	-4.94	AVG
4567.50	41.09	---	6.47	47.56	---	74.00	54.00	-6.44	Peak
5647.50	40.77	---	7.17	47.94	---	74.00	54.00	-6.06	Peak
6615.00	40.71	---	9.79	50.51	---	74.00	54.00	-3.49	Peak

966 Chamber_A at 3Meter / Vertical

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1340.00	54.11	---	-3.45	50.66	---	74.00	54.00	-3.34	Peak
1970.00	52.87	---	0.89	53.76	---	74.00	54.00	-0.24	Peak
2462.00	102.36	89.04	2.06	104.42	91.10	---	---	---	Carrier
2830.00	52.12	47.21	2.85	54.97	50.06	74.00	54.00	-3.94	AVG
3885.00	42.11	---	4.57	46.68	---	74.00	54.00	-7.32	Peak
4642.50	42.05	---	6.36	48.41	---	74.00	54.00	-5.59	Peak
5580.00	40.26	---	7.03	47.29	---	74.00	54.00	-6.71	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *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.*
4. *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.*
5. *In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.*
6. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	3G / Wireless-N Dual WAN ADSL2+ Firewall Router	Test By	WaterNil Guan
Model	BIPAC 7800NEXL	Test Date	2010/10/02
Test Mode	IEEE 802.11n HT20 TX / CH Low	TEMP & Humidity	25°C, 54%

966 Chamber_A at 3Meter / Horizontal

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1506.00	53.67	---	-2.91	50.76	---	74.00	54.00	-3.24	Peak
2108.00	51.79	---	1.36	53.15	---	74.00	54.00	-0.85	Peak
2412.00	98.90	83.93	1.96	100.86	85.89	---	---	---	Carrier
2750.00	52.02	45.63	2.68	54.70	48.31	74.00	54.00	-5.69	AVG
3907.50	42.27	---	4.64	46.91	---	74.00	54.00	-7.09	Peak
4725.00	41.38	---	6.24	47.62	---	74.00	54.00	-6.38	Peak
5505.00	40.85	---	6.86	47.71	---	74.00	54.00	-6.29	Peak

966 Chamber_A at 3Meter / Vertical

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1440.00	53.12	---	-3.14	49.98	---	74.00	54.00	-4.02	Peak
2056.00	52.93	47.36	1.25	54.18	48.61	74.00	54.00	-5.39	AVG
2412.00	105.52	90.24	1.98	107.50	92.22	---	---	---	Carrier
2838.00	51.07	46.21	2.86	53.93	49.07	74.00	54.00	-4.93	AVG
4027.50	42.12	---	5.01	47.13	---	74.00	54.00	-6.87	Peak
4897.50	41.48	---	5.98	47.46	---	74.00	54.00	-6.54	Peak
6307.50	40.96	---	8.98	49.93	---	74.00	54.00	-4.07	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *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.*
4. *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.*
5. *In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.*
6. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	3G / Wireless-N Dual WAN ADSL2+ Firewall Router	Test By	WaterNil Guan
Model	BIPAC 7800NEXL	Test Date	2010/10/02
Test Mode	IEEE 802.11n HT20 TX / CH Middle	TEMP & Humidity	25°C, 54%

966 Chamber_A at 3Meter / Horizontal									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1600.00	53.87	---	-2.14	51.73	---	74.00	54.00	-2.27	Peak
1974.00	52.32	---	0.93	53.25	---	74.00	54.00	-0.75	Peak
2437.00	100.00	84.55	2.01	102.01	86.56	---	---	---	Carrier
2738.00	51.92	45.23	2.65	54.57	47.88	74.00	54.00	-6.12	AVG
3660.00	42.43	---	3.87	46.30	---	74.00	54.00	-7.70	Peak
4492.50	41.29	---	6.55	47.84	---	74.00	54.00	-6.16	Peak
5587.50	40.35	---	7.04	47.39	---	74.00	54.00	-6.61	Peak

966 Chamber_A at 3Meter / Vertical									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1530.00	53.26	---	-2.71	50.55	---	74.00	54.00	-3.45	Peak
2080.00	52.15	---	1.30	53.45	---	74.00	54.00	-0.55	Peak
2437.00	110.21	92.81	2.01	112.22	94.82	---	---	---	Carrier
2792.00	51.64	46.37	2.76	54.40	49.13	74.00	54.00	-4.87	AVG
3832.50	41.87	---	4.40	46.28	---	74.00	54.00	-7.72	Peak
4740.00	41.58	---	6.21	47.79	---	74.00	54.00	-6.21	Peak
5715.00	41.71	---	7.32	49.03	---	74.00	54.00	-4.97	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *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.*
4. *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.*
5. *In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.*
6. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	3G / Wireless-N Dual WAN ADSL2+ Firewall Router	Test By	WaterNil Guan
Model	BIPAC 7800NEXL	Test Date	2010/10/02
Test Mode	IEEE 802.11n HT20 TX / CH High	TEMP & Humidity	25°C, 54%

966 Chamber_A at 3Meter / Horizontal

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1592.00	53.49	---	-2.21	51.29	---	74.00	54.00	-2.71	Peak
2044.00	52.75	46.13	1.23	53.98	47.36	74.00	54.00	-6.64	AVG
2462.00	93.45	78.12	2.07	95.52	80.19	---	---	---	Carrier
2700.00	51.35	46.11	2.57	53.92	48.68	74.00	54.00	-5.32	AVG
4215.00	42.44	---	5.63	48.07	---	74.00	54.00	-5.93	Peak
4912.50	41.70	---	5.96	47.66	---	74.00	54.00	-6.34	Peak
5737.50	40.99	---	7.37	48.36	---	74.00	54.00	-5.64	Peak

966 Chamber_A at 3Meter / Vertical

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1550.00	53.22	---	-2.55	50.67	---	74.00	54.00	-3.33	Peak
1990.00	52.18	---	1.06	53.23	---	74.00	54.00	-0.77	Peak
2462.00	104.35	87.29	2.06	106.41	89.35	---	---	---	Carrier
2778.00	52.05	46.70	2.73	54.78	49.43	74.00	54.00	-4.57	AVG
3660.00	41.82	---	3.87	45.69	---	74.00	54.00	-8.31	Peak
4792.50	41.67	---	6.14	47.80	---	74.00	54.00	-6.20	Peak
5625.00	41.56	---	7.12	48.69	---	74.00	54.00	-5.31	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *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.*
4. *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.*
5. *In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.*
6. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	3G / Wireless-N Dual WAN ADSL2+ Firewall Router	Test By	WaterNil Guan
Model	BIPAC 7800NEXL	Test Date	2010/10/02
Test Mode	IEEE 802.11n HT40 TX / CH Low	TEMP & Humidity	25°C, 54%

966 Chamber_A at 3Meter / Horizontal

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1524.00	53.14	---	-2.76	50.38	---	74.00	54.00	-3.62	Peak
1866.00	52.44	---	0.04	52.48	---	74.00	54.00	-1.52	Peak
2422.00	93.22	74.55	2.01	95.23	76.56	---	---	---	Carrier
2750.00	51.31	46.21	2.68	53.99	48.89	74.00	54.00	-5.11	AVG
3832.50	42.03	---	4.40	46.43	---	74.00	54.00	-7.57	Peak
4672.50	41.88	---	6.31	48.19	---	74.00	54.00	-5.81	Peak
6135.00	40.78	---	8.40	49.18	---	74.00	54.00	-4.82	Peak

966 Chamber_A at 3Meter / Vertical

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1320.00	53.43	---	-3.51	49.92	---	74.00	54.00	-4.08	Peak
1896.00	52.51	---	0.29	52.80	---	74.00	54.00	-1.20	Peak
2422.00	102.51	82.09	1.99	104.50	84.08	---	---	---	Carrier
2886.00	51.47	45.99	2.97	54.44	48.96	74.00	54.00	-5.04	AVG
3517.50	42.74	---	3.43	46.17	---	74.00	54.00	-7.83	Peak
4732.50	41.20	---	6.23	47.43	---	74.00	54.00	-6.57	Peak
6022.50	41.48	---	8.03	49.51	---	74.00	54.00	-4.49	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *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.*
4. *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.*
5. *In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.*
6. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	3G / Wireless-N Dual WAN ADSL2+ Firewall Router	Test By	WaterNil Guan
Model	BIPAC 7800NEXL	Test Date	2010/10/02
Test Mode	IEEE 802.11n HT40 TX / CH Middle	TEMP & Humidity	25°C, 54%

966 Chamber_A at 3Meter / Horizontal

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1244.00	53.88	---	-3.75	50.13	---	74.00	54.00	-3.87	Peak
2008.00	52.17	---	1.16	53.33	---	74.00	54.00	-0.67	Peak
2437.00	94.87	75.60	2.02	96.89	77.62	---	---	---	Carrier
2848.00	52.59	46.33	2.88	55.47	49.21	74.00	54.00	-4.79	AVG
4177.50	41.67	---	5.51	47.18	---	74.00	54.00	-6.82	Peak
5520.00	40.66	---	6.89	47.55	---	74.00	54.00	-6.45	Peak
6345.00	40.28	---	9.10	49.38	---	74.00	54.00	-4.62	Peak

966 Chamber_A at 3Meter / Vertical

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1394.00	53.37	---	-3.29	50.08	---	74.00	54.00	-3.92	Peak
1716.00	52.80	---	-1.19	51.61	---	74.00	54.00	-2.39	Peak
2437.00	105.52	83.60	2.04	107.56	85.64	---	---	---	Carrier
2600.00	56.33	46.56	2.35	58.68	48.91	74.00	54.00	-5.09	AVG
4530.00	41.00	---	6.53	47.53	---	74.00	54.00	-6.47	Peak
5520.00	41.17	---	6.89	48.06	---	74.00	54.00	-5.94	Peak
6382.50	40.47	---	9.23	49.70	---	74.00	54.00	-4.30	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *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.*
4. *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.*
5. *In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.*
6. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	3G / Wireless-N Dual WAN ADSL2+ Firewall Router	Test By	WaterNil Guan
Model	BIPAC 7800NEXL	Test Date	2010/10/02
Test Mode	IEEE 802.11n HT40 TX / CH High	TEMP & Humidity	25°C, 54%

966 Chamber_A at 3Meter / Horizontal									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1348.00	54.07	---	-3.43	50.64	---	74.00	54.00	-3.36	Peak
2156.00	51.74	---	1.45	53.19	---	74.00	54.00	-0.81	Peak
2452.00	91.28	72.50	2.05	93.33	74.55	---	---	---	Carrier
2776.00	51.69	46.19	2.73	54.42	48.92	74.00	54.00	-5.08	AVG
4057.50	41.90	---	5.11	47.01	---	74.00	54.00	-6.99	Peak
4845.00	41.30	---	6.06	47.36	---	74.00	54.00	-6.64	Peak
6120.00	40.98	---	8.35	49.33	---	74.00	54.00	-4.67	Peak

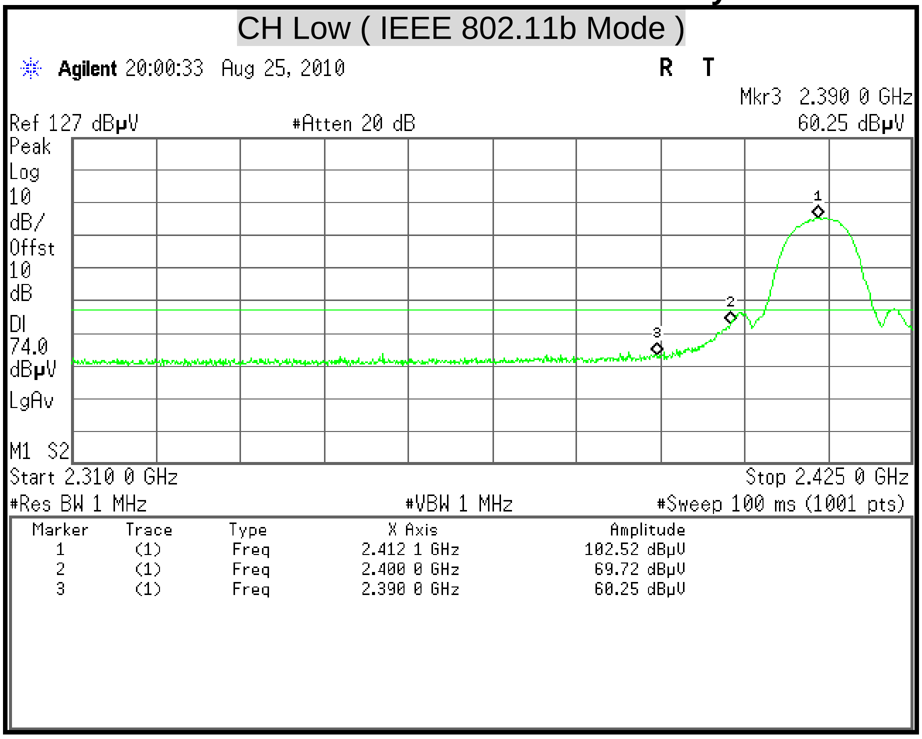
966 Chamber_A at 3Meter / Vertical									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1436.00	53.72	---	-3.16	50.56	---	74.00	54.00	-3.44	Peak
2114.00	52.51	47.03	1.37	53.88	48.40	74.00	54.00	-5.60	AVG
2452.00	102.47	80.74	2.07	104.54	82.81	---	---	---	Carrier
2852.00	51.52	46.01	2.89	54.41	48.90	74.00	54.00	-5.10	AVG
4192.50	41.48	---	5.56	47.04	---	74.00	54.00	-6.96	Peak
5415.00	40.38	---	6.68	47.06	---	74.00	54.00	-6.94	Peak
6277.50	41.25	---	8.88	50.13	---	74.00	54.00	-3.87	Peak

Remark:

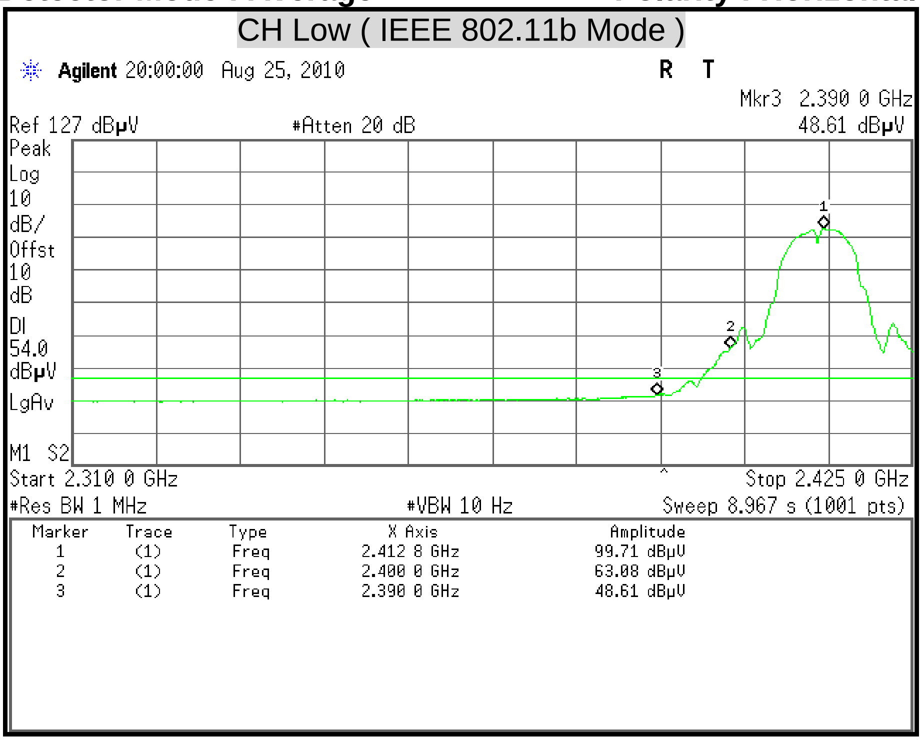
1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *Data of measurement within this frequency range shown “ --- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
4. *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.*
5. *In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.*
6. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

Restricted Band Edges

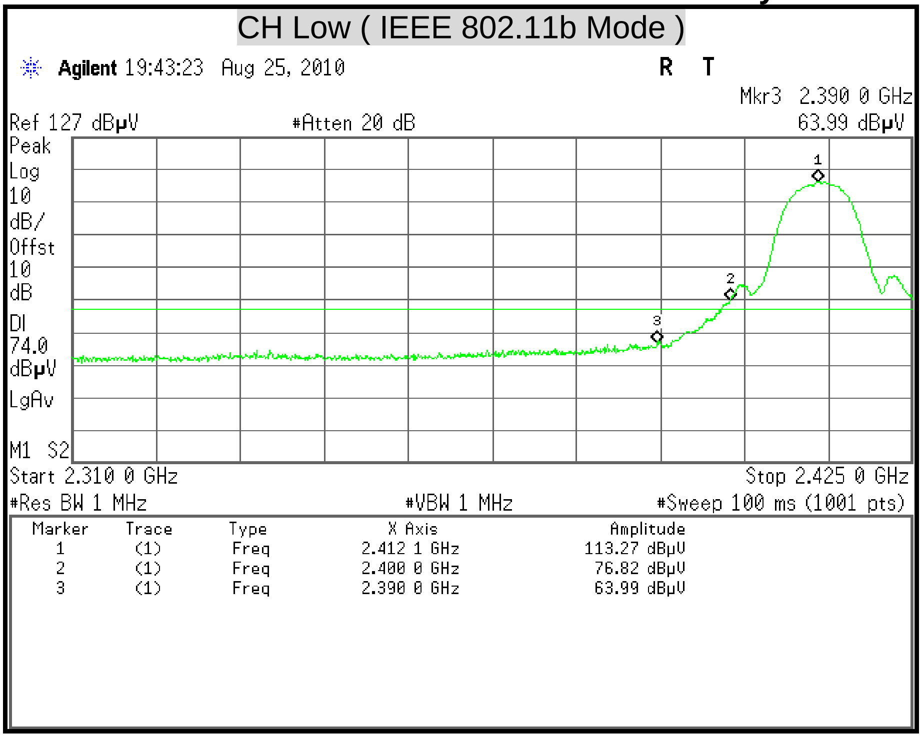
Detector Mode : Peak **Polarity : Horizontal**



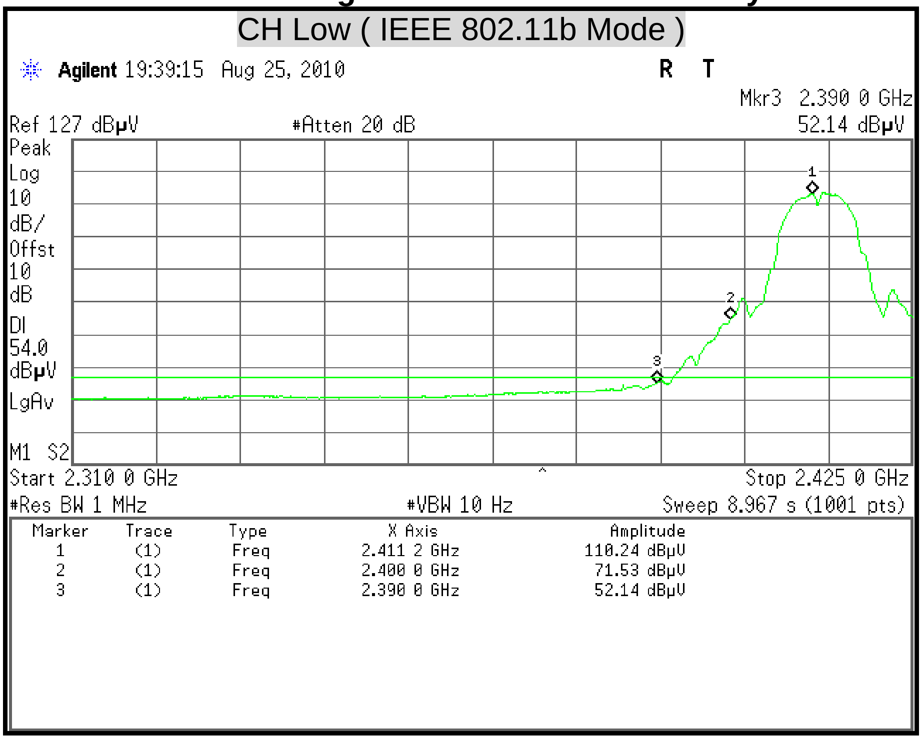
Detector Mode : Average **Polarity : Horizontal**



Detector Mode : Peak **Polarity : Vertical**

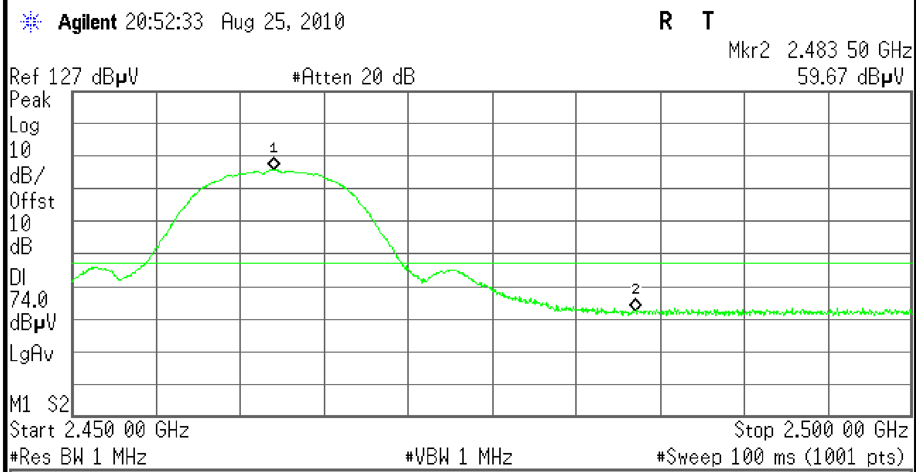


Detector Mode : Average **Polarity : Vertical**



Detector Mode : Peak **Polarity : Horizontal**

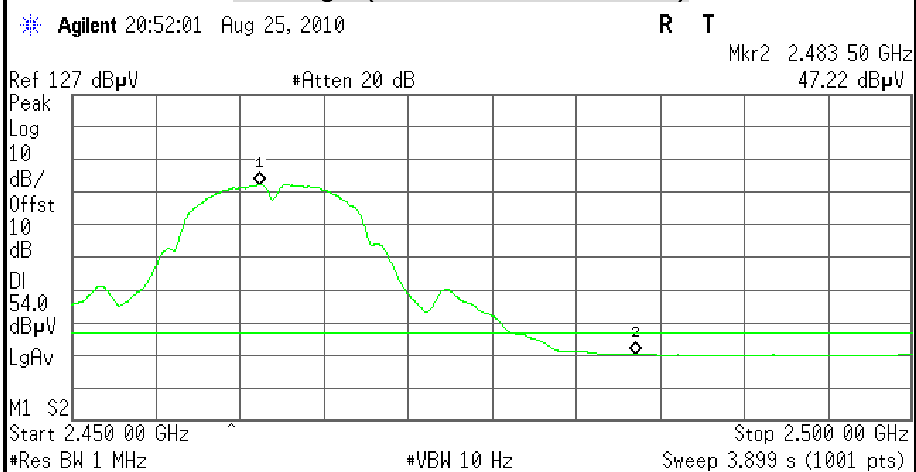
CH High (IEEE 802.11b Mode)



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.462 05 GHz	102.71 dBμV
2	(1)	Freq	2.483 50 GHz	59.67 dBμV

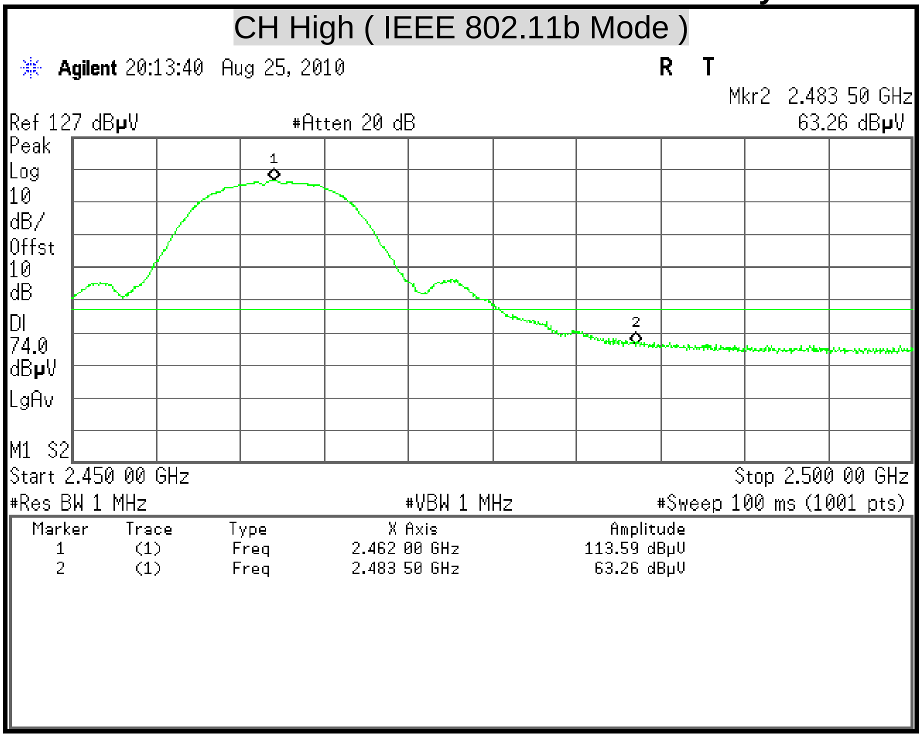
Detector Mode : Average **Polarity : Horizontal**

CH High (IEEE 802.11b Mode)

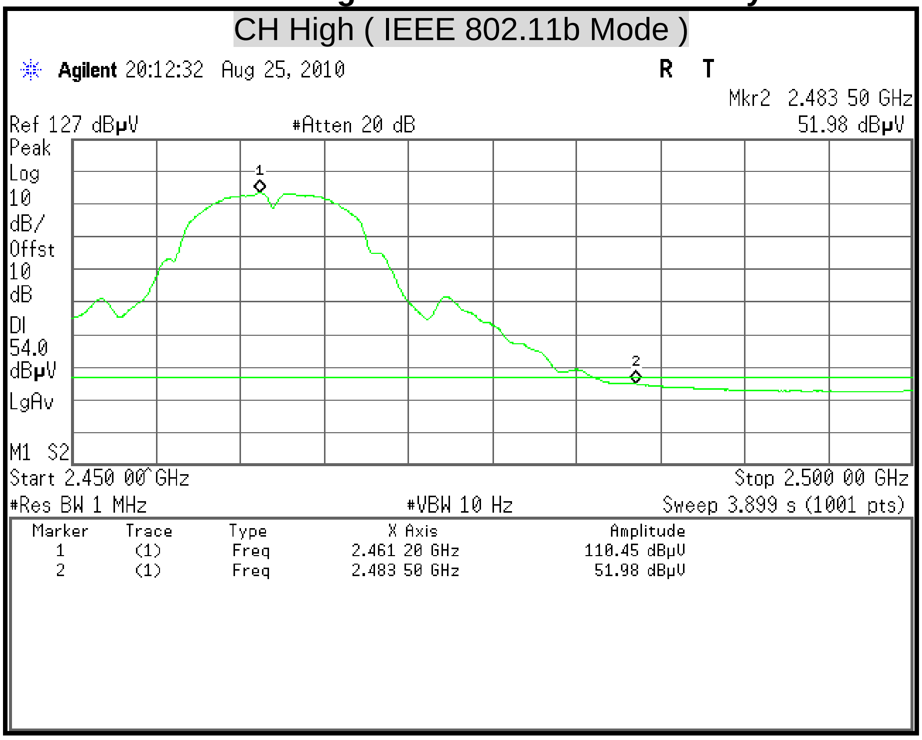


Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.461 20 GHz	99.39 dBμV
2	(1)	Freq	2.483 50 GHz	47.22 dBμV

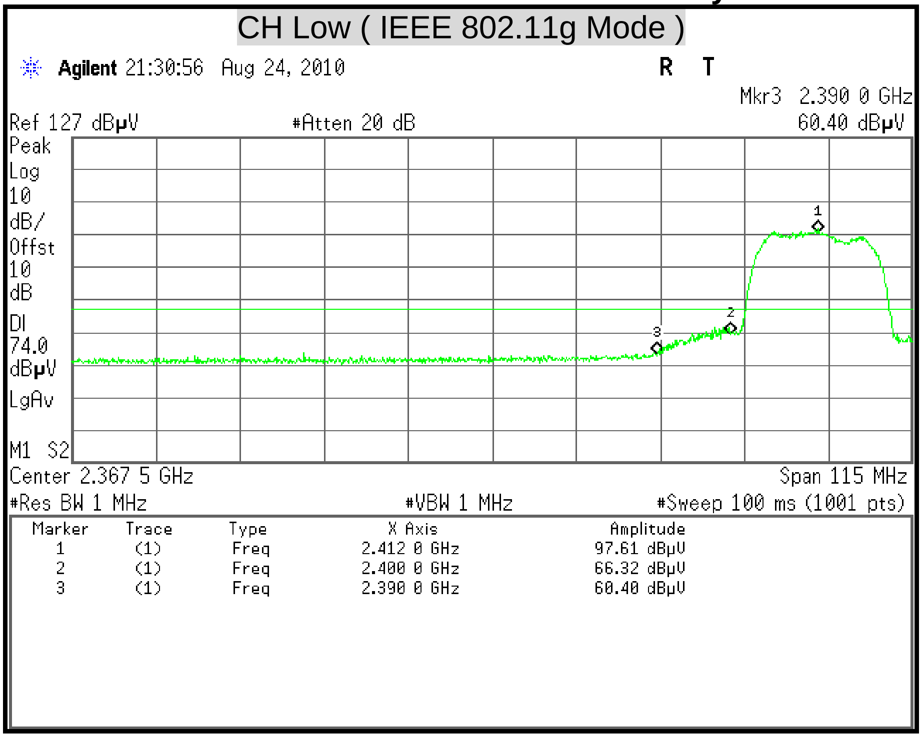
Detector Mode : Peak **Polarity : Vertical**



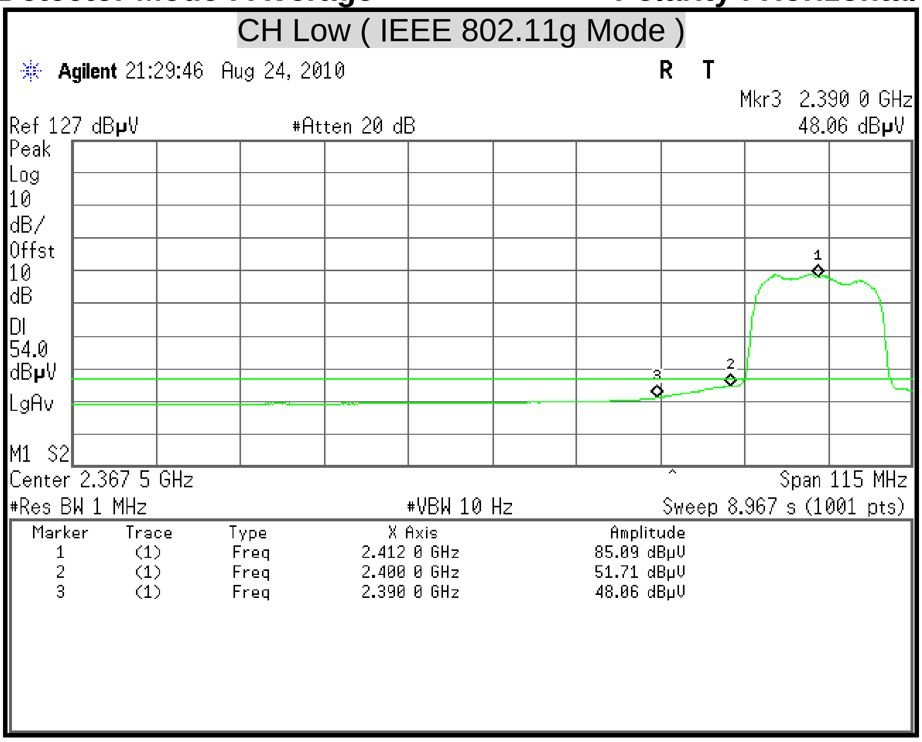
Detector Mode : Average **Polarity : Vertical**



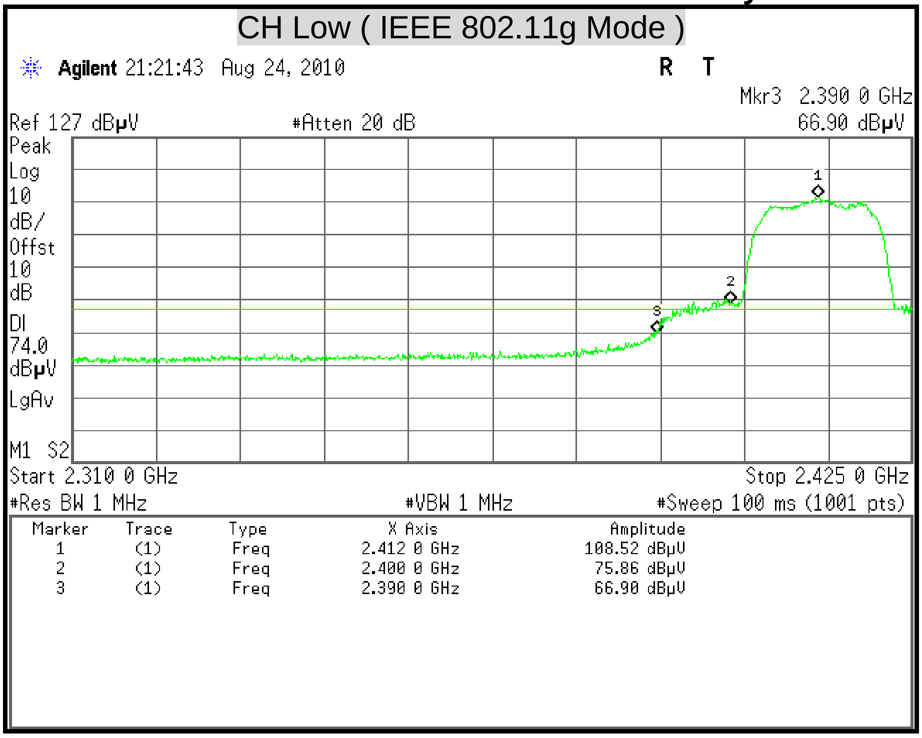
Detector Mode : Peak **Polarity : Horizontal**



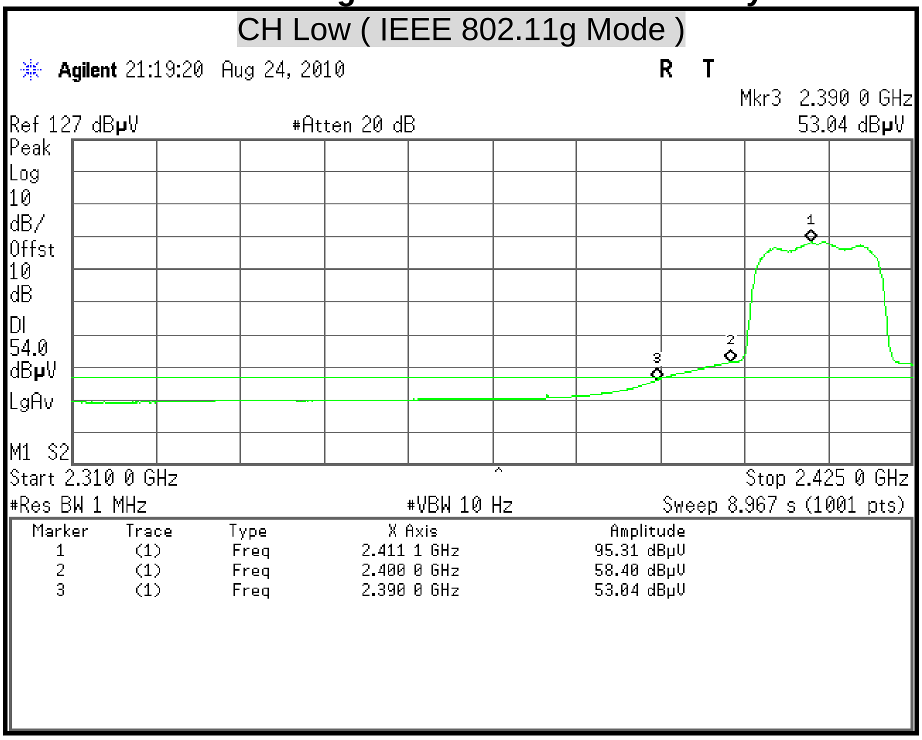
Detector Mode : Average **Polarity : Horizontal**



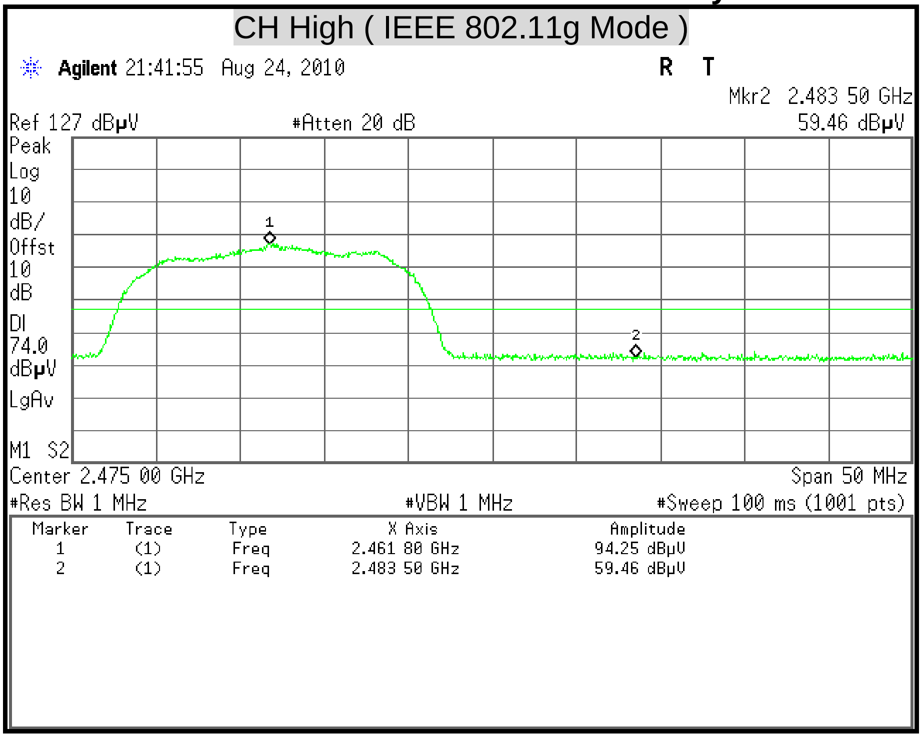
Detector Mode : Peak **Polarity : Vertical**



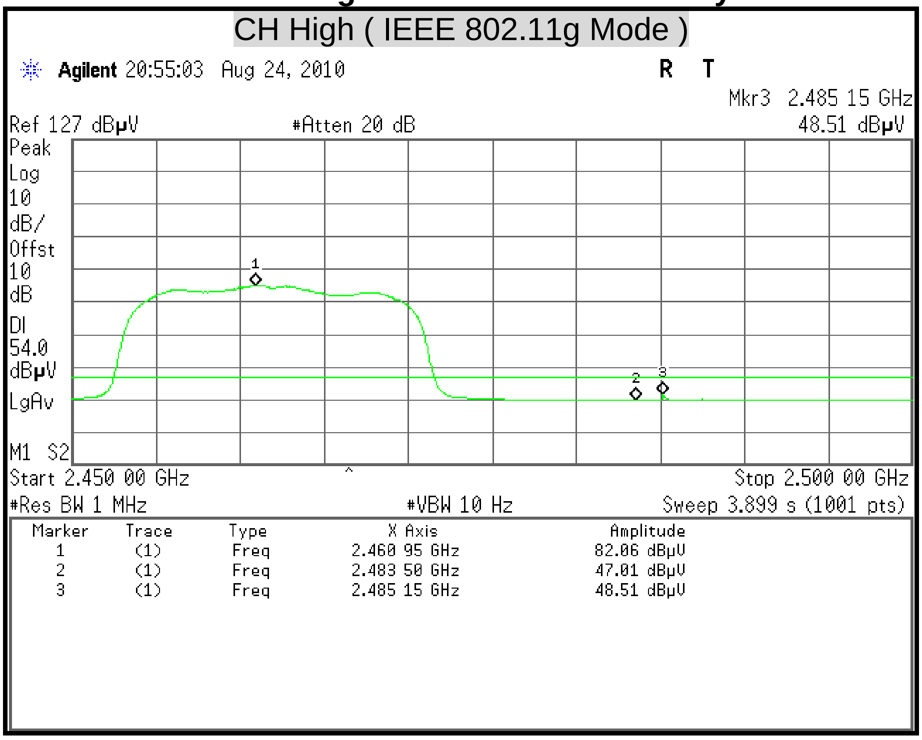
Detector Mode : Average **Polarity : Vertical**



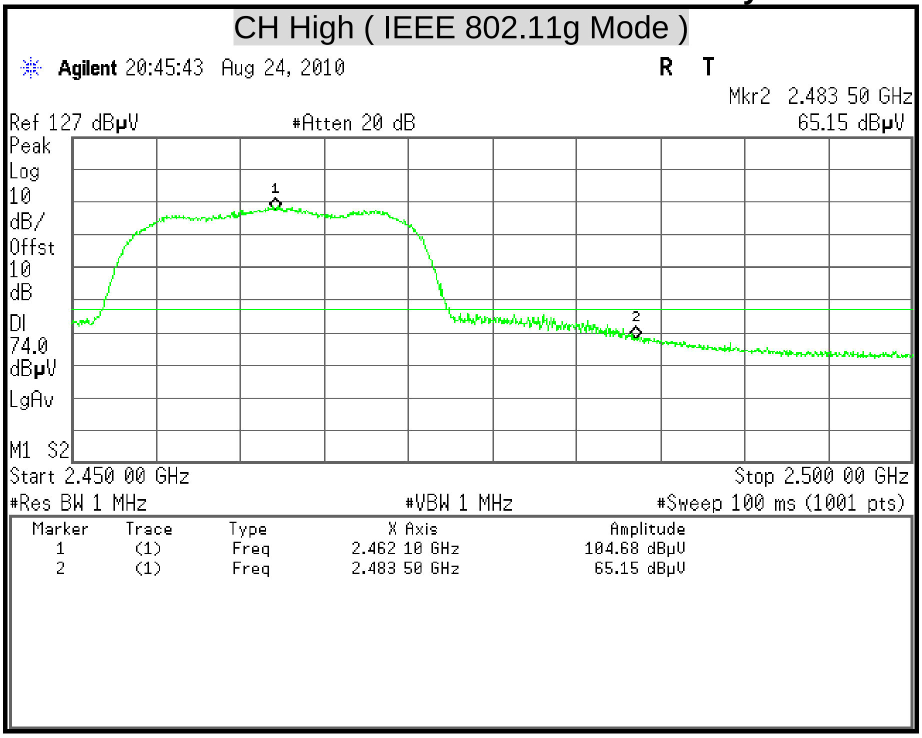
Detector Mode : Peak **Polarity : Horizontal**



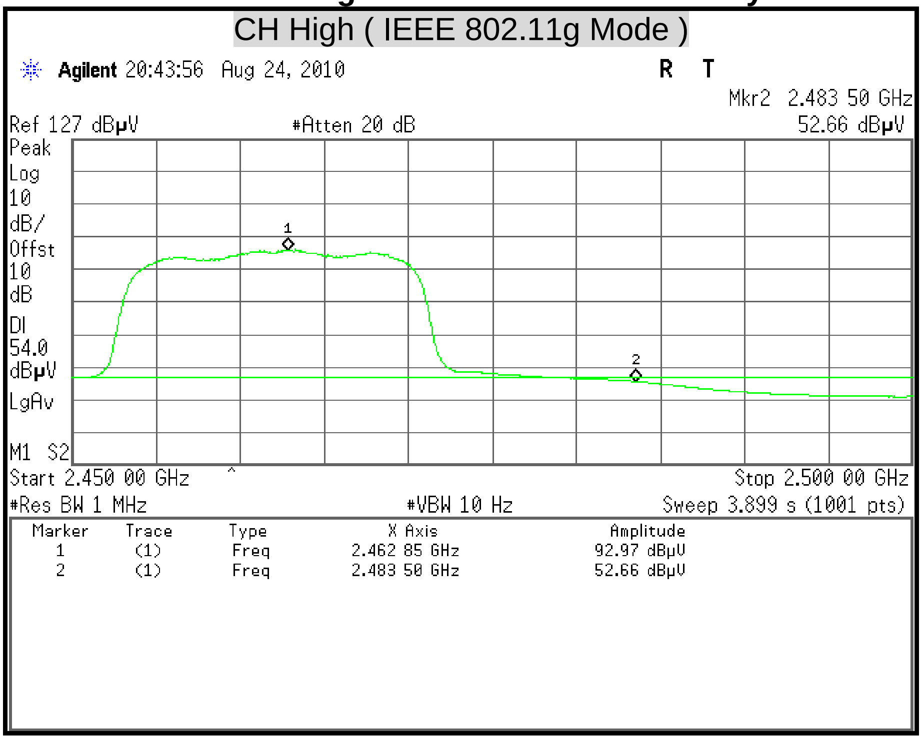
Detector Mode : Average **Polarity : Horizontal**



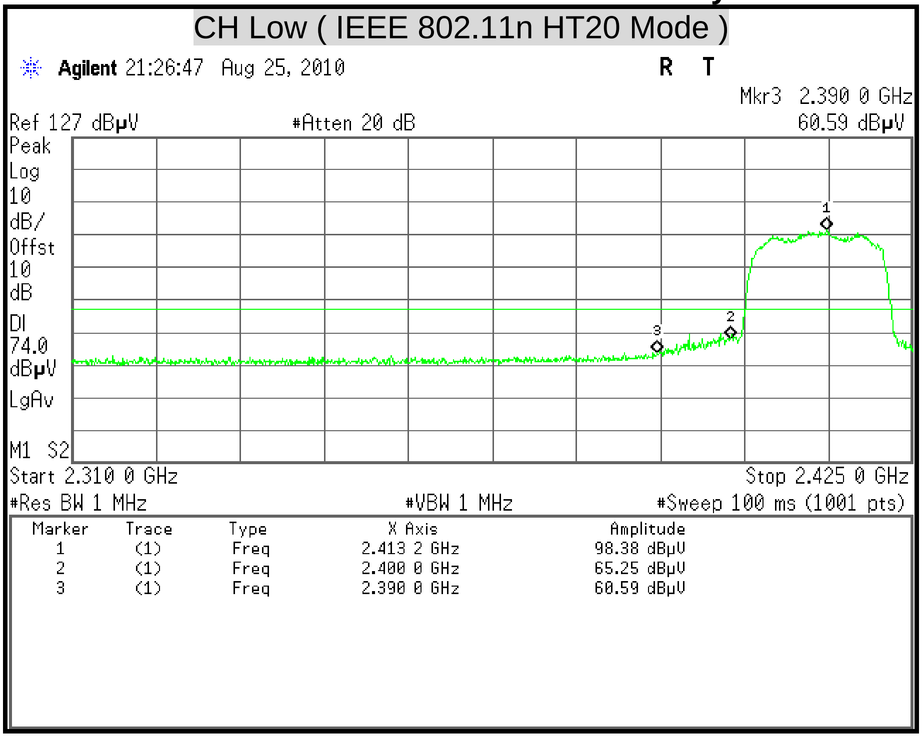
Detector Mode : Peak **Polarity : Vertical**



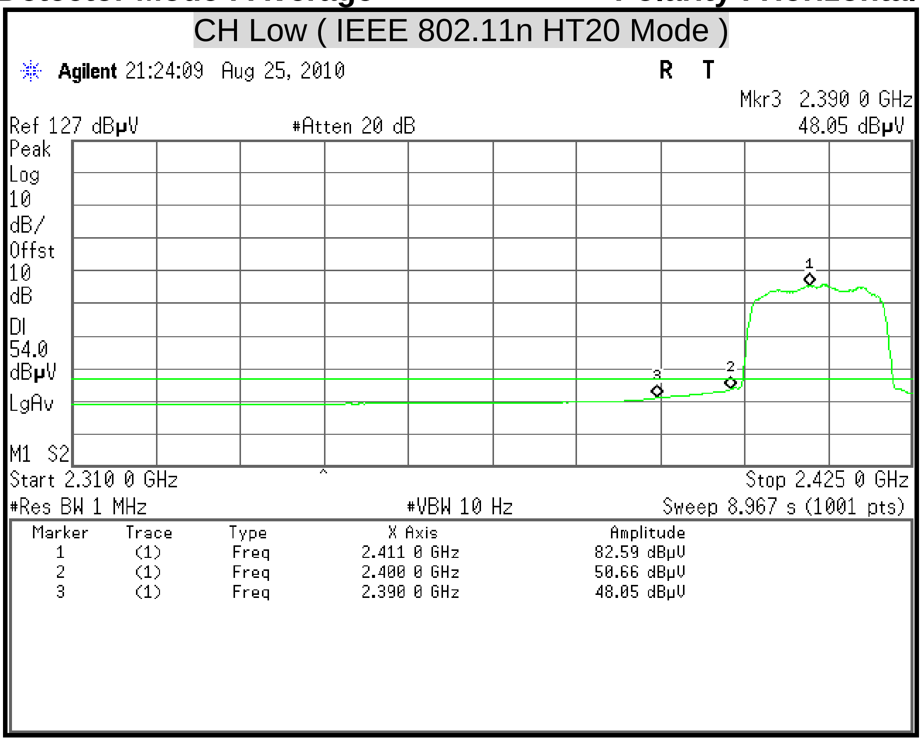
Detector Mode : Average **Polarity : Vertical**



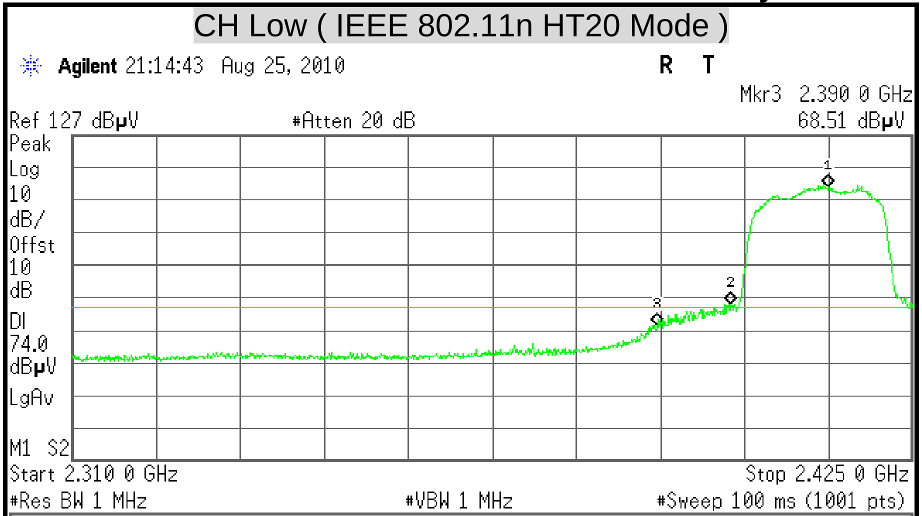
Detector Mode : Peak **Polarity : Horizontal**



Detector Mode : Average **Polarity : Horizontal**

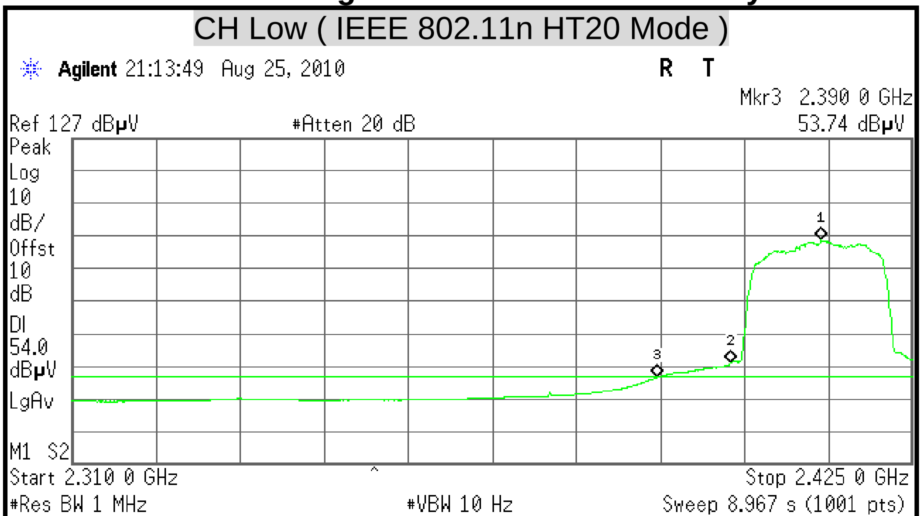


Detector Mode : Peak **Polarity : Vertical**



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.413 4 GHz	111.04 dBμV
2	(1)	Freq	2.400 0 GHz	74.90 dBμV
3	(1)	Freq	2.390 0 GHz	68.51 dBμV

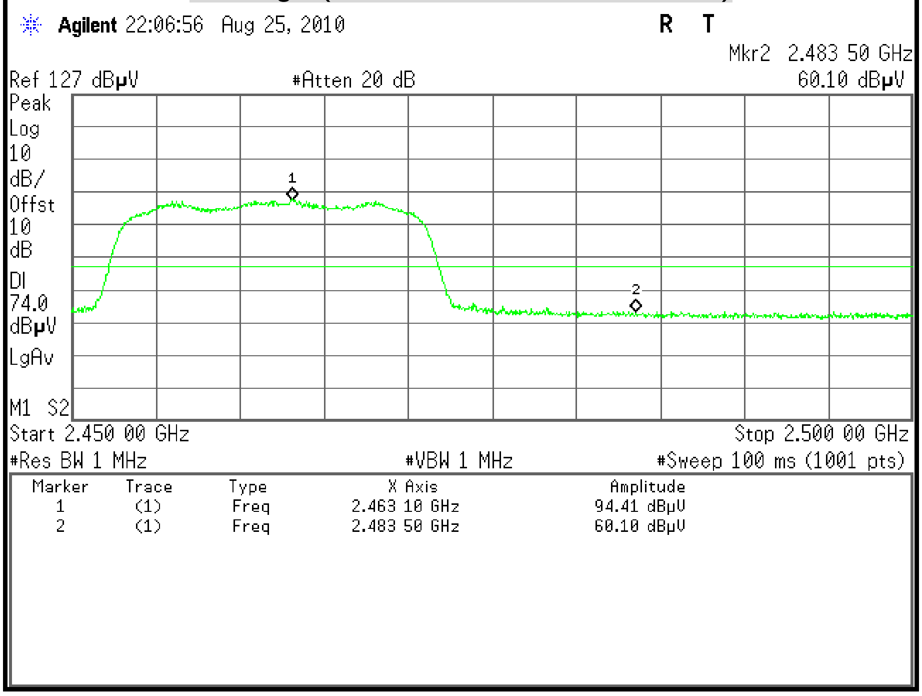
Detector Mode : Average **Polarity : Vertical**



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.412 5 GHz	95.62 dBμV
2	(1)	Freq	2.400 0 GHz	57.97 dBμV
3	(1)	Freq	2.390 0 GHz	53.74 dBμV

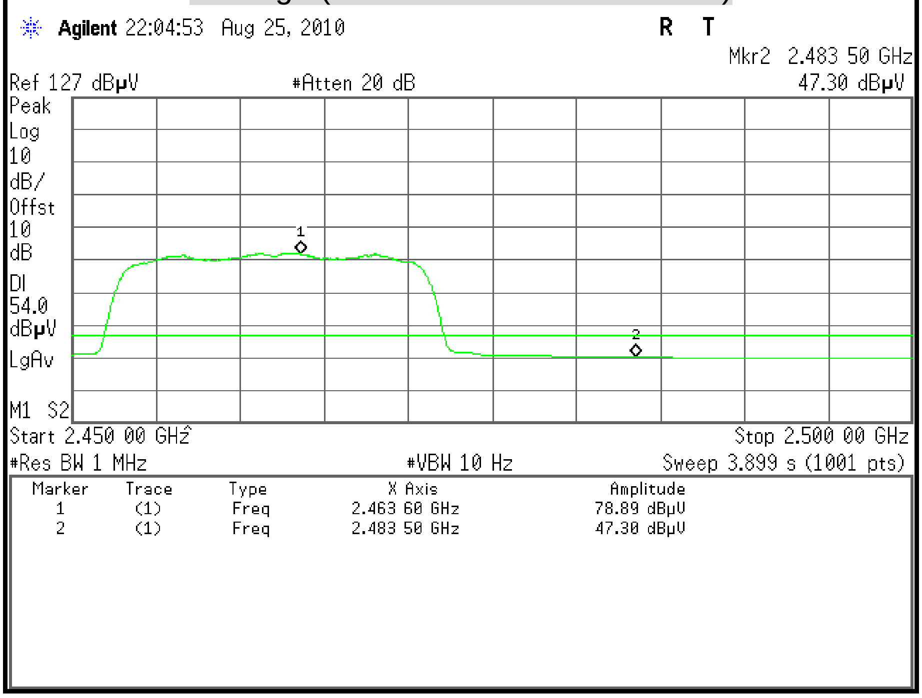
Detector Mode : Peak **Polarity : Horizontal**

CH High (IEEE 802.11n HT20 Mode)

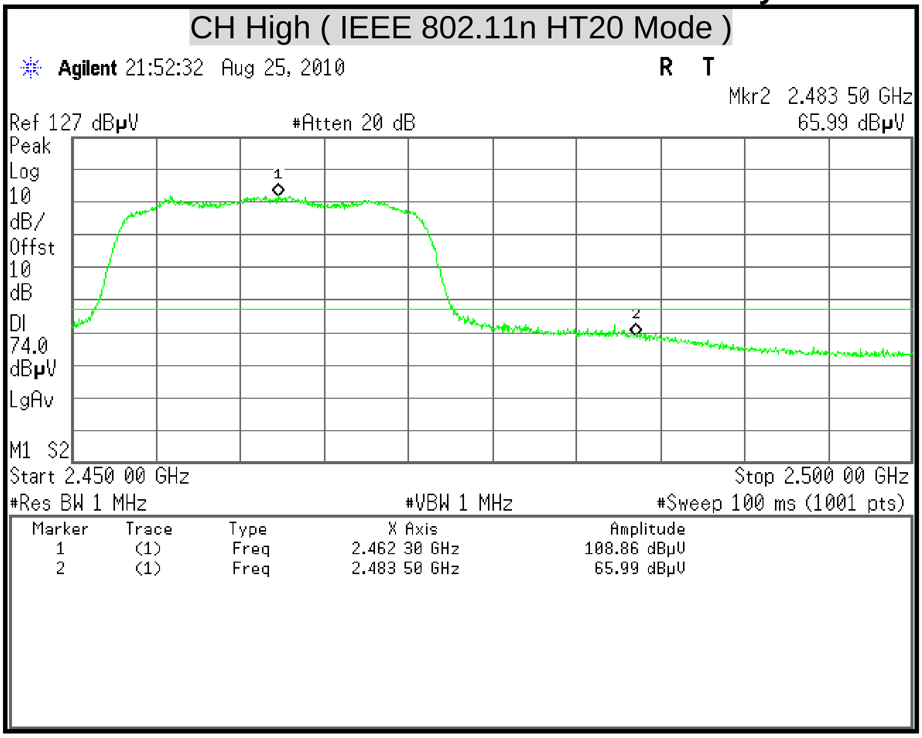


Detector Mode : Average **Polarity : Horizontal**

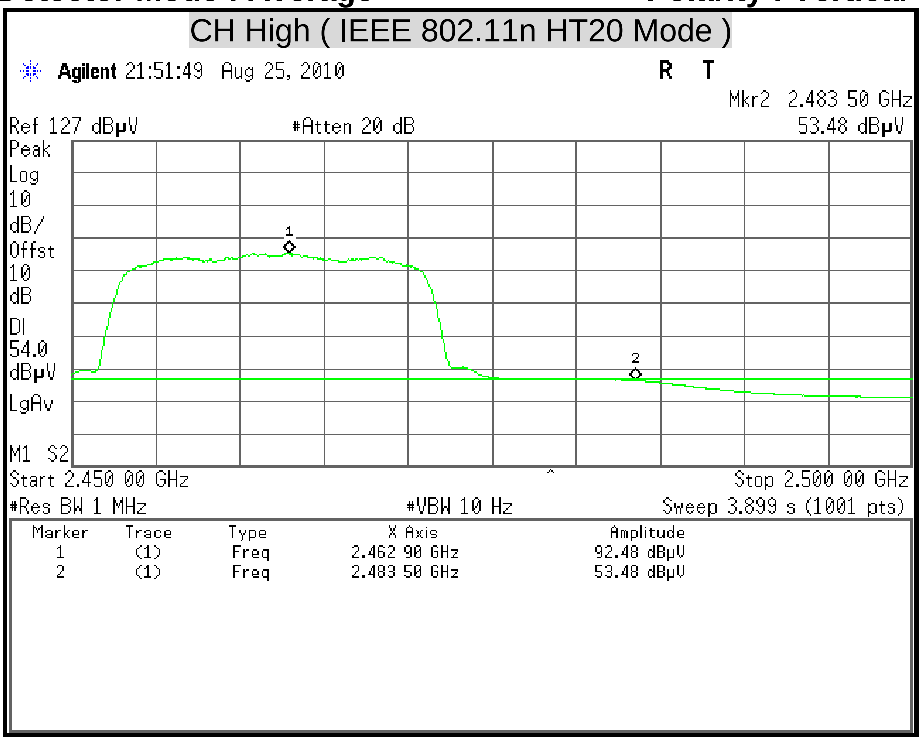
CH High (IEEE 802.11n HT20 Mode)



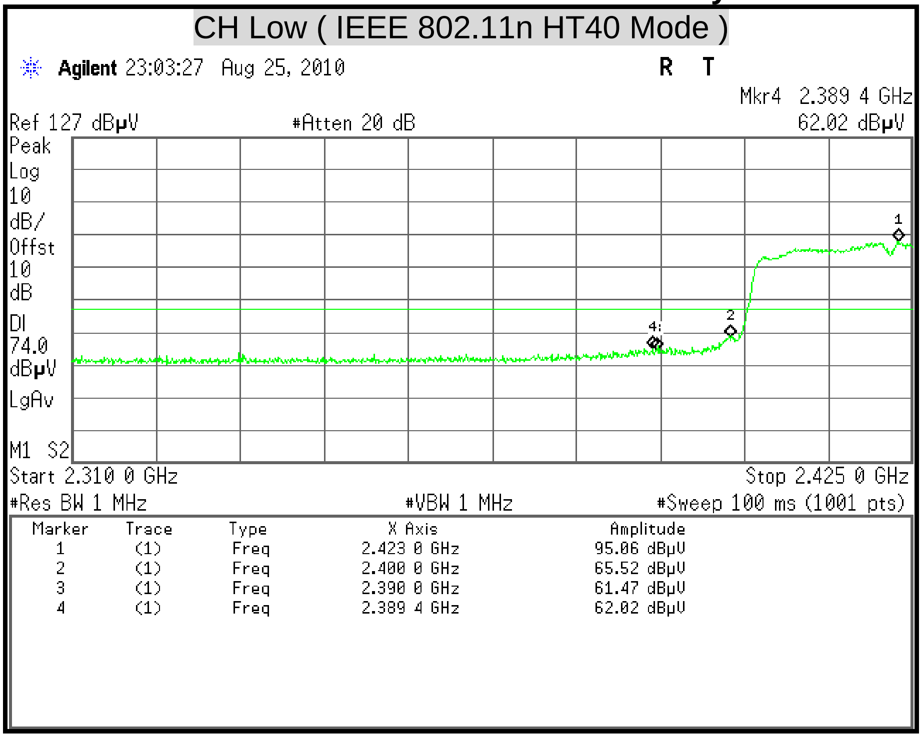
Detector Mode : Peak **Polarity : Vertical**



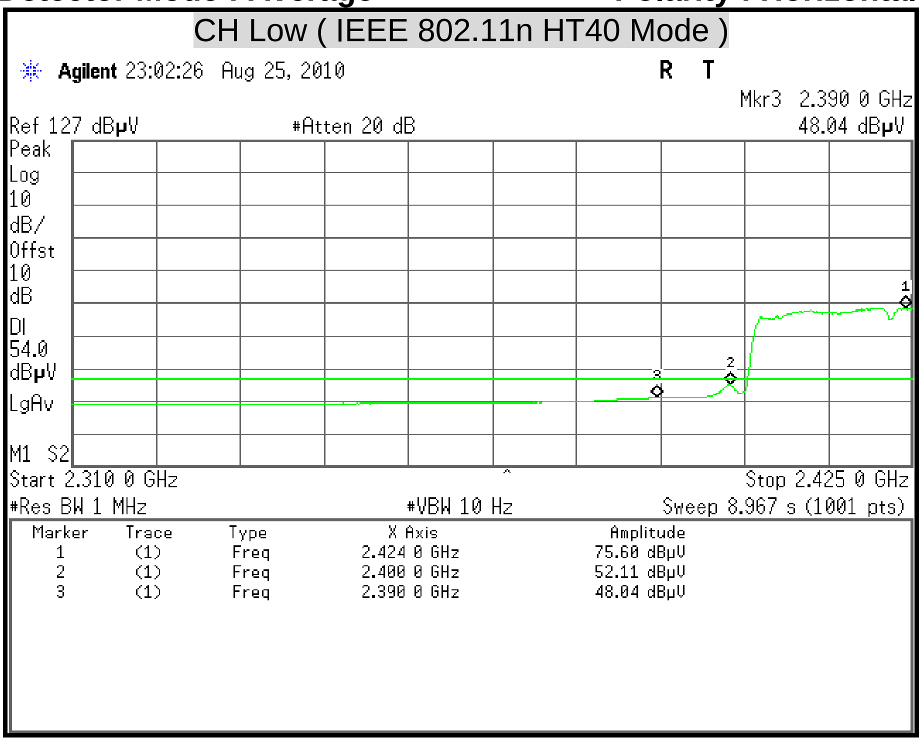
Detector Mode : Average **Polarity : Vertical**



Detector Mode : Peak **Polarity : Horizontal**

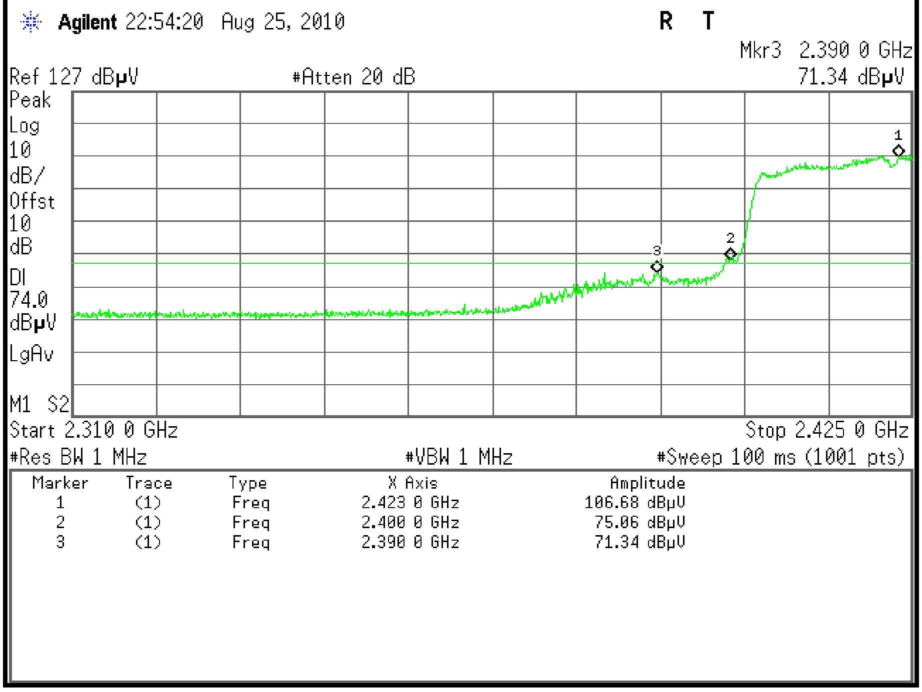


Detector Mode : Average **Polarity : Horizontal**



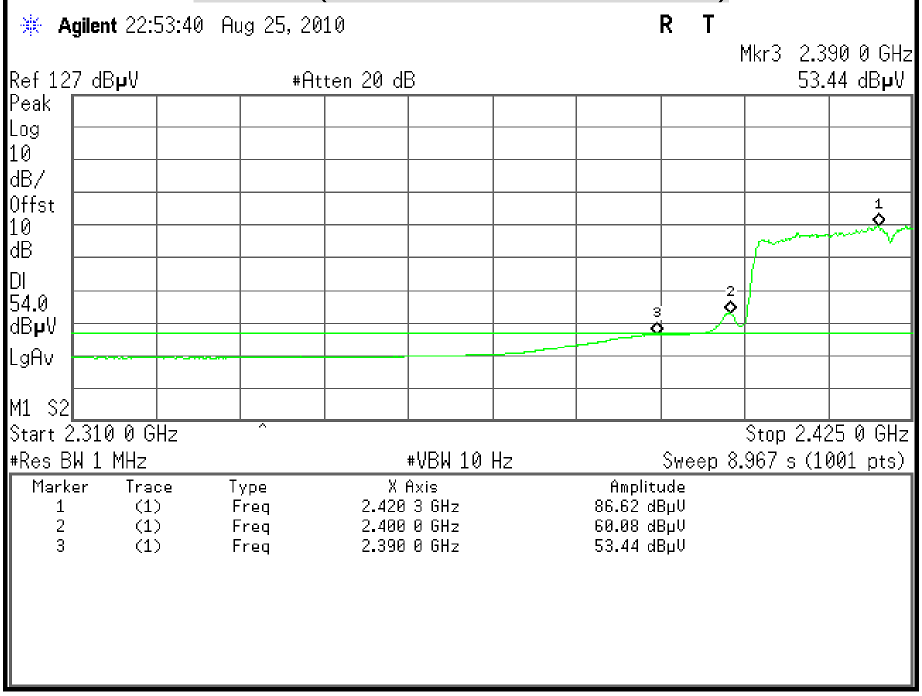
Detector Mode : Peak **Polarity : Vertical**

CH Low (IEEE 802.11n HT40 Mode)



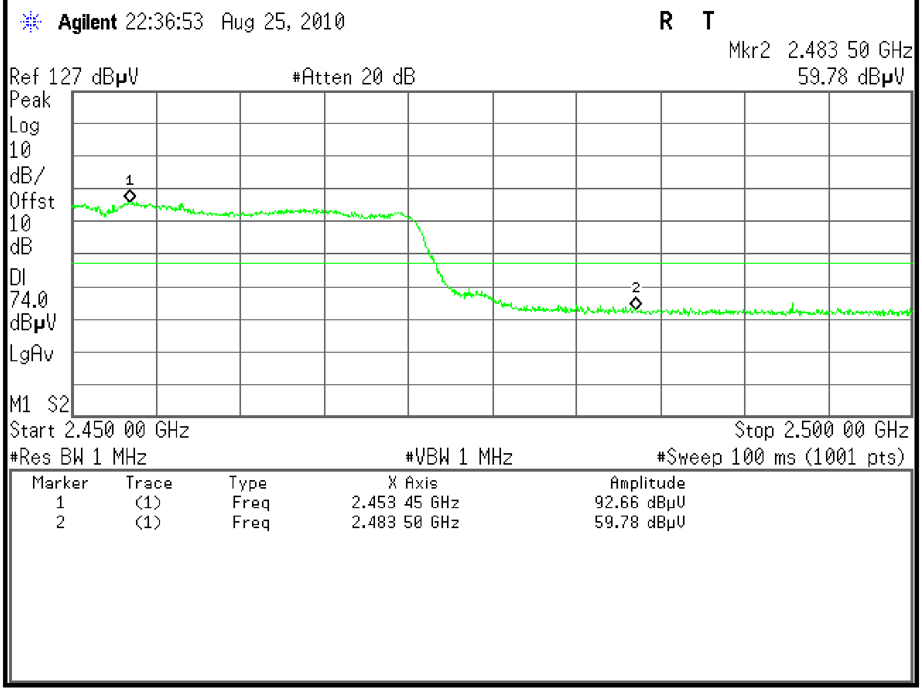
Detector Mode : Average **Polarity : Vertical**

CH Low (IEEE 802.11n HT40 Mode)



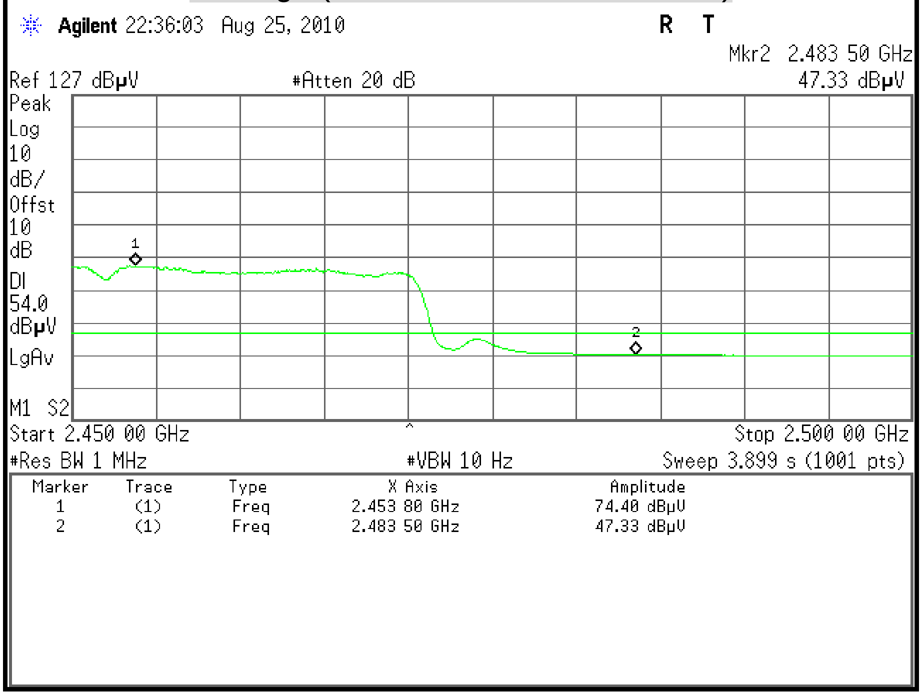
Detector Mode : Peak **Polarity : Horizontal**

CH High (IEEE 802.11n HT40 Mode)

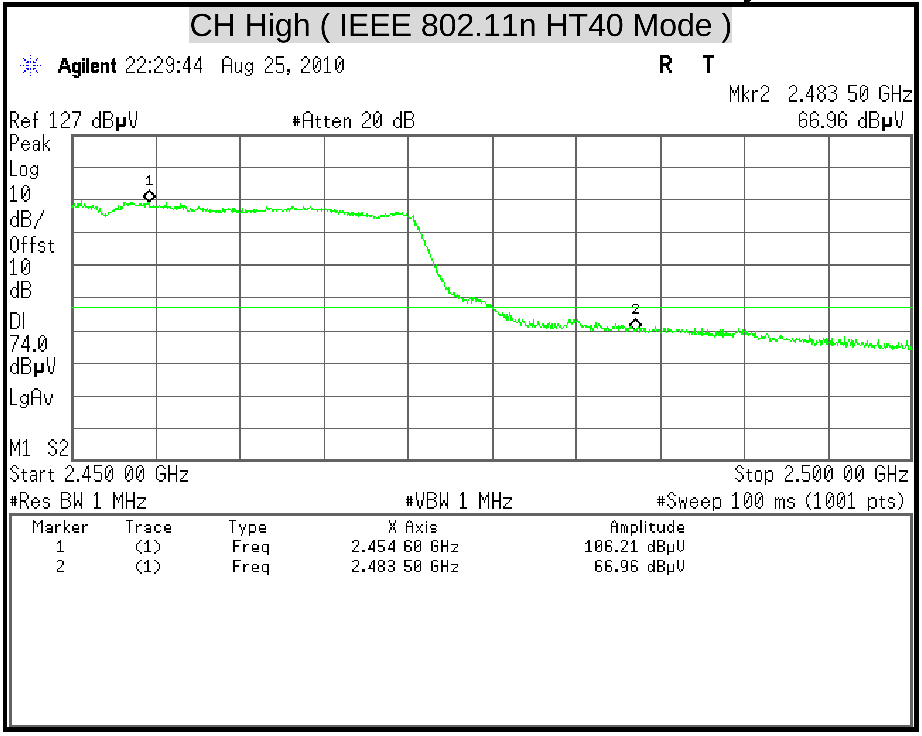


Detector Mode : Average **Polarity : Horizontal**

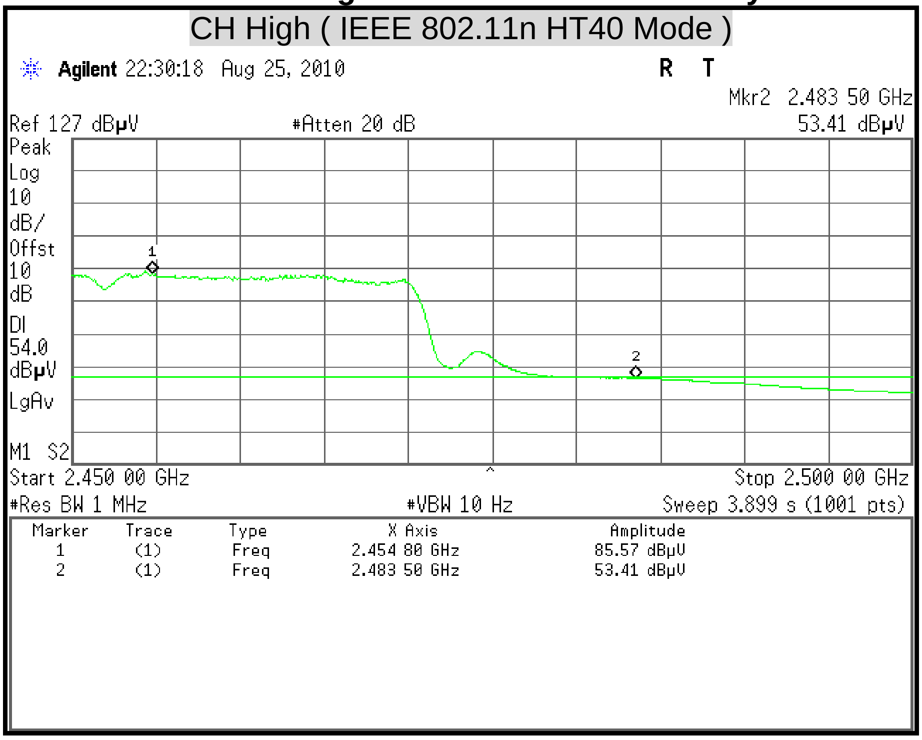
CH High (IEEE 802.11n HT40 Mode)



Detector Mode : Peak **Polarity : Vertical**



Detector Mode : Average **Polarity : Vertical**



7.7 CONDUCTED EMISSION

LIMITS

§ 15.207 (a) Except as shown in paragraph (b) and (c) 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 µH/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.

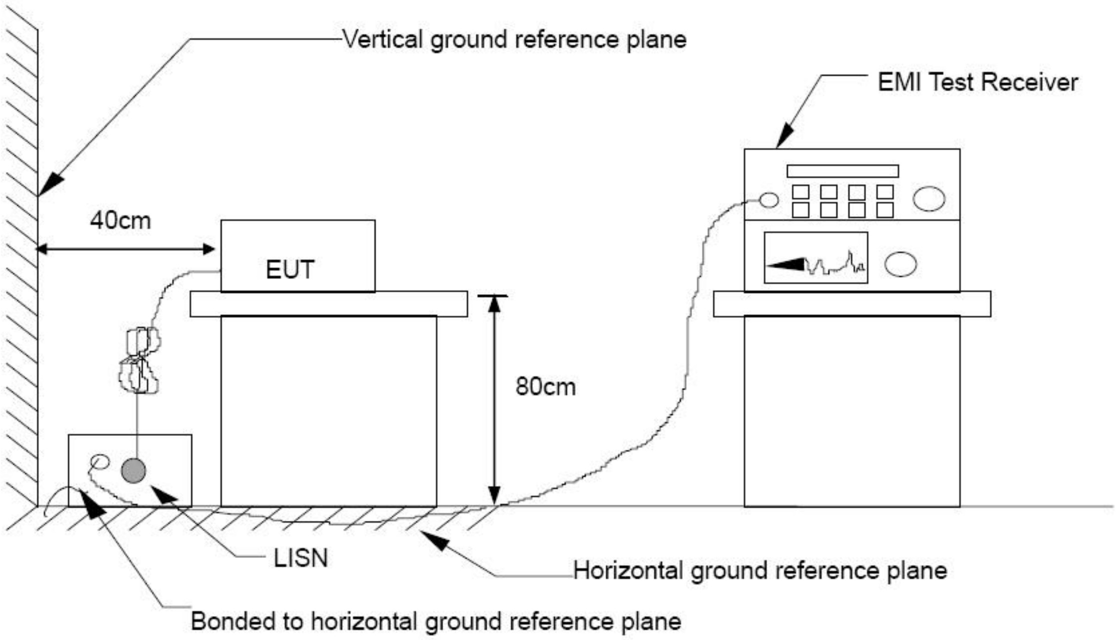
Frequency Range (MHz)	Conducted Limit (dBµv)	
	Quasi-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5.00	56	46
5.00 - 30.0	60	50

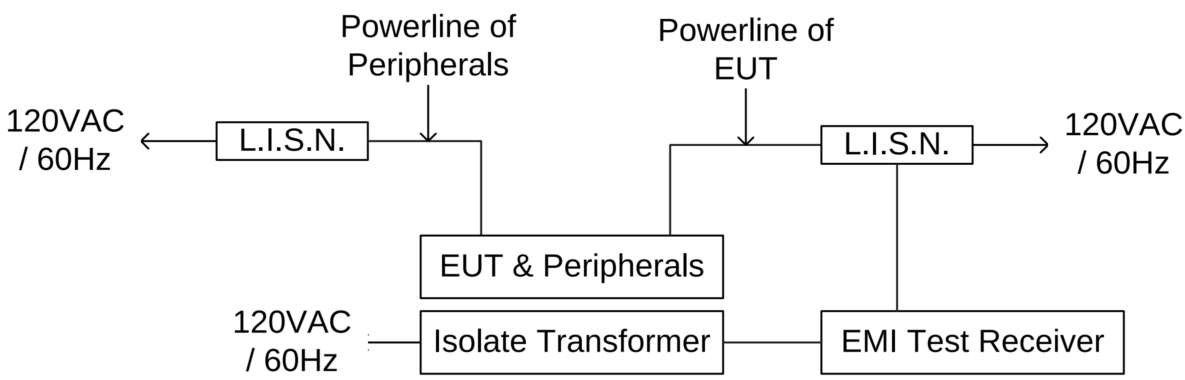
TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
L.I.S.N	SCHWARZBECK	NSLK 8127	8127-465	08/08/2011
L.I.S.N	SCHWARZBECK	NSLK 8127	8127-473	03/22/2011
EMI Test Receiver	ROHDE & SCHWARZ	ESCS30	835418/008	10/24/2011
Pulse Limit	ROHDE & SCHWARZ	ESH3-Z2	100117	09/17/2011
N Type Coaxial Cable	BELDEN	8268 M17/164	003	07/09/2011

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

TEST SETUP


Vertical ground reference plane
EMI Test Receiver
40cm
EUT
80cm
LISN
Horizontal ground reference plane
Bonded to horizontal ground reference plane


Powerline of Peripherals
Powerline of EUT
120VAC / 60Hz
L.I.S.N.
L.I.S.N.
120VAC / 60Hz
EUT & Peripherals
120VAC / 60Hz
Isolate Transformer
EMI Test Receiver

TEST PROCEDURE

The basic test procedure was in accordance with ANSI C63.4:2003.

The test procedure is performed in a 4m × 3m × 2.4m (L×W×H) shielded room.

The EUT along with its peripherals were placed on a 1.0m (W) × 1.5m (L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.

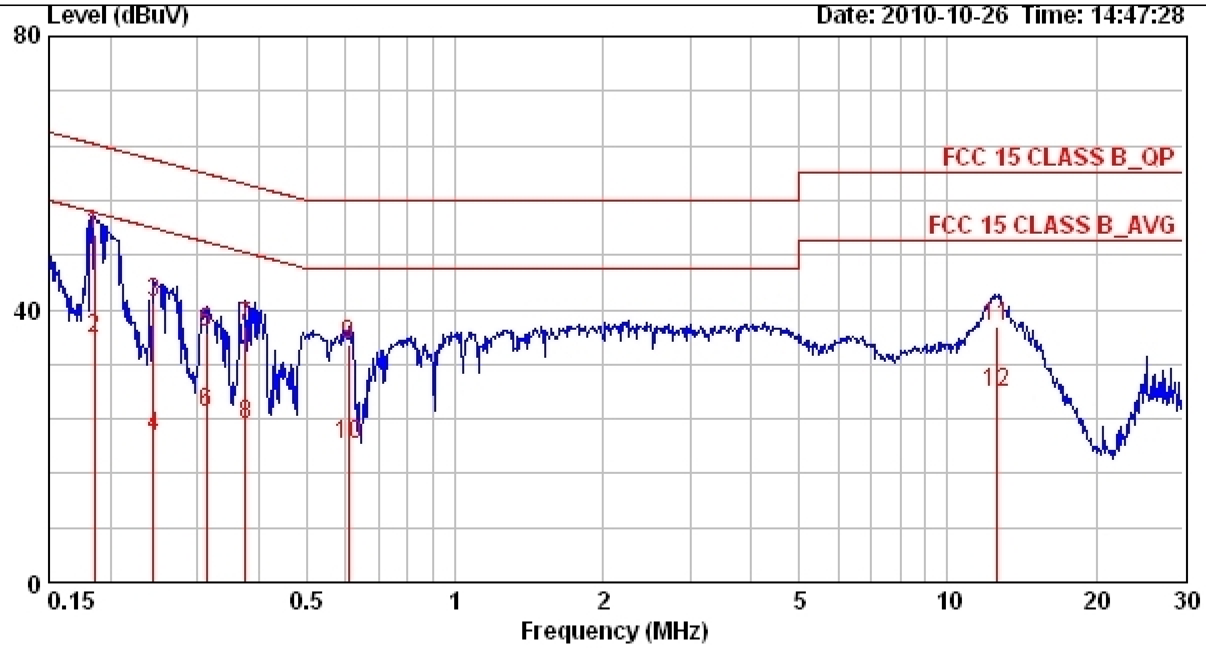
The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room. All peripherals were connected to the second LISN and the chassis ground also bounded to the horizontal ground plane of shielded room.

The EUT was located so that the distance between the boundary of the EUT and the closest surface of the LISN is 0.8 m. Where a mains flexible cord was provided by the manufacturer shall be 1 m long, or if in excess of 1 m, the excess cable was folded back and forth as far as possible so as to form a bundle not exceeding 0.4 m in length.

TEST RESULTS

Product Name	3G / Wireless-N Dual WAN ADSL2+ Firewall Router	Test By	Bell Huang
Model	BiPAC 7800NEXL	Test Date	2010/10/26
Test Mode	Normal operating / Adapter PAW012A12UL	Temp. & Humidity	23.1°C, 53%

LINE



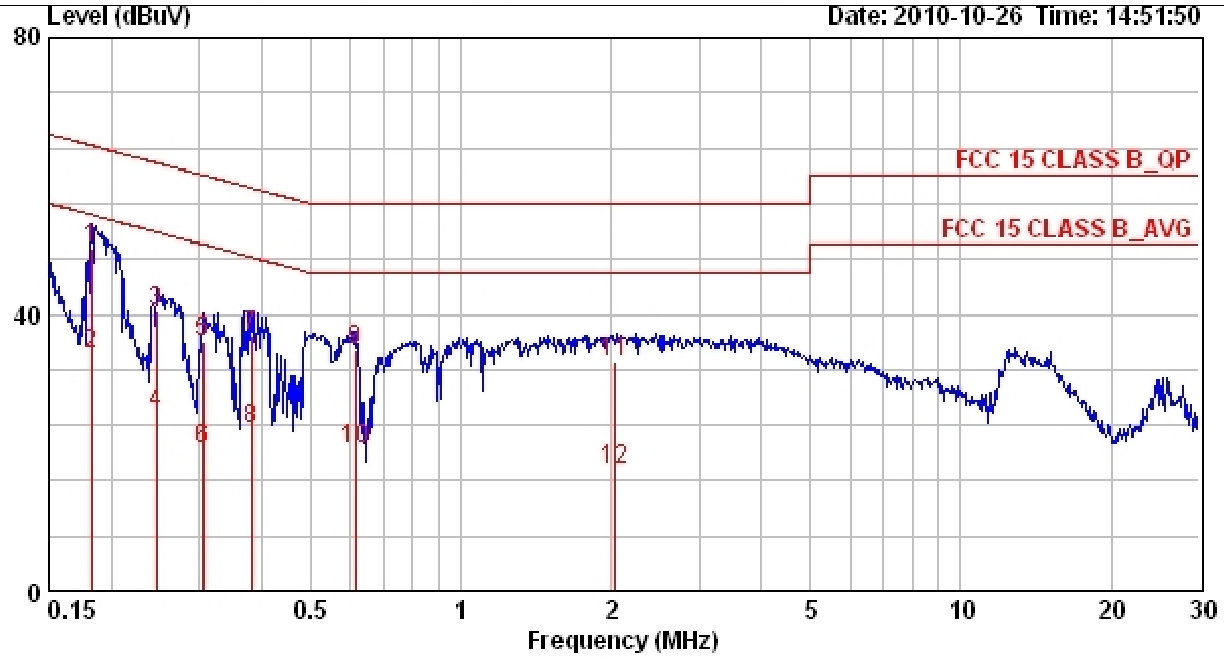
Freq. MHz	Corr. Factor dB	Reading Value dBuV Q.P.	Reading Value dBuV Ave.	Emission Level dBuV Q.P.	Emission Level dBuV Ave.	Limit dBuV Q.P.	Limit dBuV Ave.	Margin dB Q.P.	Margin dB Ave.
0.185	0.06	51.03	35.59	51.09	35.65	64.24	54.24	-13.16	-18.60
0.244	0.06	41.09	21.42	41.15	21.48	61.95	51.95	-20.81	-30.48
0.313	0.05	36.63	24.82	36.68	24.87	59.90	49.90	-23.22	-25.03
0.376	0.05	37.34	23.03	37.39	23.08	58.37	48.37	-20.98	-25.29
0.609	0.07	34.87	20.15	34.94	20.22	56.00	46.00	-21.06	-25.78
12.604	0.39	37.16	27.47	37.55	27.86	60.00	50.00	-22.45	-22.14

Remark:

1. *Correction Factor = Insertion loss + cable loss*
2. *Margin value = Emission level – Limit value*

Product Name	3G / Wireless-N Dual WAN ADSL2+ Firewall Router	Test By	Bell Huang
Model	BiPAC 7800NEXL	Test Date	2010/10/26
Test Mode	Normal operating / Adapter PAW012A12UL	Temp. & Humidity	23.1°C, 53%

NEUTRAL



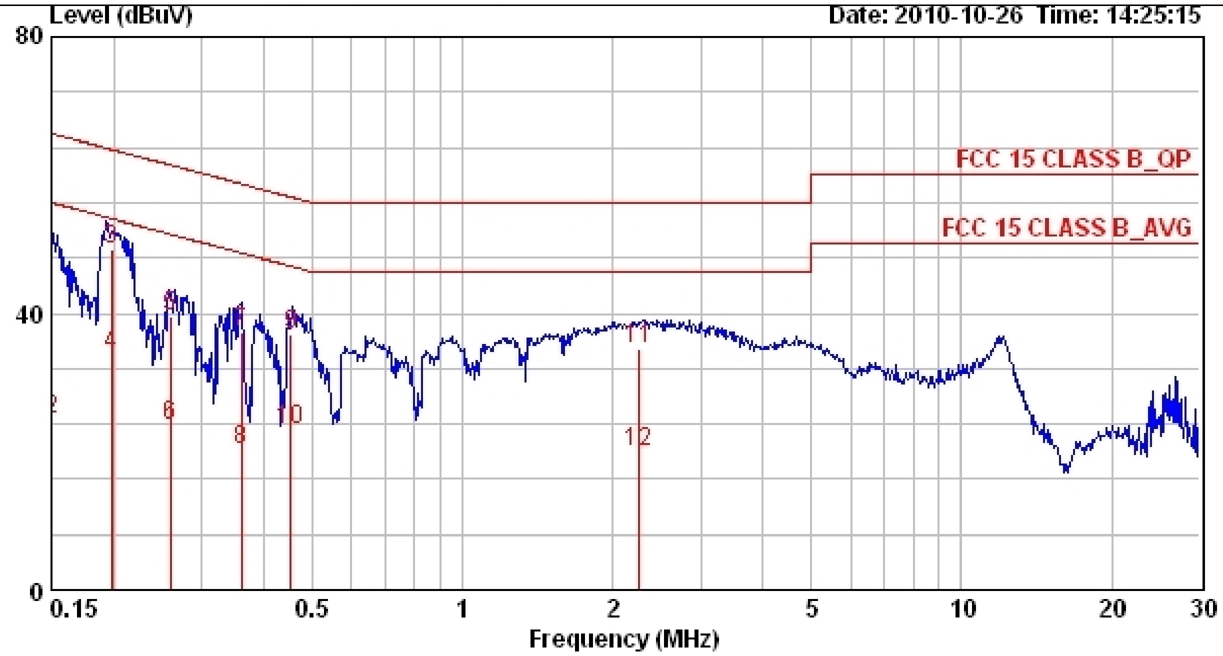
Freq. MHz	Corr. Factor dB	Reading Value dBuV Q.P.	Reading Value dBuV Ave.	Emission Level dBuV Q.P.	Emission Level dBuV Ave.	Limit dBuV Q.P.	Limit dBuV Ave.	Margin dB Q.P.	Margin dB Ave.
0.182	0.06	49.61	34.27	49.67	34.33	64.38	54.38	-14.71	-20.05
0.245	0.06	40.41	25.65	40.47	25.71	61.92	51.92	-21.45	-26.21
0.304	0.05	35.93	20.44	35.98	20.49	60.13	50.13	-24.15	-29.64
0.382	0.05	36.80	23.26	36.85	23.31	58.24	48.24	-21.39	-24.93
0.614	0.06	34.76	20.42	34.82	20.48	56.00	46.00	-21.18	-25.52
2.041	0.11	33.04	17.50	33.15	17.61	56.00	46.00	-22.85	-28.39

Remark:

1. *Correction Factor = Insertion loss + cable loss*
2. *Margin value = Emission level – Limit value*

Product Name	3G / Wireless-N Dual WAN ADSL2+ Firewall Router	Test By	Bell Huang
Model	BiPAC 7800NEXL	Test Date	2010/10/26
Test Mode	Normal operating / Adapter PAW018A12UL 8066	Temp. & Humidity	23.1°C, 53%

LINE



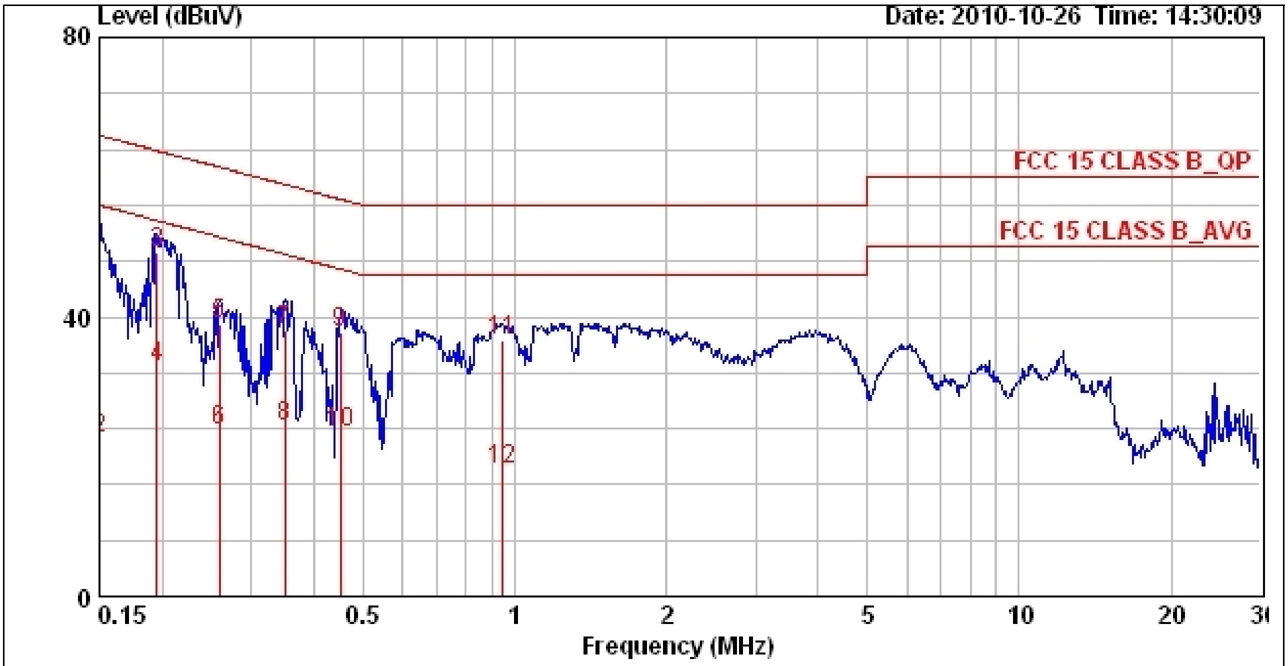
Freq. MHz	Corr. Factor dB	Reading Value dBuV Q.P.	Reading Value dBuV Ave.	Emission Level dBuV Q.P.	Emission Level dBuV Ave.	Limit dBuV Q.P.	Limit dBuV Ave.	Margin dB Q.P.	Margin dB Ave.
0.150	0.05	47.38	24.55	47.43	24.60	66.00	56.00	-18.57	-31.40
0.198	0.06	49.20	34.06	49.26	34.12	63.71	53.71	-14.45	-19.59
0.259	0.06	39.57	23.57	39.63	23.63	61.46	51.46	-21.83	-27.83
0.360	0.05	37.02	20.15	37.07	20.20	58.74	48.74	-21.67	-28.54
0.453	0.06	36.80	22.95	36.86	23.01	56.82	46.82	-19.96	-23.81
2.247	0.14	34.85	19.76	34.99	19.90	56.00	46.00	-21.01	-26.10

Remark:

1. *Correction Factor = Insertion loss + cable loss*
2. *Margin value = Emission level – Limit value*

Product Name	3G / Wireless-N Dual WAN ADSL2+ Firewall Router	Test By	Bell Huang
Model	BiPAC 7800NEXL	Test Date	2010/10/26
Test Mode	Normal operating / Adapter PAW018A12UL 8066	Temp. & Humidity	23.1°C, 53%

NEUTRAL



Freq. MHz	Corr. Factor dB	Reading Value dBuV Q.P.	Reading Value dBuV Ave.	Emission Level dBuV Q.P.	Emission Level dBuV Ave.	Limit dBuV Q.P.	Limit dBuV Ave.	Margin dB Q.P.	Margin dB Ave.
0.151	0.06	45.37	22.53	45.43	22.59	65.97	55.97	-20.54	-33.38
0.195	0.06	49.18	32.87	49.24	32.93	63.81	53.81	-14.57	-20.88
0.260	0.06	38.95	23.71	39.01	23.77	61.42	51.42	-22.42	-27.66
0.350	0.05	37.95	24.28	38.00	24.33	58.97	48.97	-20.97	-24.64
0.451	0.05	37.80	23.49	37.85	23.54	56.85	46.85	-18.99	-23.30
0.949	0.08	36.49	18.20	36.57	18.28	56.00	46.00	-19.43	-27.72

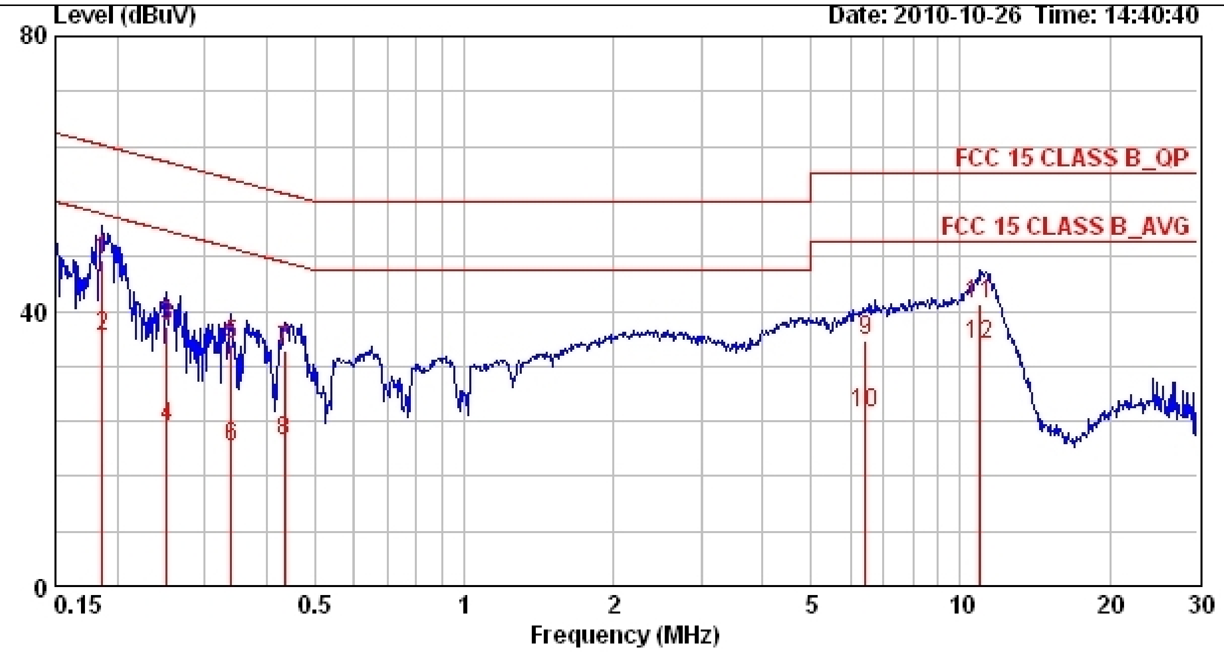
Remark:

1. Correction Factor = Insertion loss + cable loss

2. Margin value = Emission level – Limit value

Product Name	3G / Wireless-N Dual WAN ADSL2+ Firewall Router	Test By	Bell Huang
Model	BiPAC 7800NEXL	Test Date	2010/10/26
Test Mode	Normal operating / Adapter PAW018A12UL	Temp. & Humidity	23.1°C, 53%

LINE



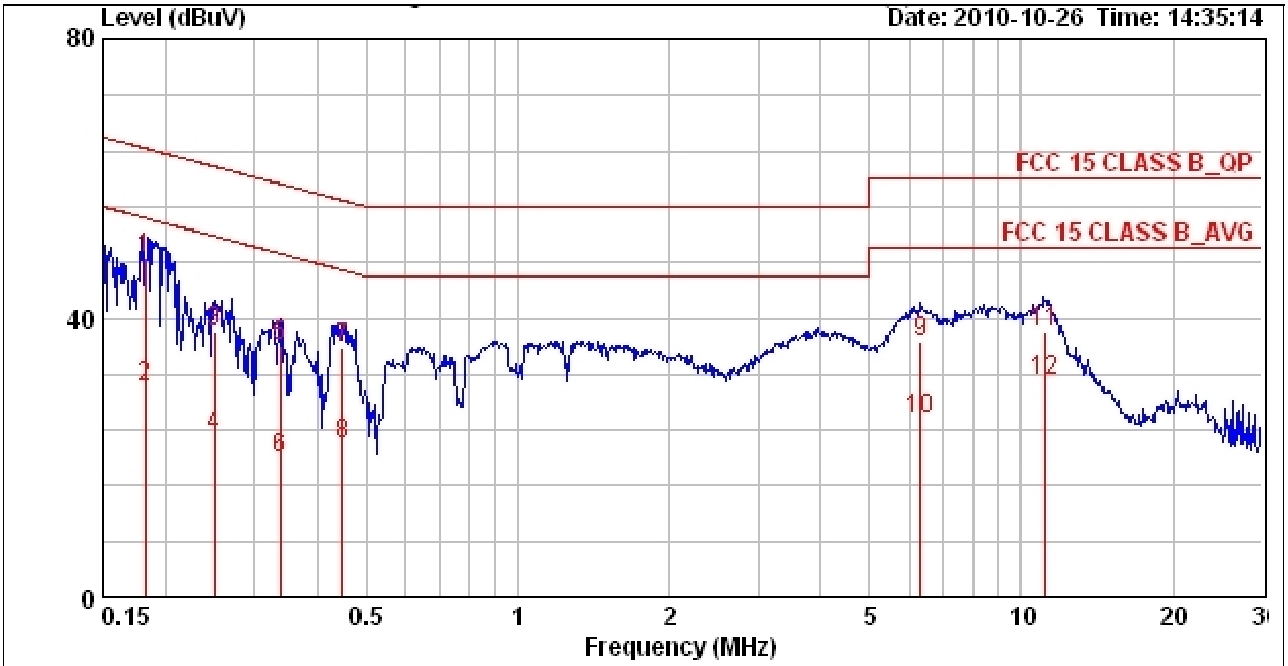
Freq. MHz	Corr. Factor dB	Reading Value dBuV Q.P.	Reading Value dBuV Ave.	Emission Level dBuV Q.P.	Emission Level dBuV Ave.	Limit dBuV Q.P.	Limit dBuV Ave.	Margin dB Q.P.	Margin dB Ave.
0.186	0.06	47.56	36.27	47.62	36.33	64.21	54.21	-16.59	-17.88
0.251	0.06	37.66	23.18	37.72	23.24	61.72	51.72	-24.01	-28.49
0.339	0.05	35.03	20.31	35.08	20.36	59.24	49.24	-24.15	-28.87
0.434	0.05	34.20	21.18	34.25	21.23	57.18	47.18	-22.93	-25.95
6.445	0.26	35.63	24.84	35.89	25.10	60.00	50.00	-24.11	-24.90
10.961	0.35	40.81	34.83	41.16	35.18	60.00	50.00	-18.84	-14.82

Remark:

1. *Correction Factor = Insertion loss + cable loss*
2. *Margin value = Emission level – Limit value*

Product Name	3G / Wireless-N Dual WAN ADSL2+ Firewall Router	Test By	Bell Huang
Model	BiPAC 7800NEXL	Test Date	2010/10/26
Test Mode	Normal operating / Adapter PAW018A12UL	Temp. & Humidity	23.1°C, 53%

NEUTRAL



Freq. MHz	Corr. Factor dB	Reading Value dBuV Q.P.	Reading Value dBuV Ave.	Emission Level dBuV Q.P.	Emission Level dBuV Ave.	Limit dBuV Q.P.	Limit dBuV Ave.	Margin dB Q.P.	Margin dB Ave.
0.182	0.06	48.58	30.11	48.64	30.17	64.41	54.41	-15.77	-24.24
0.250	0.06	38.01	23.18	38.07	23.24	61.76	51.76	-23.69	-28.52
0.337	0.05	35.99	20.02	36.04	20.07	59.27	49.27	-23.23	-29.20
0.450	0.05	35.59	21.93	35.64	21.98	56.88	46.88	-21.24	-24.90
6.318	0.23	36.28	25.31	36.51	25.54	60.00	50.00	-23.49	-24.46
11.093	0.33	37.78	30.79	38.11	31.12	60.00	50.00	-21.89	-18.88

Remark:

1. *Correction Factor = Insertion loss + cable loss*
2. *Margin value = Emission level – Limit value*

APPENDIX I MAXIMUM PERMISSIBLE EXPOSURE

According to FCC 1.1310 : The criteria listed in the following table shall be used to evaluate theenvironment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Average Time
(A) Limits for Occupational / Control Exposures				
300-1,500	--	--	F/300	6
1,500-100,000	--	--	5	6
(B) Limits for General Population / Uncontrol Exposures				
300-1,500	--	--	F/1500	6
1,500-100,000	--	--	1	30

CALCULATIONS

Given $E = \frac{\sqrt{30 \times P \times G}}{d}$ & $S = \frac{E^2}{3770}$

Where E = Field strength in Volts / meter
P = Power in Watts
G = Numeric antenna gain
d = Distance in meters
S = Power density in milliwatts / square centimeter

Combining equations and re-arranging the terms to express the distance as a function of the remaining variables yields:

$$S = \frac{30 \times P \times G}{3770 d^2}$$

Changing to units of mW and cm, using:

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

Yields

$$S = \frac{30 \times (P/1000) \times G}{3770 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2}$$

Where d = Distance in cm
P = Power in mW
G = Numeric antenna gain
S = Power density in mW / cm2

LIMIT

Power Density Limit, S=1.0mW/cm^2

TEST RESULTS

Mode	Antenna Gain (dBi)	Minimum separation distance (cm)	Output Power (dBm)	Numeric antenna gain (mW)	Power Density Limit (mW/cm^2)	Power Density at 20cm (mW/cm^2)
IEEE 802.11b	5.01	20.0	18.98	3.17	1.00	0.049856
IEEE 802.11g	5.01	20.0	22.19	3.17	1.00	0.104405
IEEE 802.11n HT20	5.01	20.0	25.39	3.17	1.00	0.218245
IEEE 802.11n HT40	5.01	20.0	24.20	3.17	1.00	0.165697

Remark: *For mobile or fixed location transmitters, the maximum power density is 1.0 mW/cm^2 even if the calculation indicates that the power density would be larger.*