



# Test Report

Industry Canada RSS-Gen Issue 3/RSS-210 Issue 8  
FCC Part15 Subpart C

Product Name : xDSL Modem/Router  
Model No. : DGN2200v4  
FCC ID : PY312300211  
IC : 4054A-12300211

Applicant : Netgear, Inc.

Address : 350 East Plumeria Drive, San Jose, California  
95134, USA

Date of Receipt : 05/12/2012  
Test Date : 05/12/2012~24/12/2012  
Issued Date : 08/01/2013  
Report No. : 12CS010R-RF-US-P05V01  
Report Version : V1.0

The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration of the equipment and evaluated measurement uncertainty herein.

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# Test Report Certification

Issued Date : 08/01/2013

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USA

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USA

Model No. : DGN2200v4

FCC ID : PY312300211

IC : 4054A-12300211

EUT Voltage : 12VDC

Brand Name : NETGEAR

Applicable Standard : FCC CFR Title 47 Part 15 Subpart C: 2012  
ANSI C63.4: 2009; ANSI C63.10: 2009  
Industry Canada RSS-Gen Issue 3/RSS-210 Issue 8

Test Result : Complied

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## Laboratory Information

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<b>Norway</b>	<b>:</b>	<b>Nemko, DNV</b>
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<b>Japan</b>	<b>:</b>	<b>VCCI</b>
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## 1. General Information

### 1.1. EUT Description

Product Name	xDSL Modem/Router
Brand Name	NETGEAR
Model No.	DGN2200v4
EUT Voltage	12VDC
Frequency Range	802.11b/g/n(20MHz): 2412~2462MHz 802.11n(40MHz): 2422~2452MHz
Channel Number	802.11b/g/n(20MHz): 11 802.11n(40MHz): 7
Type of Modulation	802.11b: DSSS 802.11g/n: OFDM
Data Rate	802.11g: 6/9/12/18/24/36/48/54 Mbps 802.11b: 1/2/5.5/11 Mbps 802.11n: up to 300 Mbps
Channel Control	Auto
Antenna Delivery	2*Tx + 2*Rx
Antenna Type	Reference to Antenna List
Peak Antenna Gain	Reference to Antenna List
AC Adapter 1#	Manufacturer: NETGEAR M/N: SAL012F1NA Input: 100-120V-47/63Hz 0.6A Output: 12V, 1A
AC Adapter 2#	Manufacturer: NETGEAR M/N: AD810F10 Input: 100-120V~50/60Hz 0.3A Output: 12V, 1A

Note 1: In this report, we choose AC adapter 1# for all RF testing.

**For 2.4GHz Band**

802.11b/g/n(20MHz) Working Frequency of Each Channel:							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
01	2412 MHz	02	2417 MHz	03	2422 MHz	04	2427 MHz
05	2432 MHz	06	2437 MHz	07	2442 MHz	08	2447 MHz
09	2452 MHz	10	2457 MHz	11	2462 MHz	N/A	N/A
802.11n(40MHz) Working Frequency of Each Channel:							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
03	2422 MHz	04	2427 MHz	05	2432 MHz	06	2437 MHz
07	2442 MHz	08	2447 MHz	09	2452 MHz	N/A	N/A

**802.11b/g/n Antenna List**

Antenna	Manufacturer	Model No.	Peak Gain
PCB Antenna 1	Foxconn	N/A	2.77dBi for 2.4GHz
PCB Antenna 2	Foxconn	N/A	2.53dBi for 2.4GHz

**Power Parameter Value of the test software**

Test Mode	Test channel	Parameter Value	Ant 1	Ant 2
802.11b	2412 MHz	70	N/A	Single tx
	2437 MHz	80	N/A	Single tx
	2462 MHz	70	N/A	Single tx
802.11g	2412 MHz	51	Just support two chain tx simultaneously	
	2437 MHz	84	Just support two chain tx simultaneously	
	2462 MHz	48	Just support two chain tx simultaneously	
802.11n(20MHz)	2412 MHz	47	Just support two chain tx simultaneously	
	2437 MHz	84	Just support two chain tx simultaneously	
	2462 MHz	47	Just support two chain tx simultaneously	
802.11n(40MHz)	2422 MHz	52	Just support two chain tx simultaneously	
	2437 MHz	84	Just support two chain tx simultaneously	
	2452 MHz	47	Just support two chain tx simultaneously	

**1.2. Mode of Operation**

Quietek has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Test Mode
Mode 1: Transmit by 802.11b
Mode 2: Transmit by 802.11g
Mode 3: Transmit by 802.11n (20MHz)
Mode 4: Transmit by 802.11n (40MHz)

Note:

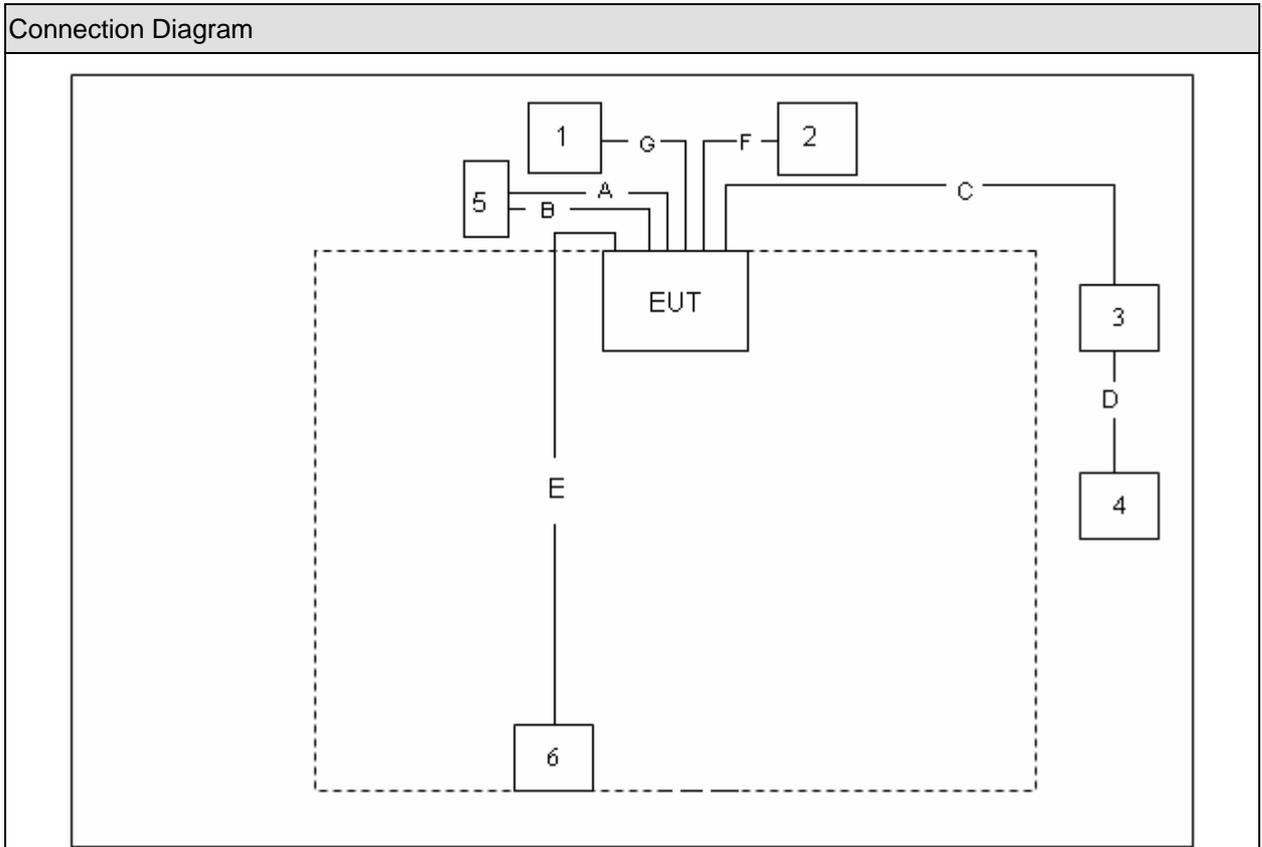
1. Regards to the frequency band operation: the lowest, middle and highest frequency of channel were selected to perform the test, then shown on this report.
2. This device is a composite device in accordance with Part 15 Subpart B regulations. The function for the receiver was measured and made a test report that the report number is 12CS010R-RF-US-P01V02.
3. The mode of 802.11g can support two chain tx simultaneously via software provided by manufacturer.

### 1.3. Tested System Details

The types for all equipments, plus descriptions of all cables used in the tested system (including inserted cards) are:

	Product	Manufacturer	Model No.	Serial No.	Power Cord
1	Notebook	DELL	E520	N/A	Non-Shielded, 1.8m
2	Notebook	ASUS	N80V	8BN0AS226971468	Non-Shielded, 1.8m
3	Server	N/A	N/A	N/A	N/A
4	Notebook	Think Pad	2526	LV-A3285	Power by adapter
5	Router	D-Link	DLR-605	PK11496006143	Non-Shielded, 1.8m
6	iPod	Apple	A1199	7J71085BVQ5	Power by PC

1.4. Configuration of Tested System



Signal Cable Type		Signal cable Description
A	LAN Cable	Non-Shielded, 1.0m
B	LAN Cable	Non-Shielded, 1.0m
C	Telecom Cable	Non-Shielded, >10.0m
D	LAN Cable	Non-Shielded, 1.0m
E	USB Cable	Non-Shielded, 1.0m
F	LAN Cable	Non-Shielded, >10.0m
G	LAN Cable	Non-Shielded, 1.0m

**1.5. EUT Exercise Software**

1	Setup the EUT and simulators as shown on above.
2	Turn on the power of equipment.
3	Execute some commands on the PC provided by applicant.
4	Setup the test channel and the test mode press ok to start the continue transmit.

## 2. Technical Test

### 2.1. Summary of Test Result

- No deviations from the test standards  
 Deviations from the test standards as below description:

Performed Test Item	Normative References	Test Performed	Deviation
Conducted Emission	FCC CFR Title 47 Part 15 Subpart C: 2012 Section 15.207	Yes	No
Radiated Emission	FCC CFR Title 47 Part 15 Subpart C: 2012 Section 15.209	Yes	No
RF Antenna Conducted Spurious	FCC CFR Title 47 Part 15 Subpart C: 2012 Section 15.247(d)	Yes	No
Radiated Emission Band Edge	FCC CFR Title 47 Part 15 Subpart C: 2012 15.247(d)	Yes	No
Operation Frequency Range of 20dB Bandwidth	FCC CFR Title 47 Part 15 Subpart C: 2012 15.215(c)	Yes	No
Occupied Bandwidth	FCC CFR Title 47 Part 15 Subpart C: 2012 Section 15.247(a)(2)	Yes	No
Power Output	FCC CFR Title 47 Part 15 Subpart C: 2012 Section 15.247(b)(3)	Yes	No
Power Spectral Density	FCC CFR Title 47 Part 15 Subpart C: 2012 Section 15.247(e)	Yes	No

Performed Test Item	Normative References	Test Performed	Deviation
Conducted Emission	RSS-Gen Issue 3 December 2010 Section 7.2.2	Yes	No
Radiated Emission	RSS-210 Issue 8 December 2010 Section 2.7 Table 2 and Table 3	Yes	No
RF Antenna Conducted Spurious	RSS-210 Issue 8 December 2010 Section A8.5	Yes	No
Radiated Emission Band Edge	RSS-210 Issue 8 December 2010 Section A8.5	Yes	No
Occupied Bandwidth	RSS-Gen Issue 3 December 2010 Section 4.6.1 and 4.6.2 RSS-210 Issue 8 December 2010 Section A8.2(1)	Yes	No
Power Output	RSS-210 Issue 8 December 2010 Section A8.4(4)	Yes	No
Power Spectral Density	RSS-210 Issue 8 December 2010 Section A8.2(2)	Yes	No

**2.2. Test Environment**

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	21
Humidity (%RH)	25-75	50
Barometric pressure (mbar)	860-1060	950-1000

### 3. Conducted Emission

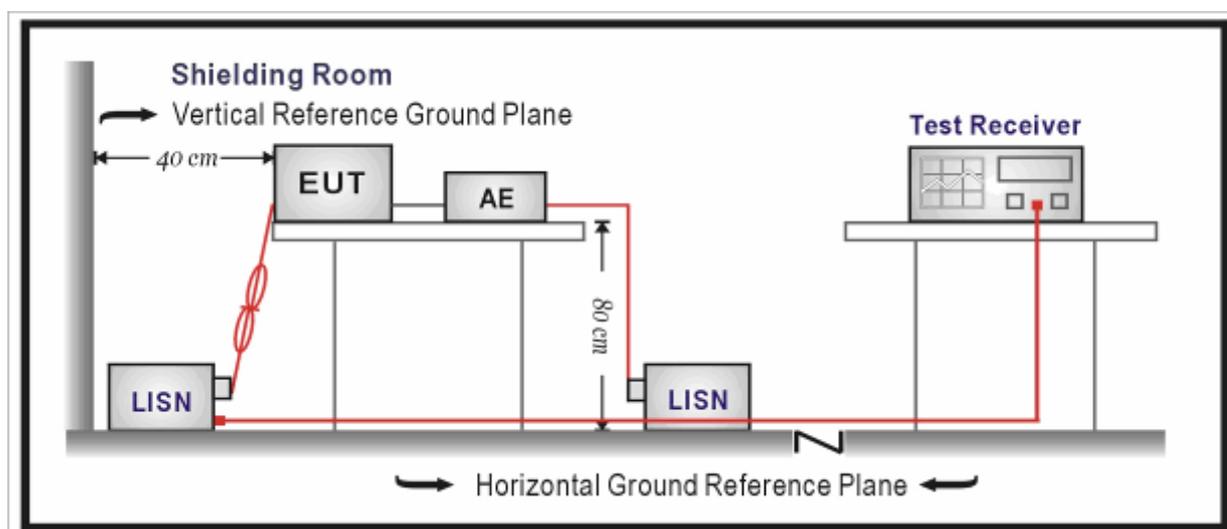
#### 3.1. Test Equipment

Conducted Emission / TR-1

Instrument	Manufacturer	Type No.	Serial No.	Cal. Date
EMI Test Receiver	R&S	ESCI	100726	2013.04.18
Two-Line V-Network	R&S	ENV216	100043	2013.04.18
Two-Line V-Network	R&S	ENV216	100044	2013.09.07
50ohm Coaxial Switch	Anritsu	MP59B	6200464462	2013.05.04
50ohm Termination	SHX	TF2	07081401	2013.09.17
Temperature/Humidity Meter	zhicheng	ZC1-2	TR1-TH	2013.01.10

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

#### 3.2. Test Setup



**3.3. Limit**

FCC Part 15 Subpart C Paragraph 15.207 Limits		
Frequency (MHz)	QP (dBuV)	AV (dBuV)
0.15 - 0.50	66 - 56	56 – 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Note 1: The lower limit shall apply at the transition frequencies.

Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

**3.4. Test Procedure**

The EUT was setup according to ANSI C63.4, 2009 and tested according to ANSI C63.10: 2009 for compliance to FCC 47CFR 15.247 requirements. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs) Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.

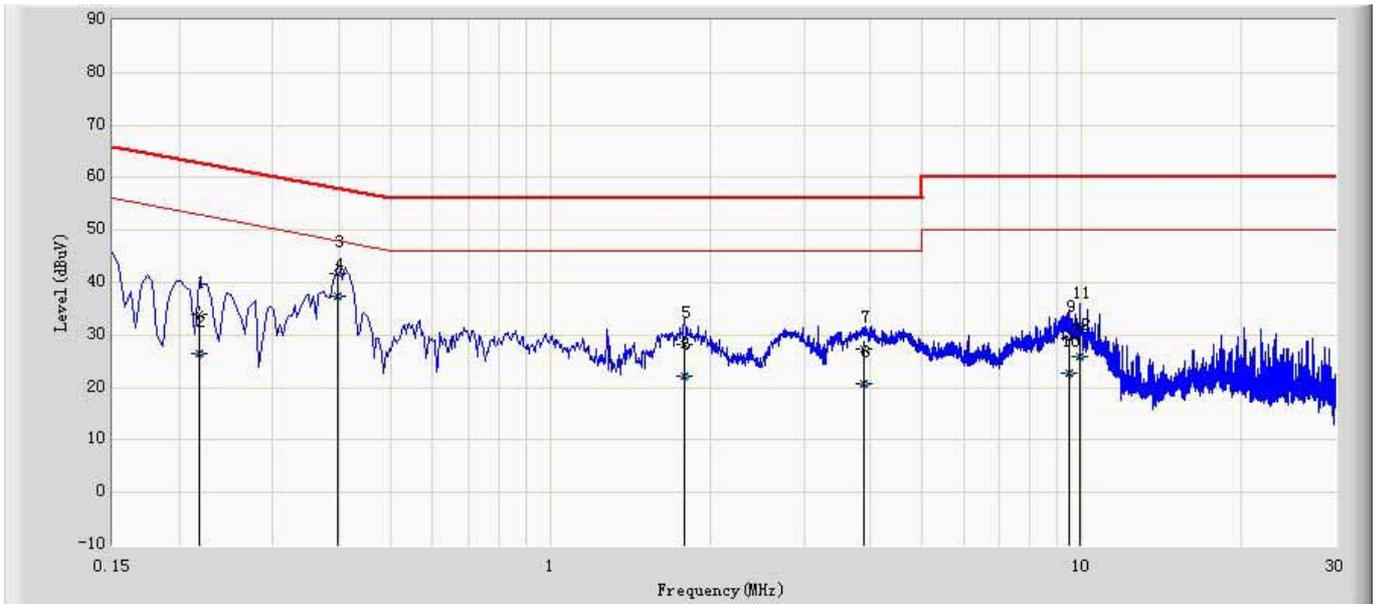
The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length. Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.

**3.5. Uncertainty**

The measurement uncertainty is defined as  $\pm 2.02$  dB

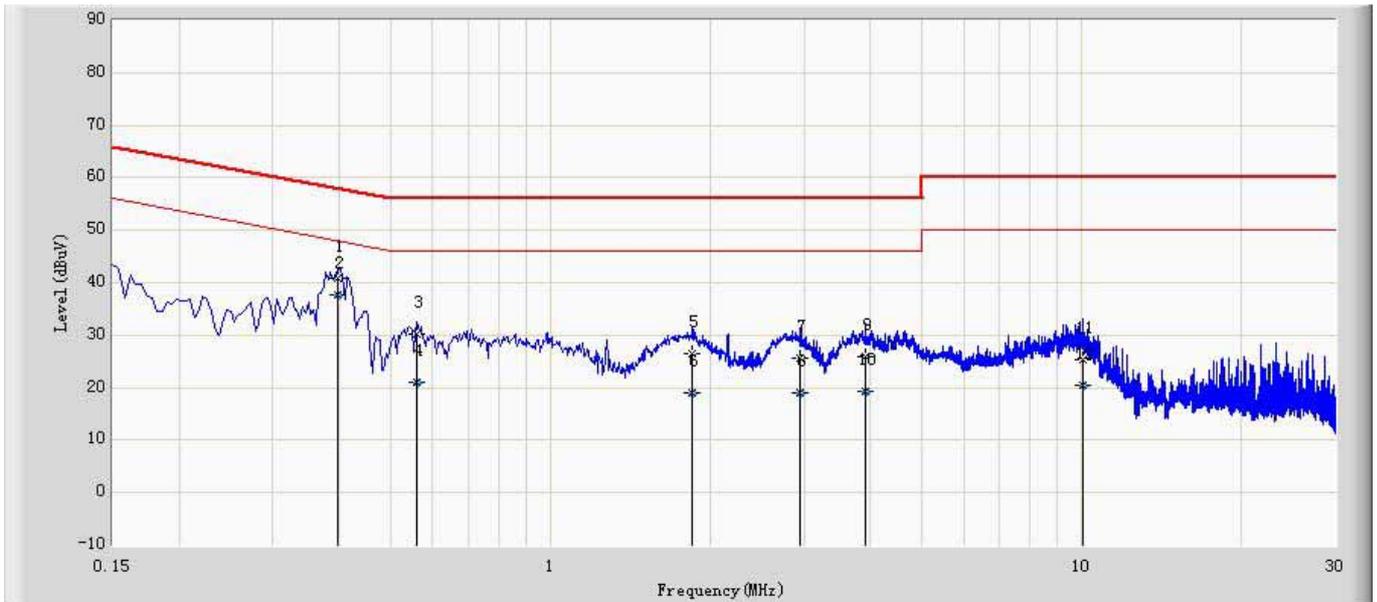
### 3.6. Test Result

Engineer: Brgant	
Site: TR1	Time: 2012/12/14 - 20:37
Limit: FCC_Part15.107_CE_AC Power_ClassB	Margin: 0
Probe: ENV216_101044(0.009-30MHz)	Polarity: Line
EUT: xDSL Modem/Router	Power: AC 120V/60Hz
Note: Mode1	



No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1		0.218	33.903	24.041	-28.991	62.895	9.863	QP
2		0.218	26.582	16.719	-26.313	52.895	9.863	AV
3		0.398	41.708	31.818	-16.187	57.895	9.890	QP
4	*	0.398	37.550	27.660	-10.345	47.895	9.890	AV
5		1.782	28.290	18.501	-27.710	56.000	9.789	QP
6		1.782	22.175	12.387	-23.825	46.000	9.789	AV
7		3.890	27.367	17.531	-28.633	56.000	9.836	QP
8		3.890	20.640	10.804	-25.360	46.000	9.836	AV
9		9.450	29.299	19.319	-30.701	60.000	9.980	QP
10		9.450	22.814	12.834	-27.186	50.000	9.980	AV
11		9.938	31.967	21.977	-28.033	60.000	9.990	QP
12		9.938	25.817	15.827	-24.183	50.000	9.990	AV

Engineer: Brgant	
Site: TR1	Time: 2012/12/14 - 20:45
Limit: FCC_Part15.107_CE_AC Power_ClassB	Margin: 0
Probe: ENV216_101044(0.009-30MHz)	Polarity: Neutral
EUT: xDSL Modem/Router	Power: AC 120V/60Hz
Note: Mode1	



No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1		0.398	40.946	30.944	-16.949	57.895	10.002	QP
2	*	0.398	37.726	27.724	-10.169	47.895	10.002	AV
3		0.562	30.202	20.198	-25.798	56.000	10.004	QP
4		0.562	20.972	10.968	-25.028	46.000	10.004	AV
5		1.846	26.534	16.569	-29.466	56.000	9.965	QP
6		1.846	19.162	9.197	-26.838	46.000	9.965	AV
7		2.950	25.763	15.765	-30.237	56.000	9.998	QP
8		2.950	18.910	8.912	-27.090	46.000	9.998	AV
9		3.918	26.030	15.983	-29.970	56.000	10.047	QP
10		3.918	19.251	9.203	-26.749	46.000	10.047	AV
11		10.066	25.273	14.887	-34.727	60.000	10.386	QP
12		10.066	20.483	10.097	-29.517	50.000	10.386	AV

## 4. Radiated Emission

### 4.1. Test Equipment

#### Radiated Emission / AC-2

Instrument	Manufacturer	Type No.	Serial No.	Cal. Date
EMI Test Receiver	R&S	ESCI	100573	2013.04.18
Loop Antenna	R&S	HFH2-Z2	833799/003	2013.11.17
Bilog Antenna	Teseq GmbH	CBL6112D	27611	2013.10.15
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC2-C	2013.03.02
Temperature/Humidity Meter	Zhicheng	ZC1-2	AC2-TH	2013.05.07

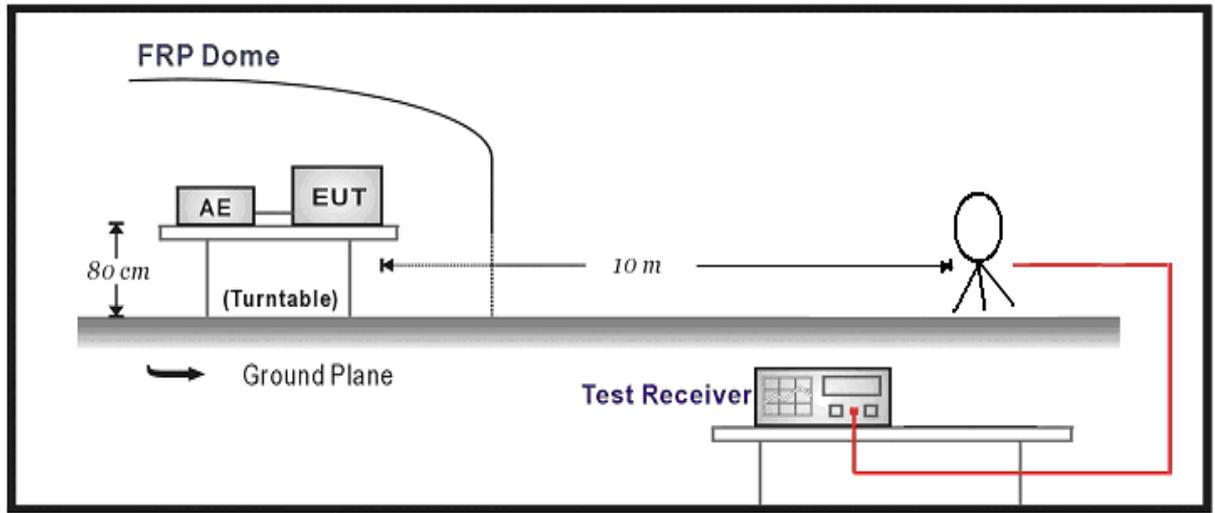
#### Radiated Emission / AC-5

Instrument	Manufacturer	Type No.	Serial No.	Cal. Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2013.04.18
Preamplifier	Miteq	NSP1800-25	1364185	2013.05.04
Preamplifier	Quietek	AP-040G	CHM-0906001	2013.05.04
Bilog Antenna	Teseq GmbH	CBL6112D	27612	2013.10.15
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	499	2014.06.08
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	294	2013.11.24
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C1	2013.03.02
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C2	2013.03.02
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	AC5-C3	2013.03.02
Temperature/Humidity Meter	Zhicheng	ZC1-2	AC5-TH	2013.01.10

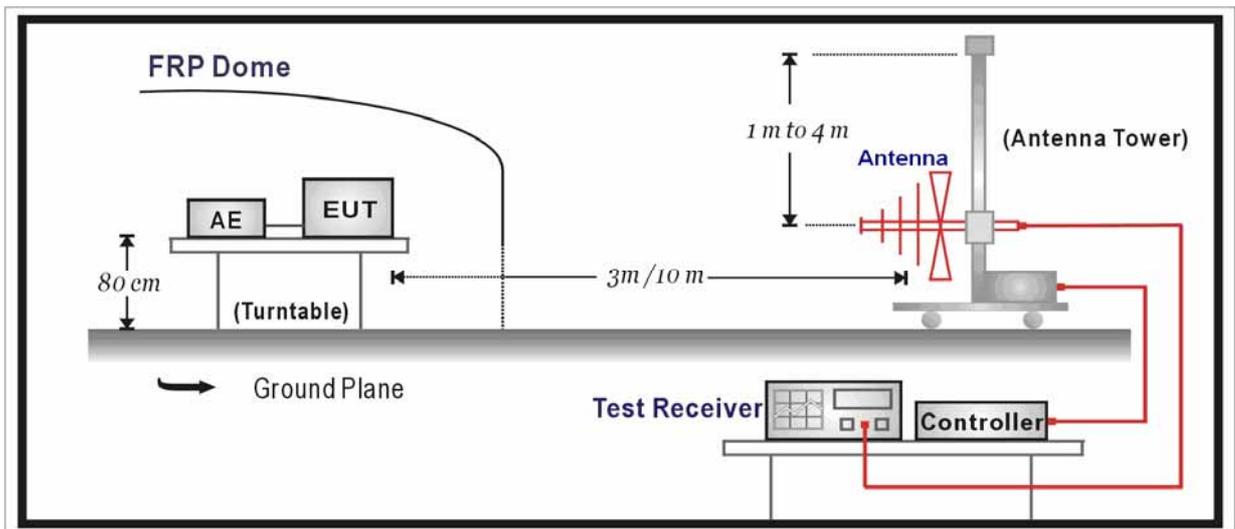
Note 1: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

### 4.2. Test Setup

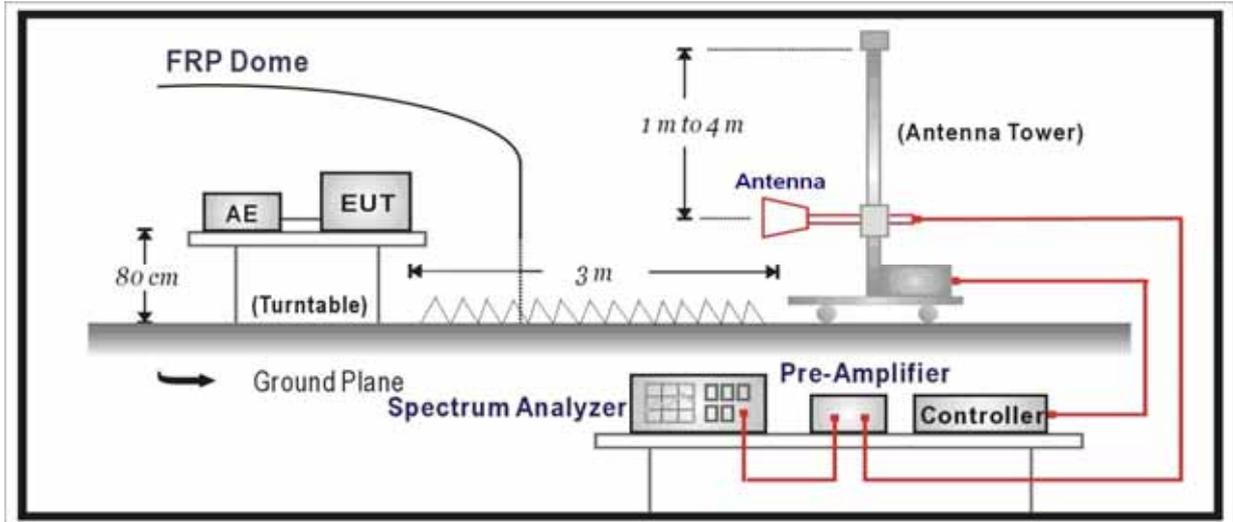
Below 30MHz Test Setup:



Below 1GHz Test Setup:



Above 1GHz Test Setup:



### 4.3. Limit

FCC Part 15 Subpart C Paragraph 15.209		
Frequency (MHz)	Distance (m)	Level (dBuV/m)
30 - 88	3	40
88 - 216	3	43.5
216 - 960	3	46
Above 960	3	54

Note 1: The lower limit shall apply at the transition frequency.

Note 2: Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

Note 3: E field strength (dBuV/m) = 20 log E field strength (uV/m)

### 4.4. Test Procedure

The EUT was setup according to ANSI C63.4: 2009 and tested according to ANSI C63.10: 2009 and KDB 558074 for compliance to FCC 47CFR 15.247 requirements.

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This

is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4: 2009 on radiated measurement.

The resolution bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

The frequency range from 30MHz to 10th harmonic is checked.

Note: When doing emission measurement above 1GHz, the horn antenna will be bended down a little (as horn antenna has the narrow beamwidth) in order to keeping the antenna in the “cone of radiation” of EUT. The 3dB beamwidth is 60 degrees for H-plane and 90 degrees for E-plane.

#### **4.5. Uncertainty**

The measurement uncertainty above 1G is defined as  $\pm 3.9$  dB

below 1G is defined as  $\pm 3.8$  dB

## 4.6. Test Result

All of the test result shown indicates the worst case, and spectrum analyzer parameters setting as shown below:

Peak detector: RBW = 1MHz, VBW = 3MHz, sweep time = 200ms;

Average detector: RBW = 1MHz, VBW = 10Hz, sweep time = auto.

Measure Level = Reading Level + Cable Loss + Antenna Factor - Preamplifier Gain

Mode1: Transmit at 802.11b

Ant	CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
Ant 2	1	H	2411.4	68.8	36.5	105.3	Fundamental	/	PK
		H	320.0	10.8	21.2	32.0	46	-14.0	QP
		H	640.0	7.8	27.4	35.2	46	-10.8	QP
		V	3200	50.4	-13.4	37.0	54(note3)	-17.0	PK
		H	4825.0	61.1	-7.7	53.4	54(note3)	-0.6	PK
		H	7247.5	70.7	-3.0	67.7	74	-6.3	PK
		H	7236.8	47.9	-3.0	44.9	54	-9.1	AV
	6	H	24000.0	59.1	-8.9	50.2	54(note3)	-3.8	PK
		H	2437.0	71.4	37.2	108.6	Fundamental	/	PK
		H	320.0	7.5	21.2	28.7	46	-17.3	QP
		H	625.0	6.5	27.3	33.8	46	-12.2	QP
		V	3200	50.3	-13.4	36.9	54(note3)	-17.1	PK
		H	4825.0	60.2	-7.7	52.5	54(note3)	-1.5	PK
		H	7247.5	54.9	-3.0	51.9	54(note3)	-2.1	PK
	11	H	24000.0	59.1	-8.9	50.2	54(note3)	-3.8	PK
		H	2462.1	72.1	34.9	107.0	Fundamental	/	PK
		H	285.5	12.0	20.0	32.0	46	-14.0	QP
		H	640.0	9.5	27.4	36.9	46	-9.1	QP
		V	3200	50.0	-13.4	36.6	54(note3)	-17.4	PK
		H	4825.0	61.2	-7.7	53.5	54(note3)	-0.5	PK
		H	7222.0	56.0	-3.1	52.9	54(note3)	-1.1	PK
H	24000.0	59.1	-8.9	50.2	54(note3)	-3.8	PK		

Note: 1. Measure Level = Reading Level + Factor.

2. The test trace is same as the ambient noise (the test frequency range: 9kHz~30MHz, 18GHz~25GHz), therefore no data appear in the report.

3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

Mode2: Transmit at 802.11g

Ant	CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
Ant 1+2	1	H	2411.8	75.4	36.5	111.9	Fundamental	/	PK
		H	320.0	10.6	21.2	31.8	46	-14.2	QP
		H	625.0	7.8	27.3	35.1	46	-10.9	QP
		V	3200	50.0	-13.4	36.6	54(note3)	-17.4	PK
		V	4825.0	55.5	-7.7	47.8	54(note3)	-6.2	PK
		V	7239.0	51.7	-3.0	48.7	54(note3)	-5.3	PK
		H	24000.0	59.1	-8.9	50.2	54(note3)	-3.8	PK
	6	H	2437.0	77.0	37.2	114.2	Fundamental	/	PK
		H	320.0	7.1	21.2	28.3	46	-17.7	QP
		H	640.0	8.7	27.4	36.1	46	-9.9	QP
		V	3200	49.9	-13.4	36.5	54(note3)	-17.5	PK
		V	4867.5	55.3	-7.7	47.6	54(note3)	-6.4	PK
		V	7307.0	58.1	-2.9	55.2	74	-18.8	PK
		V	7314.2	40.8	-2.9	37.9	54	-16.1	AV
	11	H	2461.4	74.5	36.9	111.4	Fundamental	/	PK
		H	320.0	11.8	21.2	33.0	46	-13.0	QP
		H	558.0	5.4	26.7	32.1	46	-13.9	QP
		V	3200	50.2	-13.4	36.8	54(note3)	-17.2	PK
		V	4927.0	55.3	-7.6	47.7	54(note3)	-6.3	PK
		V	7383.5	55.7	-2.7	53.0	54(note3)	-1.0	PK
		H	24000.0	59.1	-8.9	50.2	54(note3)	-3.8	PK

Note: 1. Measure Level = Reading Level + Factor.

2. The test trace is same as the ambient noise (the test frequency range: 9kHz~30MHz, 18GHz~25GHz), therefore no data appear in the report.

3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

Mode3: Transmit at 802.11n(20MHz)

Ant	CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
Ant 1+2	1	H	2411.2	78.6	36.5	115.1	Fundamental	/	PK
		H	320.0	7.0	21.2	28.2	46	-17.8	QP
		H	640.0	9.8	27.4	37.2	46	-8.8	QP
		V	3200	49.8	-13.4	36.4	54(note3)	-17.6	PK
		V	4825.0	52.4	-7.7	44.7	54(note3)	-9.3	PK
		V	7239.0	55.4	-3.0	52.4	54(note3)	-1.6	PK
		H	24000.0	59.1	-8.9	50.2	54(note3)	-3.8	PK
	6	H	2437.0	81.8	36.2	118.0	Fundamental	/	PK
		H	320.0	11.5	21.2	32.7	46	-13.3	QP
		H	640.0	8.4	27.4	35.8	46	-10.2	QP
		V	3200.0	42.9	-0.6	42.3	54(note3)	-11.7	PK
		V	4876.0	52.7	-7.6	45.1	54(note3)	-8.9	PK
		V	7307.0	53.6	-2.9	50.7	54(note3)	-3.3	PK
		H	24000.0	59.1	-8.9	50.2	54(note3)	-3.8	PK
	11	H	2461.9	74.5	36.9	111.4	Fundamental	/	PK
		H	287.3	11.5	20.1	31.6	46	-14.4	QP
		H	625.1	7.7	27.3	35.0	46	-11.0	QP
		V	3200	52.1	-13.4	38.7	54(note3)	-15.3	PK
		V	4927.0	56.8	-7.6	49.2	54(note3)	-4.8	PK
		V	7400.5	65.8	-2.6	63.2	74	-10.8	PK
		V	7383.2	38.2	-2.7	35.5	54	-18.5	AV
		H	24000.0	59.1	-8.9	50.2	54(note3)	-3.8	PK

Note: 1. Measure Level = Reading Level + Factor.

2. The test trace is same as the ambient noise (the test frequency range: 9kHz~30MHz, 18GHz~25GHz), therefore no data appear in the report.

3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

Mode4: Transmit at 802.11n(40MHz)

Ant	CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
Ant 1+2	3	H	2423.3	63.8	36.6	100.4	Fundamental	/	PK
		H	320.0	11.4	21.2	32.6	46	-13.4	QP
		H	625.0	8.1	27.3	35.4	46	-10.6	QP
		V	3200	50.8	-13.4	37.4	54(note3)	-16.6	PK
		V	4825.0	52.7	-7.7	45.0	54(note3)	-9.0	PK
		V	7239.0	50.1	-3.0	47.1	54(note3)	-6.9	PK
		H	24000.0	59.1	-8.9	50.2	54(note3)	-3.8	PK
	6	H	2437.0	66.1	37.2	103.3	Fundamental	/	PK
		H	294.0	9.9	20.3	30.2	46	-15.8	QP
		H	625.0	7.3	27.3	34.6	46	-11.4	QP
		V	3200	50.5	-13.4	37.1	54(note3)	-16.9	PK
		V	4876.0	52.0	-7.6	44.4	54(note3)	-9.6	PK
		V	7311.0	45.6	-2.9	42.7	54(note3)	-11.3	PK
		H	24000.0	59.1	-8.9	50.2	54(note3)	-3.8	PK
	9	H	2453.4	63.7	36.8	100.5	Fundamental	/	PK
		H	272.5	16.7	19.8	36.5	46	-9.5	QP
		H	580.0	5.0	26.7	31.7	46	-14.3	QP
		V	3200	51.2	-13.4	37.8	54(note3)	-16.2	PK
		V	4901.5	53.0	-7.6	45.4	54(note3)	-8.6	PK
		V	7356.0	45.5	-2.8	42.7	54(note3)	-11.3	PK
		H	24000.0	59.1	-8.9	50.2	54(note3)	-3.8	PK

Note: 1. Measure Level = Reading Level + Factor.

2. The test trace is same as the ambient noise (the test frequency range: 9kHz~30MHz, 18GHz~25GHz), therefore no data appear in the report.

3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

## 5. RF Antenna Conducted Spurious

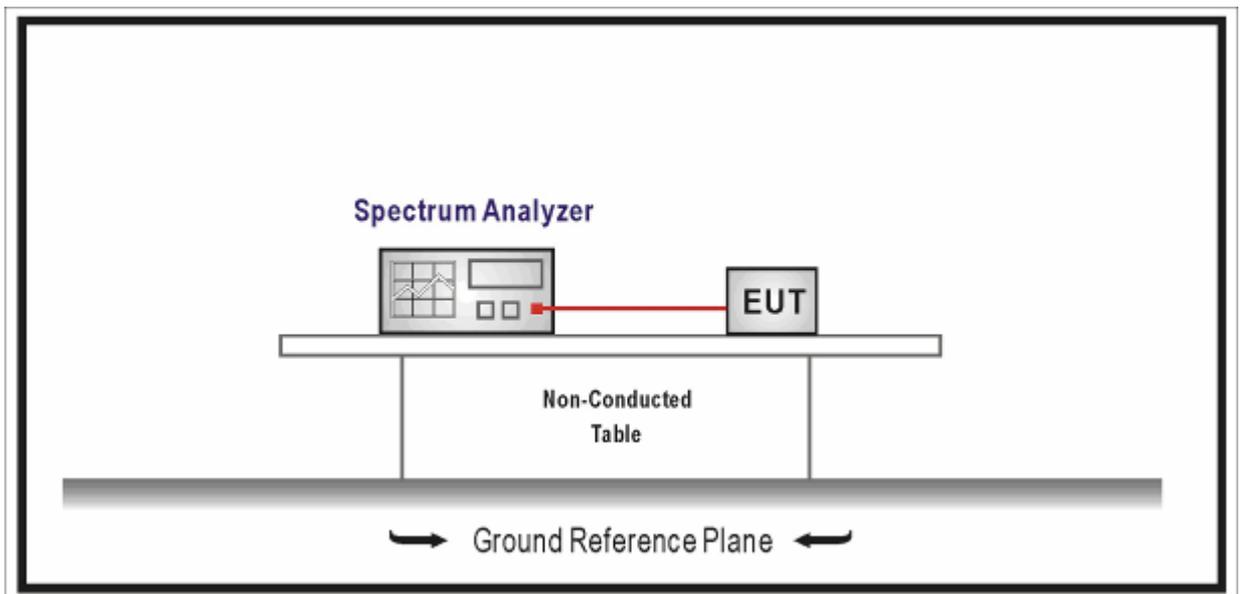
### 5.1. Test Equipment

RF Antenna Conducted Spurious / TR-8

Instrument	Manufacturer	Type No.	Serial No.	Cal. Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2013.04.18
Temperature/Humidity Meter	zhicheng	ZC1-2	TR8-TH	2013.05.07

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

### 5.2. Test Setup



### 5.3. Limit

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 band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

#### **5.4. Test Procedure**

The EUT was tested according to ANSI C63.10: 2009 and KDB 558074 for compliance to FCC 47CFR 15.247 requirements.

Set RBW = 100 kHz, Set VBW > RBW, scan up through 10th harmonic.

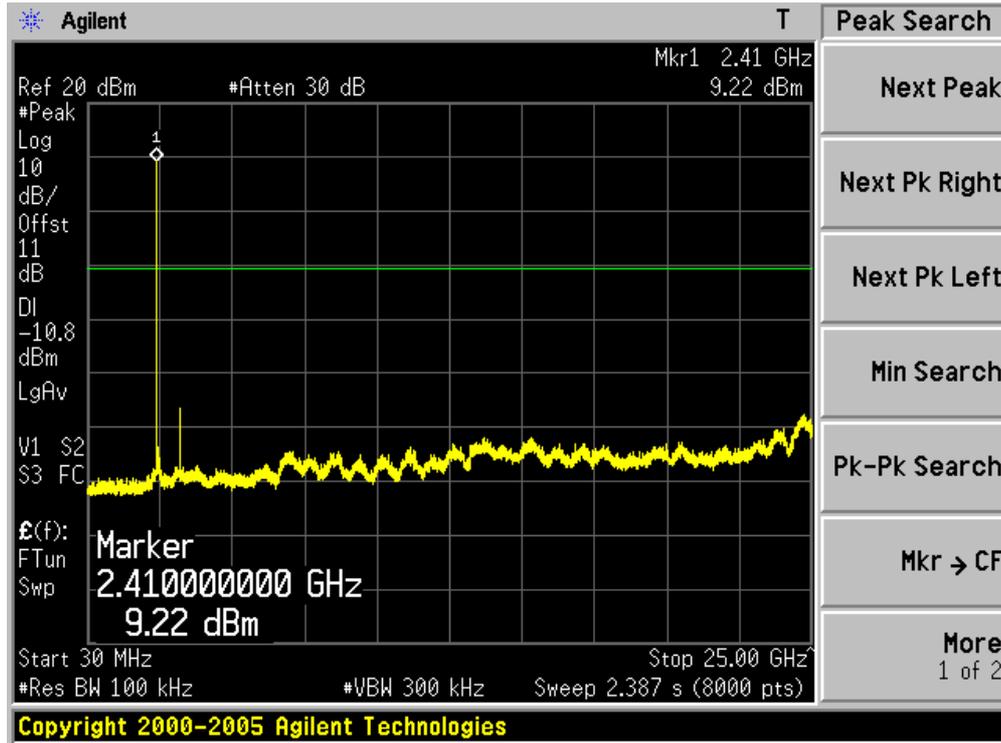
#### **5.5. Uncertainty**

The measurement uncertainty is defined as  $\pm 1.27$  dB

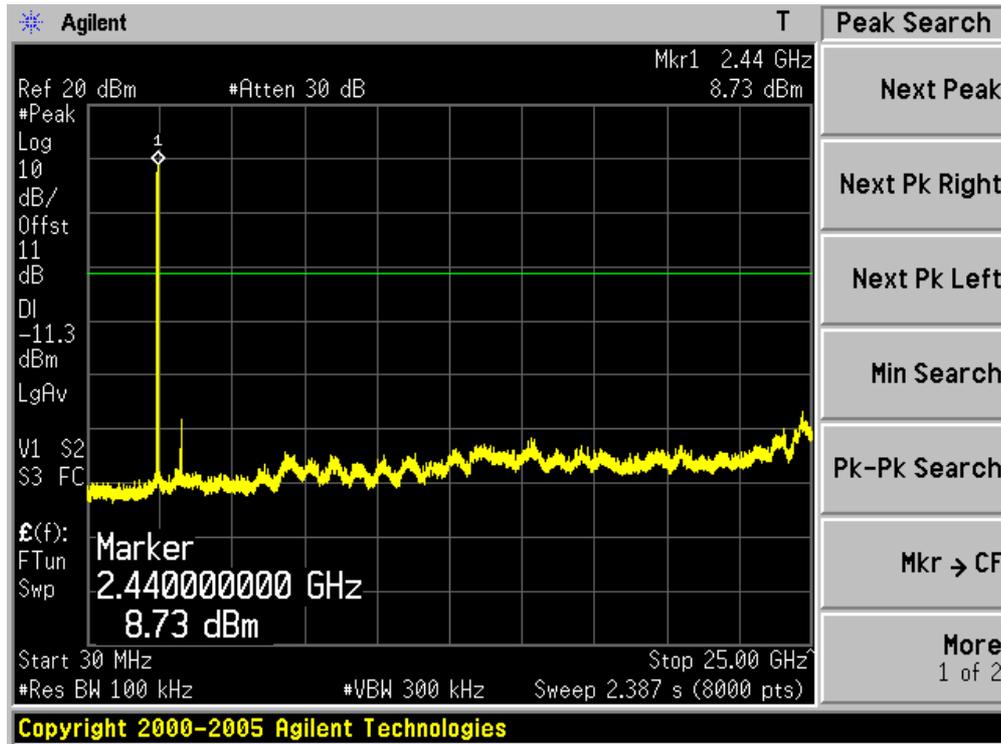
5.6. Test Result

Product	:	xDSL Modem/Router
Test Item	:	RF Antenna Conducted Spurious
Test Site	:	TR-8
Test Mode	:	Mode 1: Transmit by 802.11b (Ant 2)

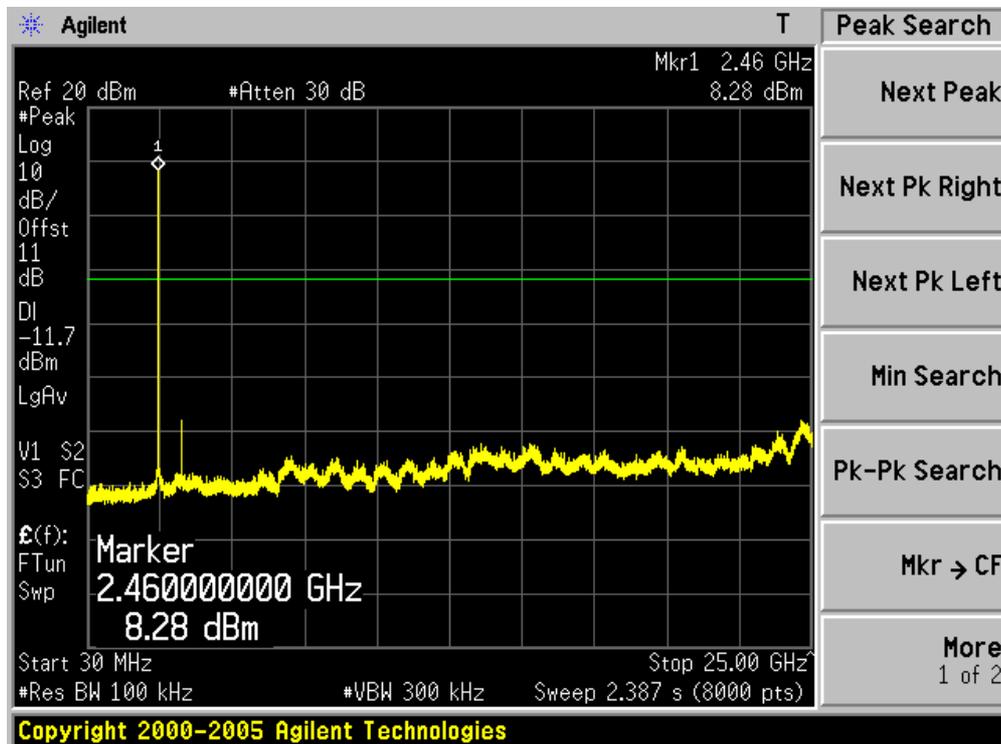
Channel 01 (2412MHz)



Channel 06 (2437MHz)

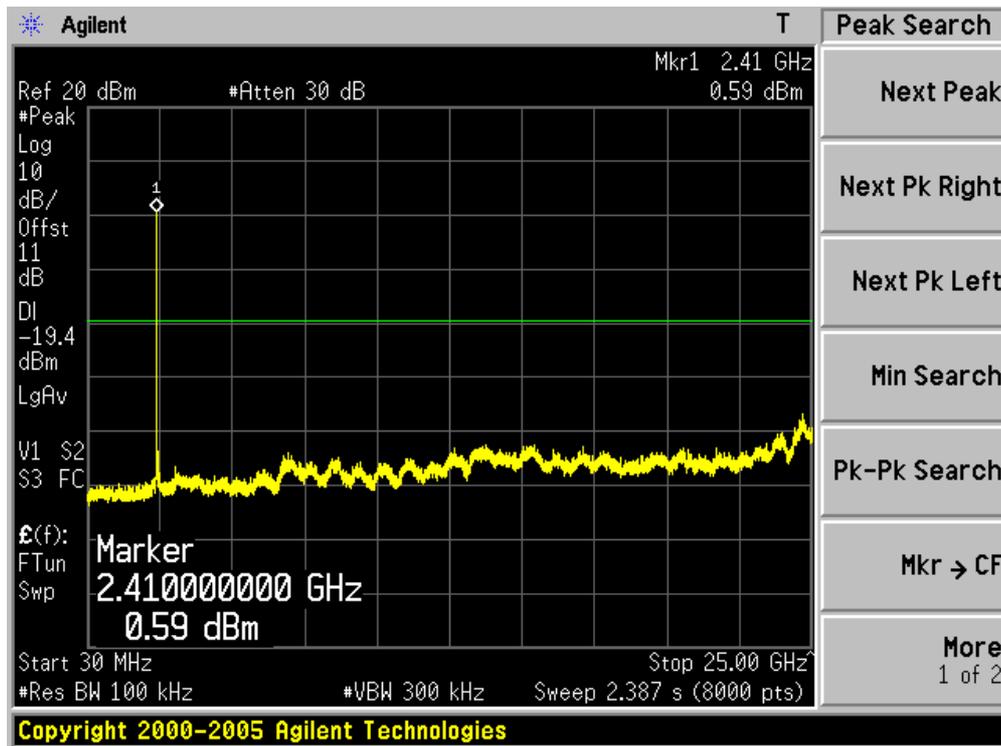


Channel 11 (2462MHz)

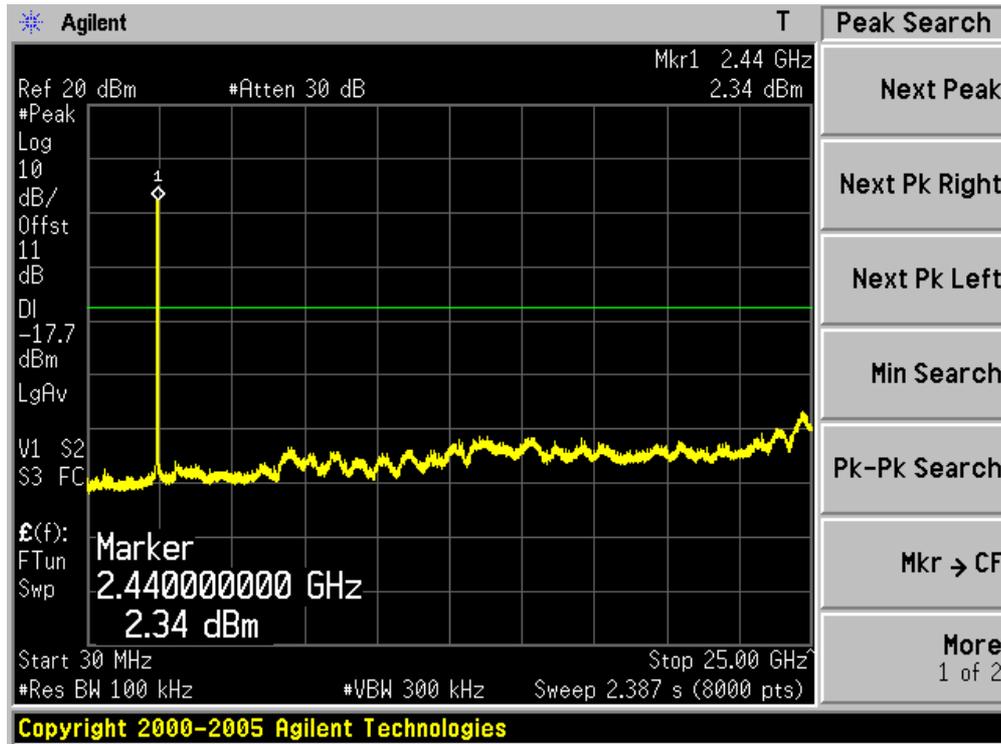


Product	: xDSL Modem/Router
Test Item	: RF Antenna Conducted Spurious
Test Site	: TR-8
Test Mode	: Mode 2: Transmit by 802.11g (Ant 1+2)

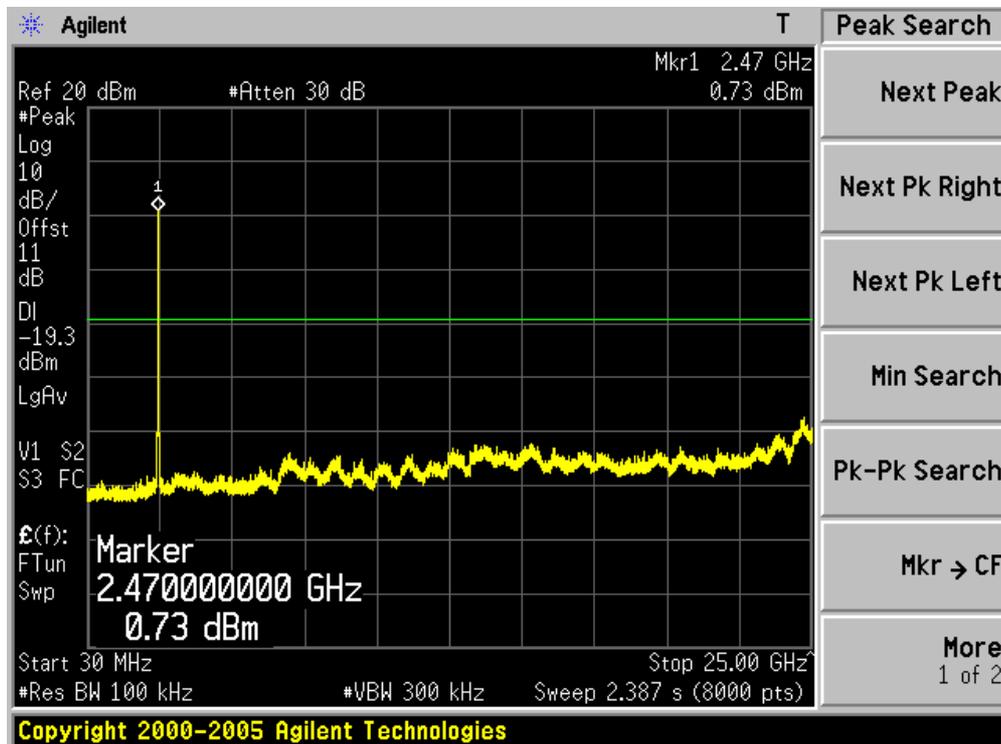
Channel 01 (2412MHz) Ant 1



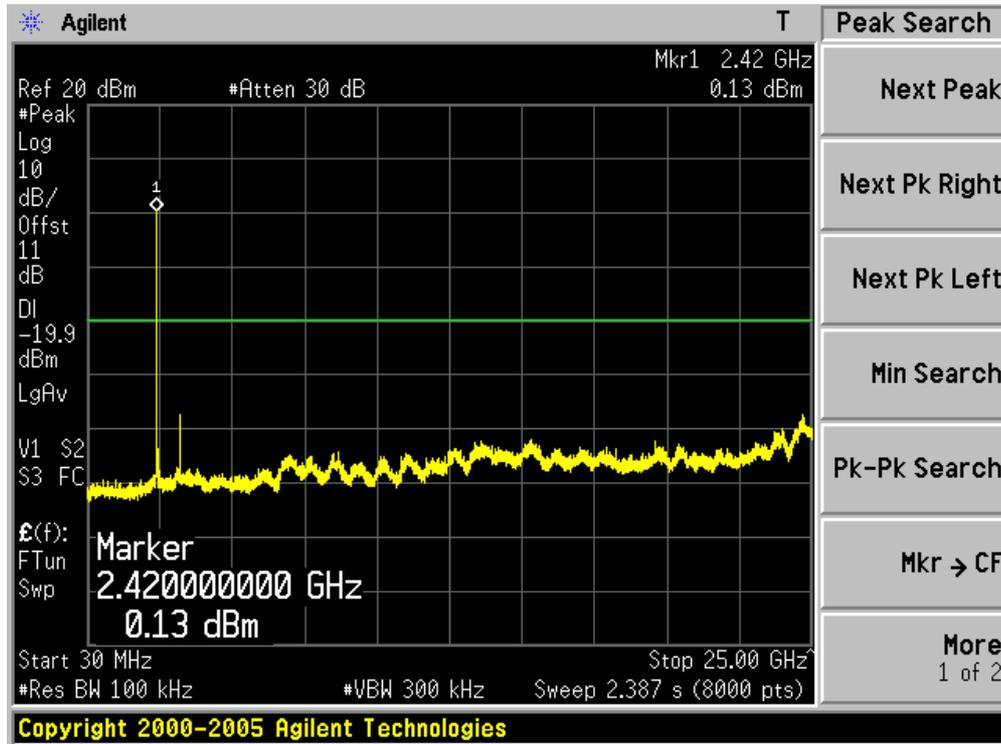
Channel 06 (2437MHz) Ant 1



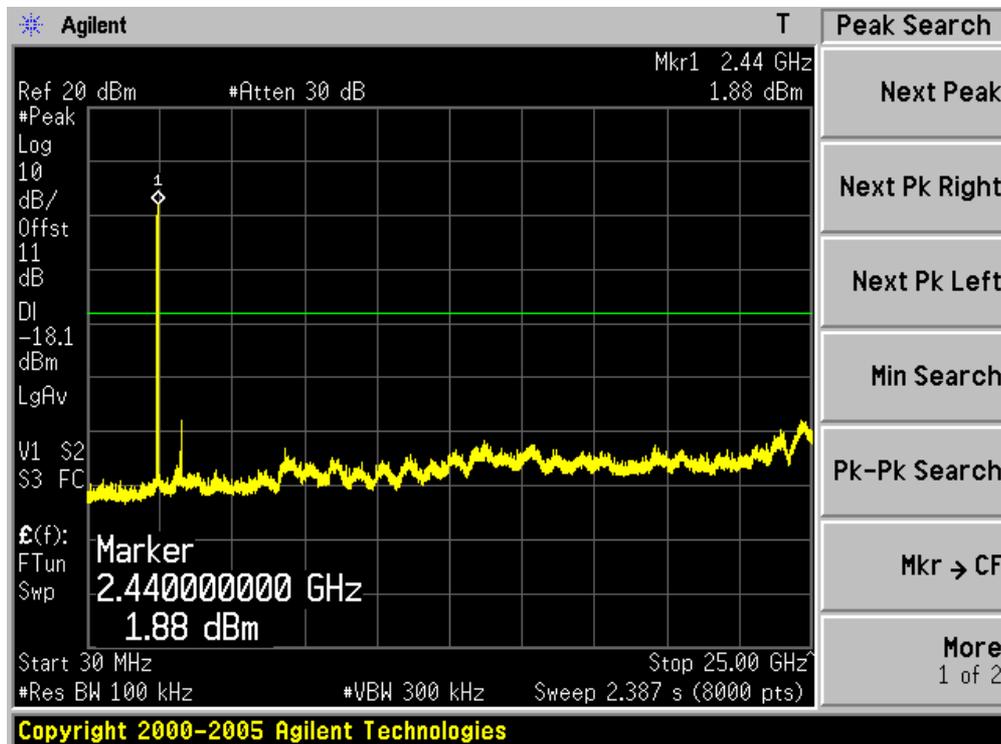
Channel 11 (2462MHz) Ant 1



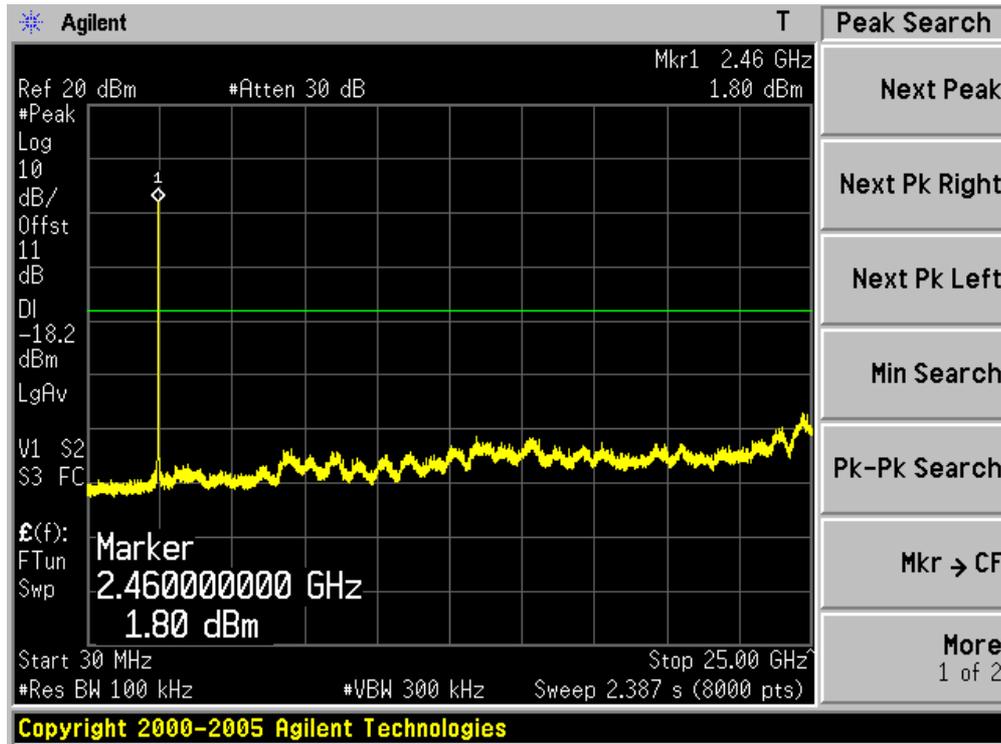
Channel 01 (2412MHz) Ant 2



Channel 06 (2437MHz) Ant 2

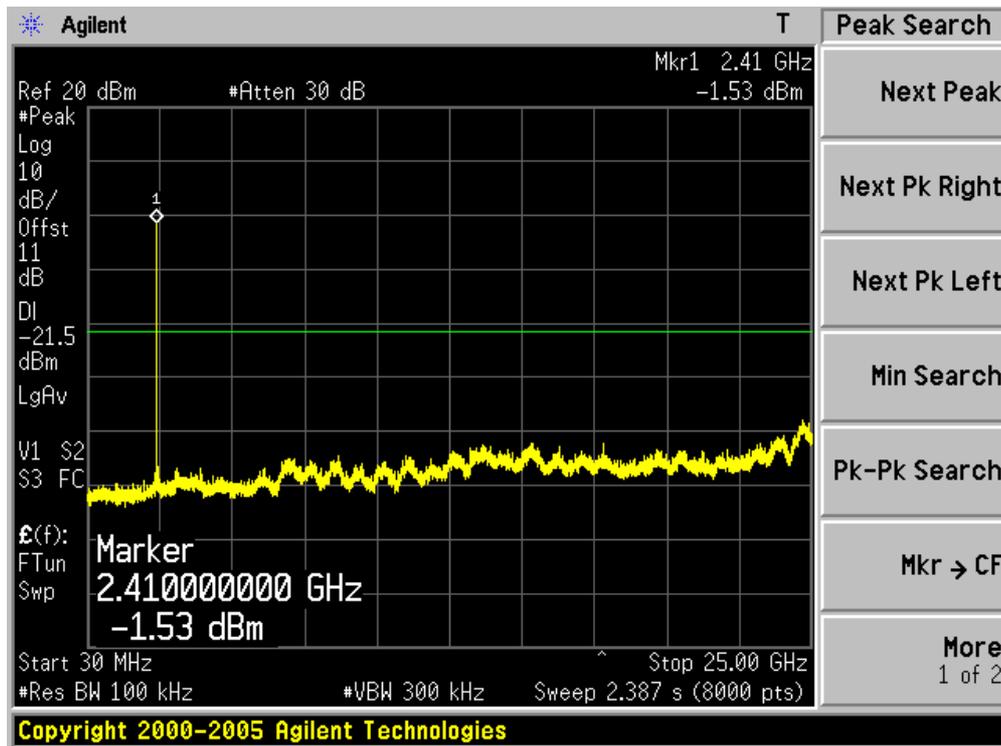


Channel 11 (2462MHz) Ant 2

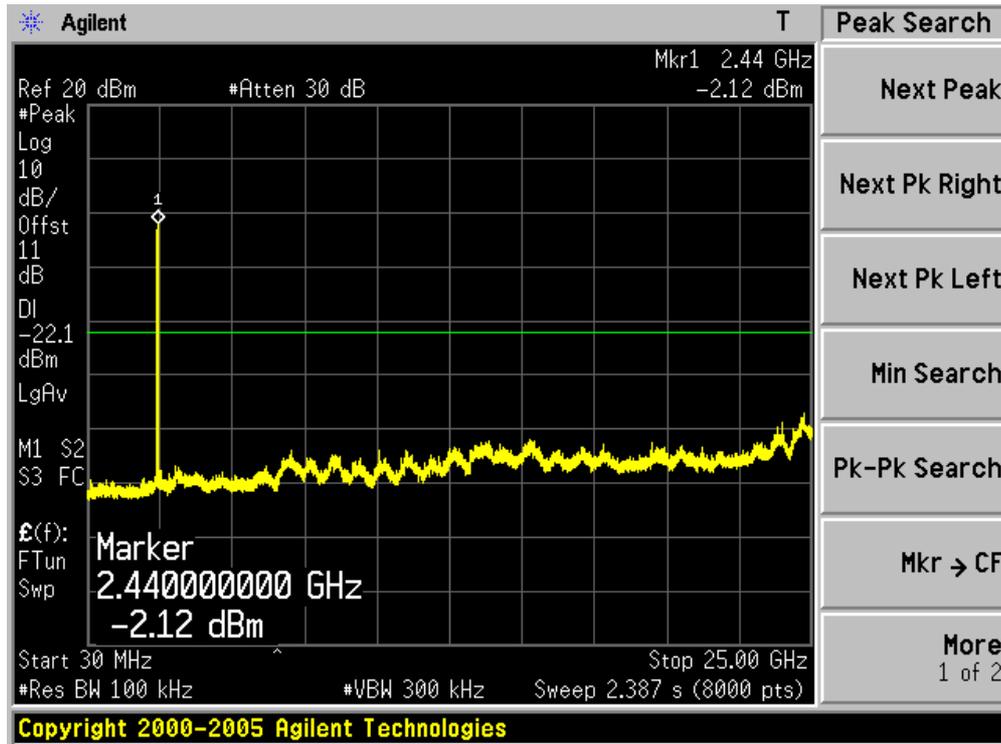


Product	: xDSL Modem/Router
Test Item	: RF Antenna Conducted Spurious
Test Site	: TR-8
Test Mode	: Mode 3: Transmit by 802.11n (20MHz) (Ant 1+2)

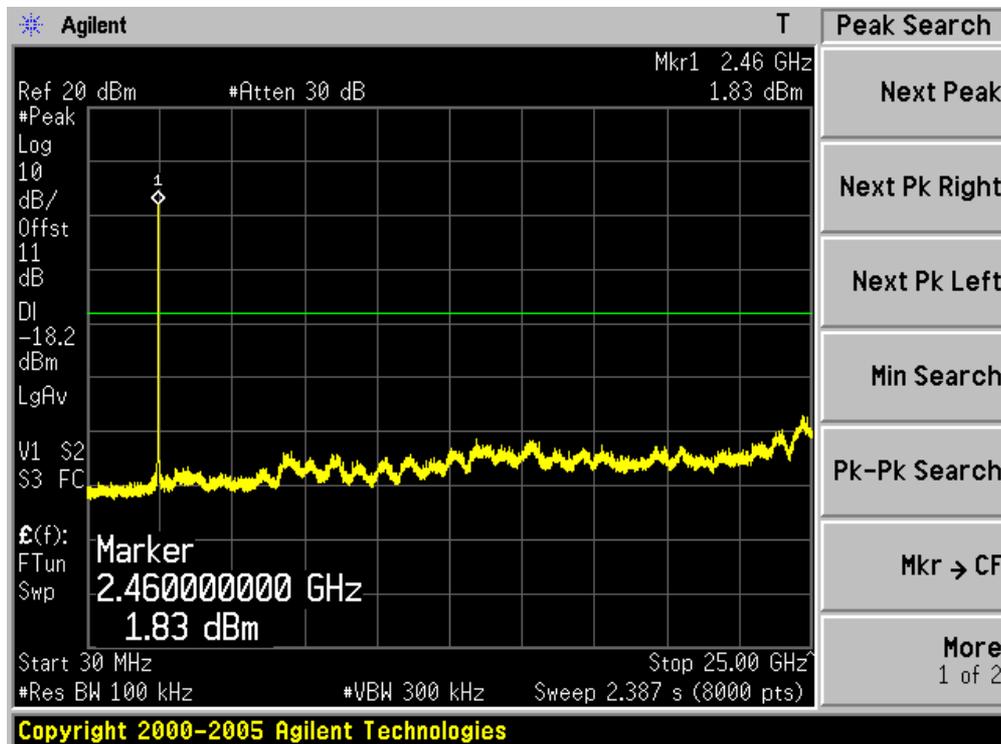
Channel 01 (2412MHz) Ant 1



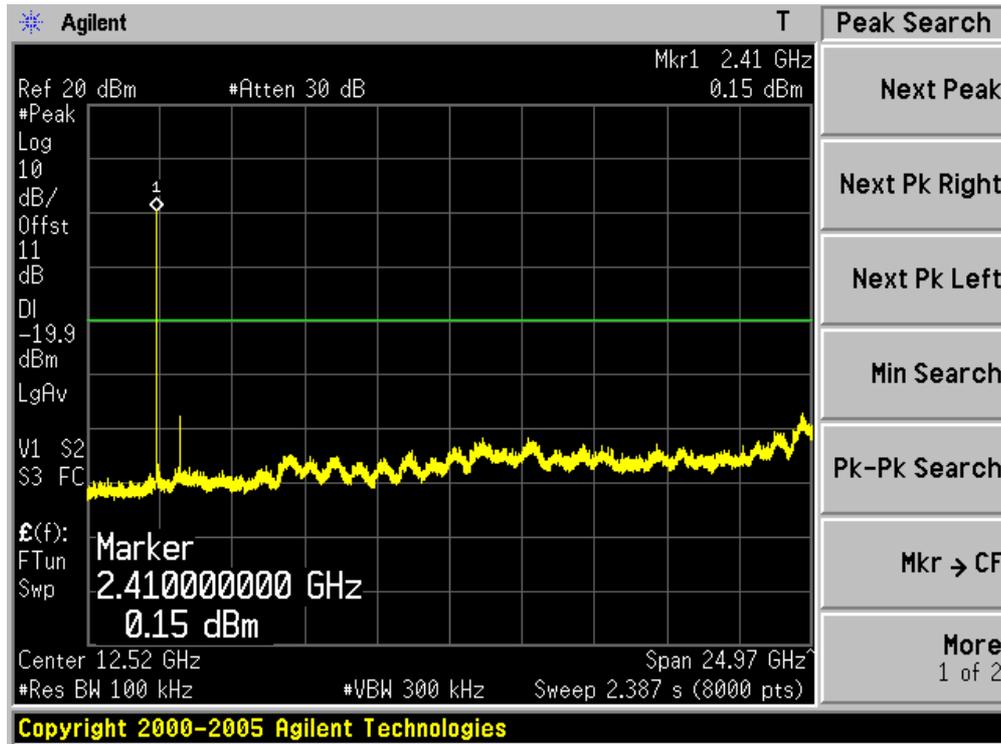
Channel 06 (2437MHz) Ant 1



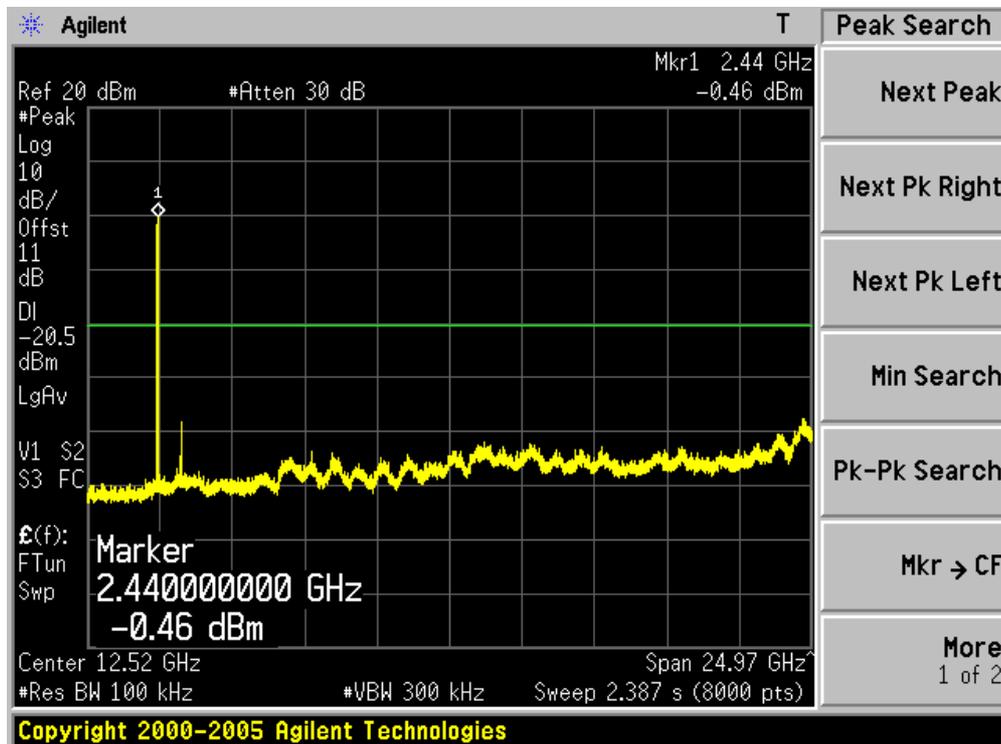
Channel 11 (2462MHz) Ant 1



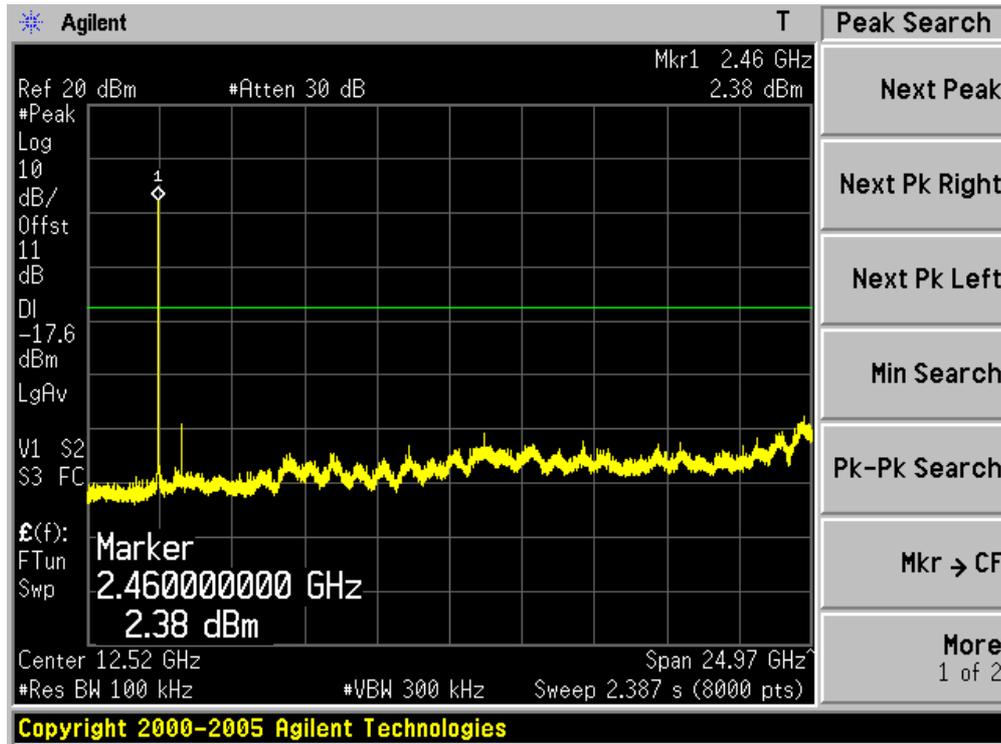
Channel 01 (2412MHz) Ant 2



Channel 06 (2437MHz) Ant 2

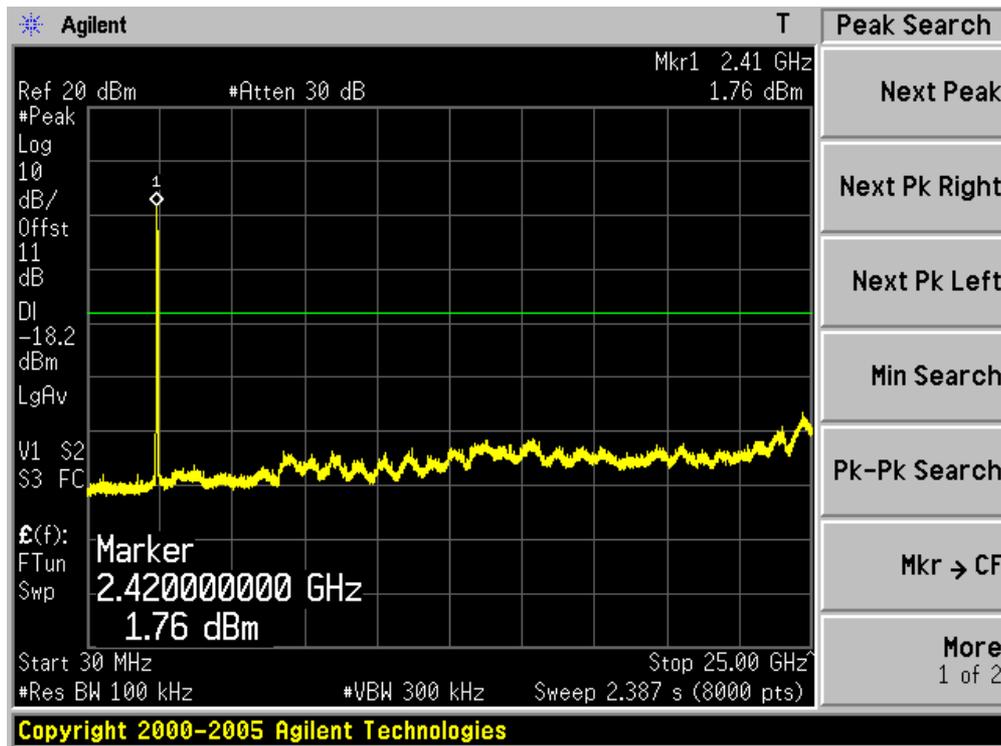


Channel 11 (2462MHz) Ant 2

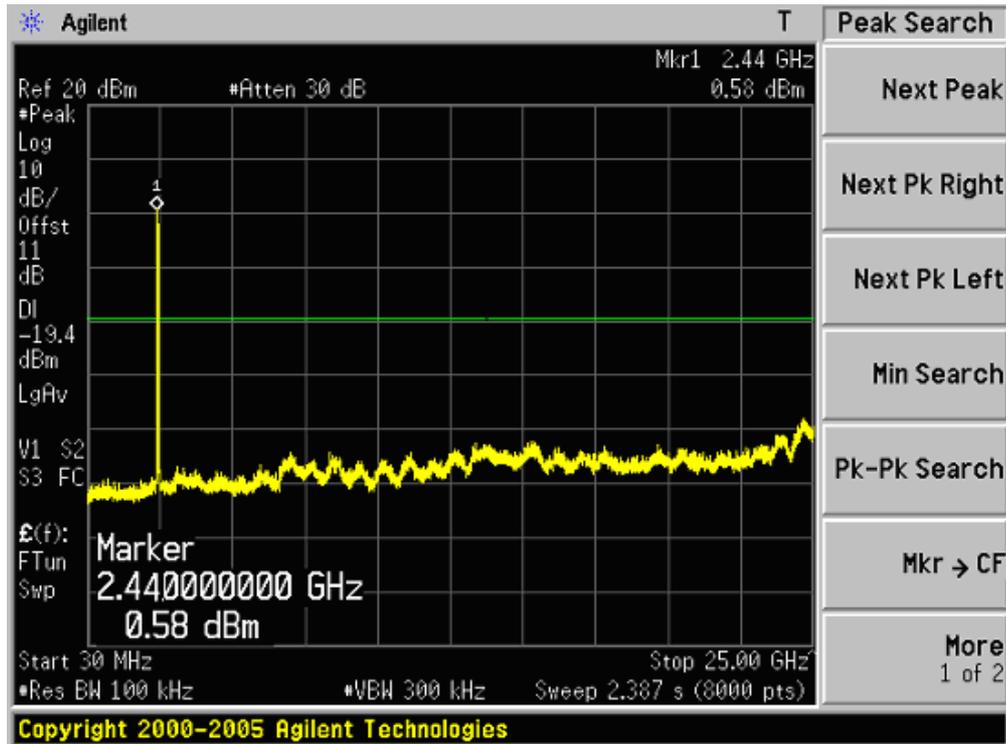


Product	: xDSL Modem/Router
Test Item	: RF Antenna Conducted Spurious
Test Site	: TR-8
Test Mode	: Mode 4: Transmit by 802.11n (40MHz) (Ant 1+2)

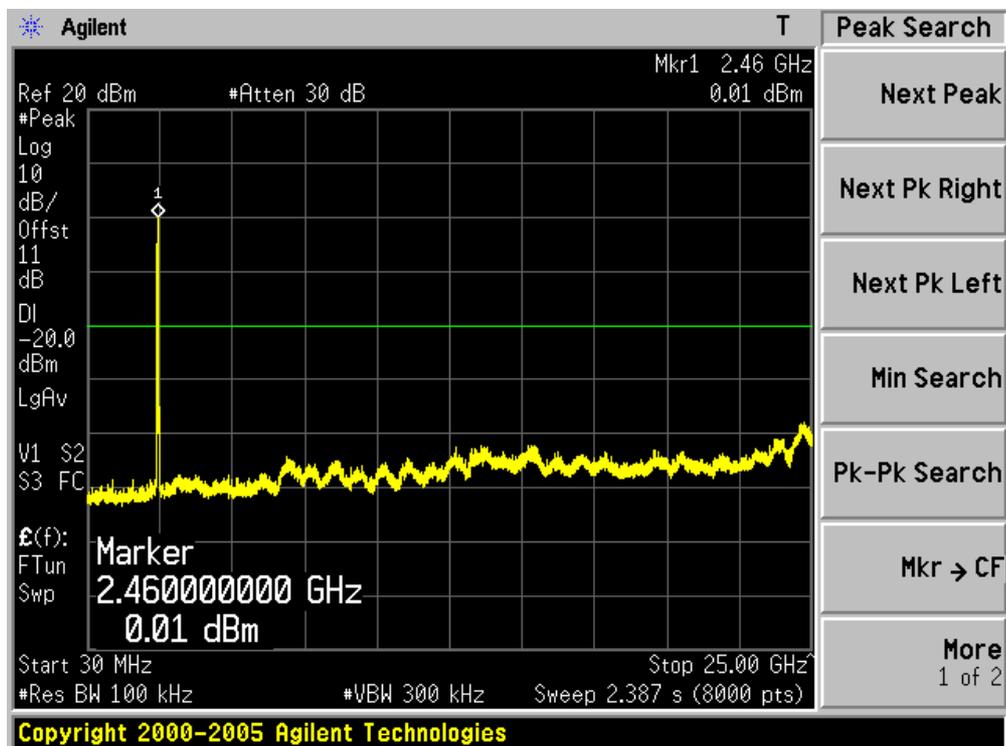
Channel 03 (2422MHz) Ant 1



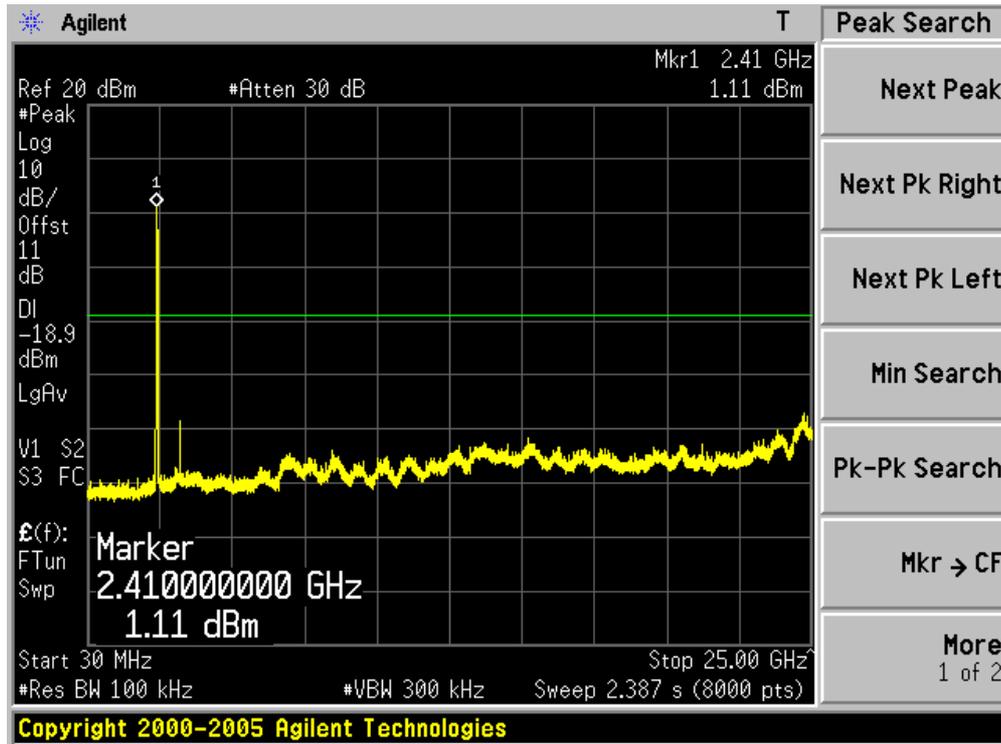
Channel 06 (2437MHz) Ant 1



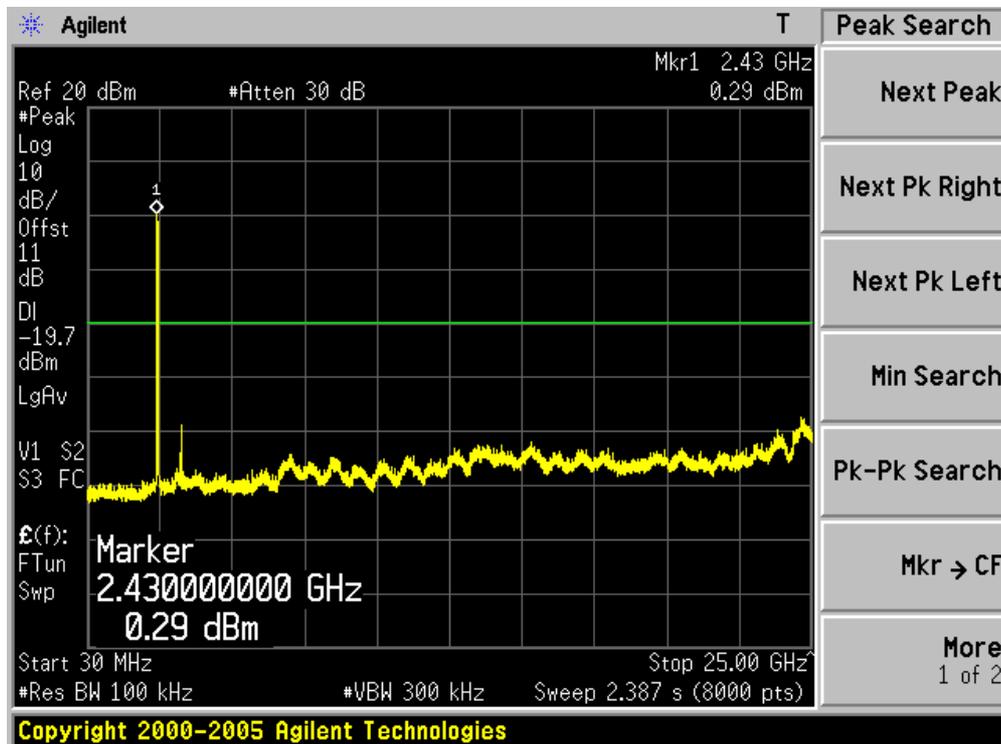
Channel 09 (2452MHz) Ant 1



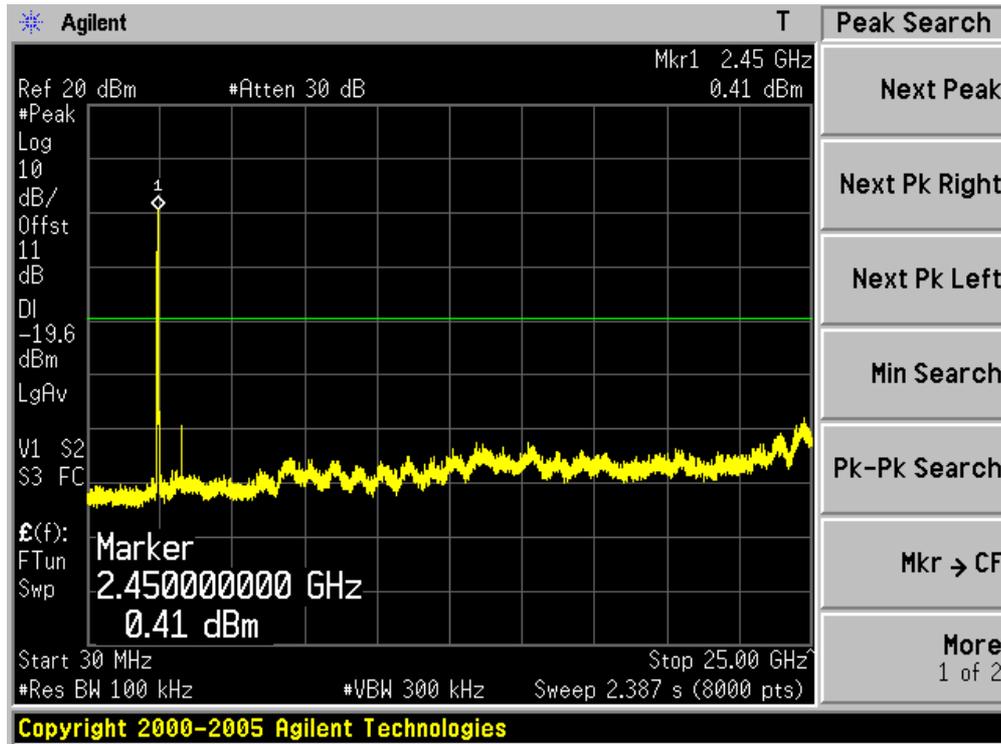
Channel 03 (2422MHz) Ant 2



Channel 06 (2437MHz) Ant 2



Channel 09 (2452MHz) Ant 2



**6. Radiated Emission Band Edge**

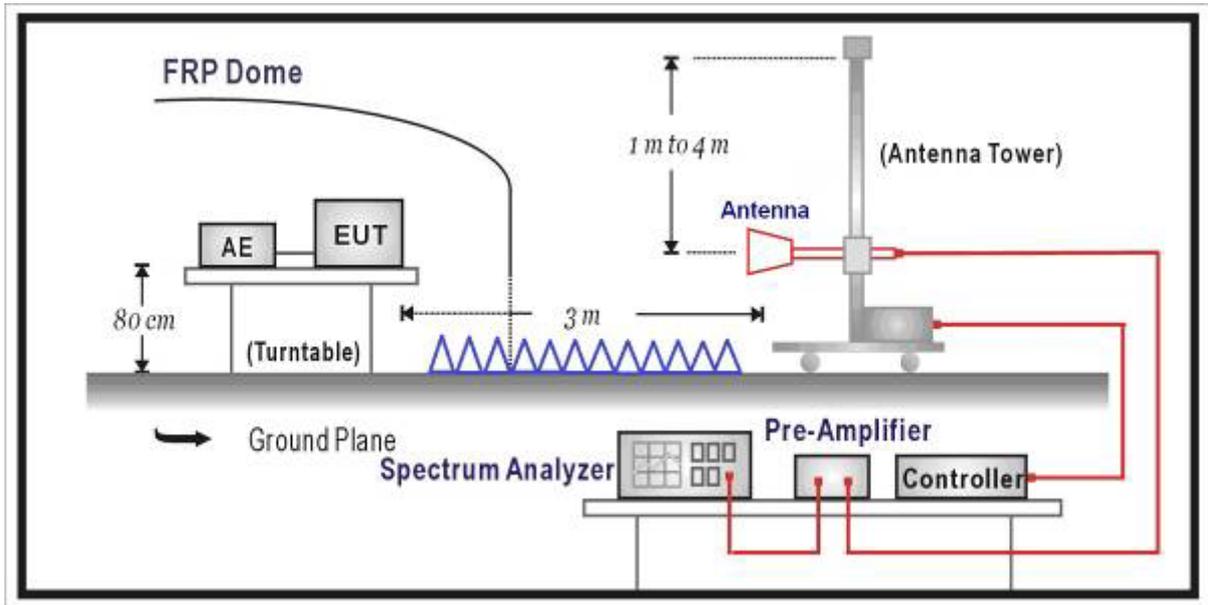
**6.1. Test Equipment**

Radiated Emission Band Edge / AC-5

Instrument	Manufacturer	Type No.	Serial No.	Cali. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2013.04.18
EMI Test Receiver	R&S	ESCI	100573	2013.04.18
Preamplifier	Miteq	NSP1800-25	1364185	2013.05.04
Preamplifier	Quietek	AP-040G	CHM-0906001	2013.05.04
Bilog Type Antenna	Schaffner	CBL6112B	2932	2013.10.15
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	499	2014.06.08
50ohm Coaxial Switch	Anritsu	MP59B	6200464462	2013.03.02
Temperature/Humidity Meter	zhicheng	ZC1-2	AC5-TH	2013.01.10

Note 1: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

**6.2. Test Setup**



**6.3. Limit**

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) of FCC part 15, must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

**6.4. Test Procedure**

The EUT was setup according to ANSI C63.4: 2009 and tested according to ANSI C63.10: 2009 and KDB 558074 for compliance to FCC 47CFR 15.247 requirements.

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4: 2009 on radiated measurement.

**6.5. Uncertainty**

The measurement uncertainty above 1G is defined as  $\pm 3.9$  dB

6.6. Test Result

All of the test result shown indicates the worst case, and spectrum analyzer parameters setting as shown below:

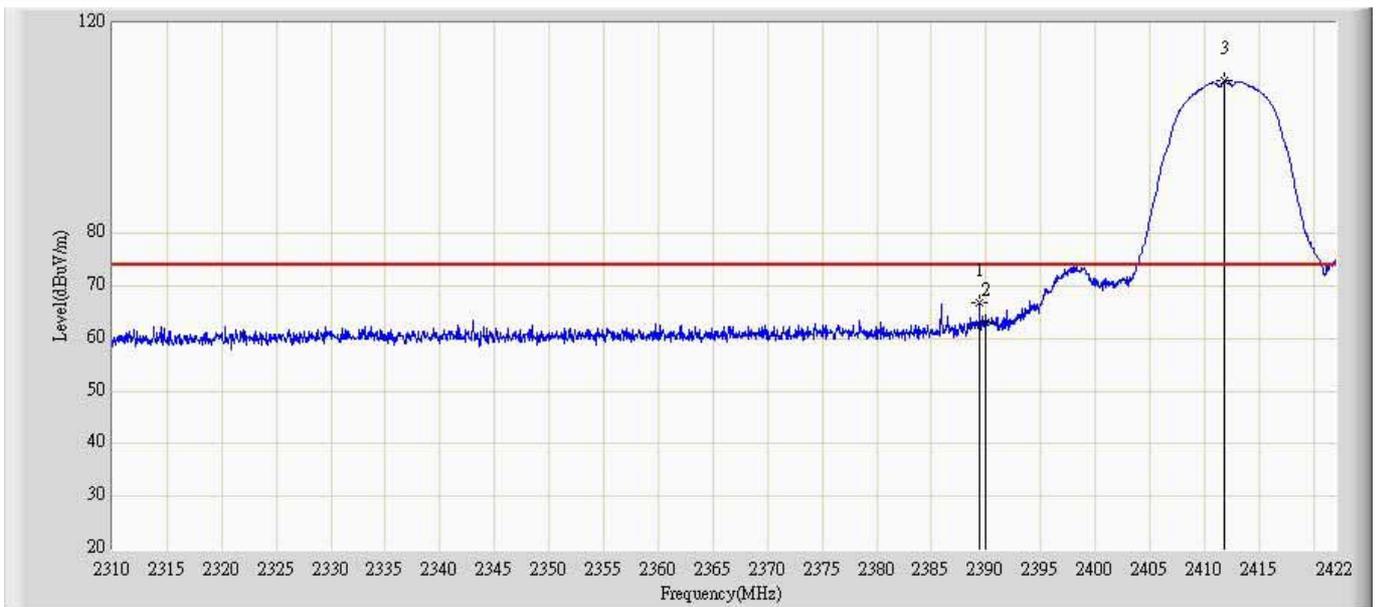
Peak detector: RBW = 1MHz, VBW = 3MHz, sweep time = 200ms;

Average detector: RBW = 1MHz, VBW = 10Hz, sweep time = auto.

Measure Level = Reading Level + Cable Loss + Antenna Factor - Pre-amplifier Gain

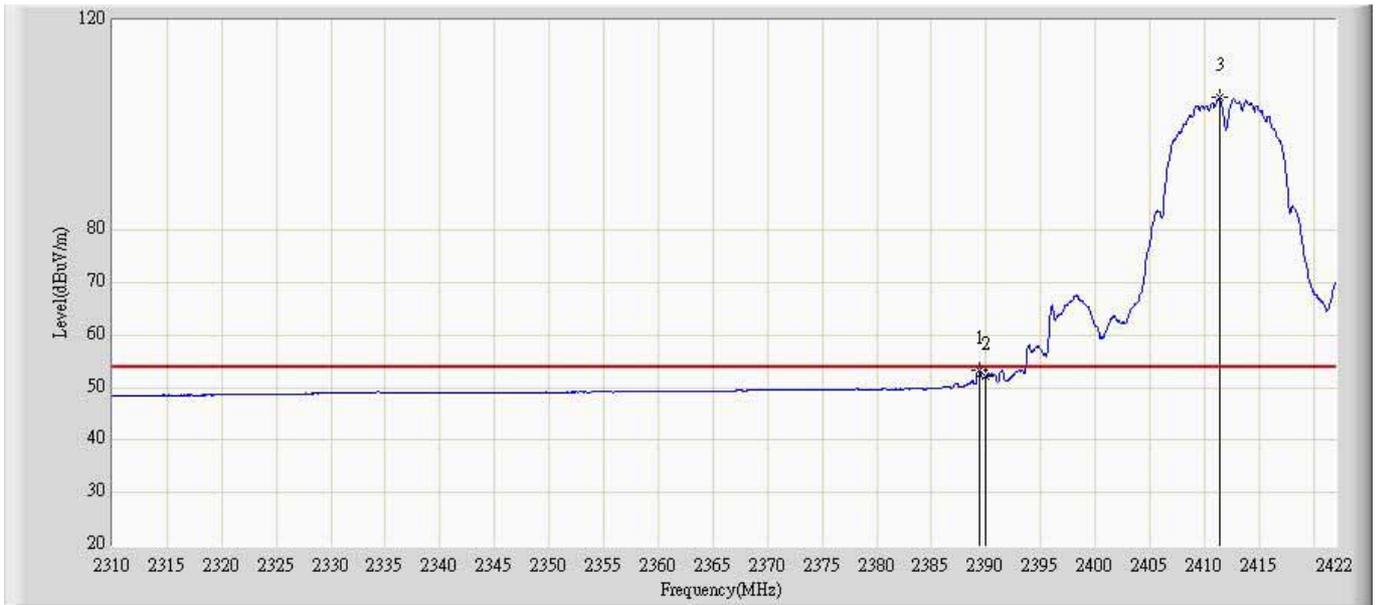
In case the emission is fail due to the used RB/VB is too wide, marker-delta method of FCC Public Notice will be followed.

Engineer: Toms	
Site: AC5	Time: 2012/12/10 - 21:41
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Horizontal
EUT: xDSL Modem/Router	Power: AC 120V/60Hz
Note: Mode1: Transmit at channel 2412MHz by 802.11b ant 2	



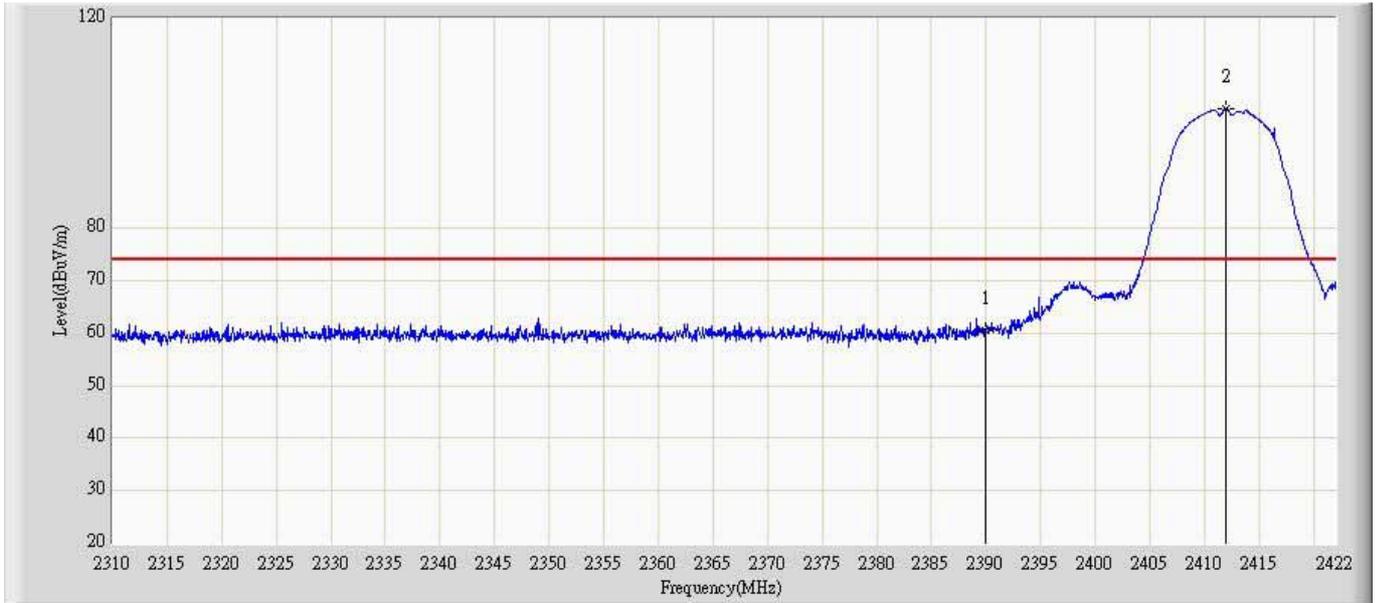
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2389.408	66.830	30.534	-7.170	74.000	36.296	PK
2			2390.000	63.048	26.747	-10.952	74.000	36.302	PK
3		*	2411.864	109.108	72.626	N/A	N/A	36.482	PK

Engineer: Toms	
Site: AC5	Time: 2012/12/10 - 21:44
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Horizontal
EUT: xDSL Modem/Router	Power: AC 120V/60Hz
Note: Mode1: Transmit at channel 2412MHz by 802.11b ant 2	



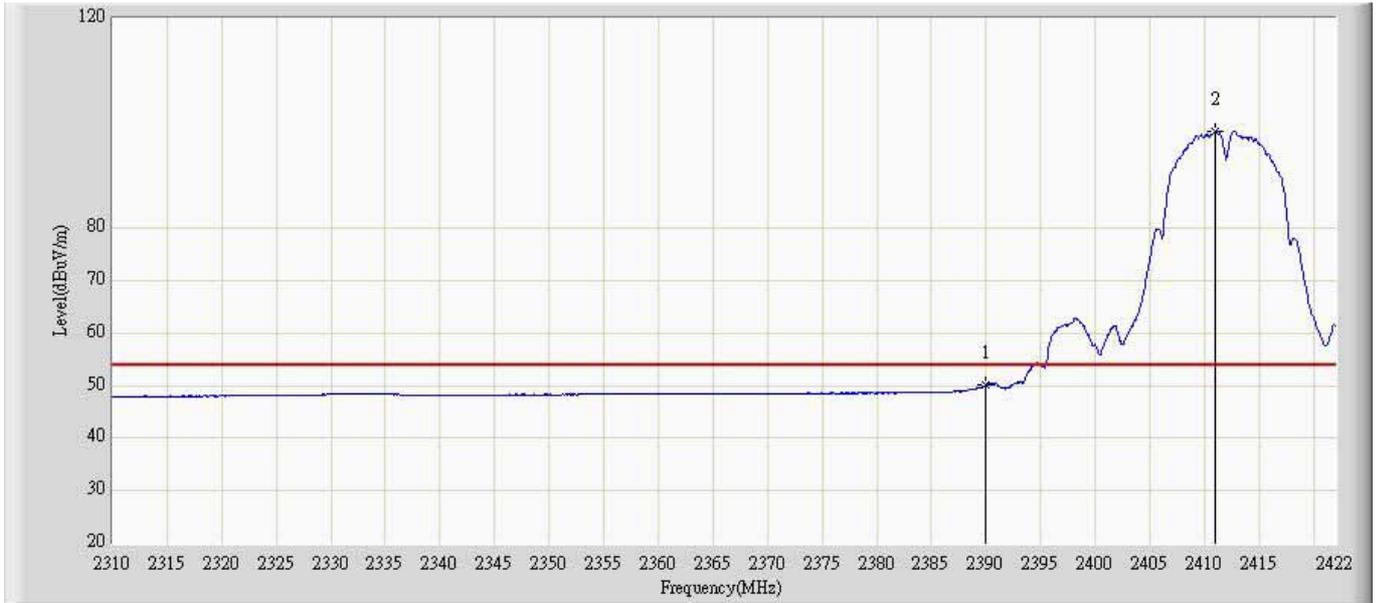
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2389.352	53.202	16.906	-0.798	54.000	36.296	AV
2			2390.000	52.085	15.784	-1.915	54.000	36.302	AV
3		*	2411.360	105.263	68.786	N/A	N/A	36.477	AV

Engineer: Toms	
Site: AC5	Time: 2012/12/10 - 21:49
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Vertical
EUT: xDSL Modem/Router	Power: AC 120V/60Hz
Note: Mode1: Transmit at channel 2412MHz by 802.11b ant 2	



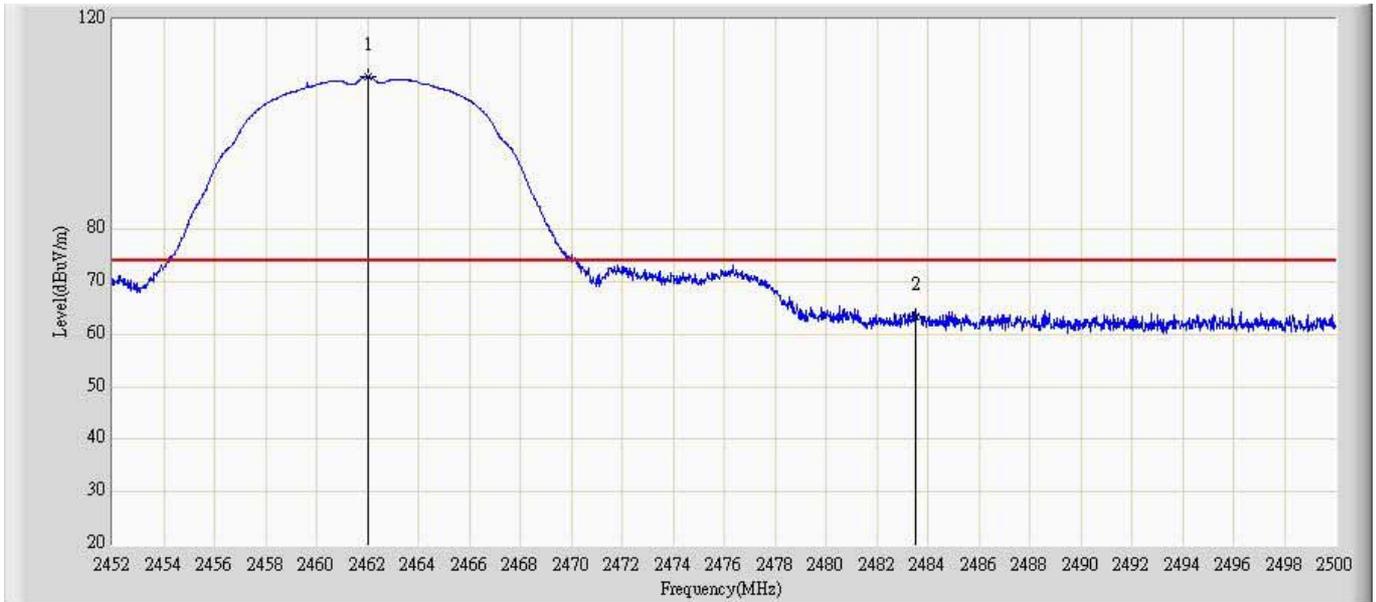
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	60.583	24.942	-13.417	74.000	35.642	PK
2		*	2412.032	102.735	67.000	N/A	N/A	35.735	PK

Engineer: Toms	
Site: AC5	Time: 2012/12/10 - 21:51
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Vertical
EUT: xDSL Modem/Router	Power: AC 120V/60Hz
Note: Mode1: Transmit at channel 2412MHz by 802.11b ant 2	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	50.073	14.432	-3.927	54.000	35.642	AV
2		*	2411.024	98.429	62.699	N/A	N/A	35.730	AV

Engineer: Brgant	
Site: AC5	Time: 2012/12/14 - 16:44
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Horizontal
EUT: xDSL Modem/Router	Power: AC 120V/60Hz
Note: Mode1: Transmit at channel 2462MHz by 802.11b ant 2	



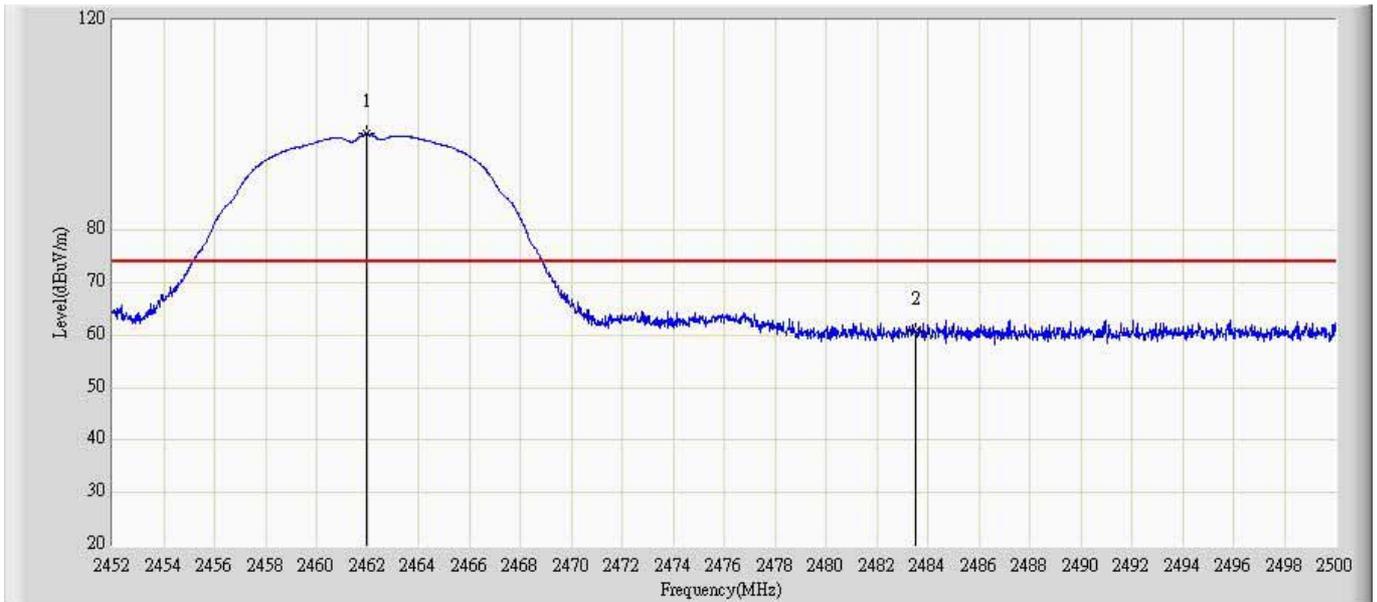
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2462.056	108.996	72.085	N/A	N/A	36.911	PK
2			2483.500	63.277	26.187	-10.723	74.000	37.089	PK

Engineer: Brgant	
Site: AC5	Time: 2012/12/14 - 16:45
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Horizontal
EUT: xDSL Modem/Router	Power: AC 120V/60Hz
Note: Mode1: Transmit at channel 2462MHz by 802.11b ant 2	



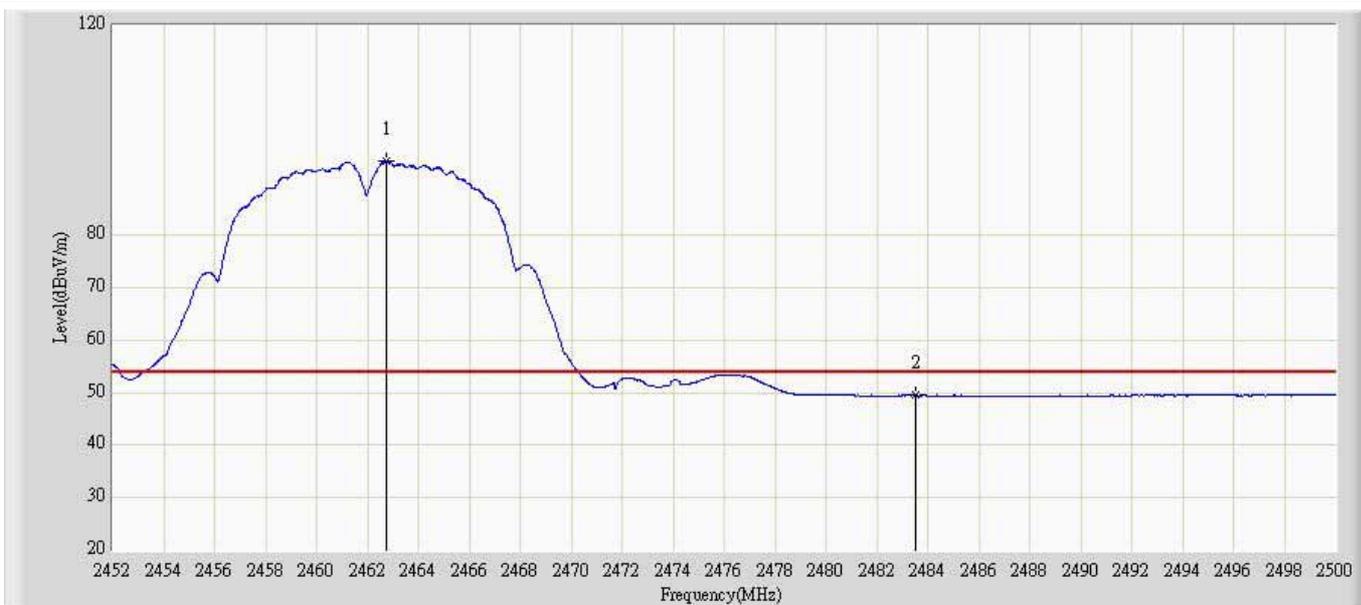
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2462.800	104.707	67.789	50.707	54.000	36.917	AV
2			2483.500	52.531	15.442	-1.469	54.000	37.089	AV

Engineer: Brgant	
Site: AC5	Time: 2012/12/14 - 16:47
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Vertical
EUT: xDSL Modem/Router	Power: AC 120V/60Hz
Note: Mode1: Transmit at channel 2462MHz by 802.11b ant 2	



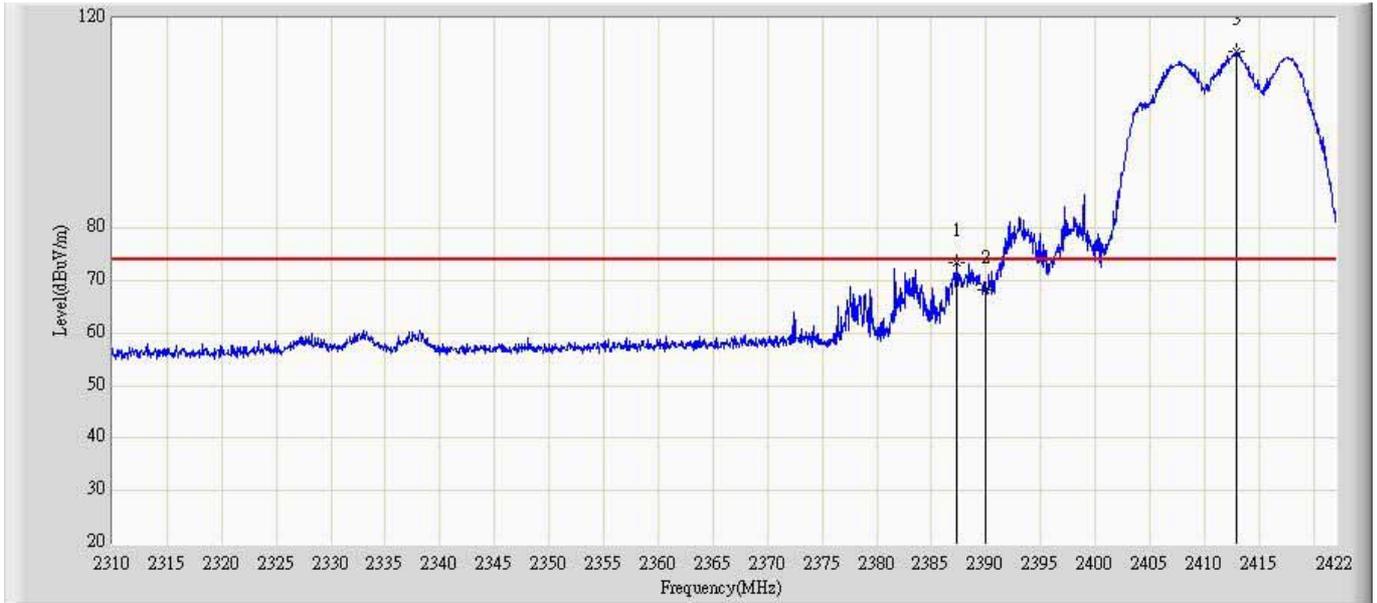
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2461.984	98.339	62.376	N/A	N/A	35.963	PK
2			2483.500	60.773	24.717	-13.227	74.000	36.055	PK

Engineer: Brgant	
Site: AC5	Time: 2012/12/14 - 16:47
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Vertical
EUT: xDSL Modem/Router	Power: AC 120V/60Hz
Note: Mode1: Transmit at channel 2462MHz by 802.11b ant 2	



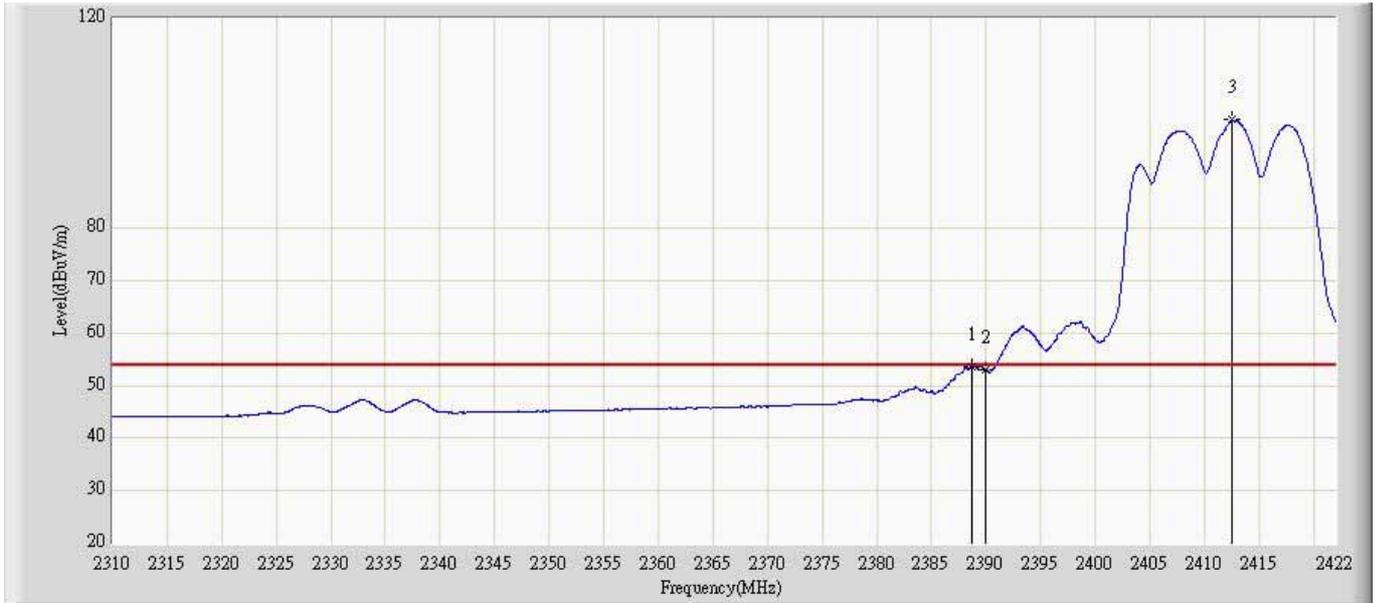
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2462.728	94.200	58.234	N/A	N/A	35.966	AV
2			2483.500	49.471	13.415	-4.529	54.000	36.055	AV

Engineer: Toms	
Site: AC5	Time: 2012/12/21 - 19:34
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Horizontal
EUT: xDSL Modem/Router	Power: AC 120V/60Hz
Note: Mode2: Transmit at channel 2412MHz by 802.11g ant 1+2	



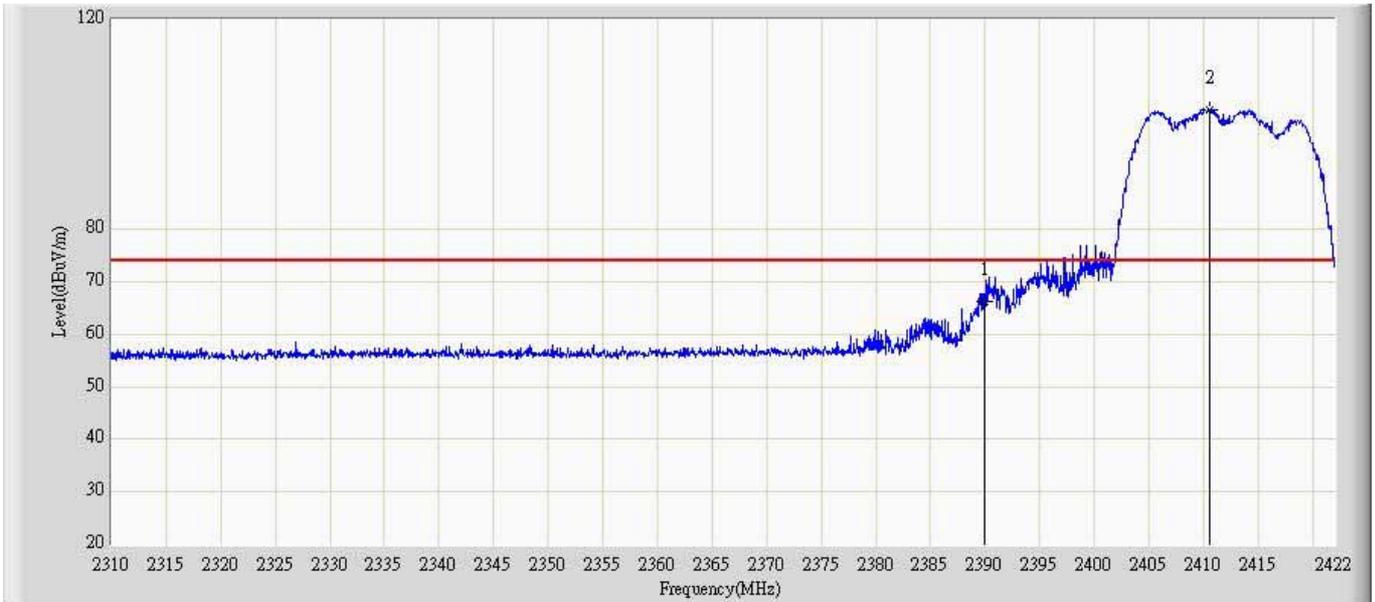
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2387.336	73.523	37.243	-0.477	74.000	36.279	PK
2			2390.000	68.262	31.961	-5.738	74.000	36.302	PK
3		*	2412.984	113.578	77.087	N/A	N/A	36.491	PK

Engineer: Toms	
Site: AC5	Time: 2012/12/21 - 19:36
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Horizontal
EUT: xDSL Modem/Router	Power: AC 120V/60Hz
Note: Mode2: Transmit at channel 2412MHz by 802.11g ant 1+2	



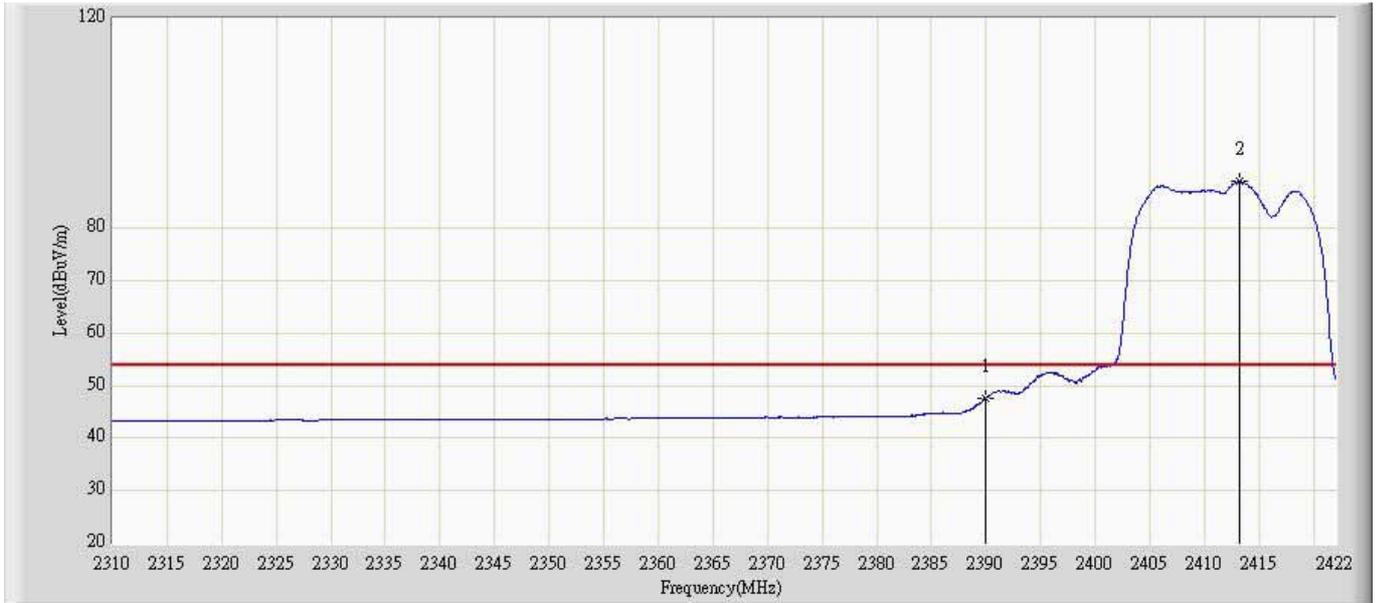
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2388.680	53.764	17.473	-0.236	54.000	36.291	AV
2			2390.000	53.067	16.766	-0.933	54.000	36.302	AV
3		*	2412.536	100.683	64.196	N/A	N/A	36.488	AV

Engineer: Toms	
Site: AC5	Time: 2012/12/21 - 19:30
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Vertical
EUT: xDSL Modem/Router	Power: AC 120V/60Hz
Note: Mode2: Transmit at channel 2412MHz by 802.11g ant 1+2	



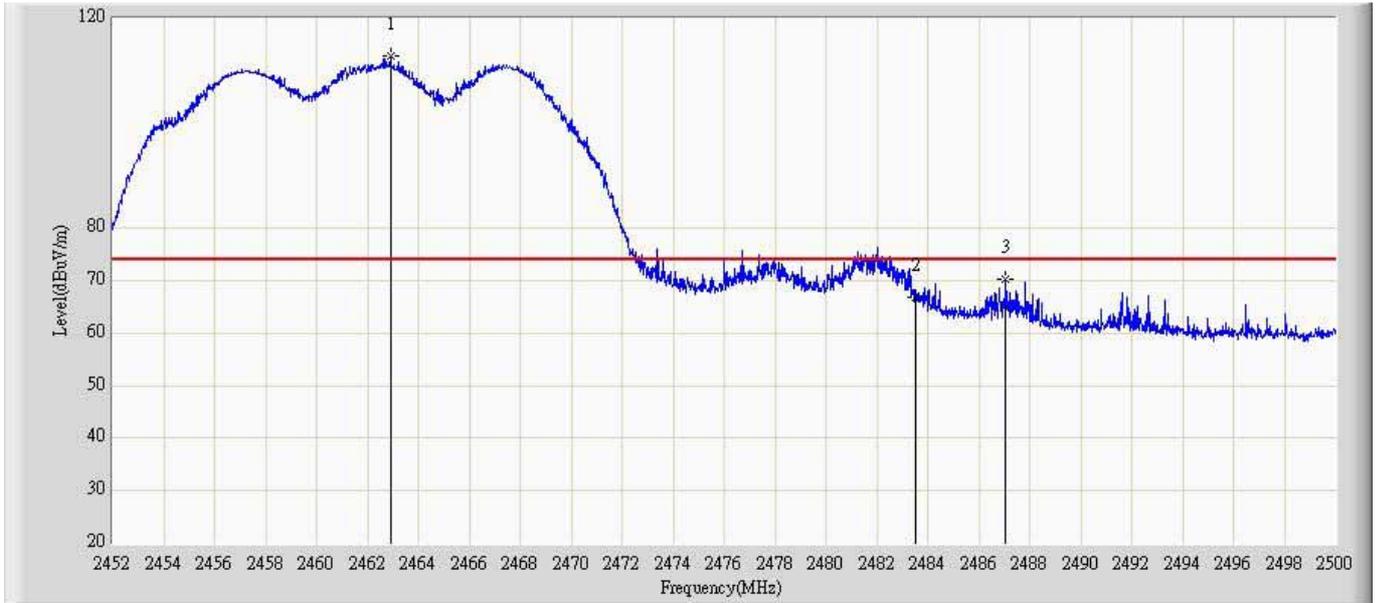
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	66.160	30.519	-7.840	74.000	35.642	PK
2		*	2410.520	102.873	67.145	N/A	N/A	35.728	PK

Engineer: Toms	
Site: AC5	Time: 2012/12/21 - 19:33
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Vertical
EUT: xDSL Modem/Router	Power: AC 120V/60Hz
Note: Mode2: Transmit at channel 2412MHz by 802.11g ant 1+2	



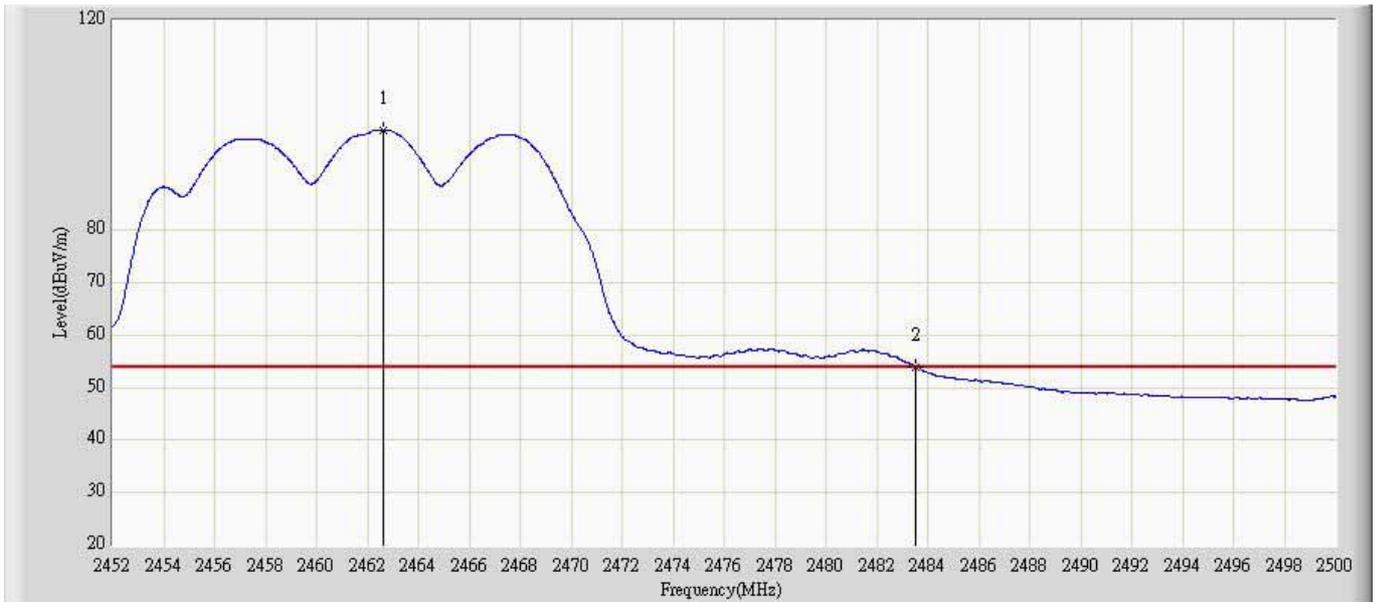
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	47.588	11.947	-6.412	54.000	35.642	AV
2		*	2413.208	88.876	53.135	N/A	N/A	35.741	AV

Engineer: Toms	
Site: AC5	Time: 2012/12/21 - 19:43
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Horizontal
EUT: xDSL Modem/Router	Power: AC 120V/60Hz
Note: Mode2: Transmit at channel 2462MHz by 802.11g ant 1+2	



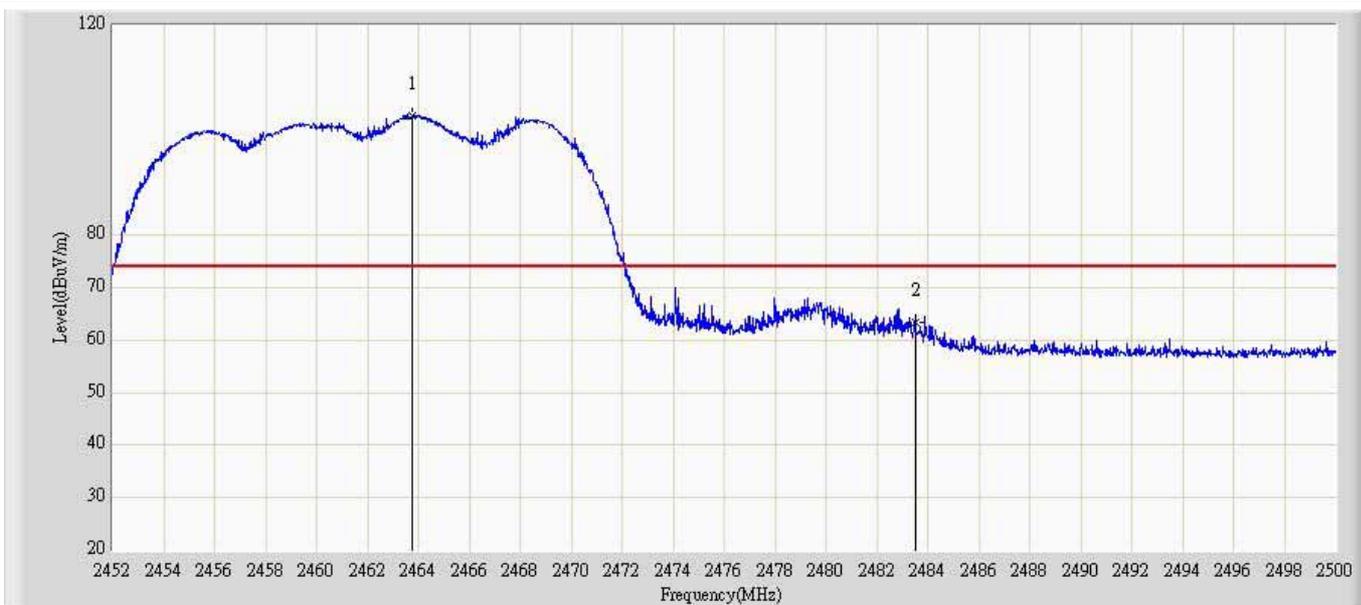
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2462.896	112.883	75.965	N/A	N/A	36.919	PK
2			2483.500	66.813	29.723	-7.187	74.000	37.089	PK
3			2487.064	70.204	33.083	-3.796	74.000	37.121	PK

Engineer: Toms	
Site: AC5	Time: 2012/12/21 - 19:51
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Horizontal
EUT: xDSL Modem/Router	Power: AC 120V/60Hz
Note: Mode2: Transmit at channel 2462MHz by 802.11g ant 1+2	



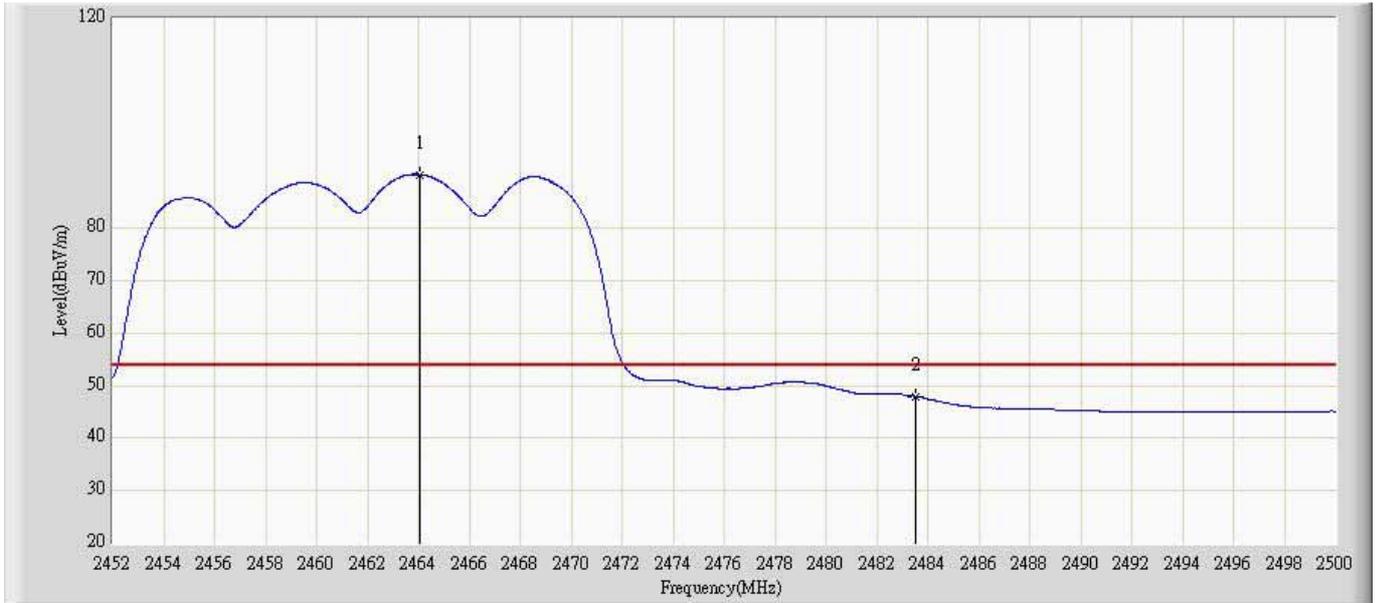
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2462.656	99.124	62.208	N/A	N/A	36.916	AV
2			2483.500	53.961	16.871	-0.039	54.000	37.089	AV

Engineer: Toms	
Site: AC5	Time: 2012/12/21 - 20:03
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Vertical
EUT: xDSL Modem/Router	Power: AC 120V/60Hz
Note: Mode2: Transmit at channel 2462MHz by 802.11g ant 1+2	



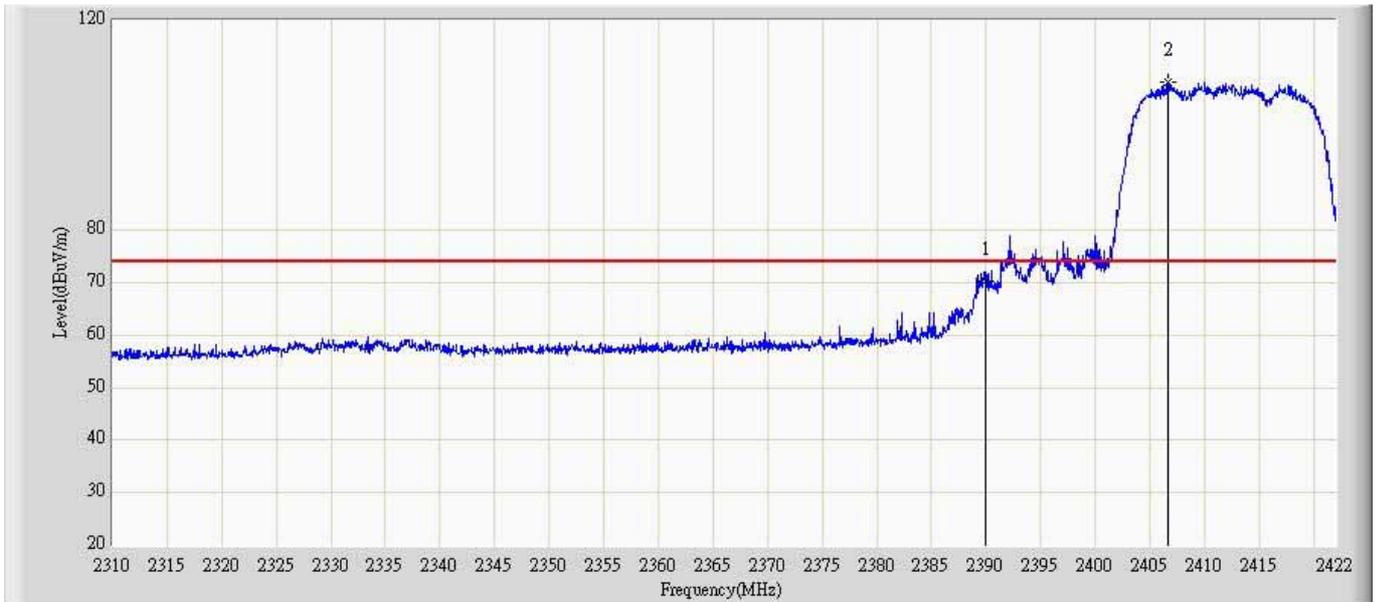
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2463.760	102.778	66.808	N/A	N/A	35.970	PK
2			2483.500	63.320	27.264	-10.680	74.000	36.055	PK

Engineer: Toms	
Site: AC5	Time: 2012/12/21 - 20:05
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Vertical
EUT: xDSL Modem/Router	Power: AC 120V/60Hz
Note: Mode2: Transmit at channel 2462MHz by 802.11g ant 1+2	



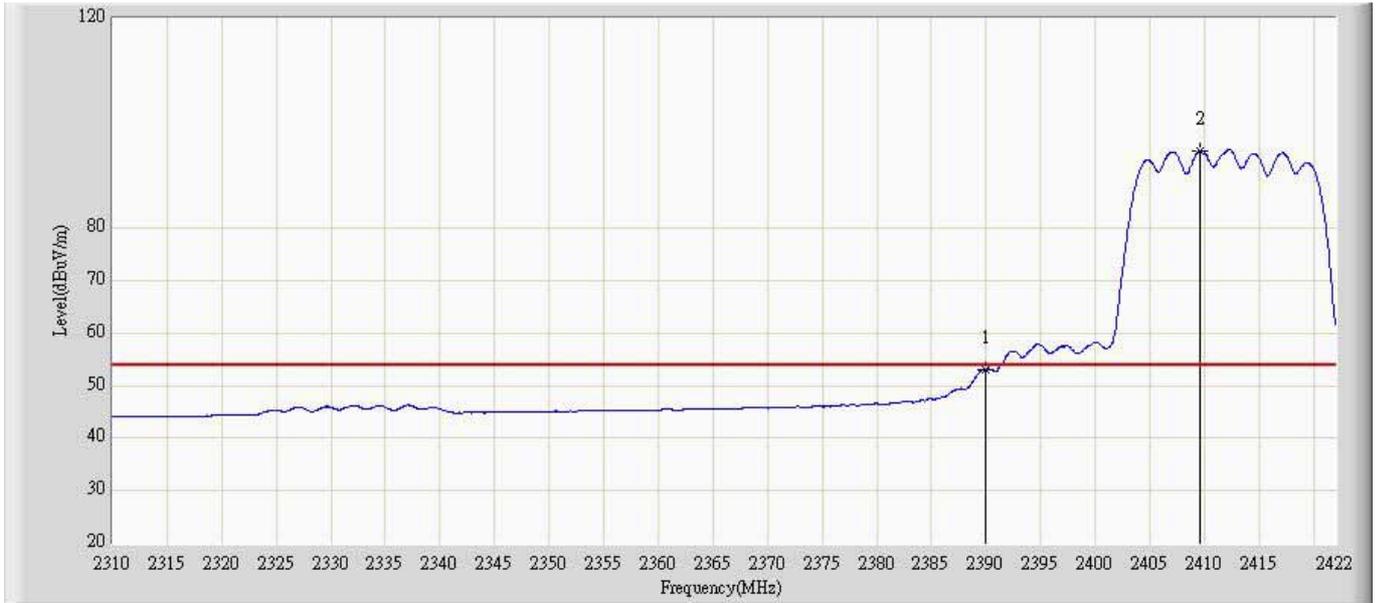
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2464.072	90.233	54.261	N/A	N/A	35.971	AV
2			2483.500	47.963	11.907	-6.037	54.000	36.055	AV

Engineer: Toms	
Site: AC5	Time: 2012/12/21 - 20:05
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Horizontal
EUT: xDSL Modem/Router	Power: AC 120V/60Hz
Note: Mode3: Transmit at channel 2412MHz by 802.11n20MHz ant 1+2	



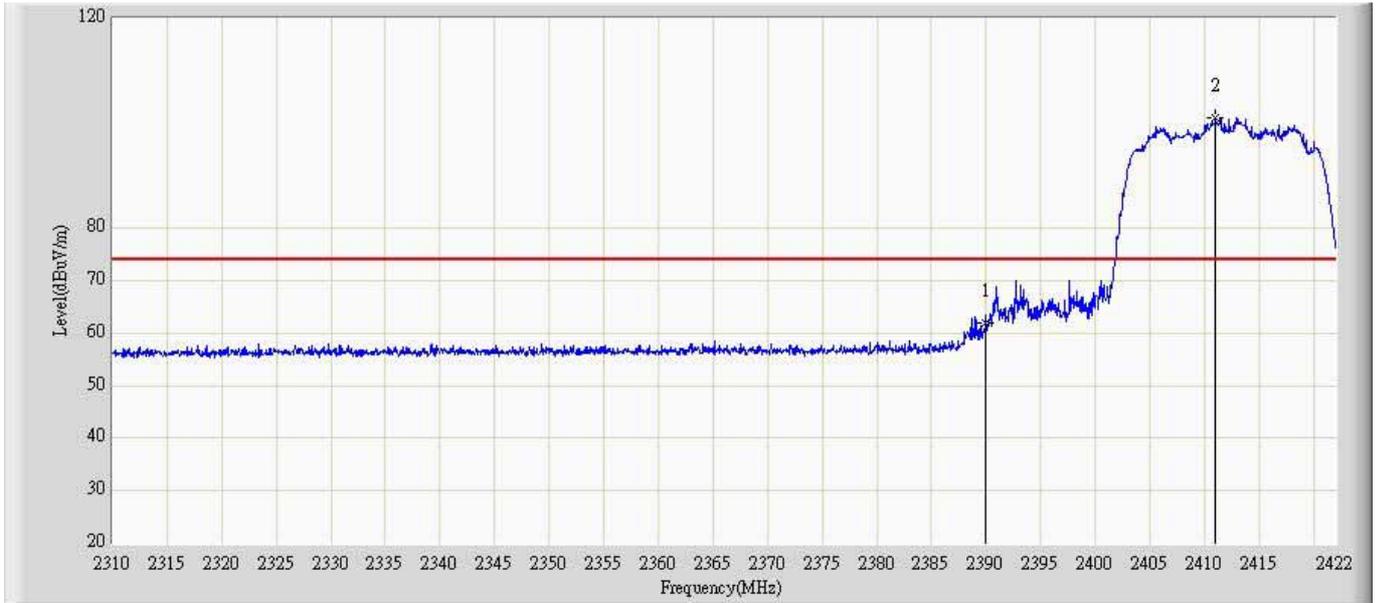
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	70.306	34.005	-3.694	74.000	36.302	PK
2		*	2406.656	108.083	71.645	N/A	N/A	36.438	PK

Engineer: Toms	
Site: AC5	Time: 2012/12/21 - 20:08
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Horizontal
EUT: xDSL Modem/Router	Power: AC 120V/60Hz
Note: Mode3: Transmit at channel 2412MHz by 802.11n20MHz ant 1+2	



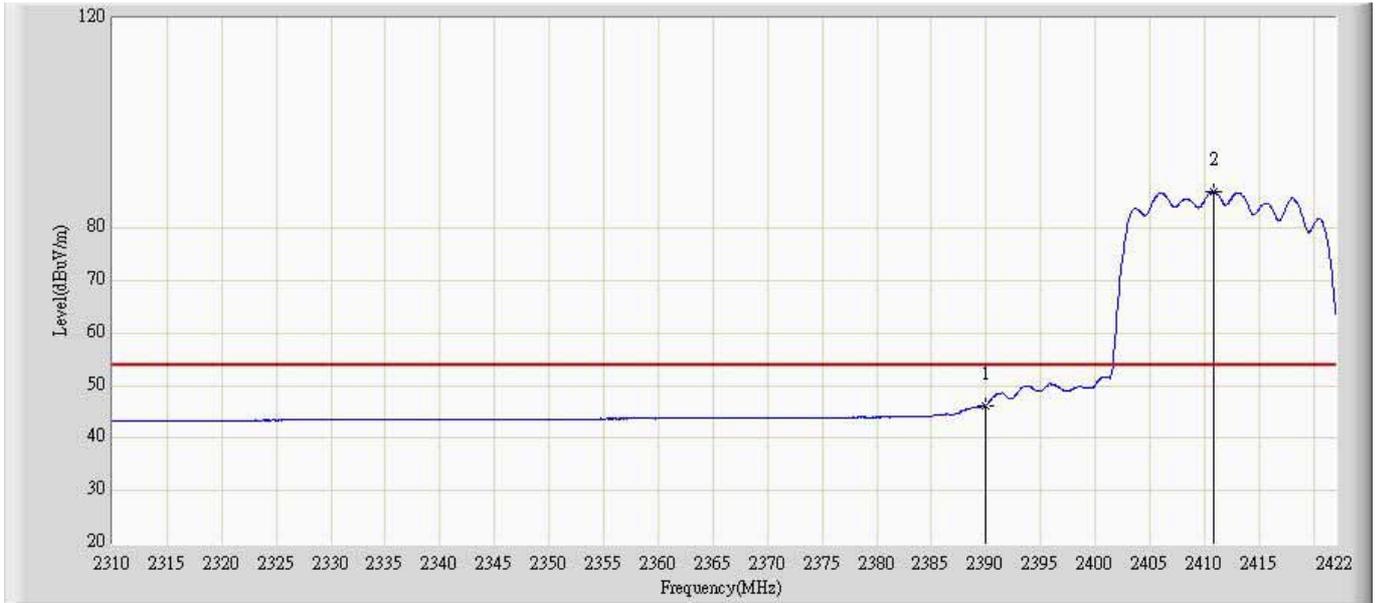
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	53.025	16.724	-0.975	54.000	36.302	AV
2		*	2409.568	94.757	58.295	N/A	N/A	36.462	AV

Engineer: Toms	
Site: AC5	Time: 2012/12/21 - 20:16
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Vertical
EUT: xDSL Modem/Router	Power: AC 120V/60Hz
Note: Mode3: Transmit at channel 2412MHz by 802.11n20MHz ant 1+2	



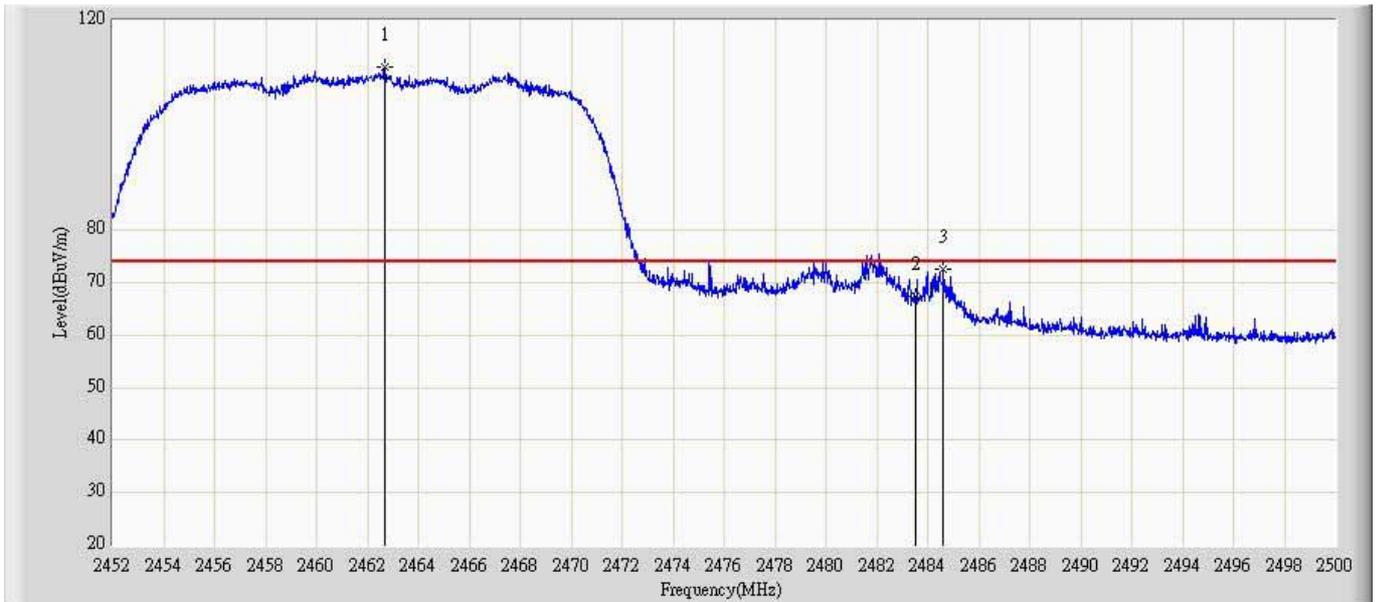
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	62.072	26.431	-11.928	74.000	35.642	PK
2		*	2411.024	101.123	65.393	N/A	N/A	35.730	PK

Engineer: Toms	
Site: AC5	Time: 2012/12/21 - 20:18
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Vertical
EUT: xDSL Modem/Router	Power: AC 120V/60Hz
Note: Mode3: Transmit at channel 2412MHz by 802.11n20MHz ant 1+2	



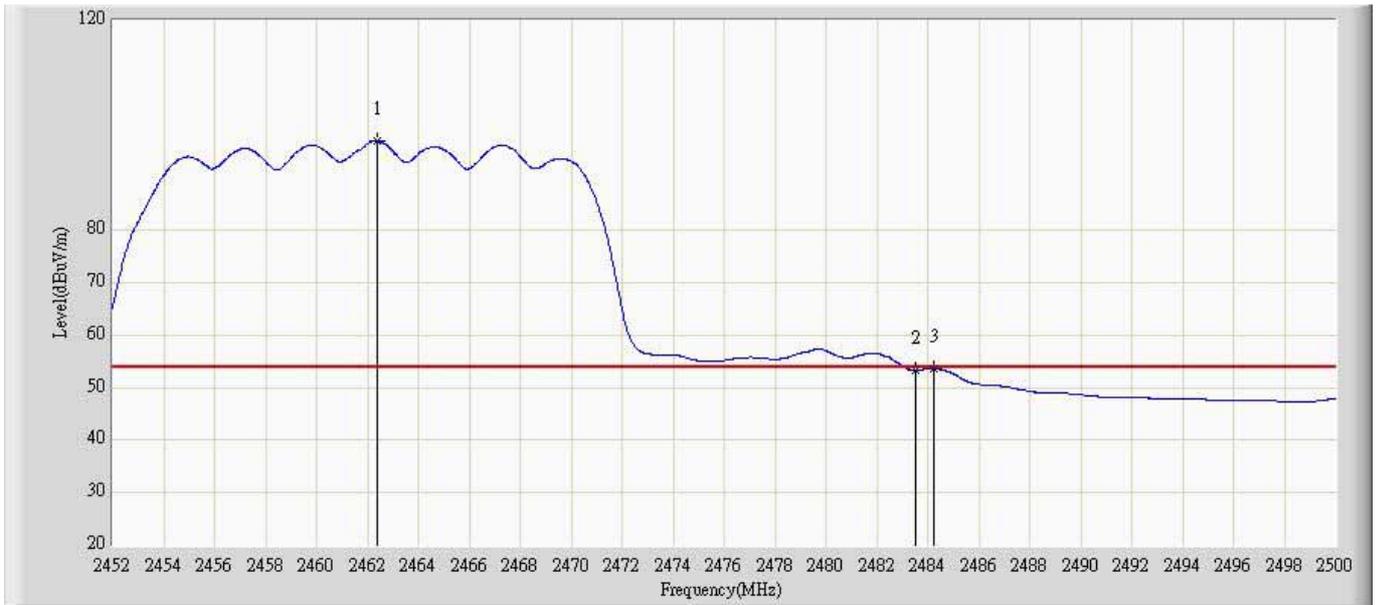
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	46.255	10.614	-7.745	54.000	35.642	AV
2		*	2410.800	86.987	51.258	N/A	N/A	35.729	AV

Engineer: Toms	
Site: AC5	Time: 2012/12/21 - 20:18
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Horizontal
EUT: xDSL Modem/Router	Power: AC 120V/60Hz
Note: Mode3: Transmit at channel 2462MHz by 802.11n20MHz ant 1+2	



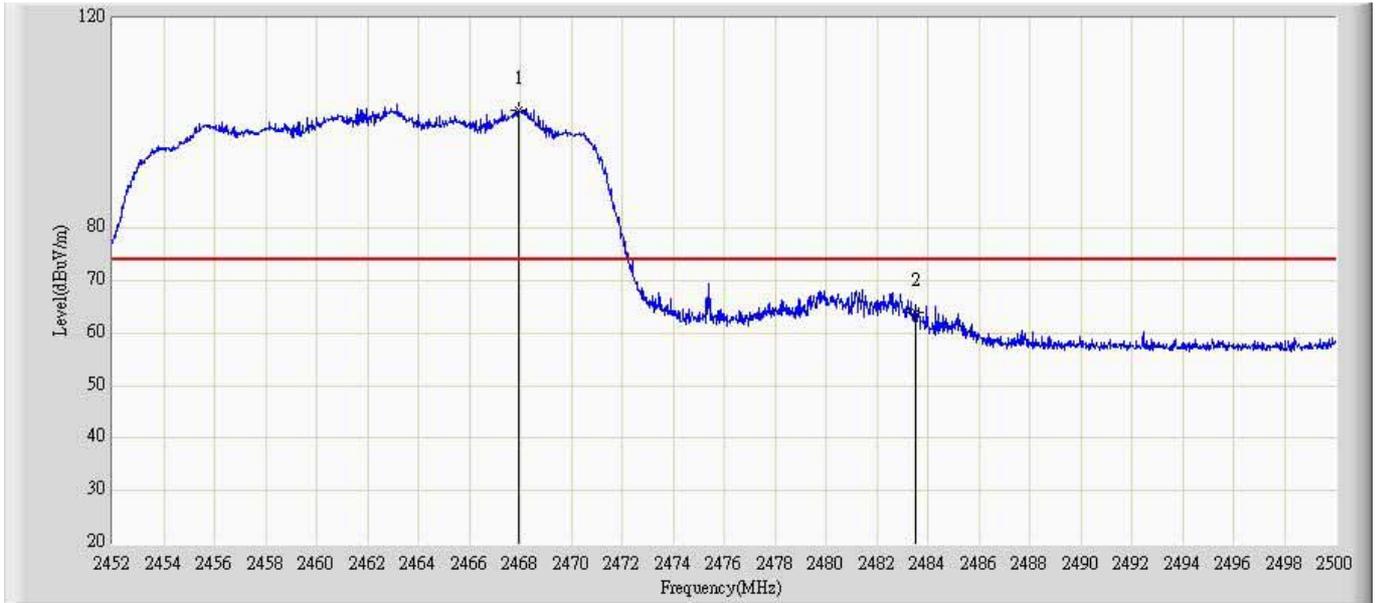
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2462.680	111.031	74.114	N/A	N/A	36.916	PK
2			2483.500	67.490	30.400	-6.510	74.000	37.089	PK
3			2484.616	72.586	35.486	-1.414	74.000	37.100	PK

Engineer: Toms	
Site: AC5	Time: 2012/12/21 - 20:20
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Horizontal
EUT: xDSL Modem/Router	Power: AC 120V/60Hz
Note: Mode3: Transmit at channel 2462MHz by 802.11n20MHz ant 1+2	



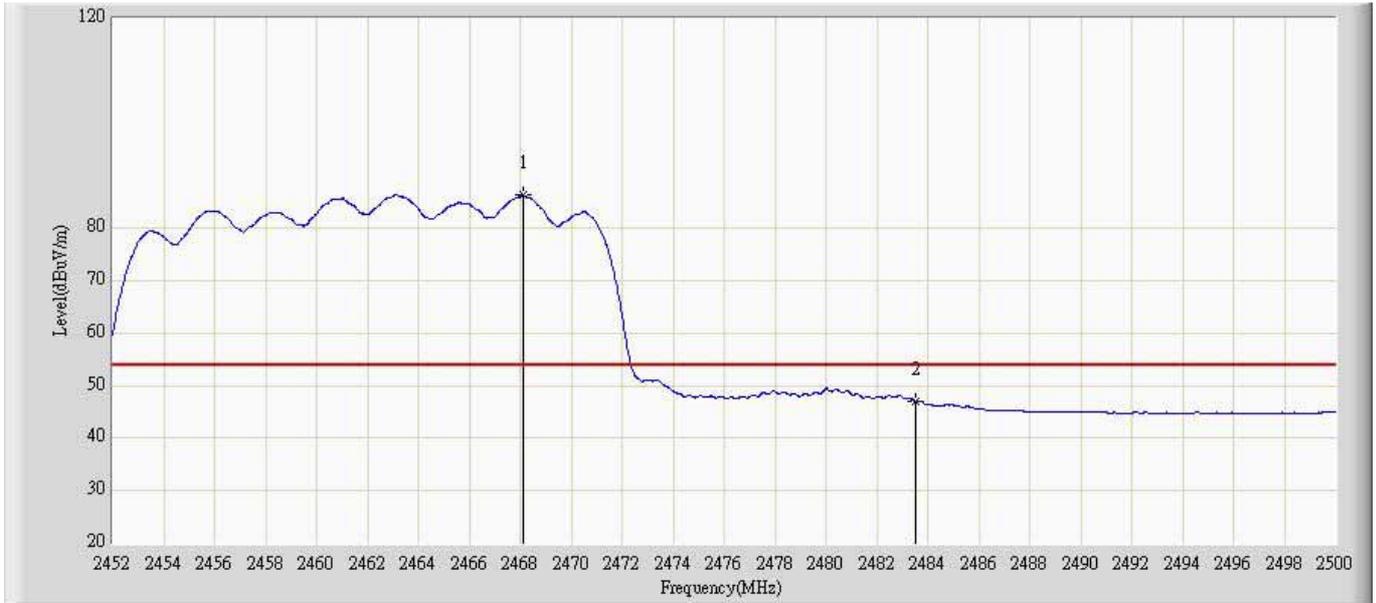
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2462.416	97.034	60.120	N/A	N/A	36.914	AV
2			2483.500	53.353	16.263	-0.647	54.000	37.089	AV
3			2484.232	53.552	16.456	-0.448	54.000	37.096	AV

Engineer: Toms	
Site: AC5	Time: 2012/12/21 - 20:23
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Vertical
EUT: xDSL Modem/Router	Power: AC 120V/60Hz
Note: Mode3: Transmit at channel 2462MHz by 802.11n20MHz ant 1+2	



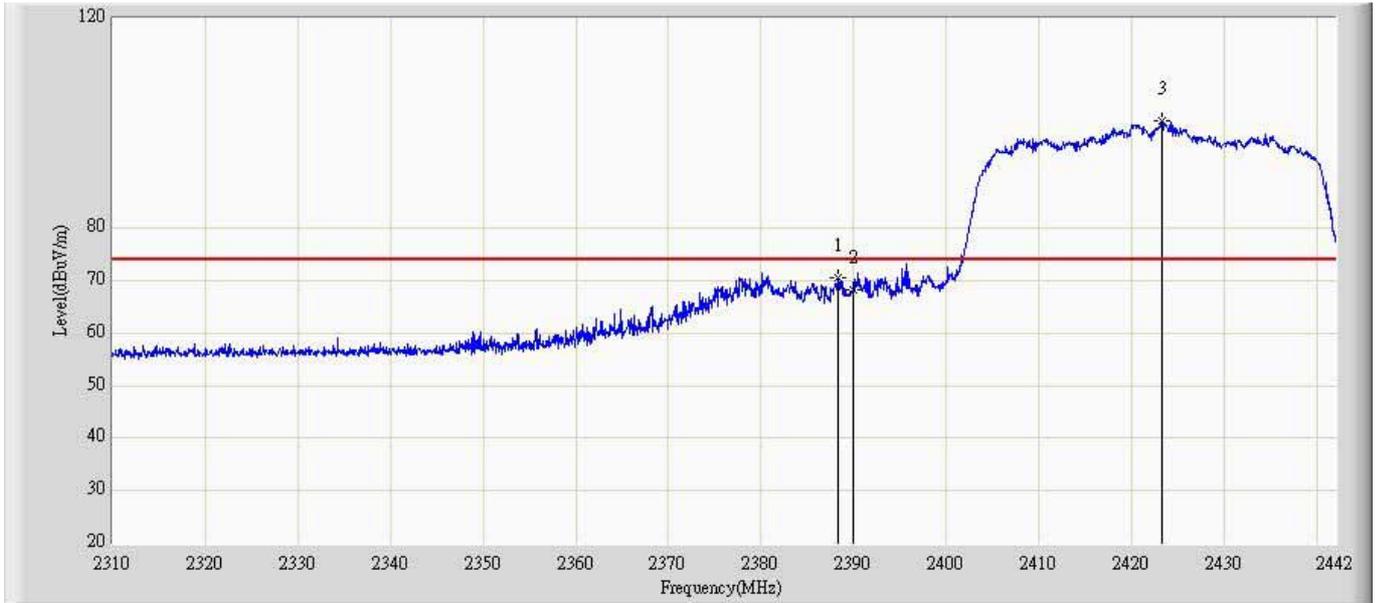
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2467.912	102.503	66.515	N/A	N/A	35.987	PK
2			2483.500	63.958	27.902	-10.042	74.000	36.055	PK

Engineer: Toms	
Site: AC5	Time: 2012/12/21 - 20:24
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Vertical
EUT: xDSL Modem/Router	Power: AC 120V/60Hz
Note: Mode3: Transmit at channel 2462MHz by 802.11n20MHz ant 1+2	



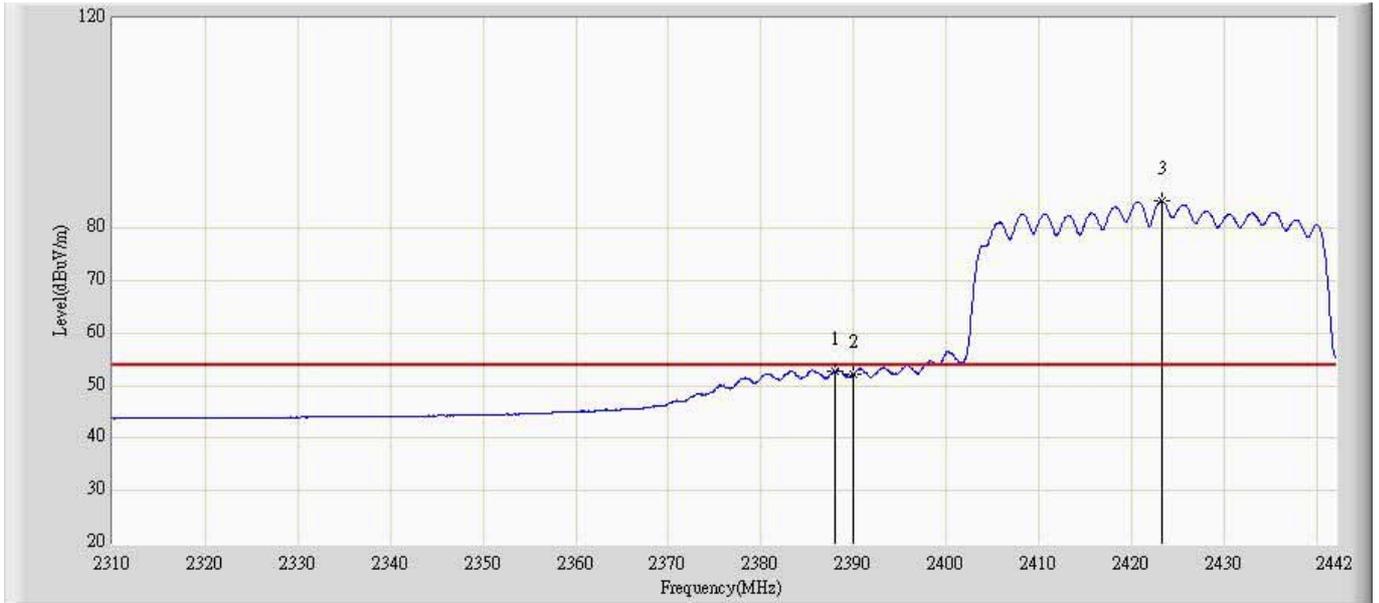
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2468.104	86.351	50.363	N/A	N/A	35.989	AV
2			2483.500	46.946	10.890	-7.054	54.000	36.055	AV

Engineer: Toms	
Site: AC5	Time: 2012/12/21 - 20:25
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Horizontal
EUT: xDSL Modem/Router	Power: AC 120V/60Hz
Note: Mode4: Transmit at channel 2422MHz by 802.11n40MHz ant 1+2	



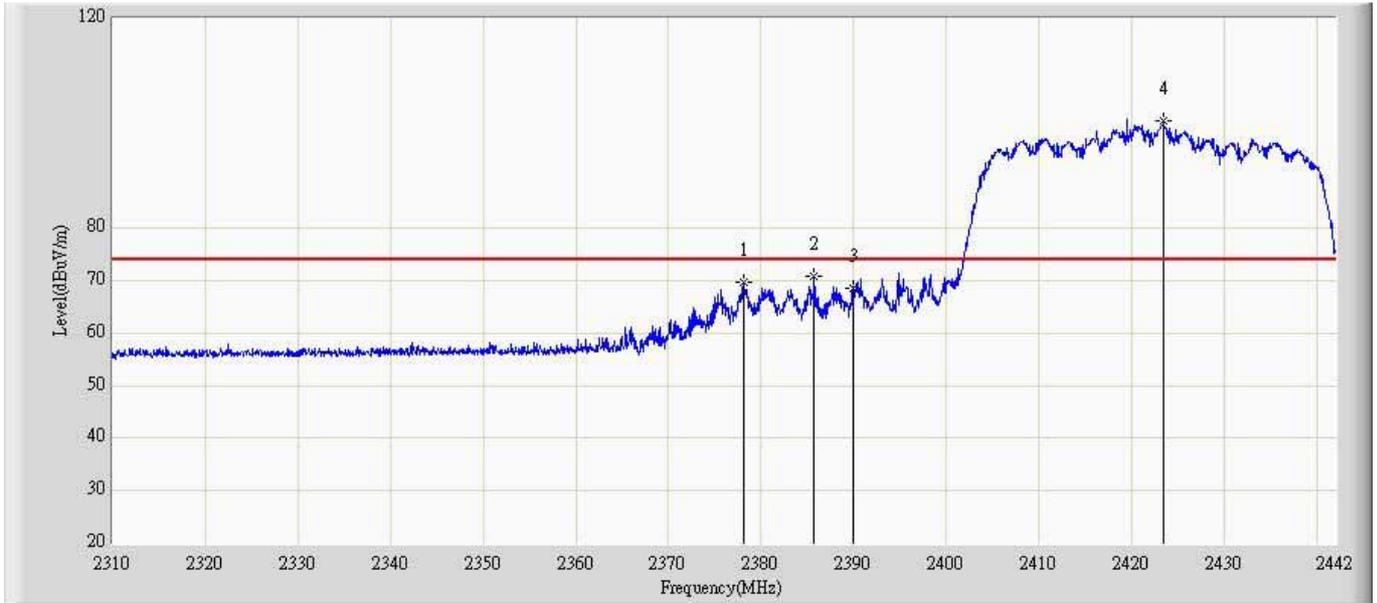
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2388.342	70.647	34.359	-3.353	74.000	36.288	PK
2			2390.000	68.400	32.099	-5.600	74.000	36.302	PK
3		*	2423.322	100.355	63.773	N/A	N/A	36.582	PK

Engineer: Toms	
Site: AC5	Time: 2012/12/21 - 20:47
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Horizontal
EUT: xDSL Modem/Router	Power: AC 120V/60Hz
Note: Mode4: Transmit at channel 2422MHz by 802.11n40MHz ant 1+2	



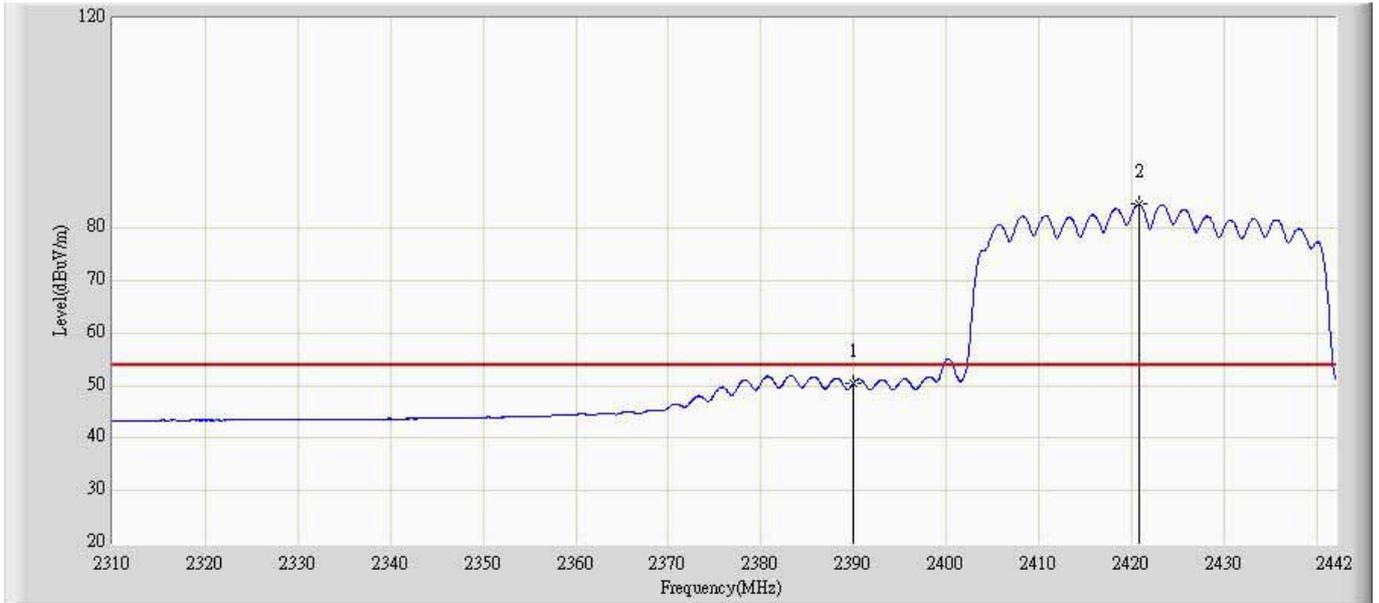
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2388.012	52.791	16.506	-1.209	54.000	36.285	AV
2			2390.000	52.195	15.894	-1.805	54.000	36.302	AV
3		*	2423.256	85.102	48.521	N/A	N/A	36.581	AV

Engineer: Toms	
Site: AC5	Time: 2012/12/21 - 20:49
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Vertical
EUT: xDSL Modem/Router	Power: AC 120V/60Hz
Note: Mode4: Transmit at channel 2422MHz by 802.11n40MHz ant 1+2	



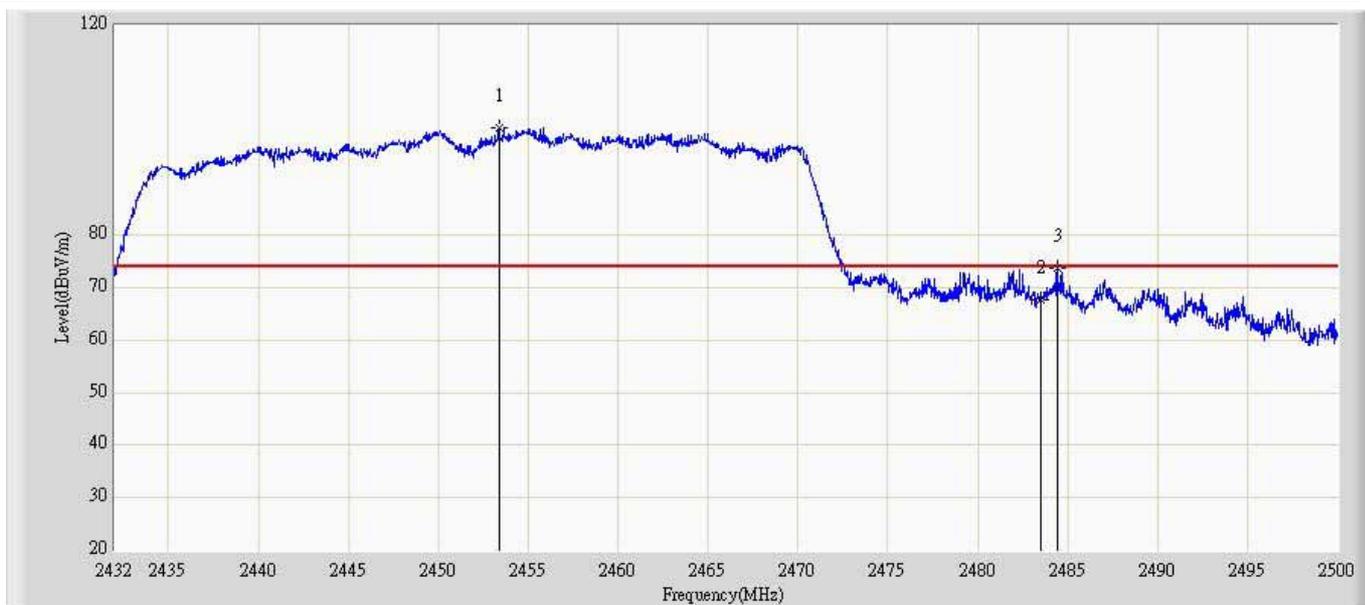
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2378.112	69.690	34.098	-4.310	74.000	35.592	PK
2			2385.768	70.973	35.349	-3.027	74.000	35.623	PK
3			2390.000	68.540	32.899	-5.460	74.000	35.642	PK
4		*	2423.454	100.588	64.799	N/A	N/A	35.790	PK

Engineer: Toms	
Site: AC5	Time: 2012/12/21 - 20:52
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Vertical
EUT: xDSL Modem/Router	Power: AC 120V/60Hz
Note: Mode4: Transmit at channel 2422MHz by 802.11n40MHz ant 1+2	



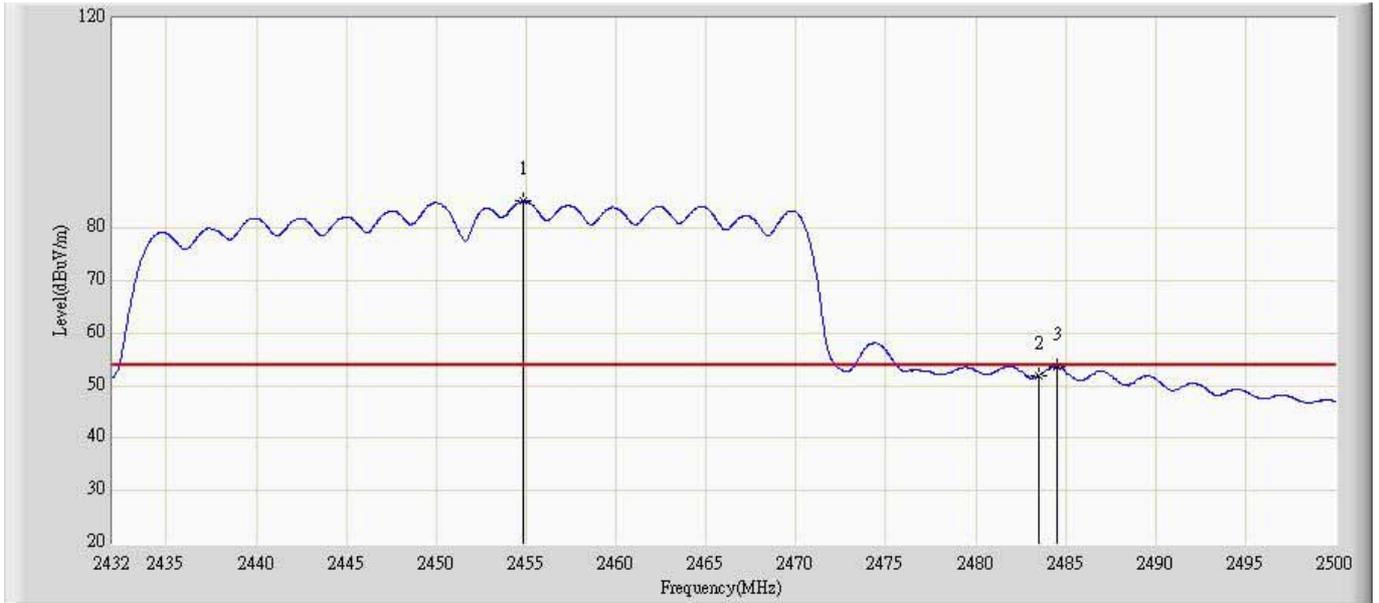
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	50.479	14.838	-3.521	54.000	35.642	AV
2		*	2420.814	84.535	48.758	N/A	N/A	35.777	AV

Engineer: Toms	
Site: AC5	Time: 2012/12/21 - 21:02
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Horizontal
EUT: xDSL Modem/Router	Power: AC 120V/60Hz
Note: Mode4: Transmit at channel 2452MHz by 802.11n40MHz ant 1+2	



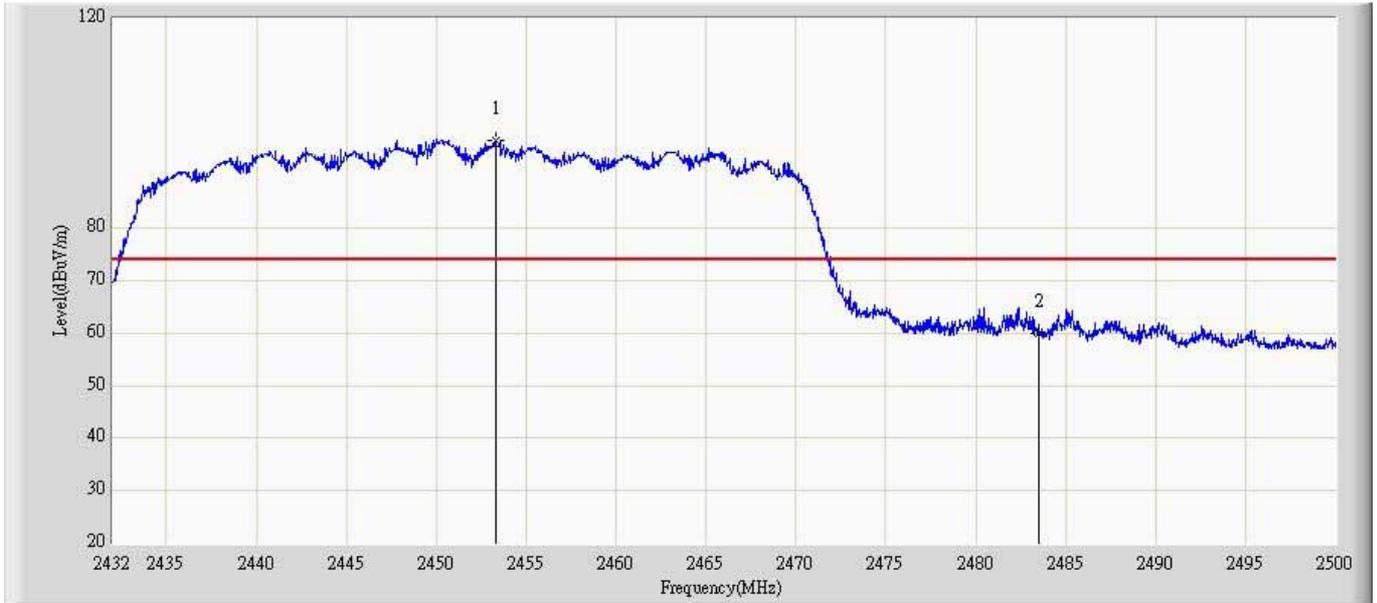
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2453.386	100.492	63.656	N/A	N/A	36.836	PK
2			2483.500	67.818	30.728	-6.182	74.000	37.089	PK
3			2484.428	73.653	36.555	-0.347	74.000	37.098	PK

Engineer: Toms	
Site: AC5	Time: 2012/12/21 - 21:07
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Horizontal
EUT: xDSL Modem/Router	Power: AC 120V/60Hz
Note: Mode4: Transmit at channel 2452MHz by 802.11n40MHz ant 1+2	



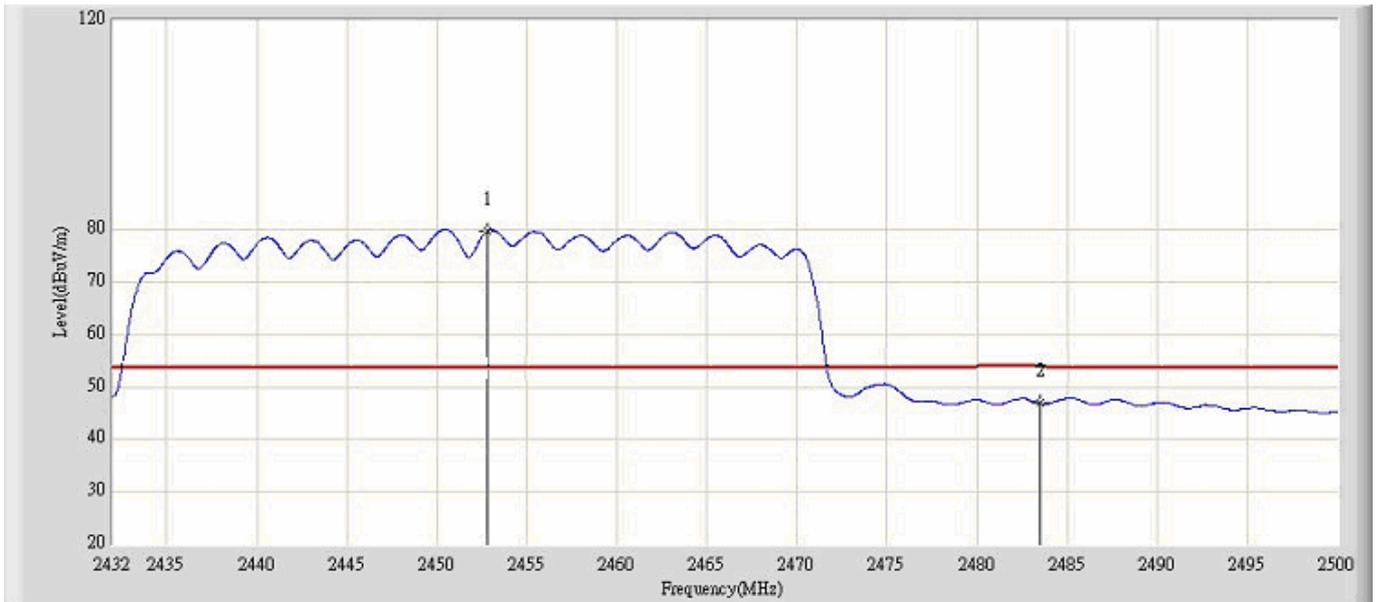
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2454.814	85.102	48.254	N/A	N/A	36.848	AV
2			2483.500	51.934	14.844	-2.066	54.000	37.089	AV
3			2484.530	53.616	16.517	-0.384	54.000	37.099	AV

Engineer: Toms	
Site: AC5	Time: 2012/12/21 - 21:11
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Vertical
EUT: xDSL Modem/Router	Power: AC 120V/60Hz
Note: Mode4: Transmit at channel 2452MHz by 802.11n40MHz ant 1+2	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2453.284	96.672	60.751	N/A	N/A	35.922	PK
2			2483.500	60.006	23.950	-13.994	74.000	36.055	PK

Engineer: Toms	
Site: AC5	Time: 2012/12/21 - 21:12
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Vertical
EUT: xDSL Modem/Router	Power: AC 120V/60Hz
Note: Mode4: Transmit at channel 2452MHz by 802.11n40MHz ant 1+2	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2452.808	79.784	43.865	N/A	N/A	35.919	AV
2			2483.500	46.897	10.841	-7.103	54.000	36.055	AV

## 7. Operation Frequency Range of 20dB Bandwidth

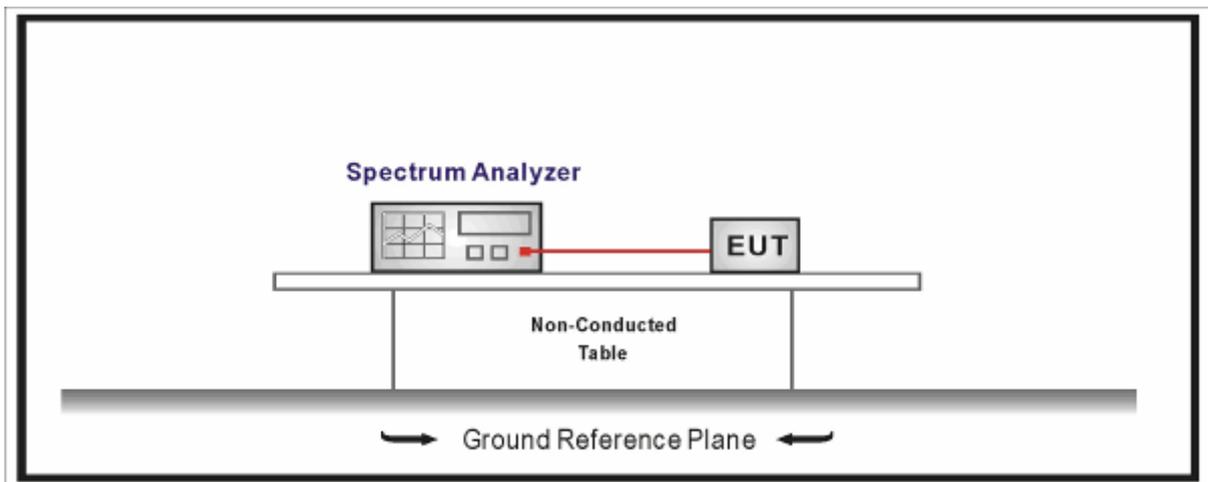
### 7.1. Test Equipment

Operation Frequency Range of 20dB Bandwidth / TR-8

Instrument	Manufacturer	Type No.	Serial No.	Cal. Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2013.04.18
Temperature/Humidity Meter	zhicheng	ZC1-2	TR8-TH	2013.05.07

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

### 7.2. Test Setup



### 7.3. Limit

20 dB bandwidth of the emission is contained within the operation frequency band.

### 7.4. Test Procedure

The EUT was tested according to ANSI C63.10: 2009 and KDB 558074 for compliance to FCC 47CFR 15.247 requirements.

Set RBW = 100 kHz, Span greater than RBW.

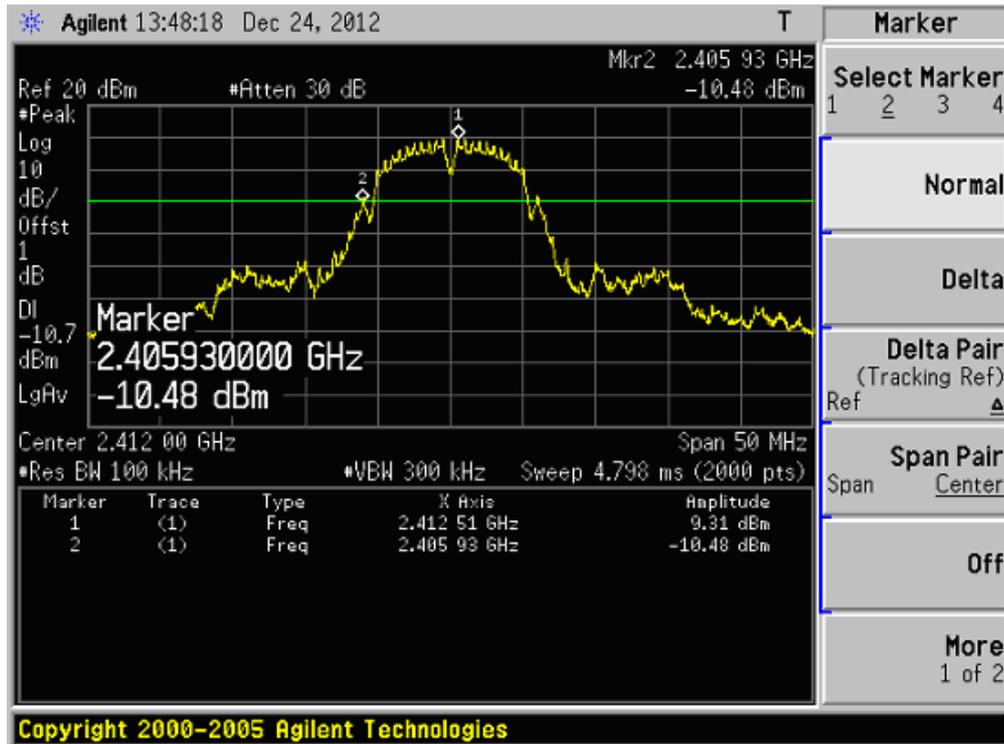
### 7.5. Uncertainty

The measurement uncertainty is defined as  $\pm 1$  kHz

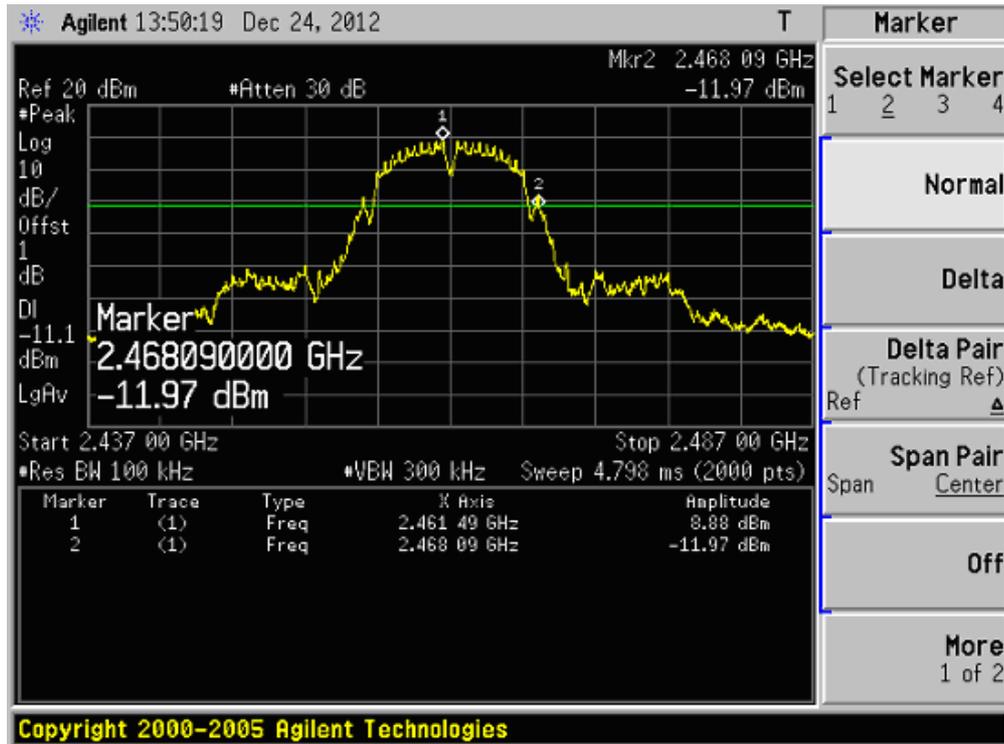
7.6. Test Result

Product	:	xDSL Modem/Router
Test Item	:	Operation Frequency Range of 20dB Bandwidth
Test Site	:	TR-8
Test Mode	:	Mode 1: Transmit by 802.11b (Ant 2)

Channel 01 (2412MHz)

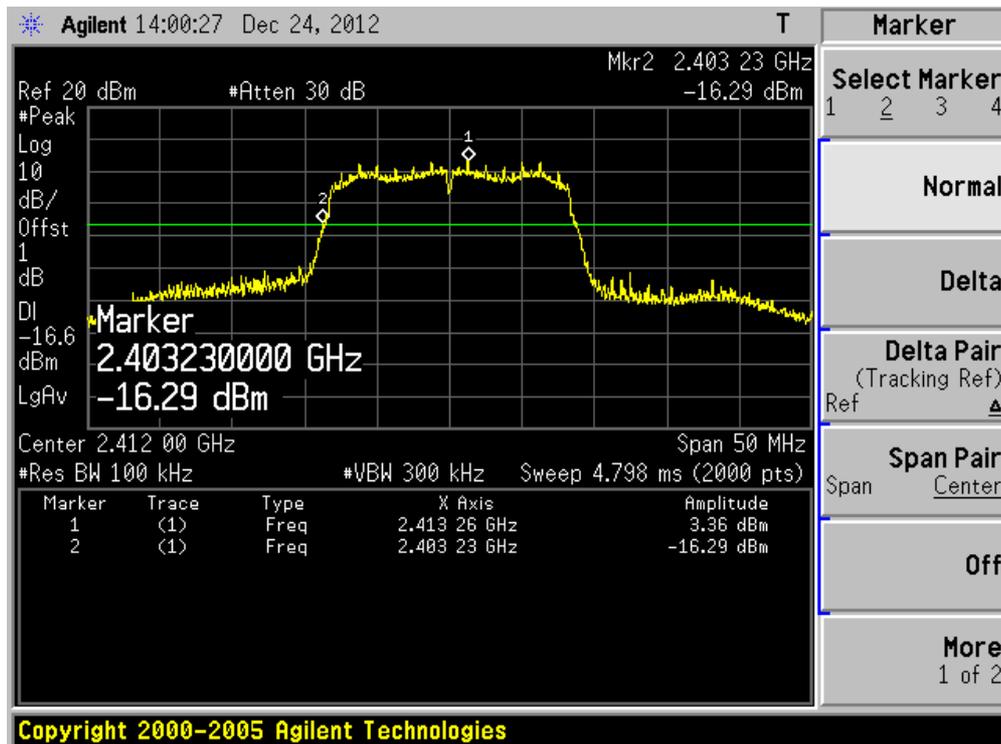


Channel 11 (2462MHz)

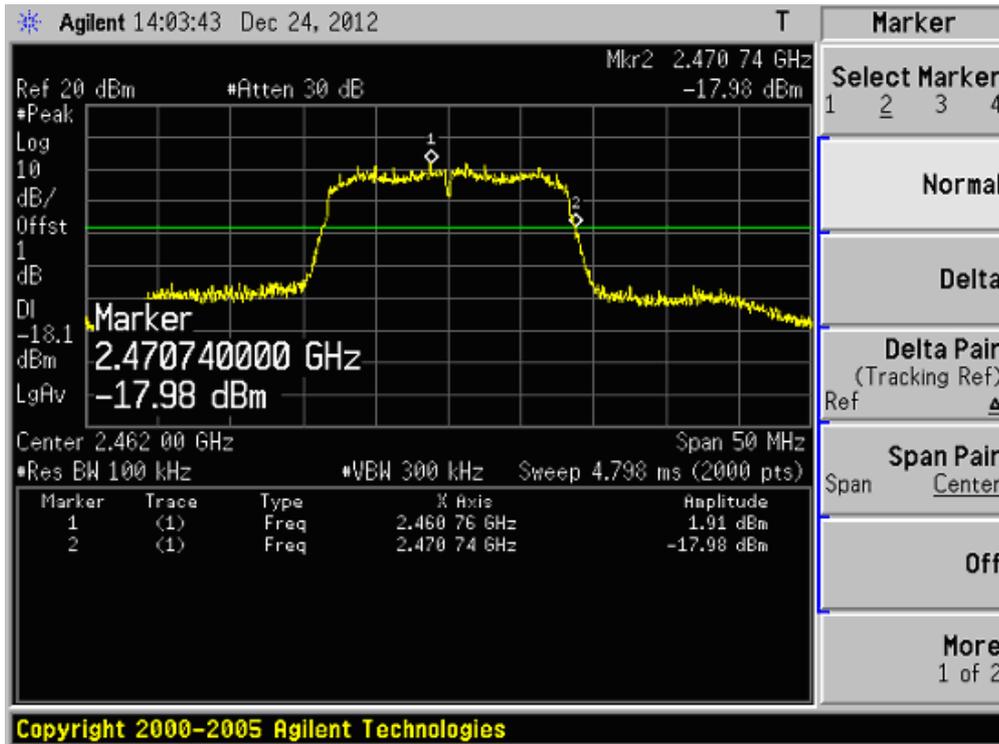


Product	: xDSL Modem/Router
Test Item	: Operation Frequency Range of 20dB Bandwidth
Test Site	: TR-8
Test Mode	: Mode 2: Transmit by 802.11g (Ant 1+2)

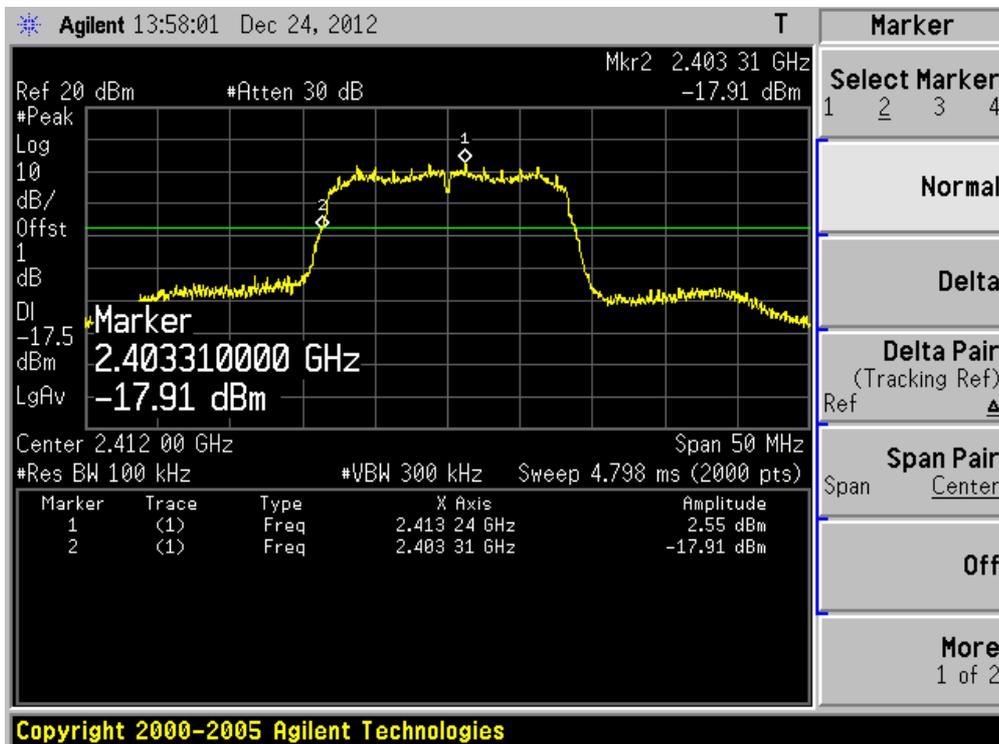
### Channel 01 (2412MHz) Ant 1



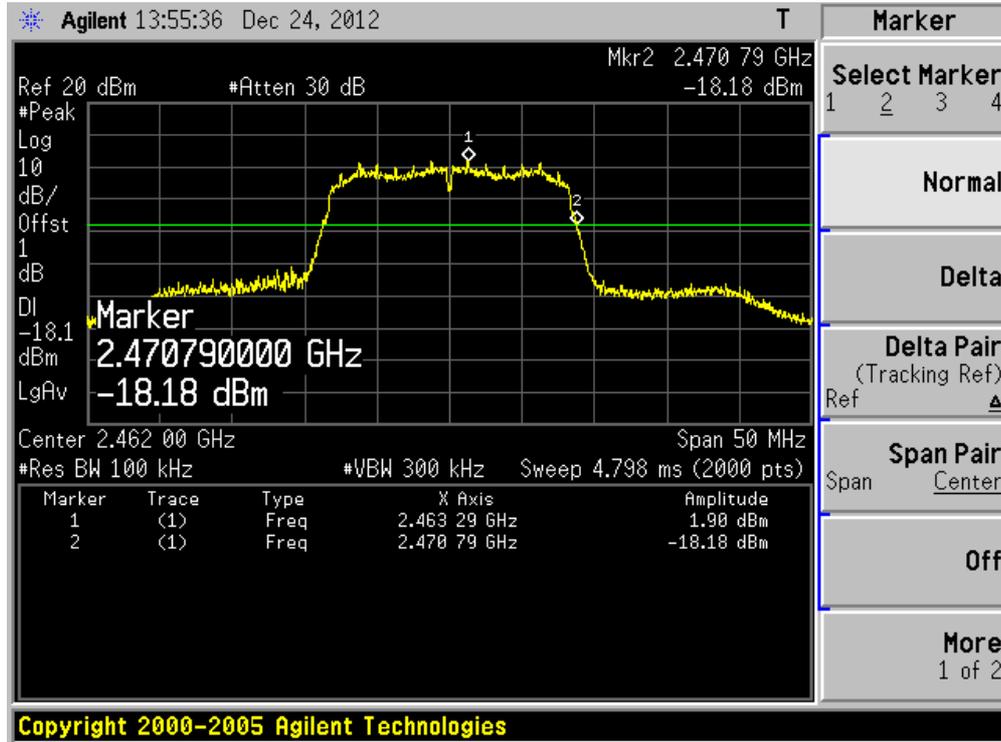
Channel 11 (2462MHz) Ant 1



Channel 01 (2412MHz) Ant 2

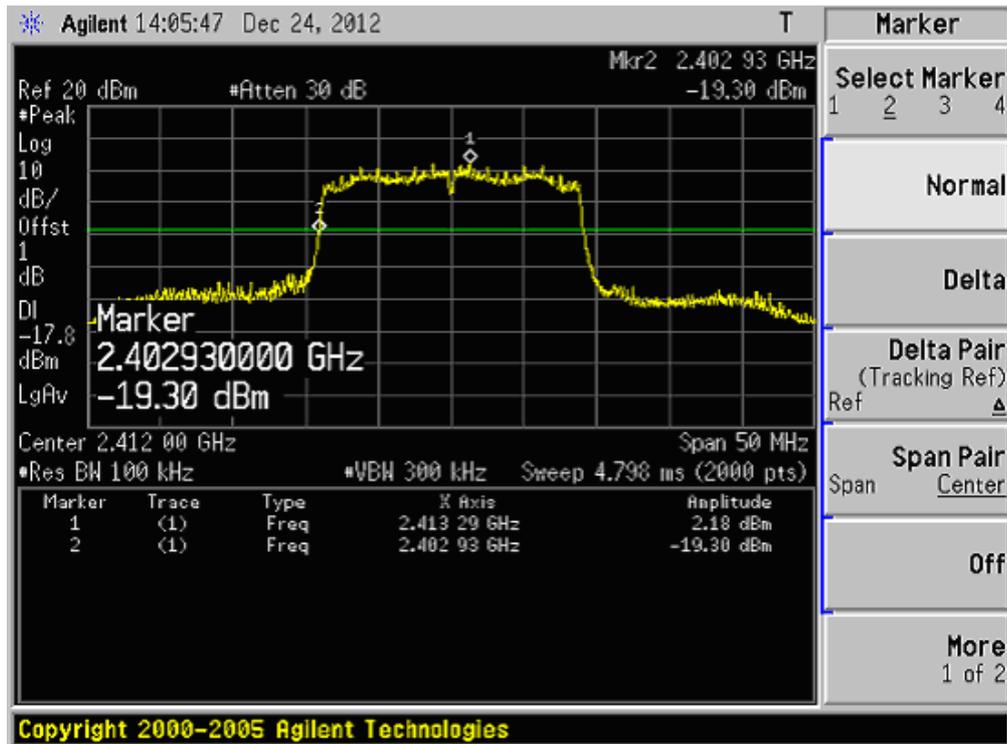


Channel 11 (2462MHz) Ant 2

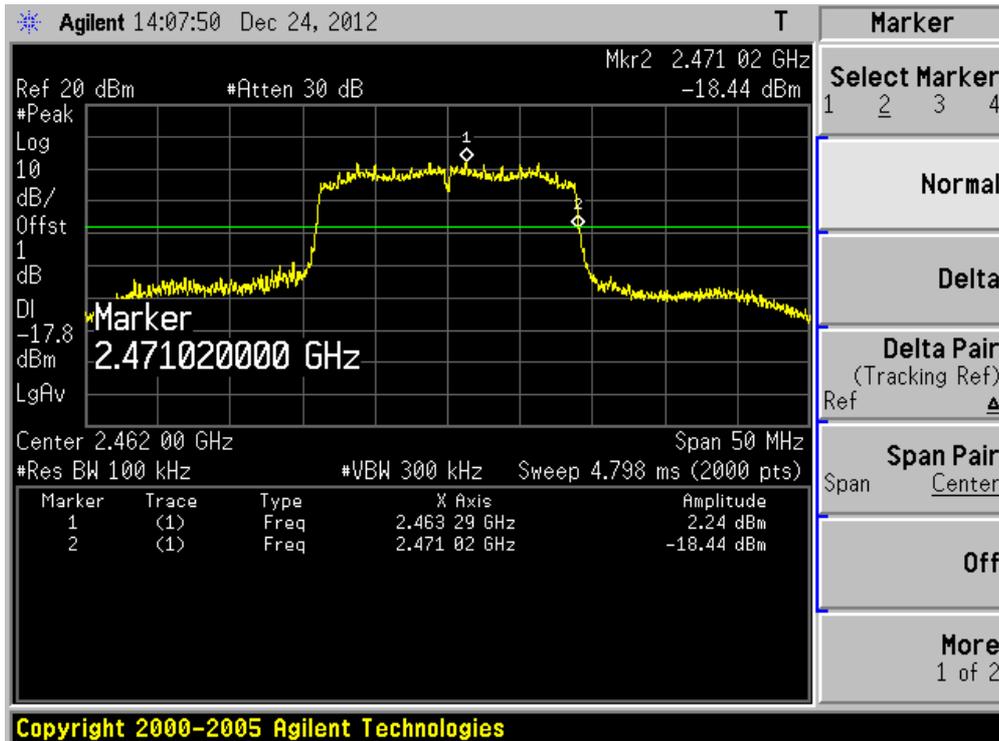


Product	: xDSL Modem/Router
Test Item	: Operation Frequency Range of 20dB Bandwidth
Test Site	: TR-8
Test Mode	: Mode 3: Transmit by 802.11n (20MHz) (Ant 1+2)

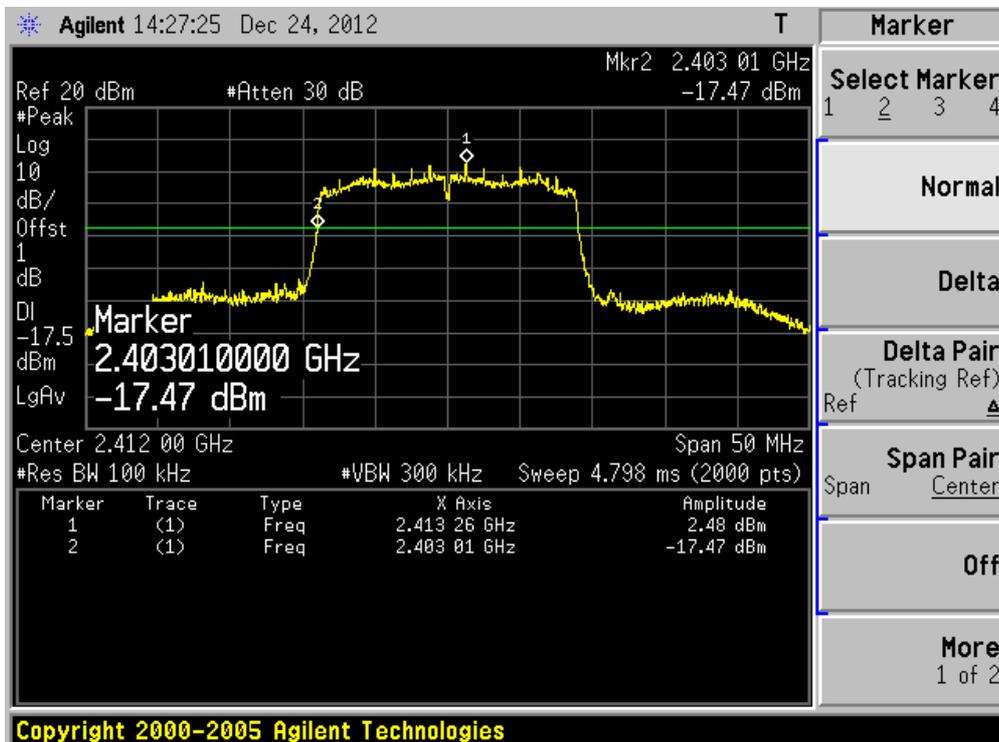
### Channel 01 (2412MHz) Ant 1



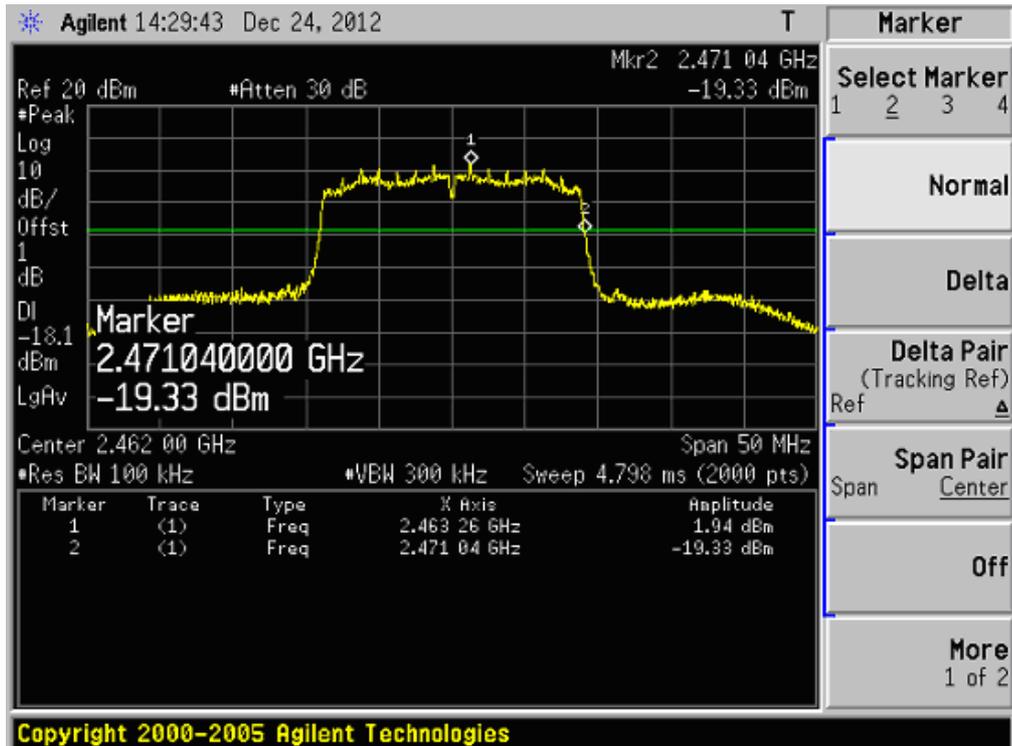
Channel 11 (2462MHz) Ant 1



Channel 01 (2412MHz) Ant 2

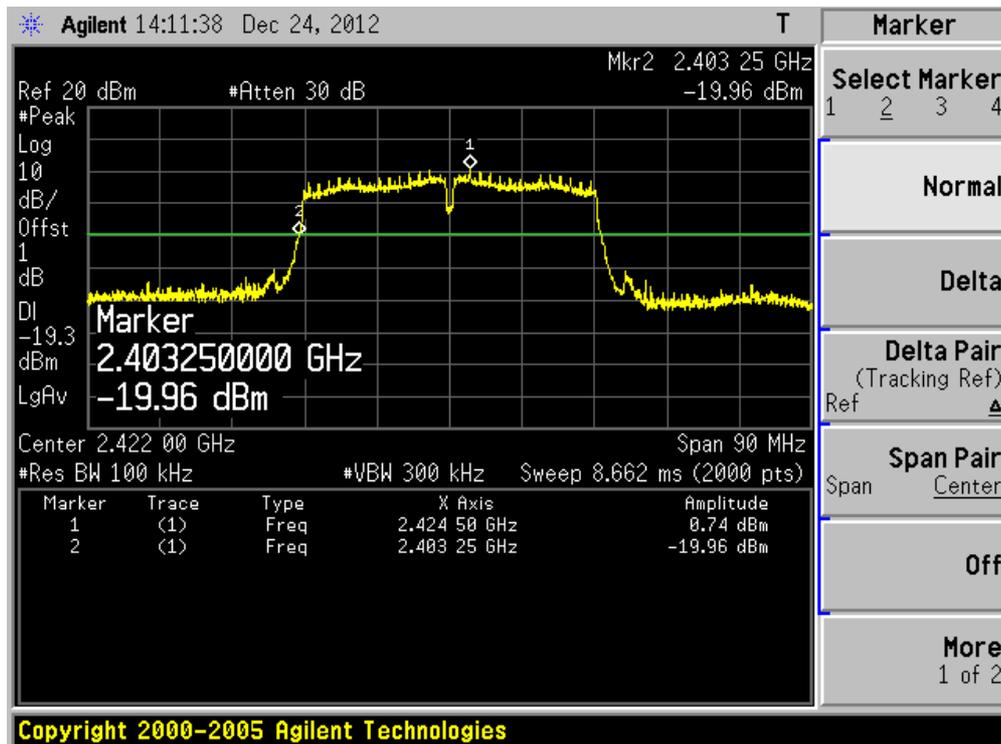


Channel 11 (2462MHz) Ant 2

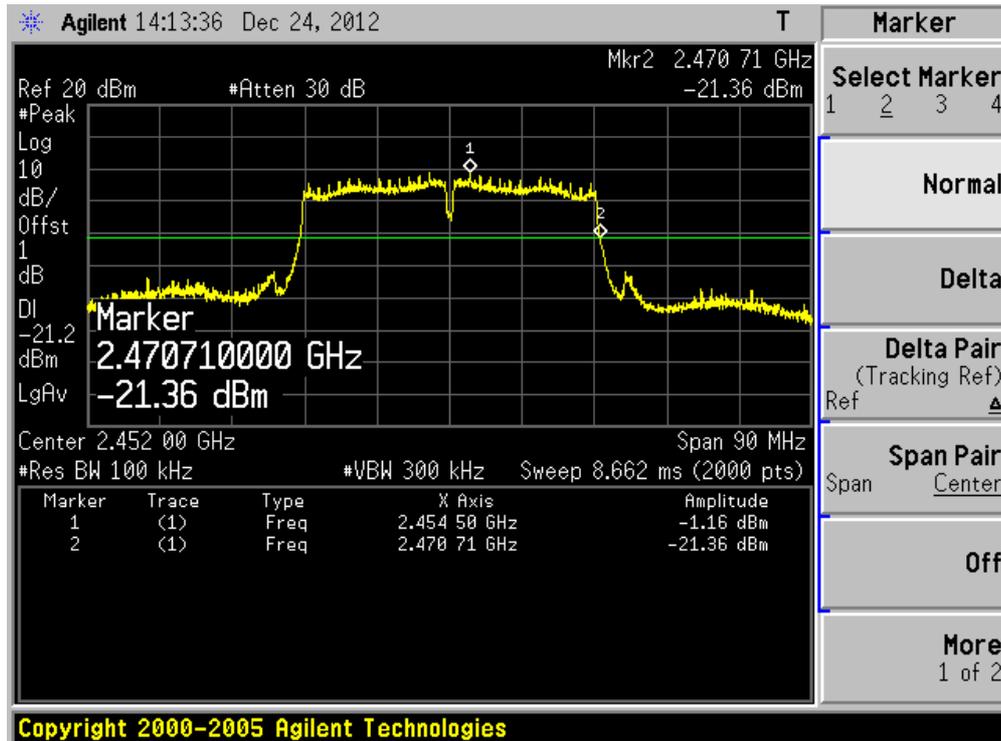


Product	: xDSL Modem/Router
Test Item	: Operation Frequency Range of 20dB Bandwidth
Test Site	: TR-8
Test Mode	: Mode 4: Transmit by 802.11n (40MHz) (Ant 1+2)

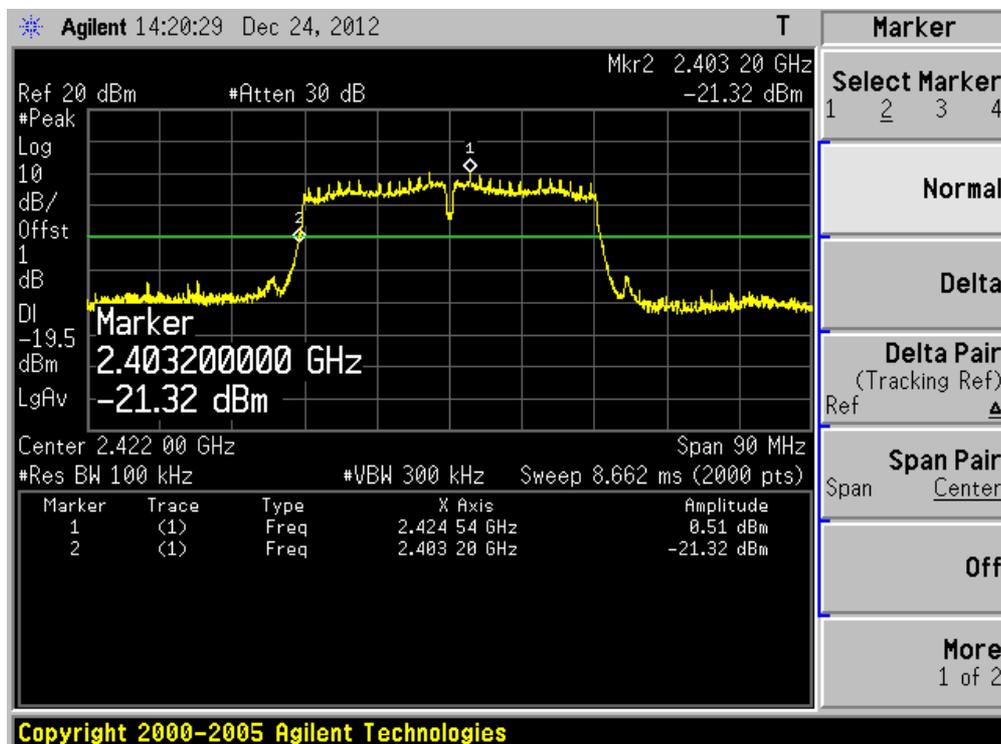
Channel 03 (2422MHz) Ant 1



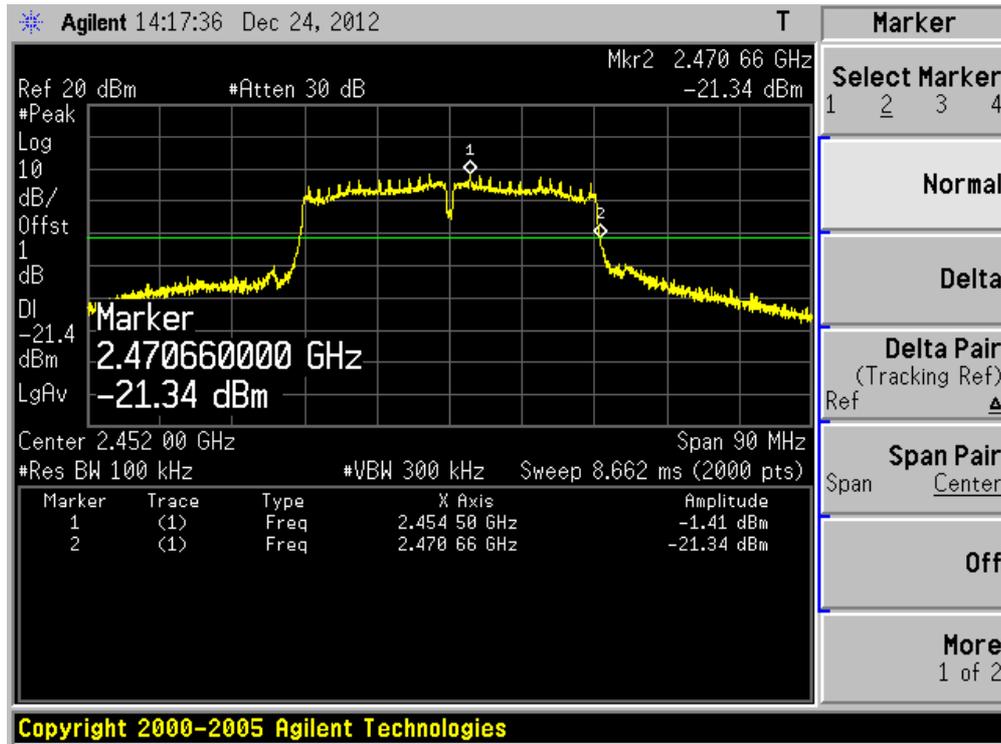
Channel 09 (2452MHz) Ant 1



Channel 03 (2422MHz) Ant 2



Channel 09 (2452MHz) Ant 2



## 8. Occupied Bandwidth

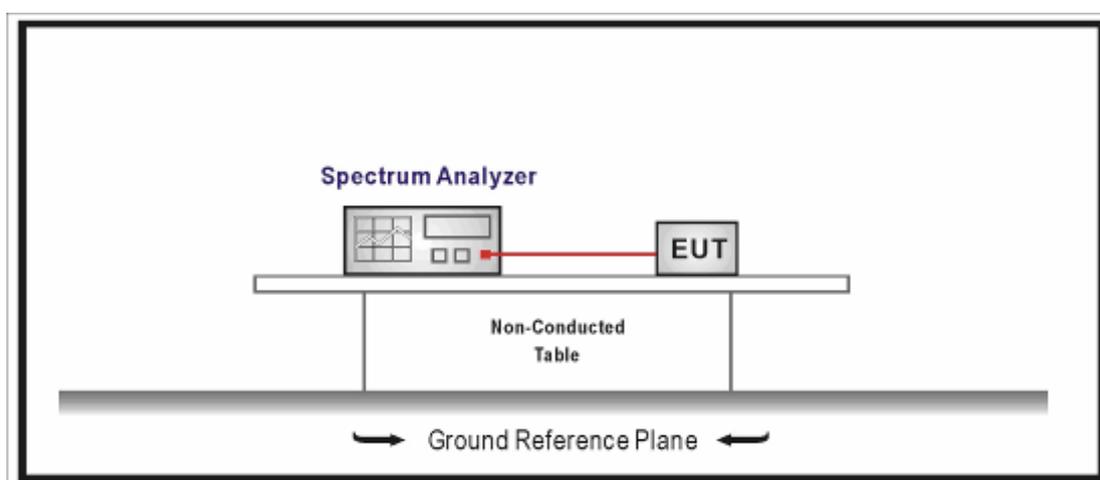
### 8.1. Test Equipment

Occupied Bandwidth / TR-8

Instrument	Manufacturer	Type No.	Serial No.	Cal. Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2013.04.18
Temperature/Humidity Meter	zhicheng	ZC1-2	TR8-TH	2013.05.07

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

### 8.2. Test Setup



### 8.3. Limit

The minimum 6 dB bandwidth shall be at least 500 kHz.

### 8.4. Test Procedure

The EUT was tested according to ANSI C63.10: 2009 and KDB 558074 for compliance to FCC 47CFR 15.247 requirements.

Set RBW = 100 kHz, Span greater than RBW.

### 8.5. Uncertainty

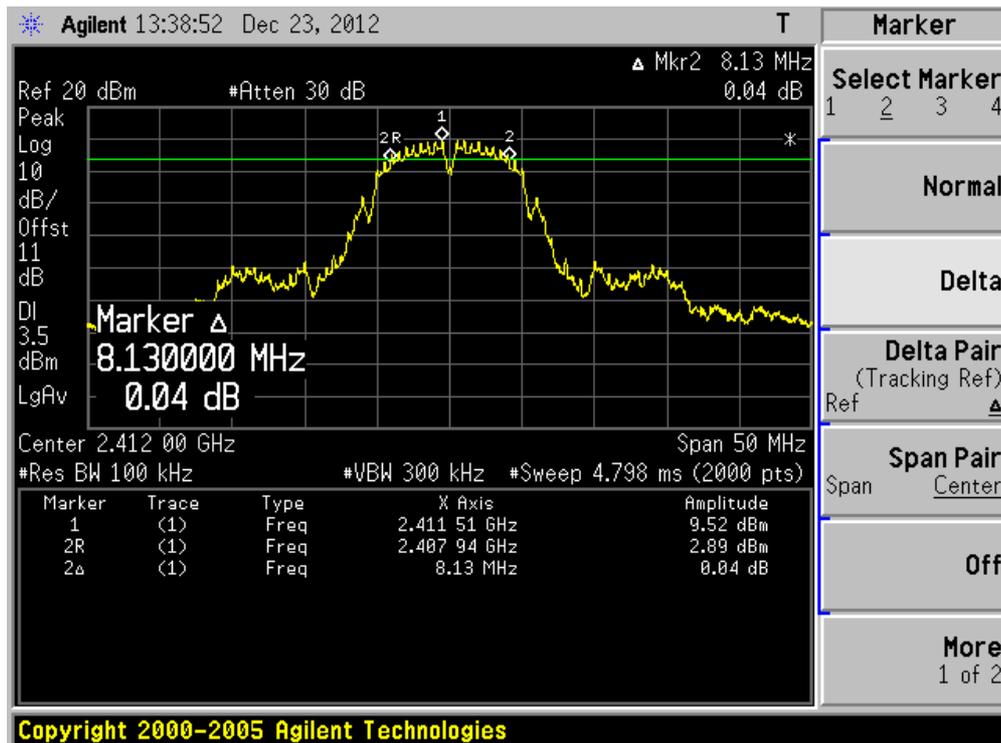
The measurement uncertainty is defined as  $\pm 1$  kHz

## 8.6. Test Result

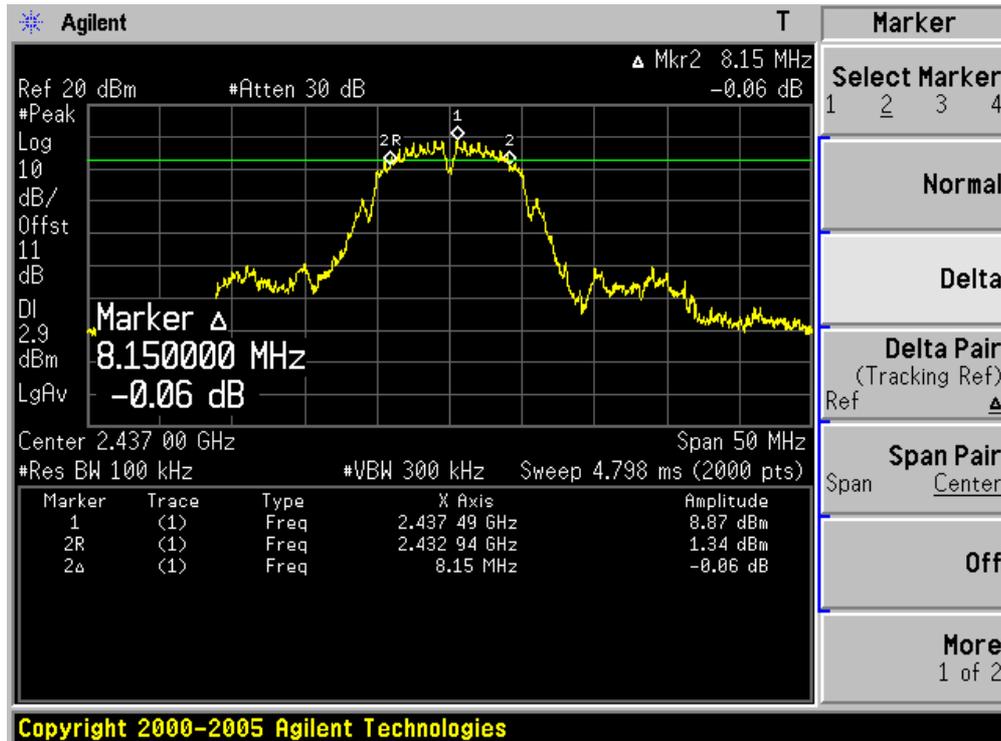
Product	:	xDSL Modem/Router
Test Item	:	6dB Occupied Bandwidth
Test Site	:	TR-8
Test Mode	:	Mode 1: Transmit by 802.11b (Ant 2)

Channel No.	Frequency (MHz)	Occupied Bandwidth (kHz)	Limit (kHz)	Result
01	2412	8130	500	Pass
06	2437	8150	500	Pass
11	2462	9030	500	Pass

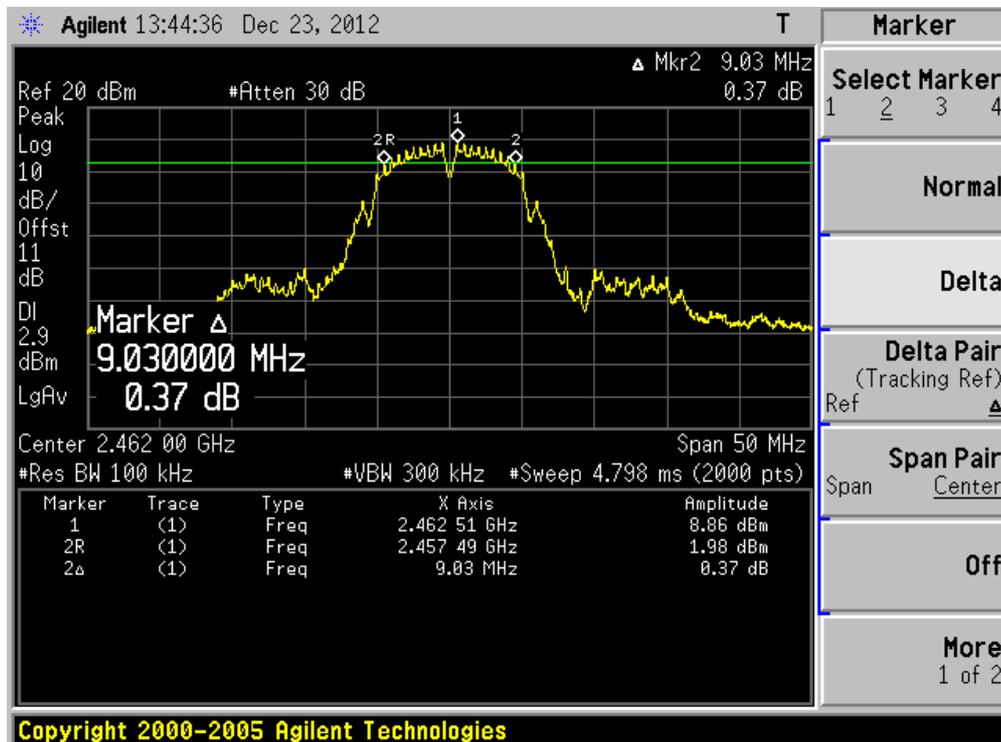
Channel 01 (2412MHz)



Channel 06 (2437MHz)



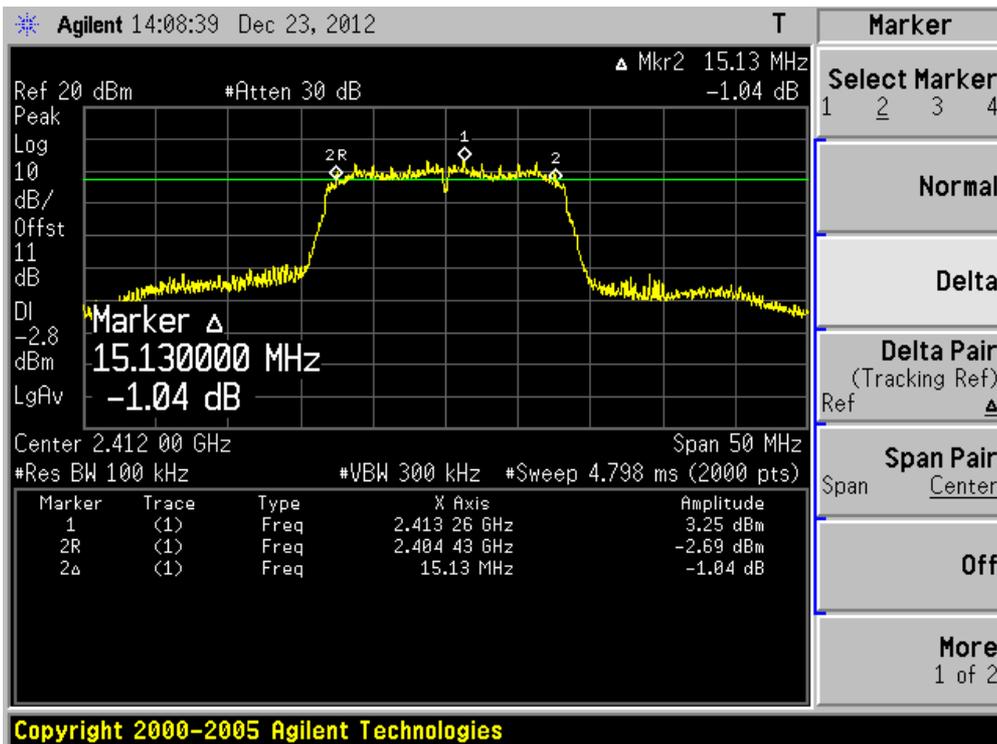
Channel 11 (2462MHz)



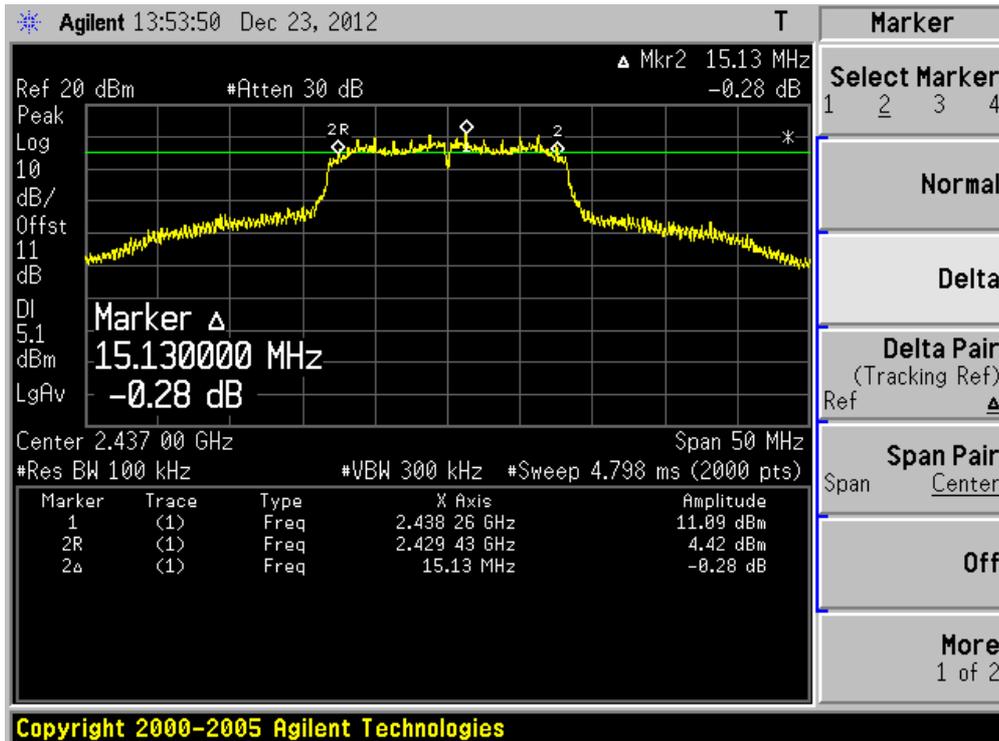
Product	: xDSL Modem/Router
Test Item	: 6dB Occupied Bandwidth
Test Site	: TR-8
Test Mode	: Mode 2: Transmit by 802.11g (Ant 1+2) Ant 1

Channel No.	Frequency (MHz)	Occupied Bandwidth (kHz)	Limit (kHz)	Result
01	2412	15130	500	Pass
06	2437	15130	500	Pass
11	2462	15110	500	Pass

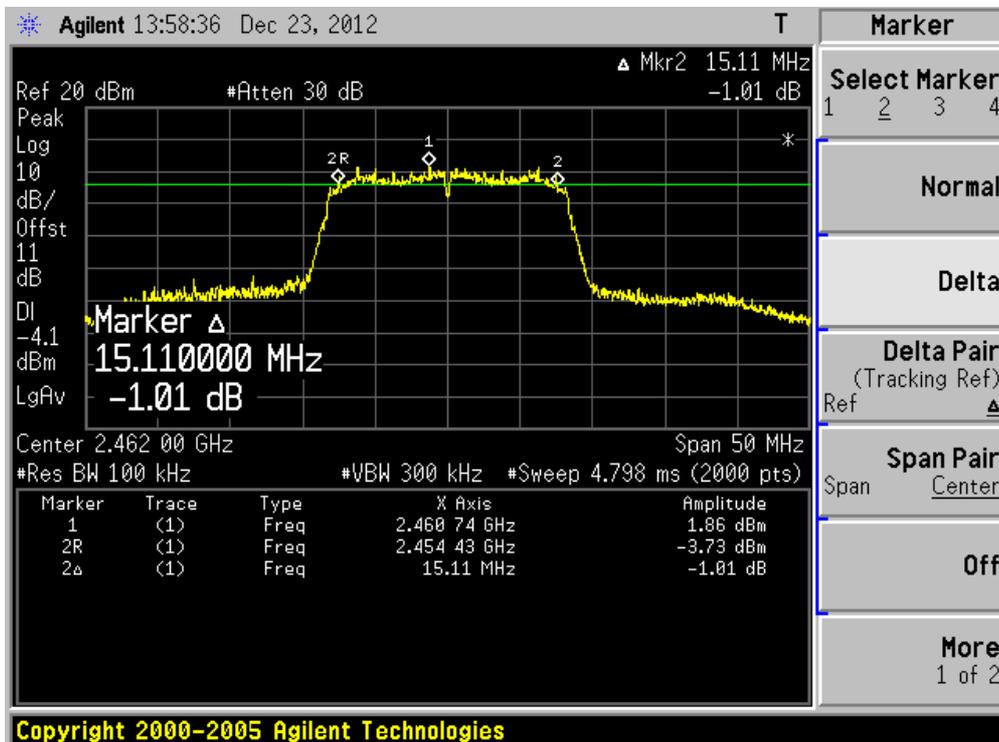
### Channel 01 (2412MHz)



Channel 06 (2437MHz)



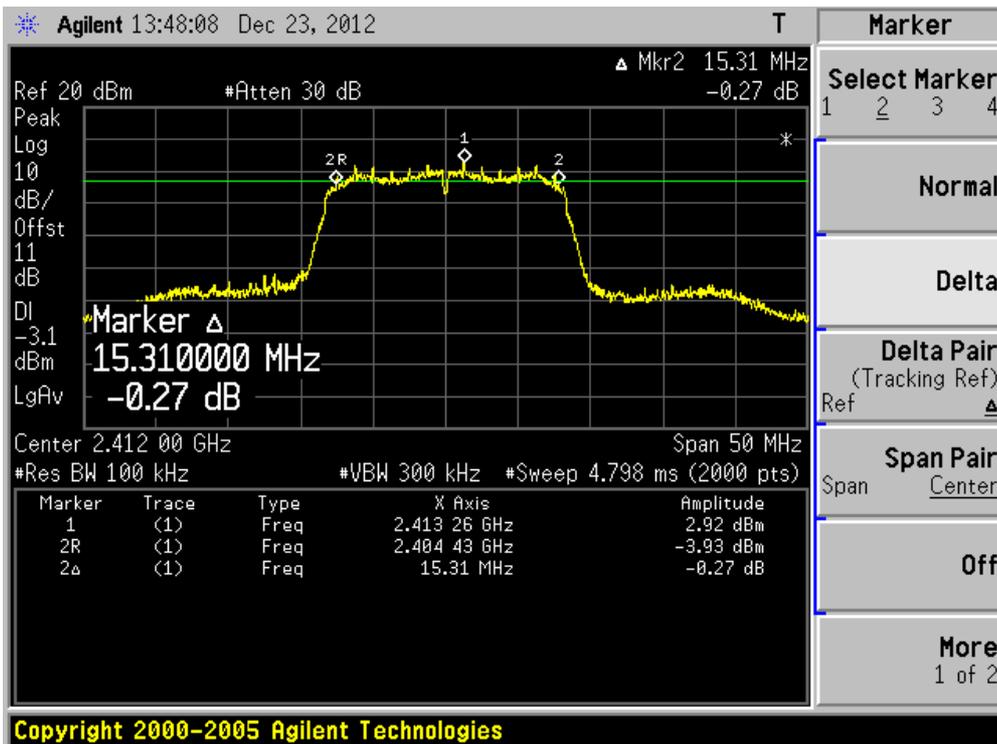
Channel 11 (2462MHz)



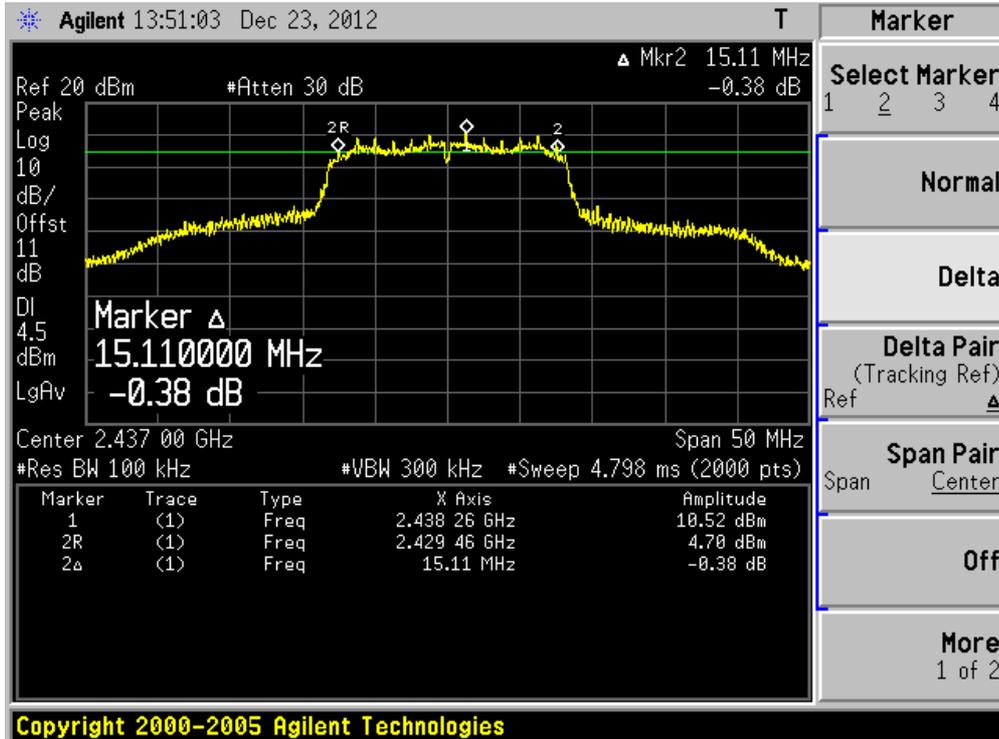
Product	: xDSL Modem/Router
Test Item	: 6dB Occupied Bandwidth
Test Site	: TR-8
Test Mode	: Mode 2: Transmit by 802.11g (Ant 1+2) Ant 2

Channel No.	Frequency (MHz)	Occupied Bandwidth (kHz)	Limit (kHz)	Result
01	2412	15310	500	Pass
06	2437	15110	500	Pass
11	2462	15810	500	Pass

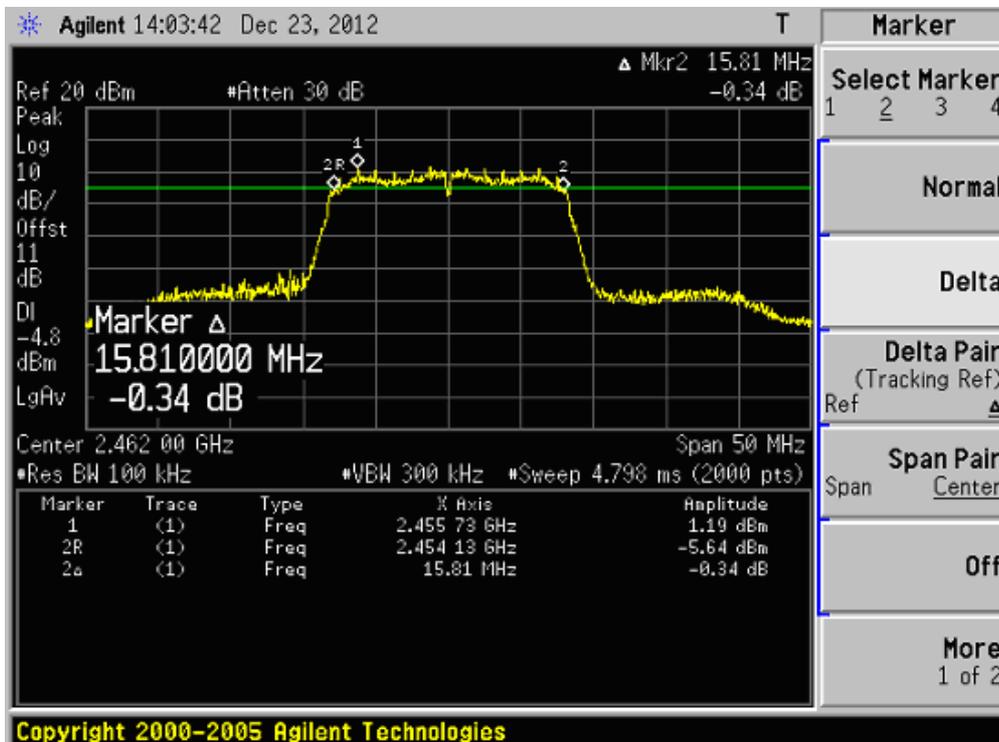
### Channel 01 (2412MHz)



Channel 06 (2437MHz)



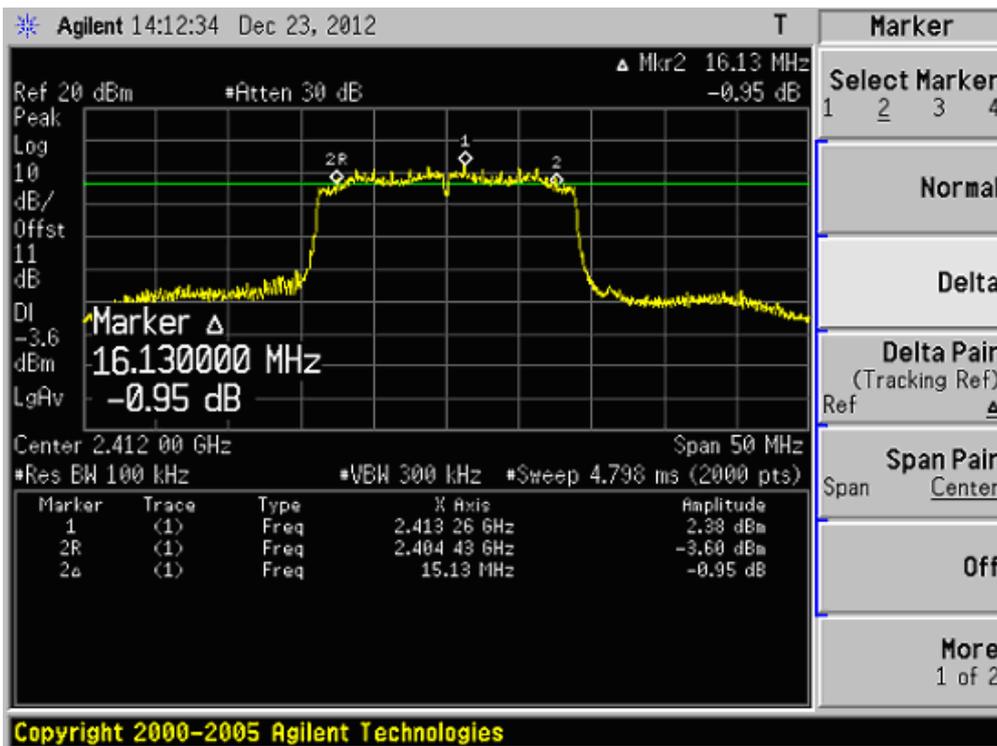
Channel 11 (2462MHz)



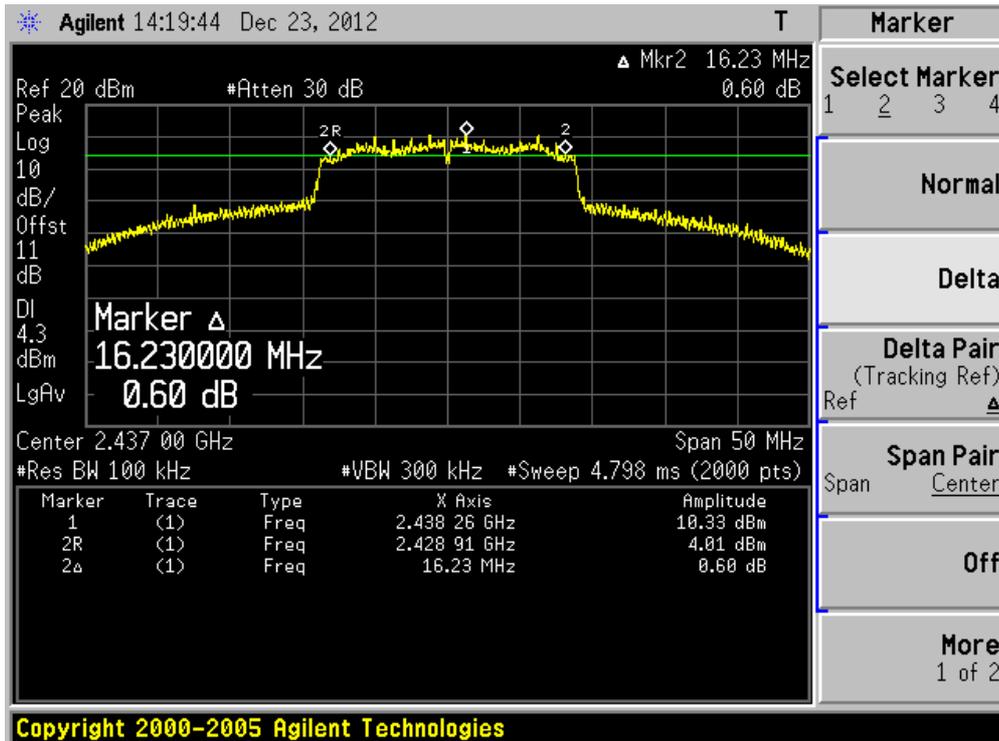
Product	: xDSL Modem/Router
Test Item	: 6dB Occupied Bandwidth
Test Site	: TR-8
Test Mode	: Mode 3: Transmit by 802.11n (20MHz) (Ant 1+2) Ant 1

Channel No.	Frequency (MHz)	Occupied Bandwidth (kHz)	Limit (kHz)	Result
01	2412	16130	500	Pass
06	2437	16230	500	Pass
11	2462	16560	500	Pass

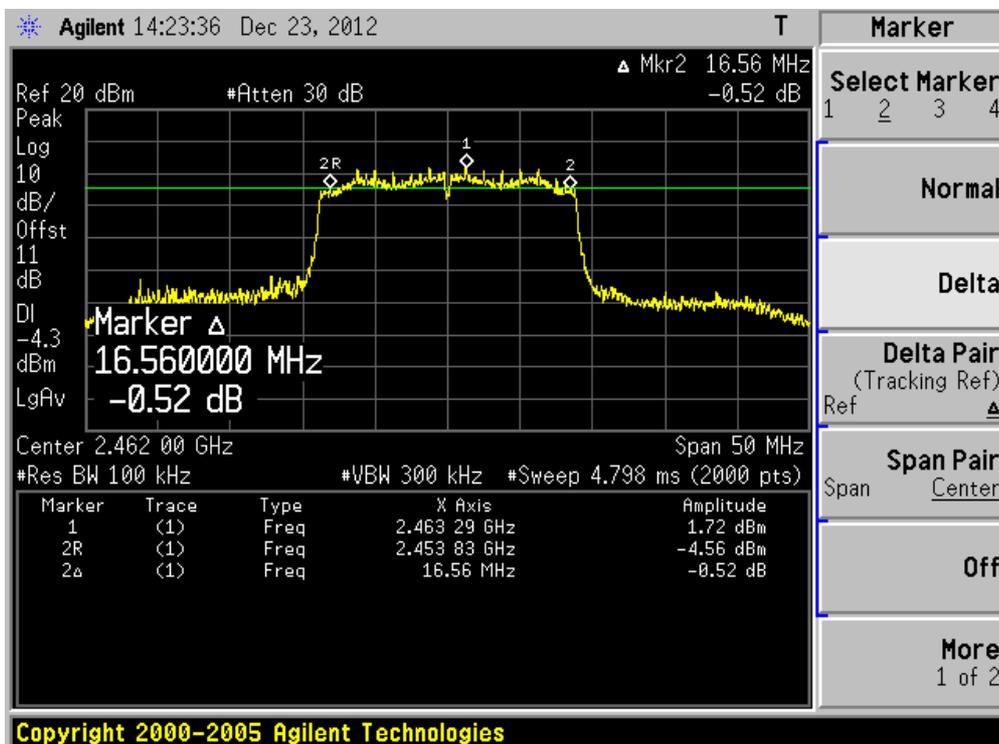
### Channel 01 (2412MHz)



Channel 06 (2437MHz)



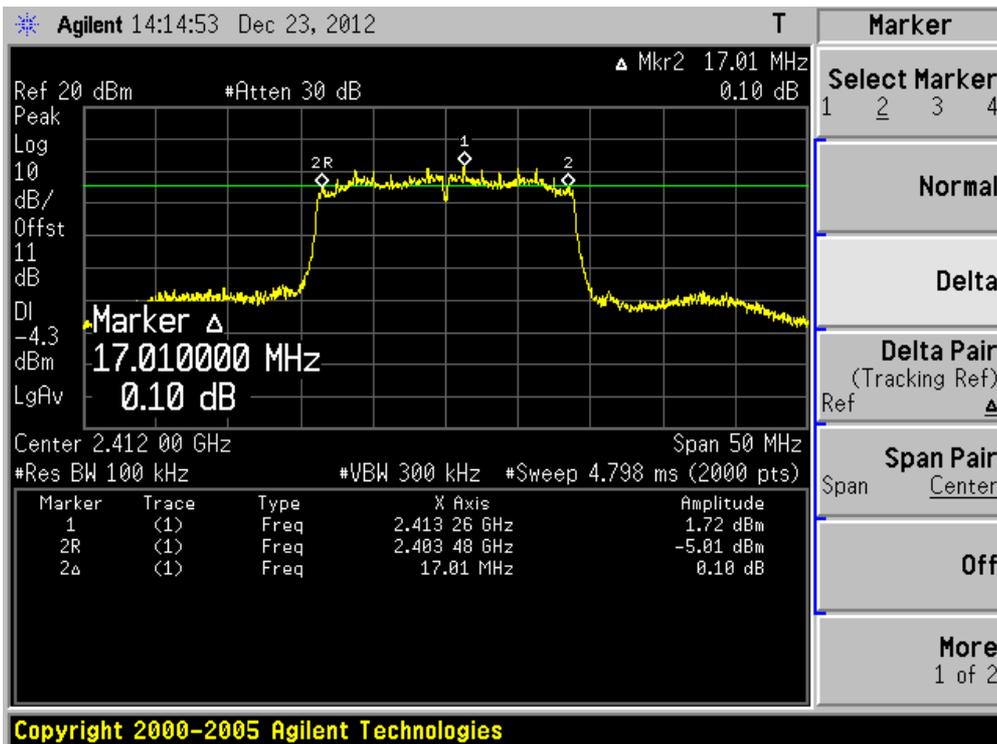
Channel 11 (2462MHz)



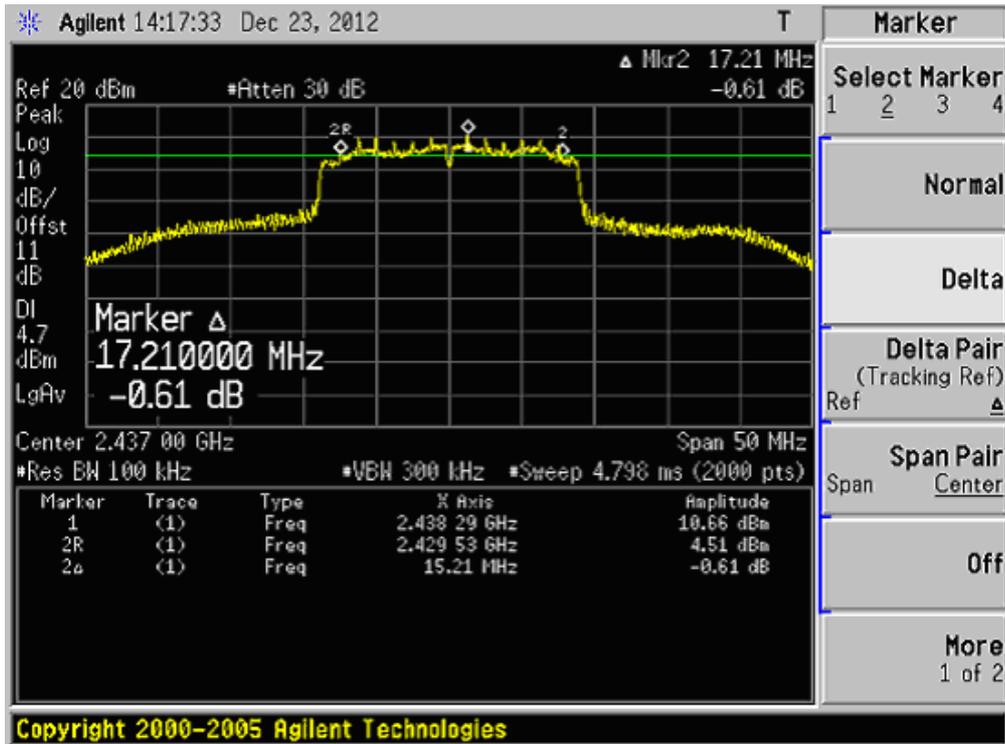
Product	:	xDSL Modem/Router
Test Item	:	6dB Occupied Bandwidth
Test Site	:	TR-8
Test Mode	:	Mode 3: Transmit by 802.11n (20MHz) (Ant 1+2) Ant 2

Channel No.	Frequency (MHz)	Occupied Bandwidth (kHz)	Limit (kHz)	Result
01	2412	17010	500	Pass
06	2437	17210	500	Pass
11	2462	17130	500	Pass

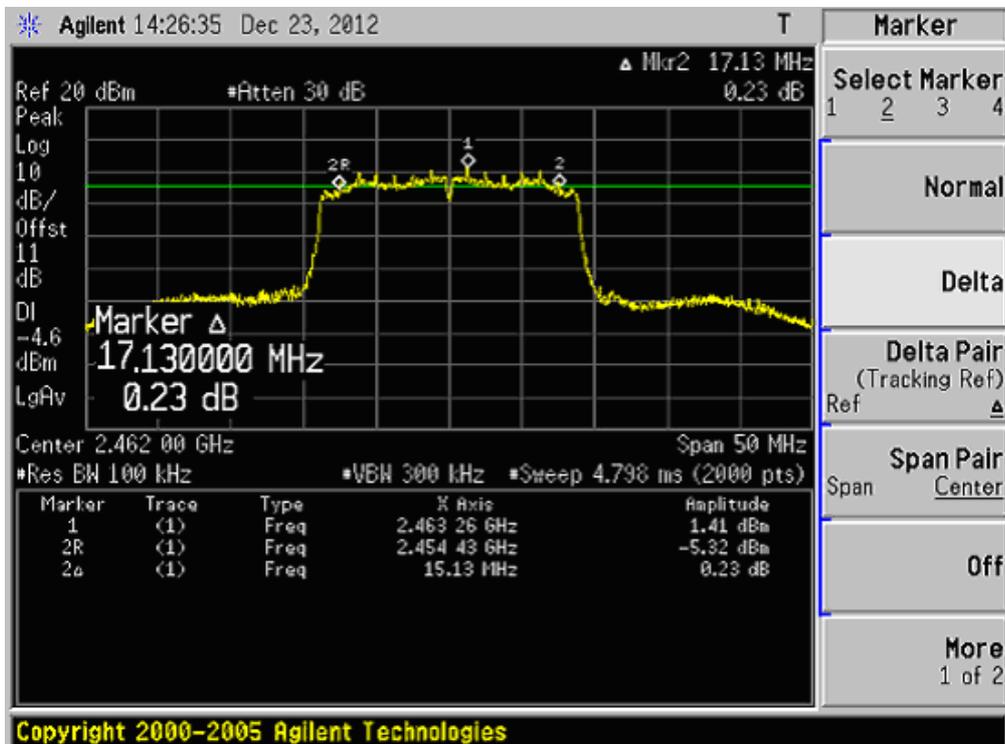
### Channel 01 (2412MHz)



Channel 06 (2437MHz)



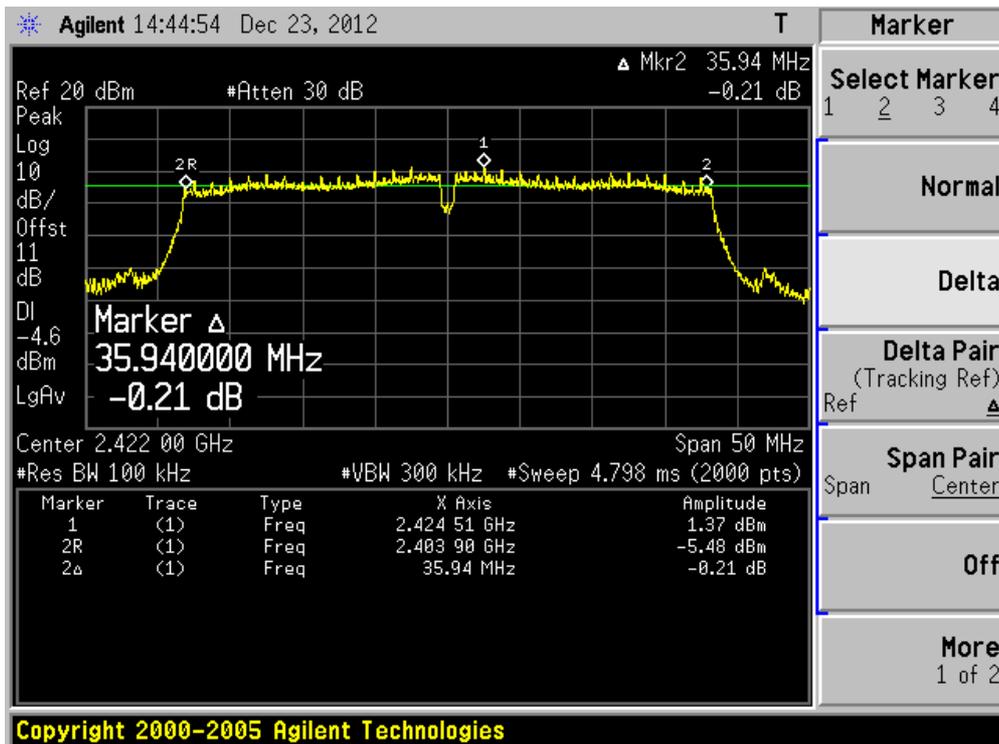
Channel 11 (2462MHz)



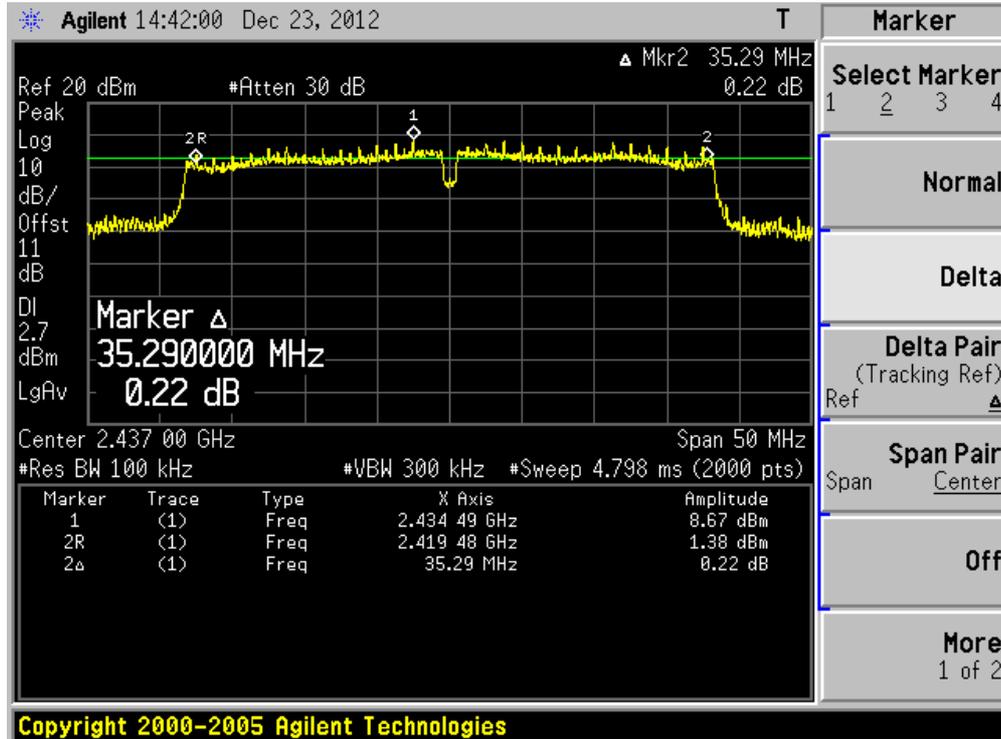
Product	:	xDSL Modem/Router
Test Item	:	6dB Occupied Bandwidth
Test Site	:	TR-8
Test Mode	:	Mode 4: Transmit by 802.11n (40MHz) (Ant 1+2) Ant 1

Channel No.	Frequency (MHz)	Occupied Bandwidth (kHz)	Limit (kHz)	Result
03	2422	35940	500	Pass
06	2437	35290	500	Pass
09	2452	36020	500	Pass

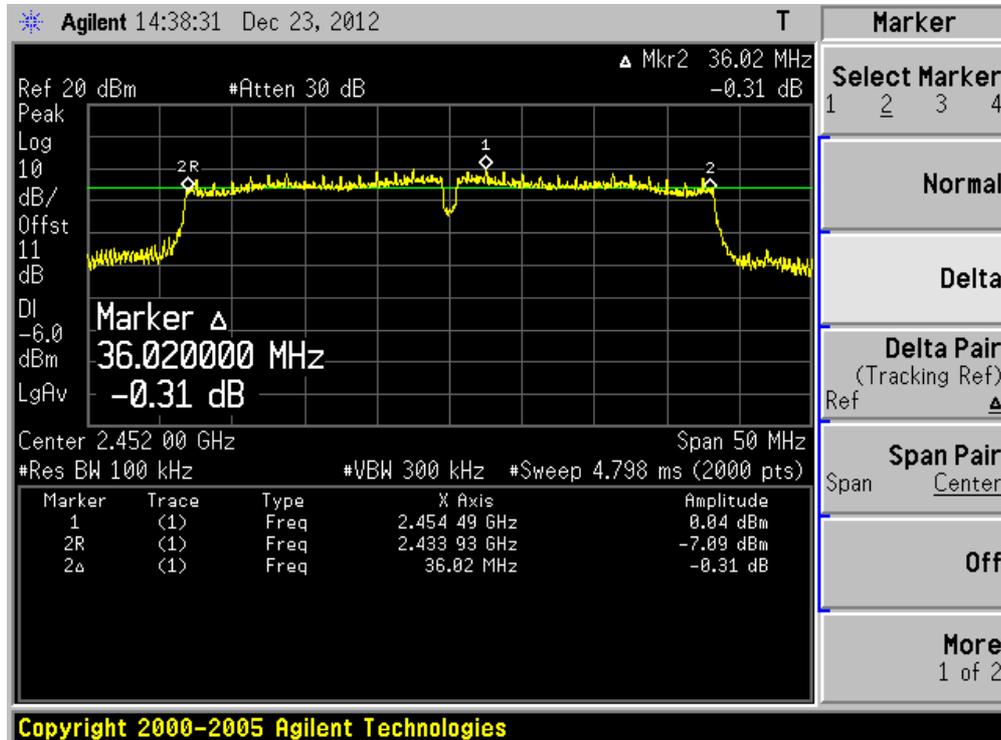
### Channel 03 (2422MHz)



Channel 06 (2437MHz)



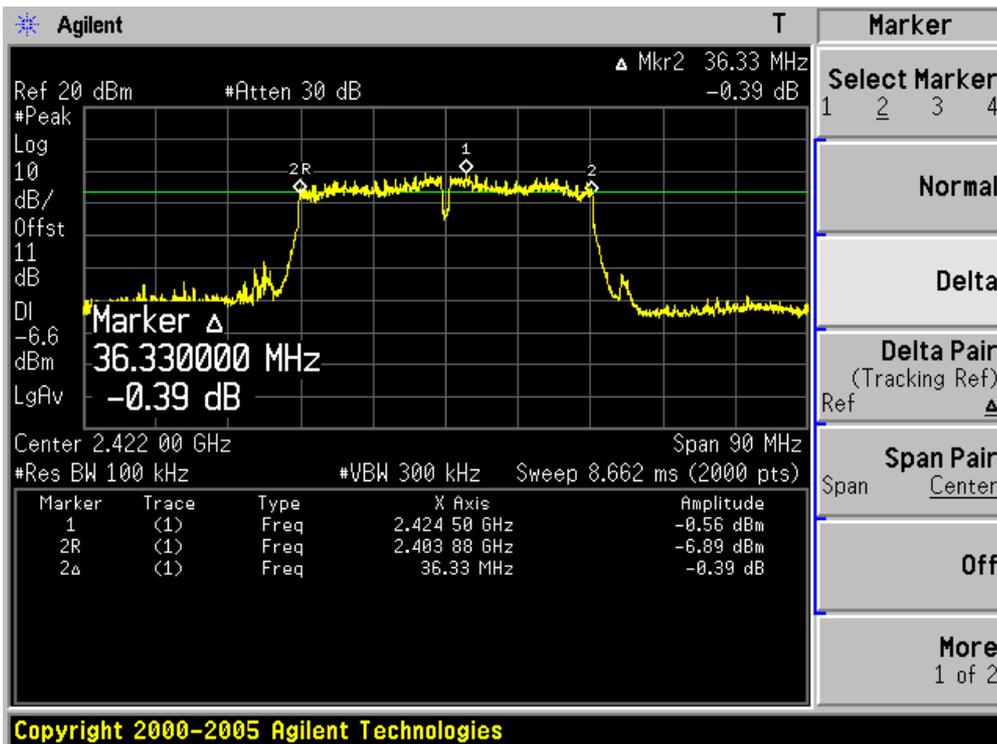
Channel 09 (2452MHz)



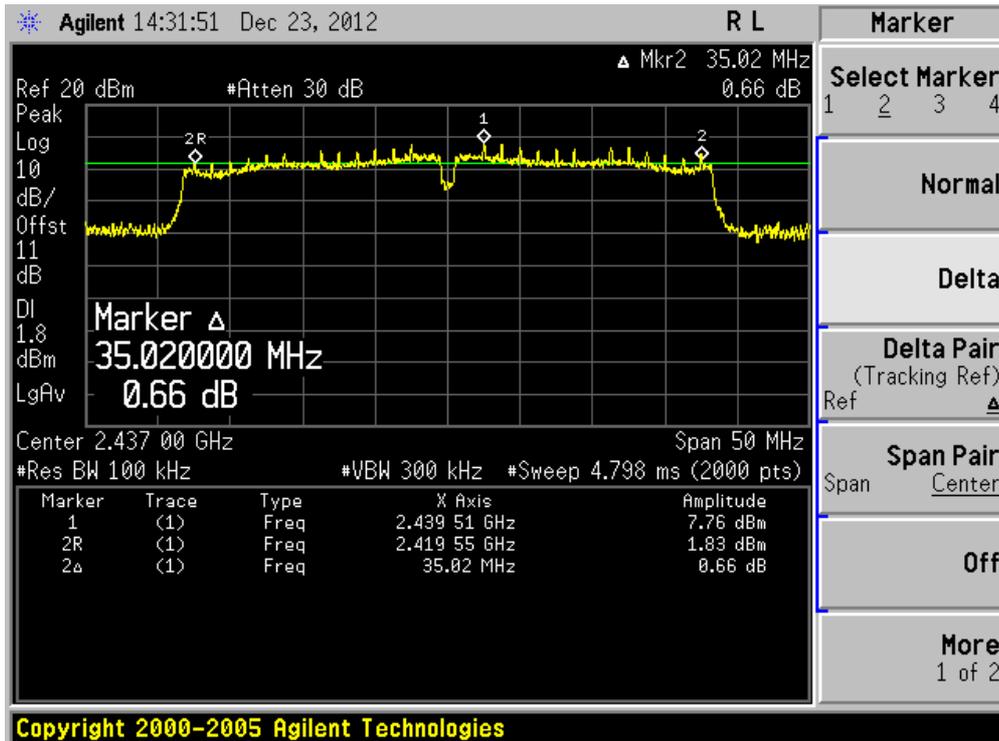
Product	: xDSL Modem/Router
Test Item	: 6dB Occupied Bandwidth
Test Site	: TR-8
Test Mode	: Mode 4: Transmit by 802.11n (40MHz) (Ant 1+2) Ant 2

Channel No.	Frequency (MHz)	Occupied Bandwidth (kHz)	Limit (kHz)	Result
03	2422	36330	500	Pass
06	2437	35020	500	Pass
09	2452	35140	500	Pass

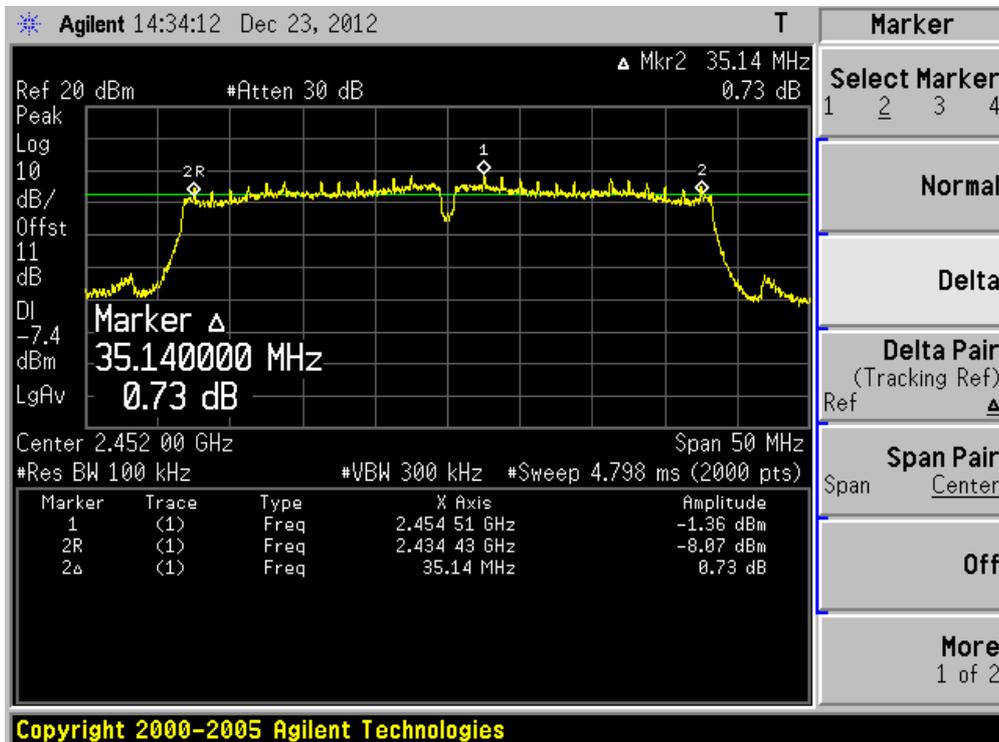
### Channel 03 (2422MHz)



Channel 06 (2437MHz)



Channel 09 (2452MHz)



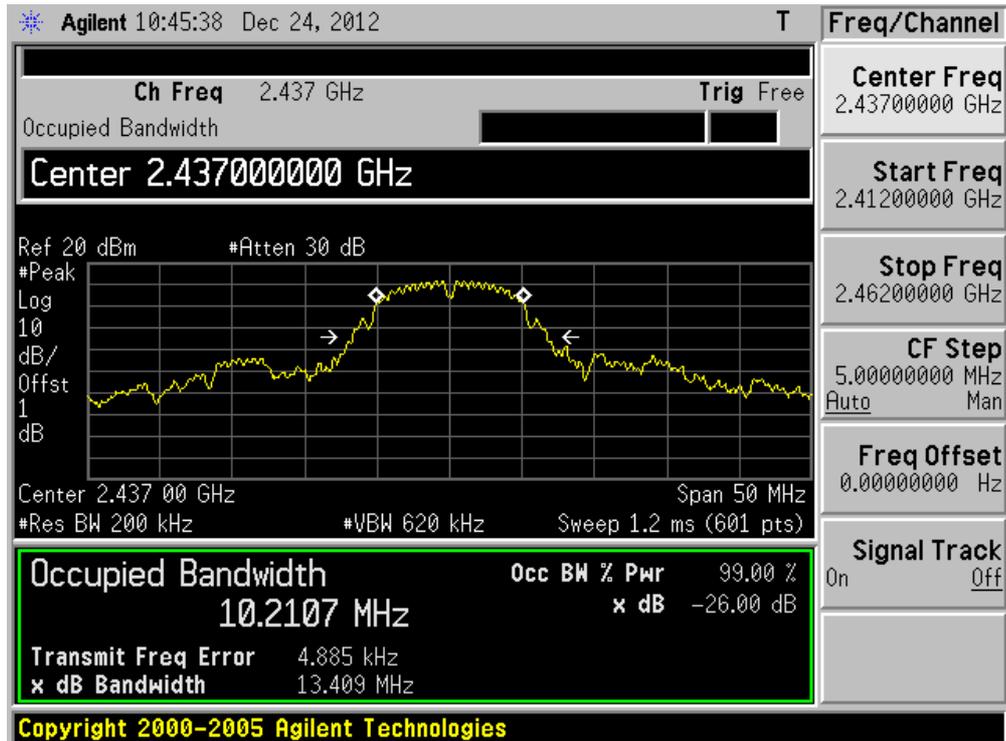
Product	:	xDSL Modem/Router
Test Item	:	99% Occupied Bandwidth
Test Site	:	TR-8
Test Mode	:	Mode 1: Transmit by 802.11b (Ant 2)

Channel No.	Frequency (MHz)	99% Bandwidth (kHz)
01	2412	10168.5
06	2437	10210.7
11	2462	10161.1

### Channel 01 (2412MHz)



Channel 06 (2437MHz)



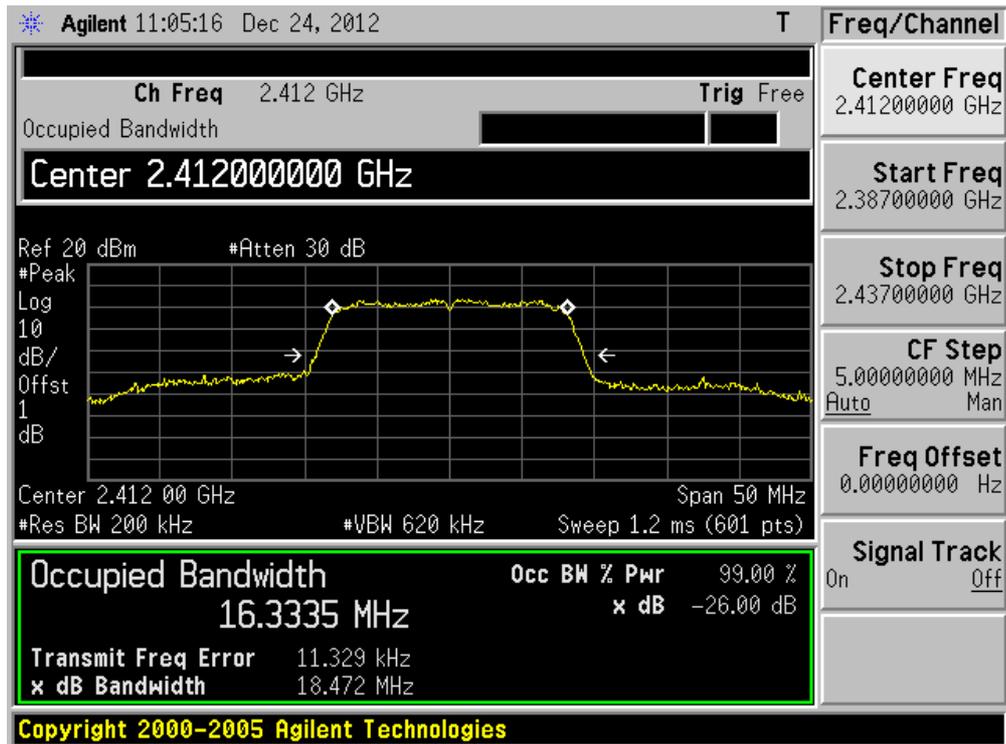
Channel 11 (2462MHz)



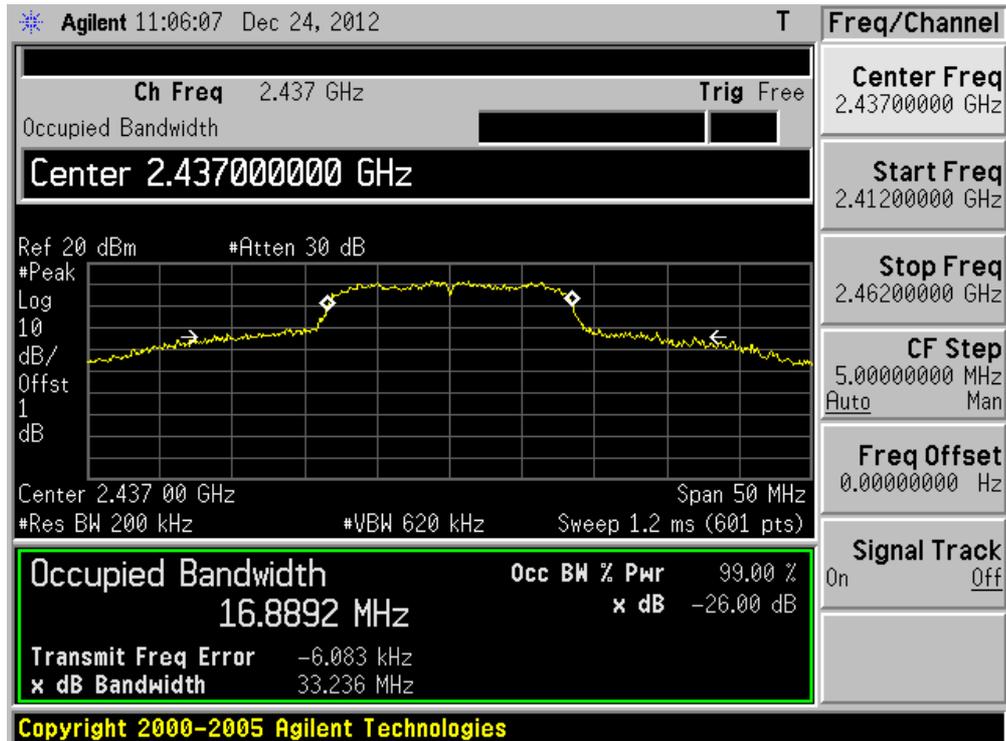
Product	:	xDSL Modem/Router
Test Item	:	99% Occupied Bandwidth
Test Site	:	TR-8
Test Mode	:	Mode 2: Transmit by 802.11g (Ant 1+2) Ant 1

Channel No.	Frequency (MHz)	99% Bandwidth (kHz)
01	2412	16333.5
06	2437	16889.2
11	2462	16358.5

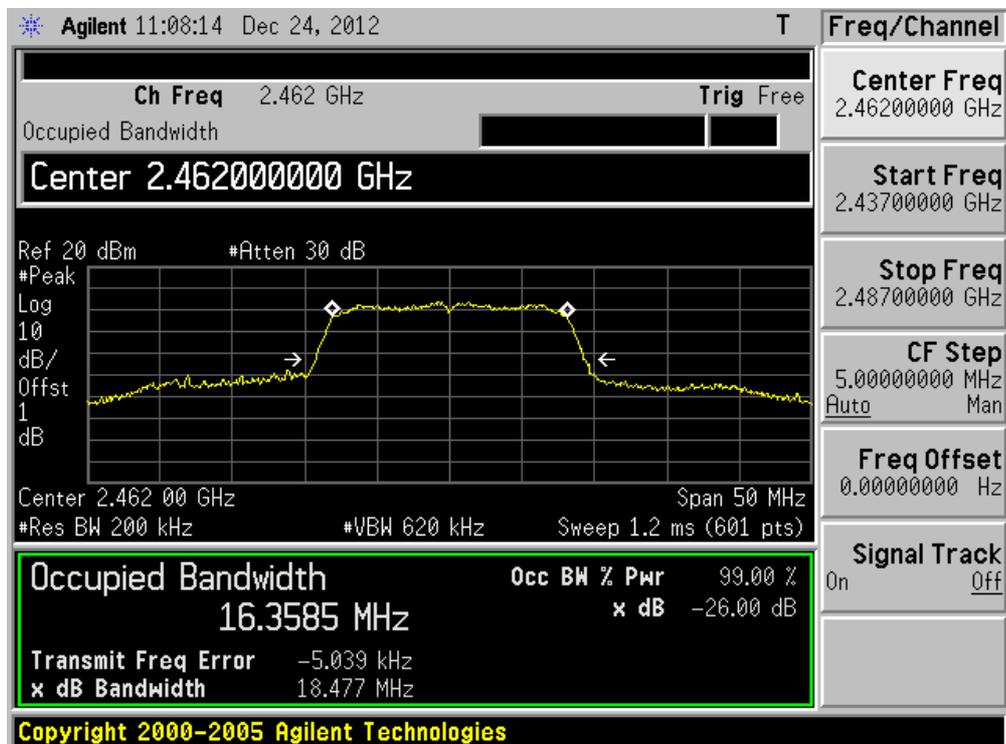
**Channel 01 (2412MHz)**



Channel 06 (2437MHz)



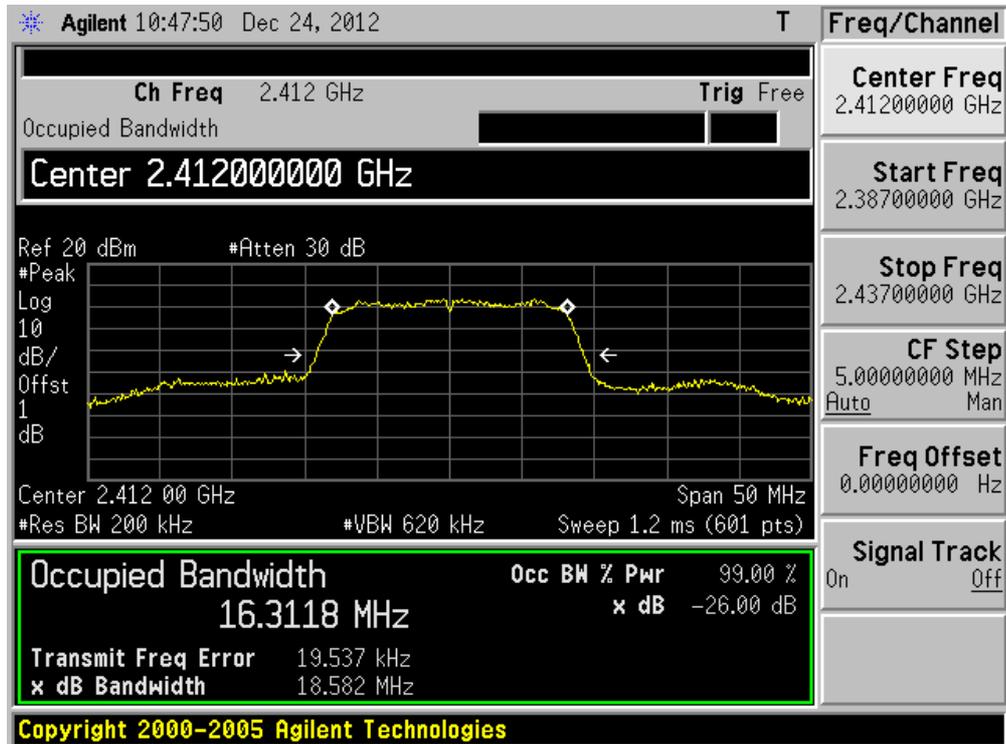
Channel 11 (2462MHz)



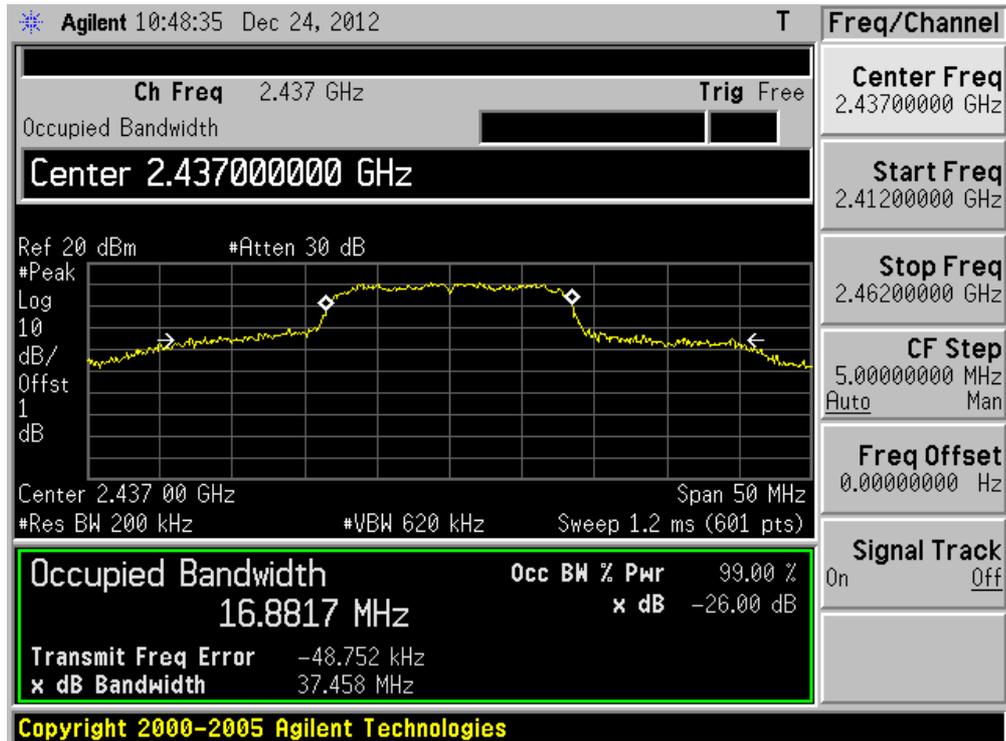
Product	:	xDSL Modem/Router
Test Item	:	99% Occupied Bandwidth
Test Site	:	TR-8
Test Mode	:	Mode 2: Transmit by 802.11g (Ant 1+2) Ant 2

Channel No.	Frequency (MHz)	99% Bandwidth (kHz)
01	2412	16311.8
06	2437	16881.7
11	2462	16310.5

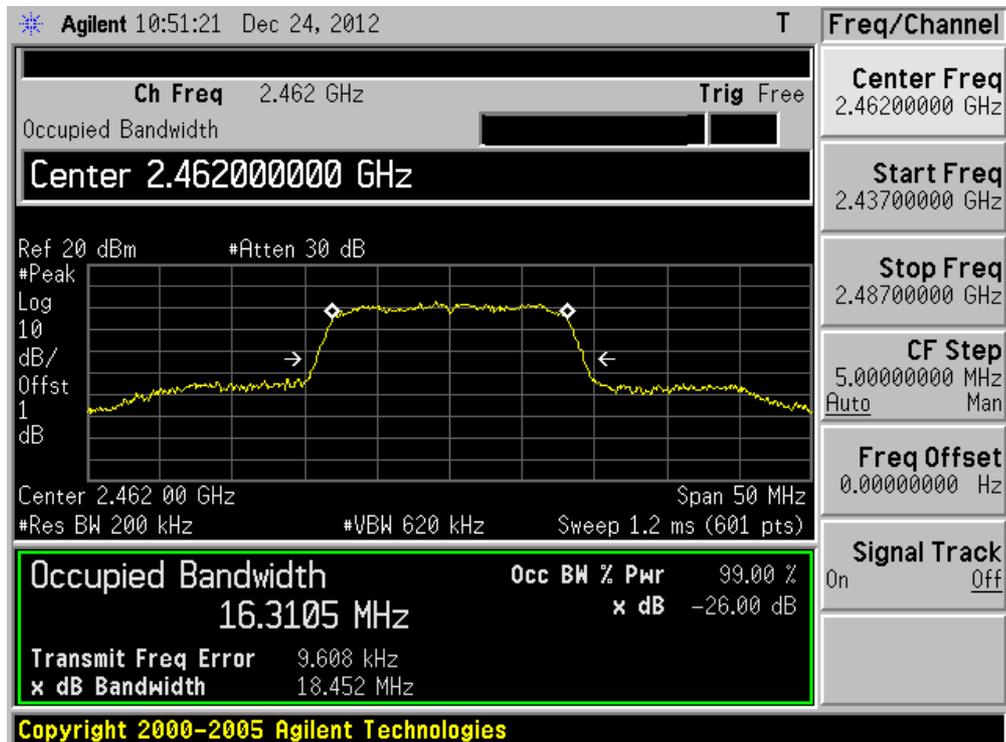
### Channel 01 (2412MHz)



Channel 06 (2437MHz)



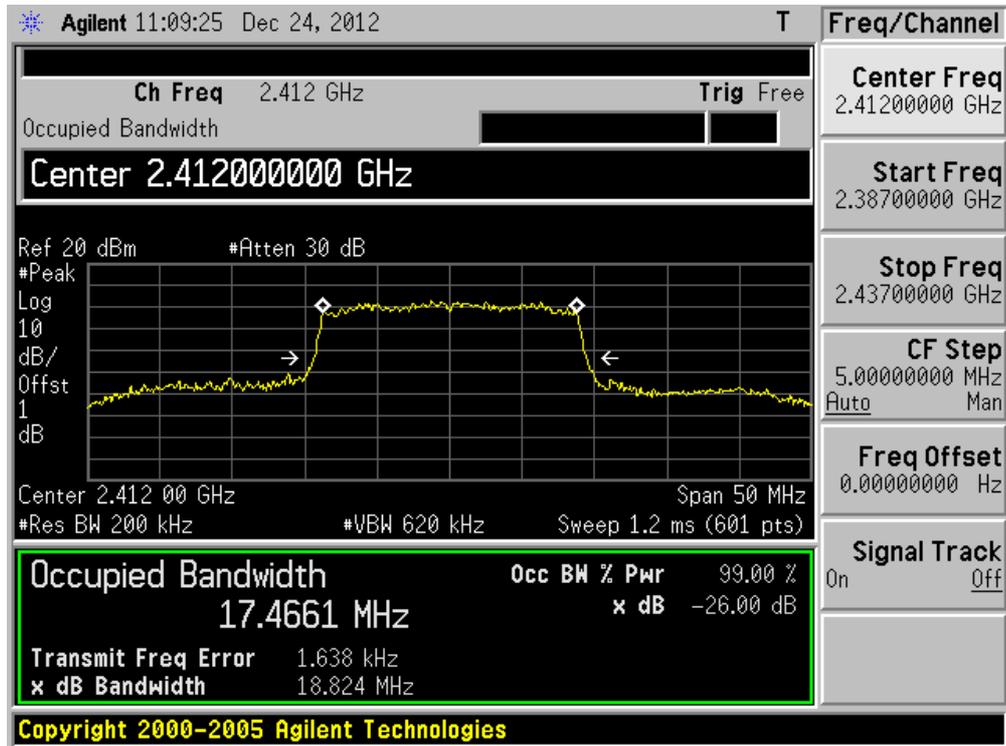
Channel 06 (2462MHz)



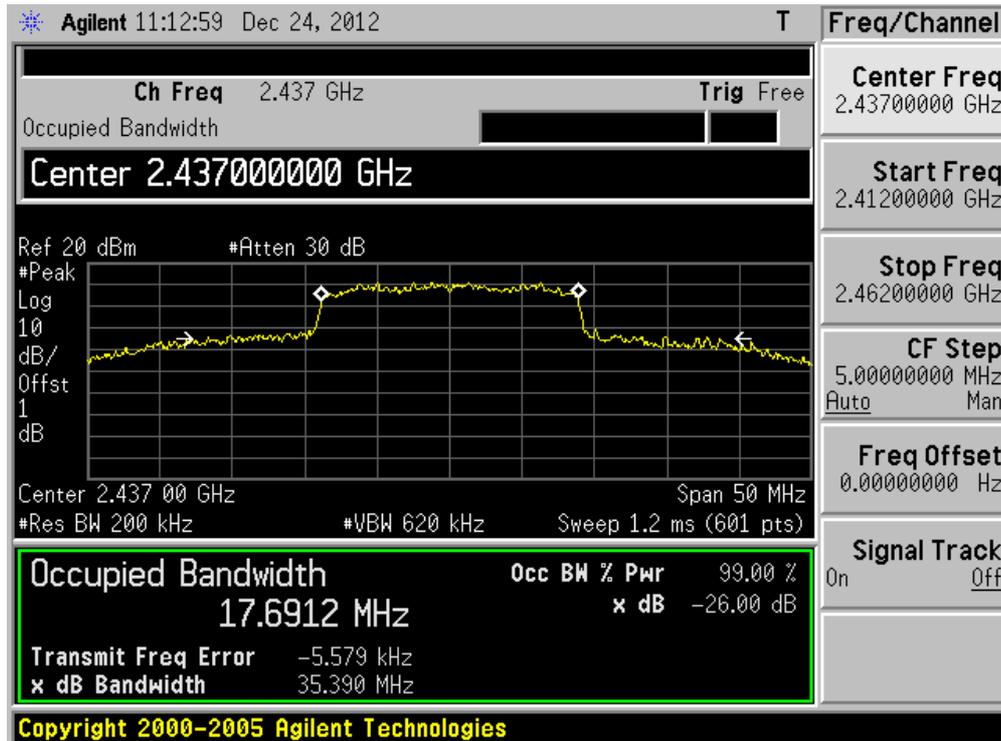
Product	:	xDSL Modem/Router
Test Item	:	99% Occupied Bandwidth
Test Site	:	TR-8
Test Mode	:	Mode 3: Transmit by 802.11n(20MHz) (Ant 1+2) Ant 1

Channel No.	Frequency (MHz)	99% Bandwidth (kHz)
01	2412	17466.1
06	2437	17691.2
11	2462	17464.9

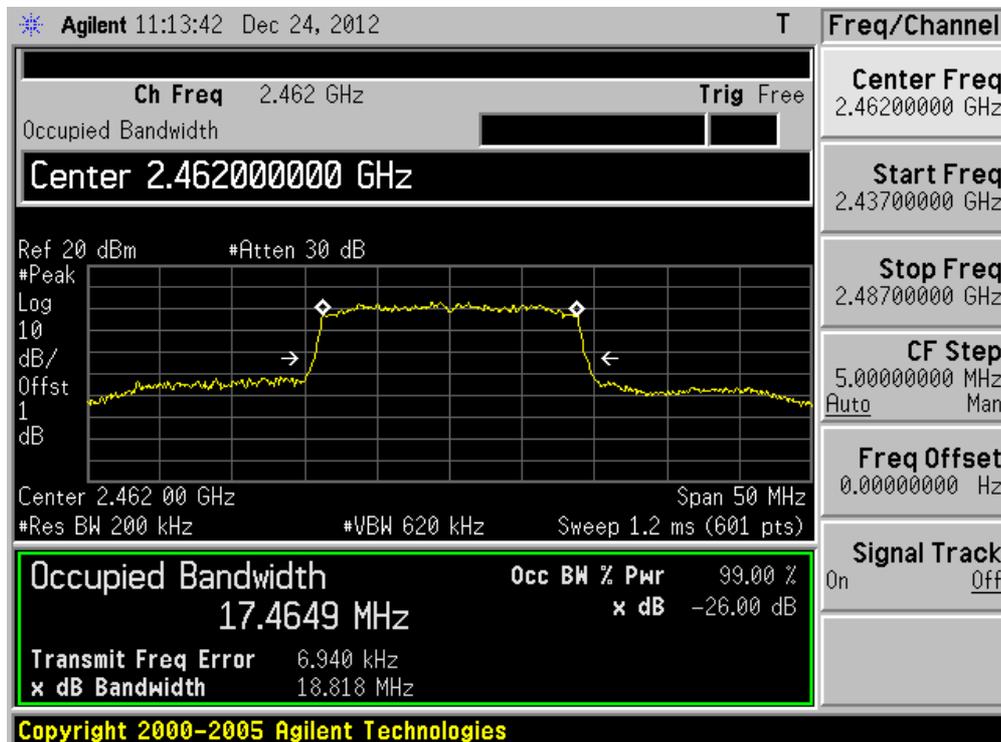
### Channel 01 (2412MHz)



Channel 06 (2437MHz)



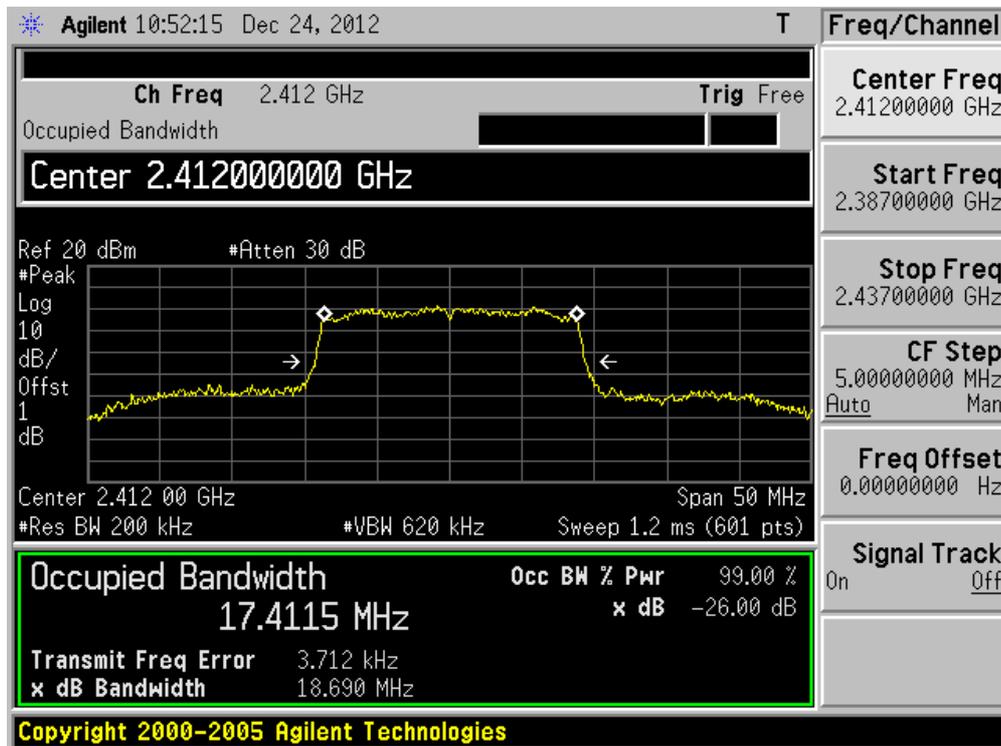
Channel 11 (2462MHz)



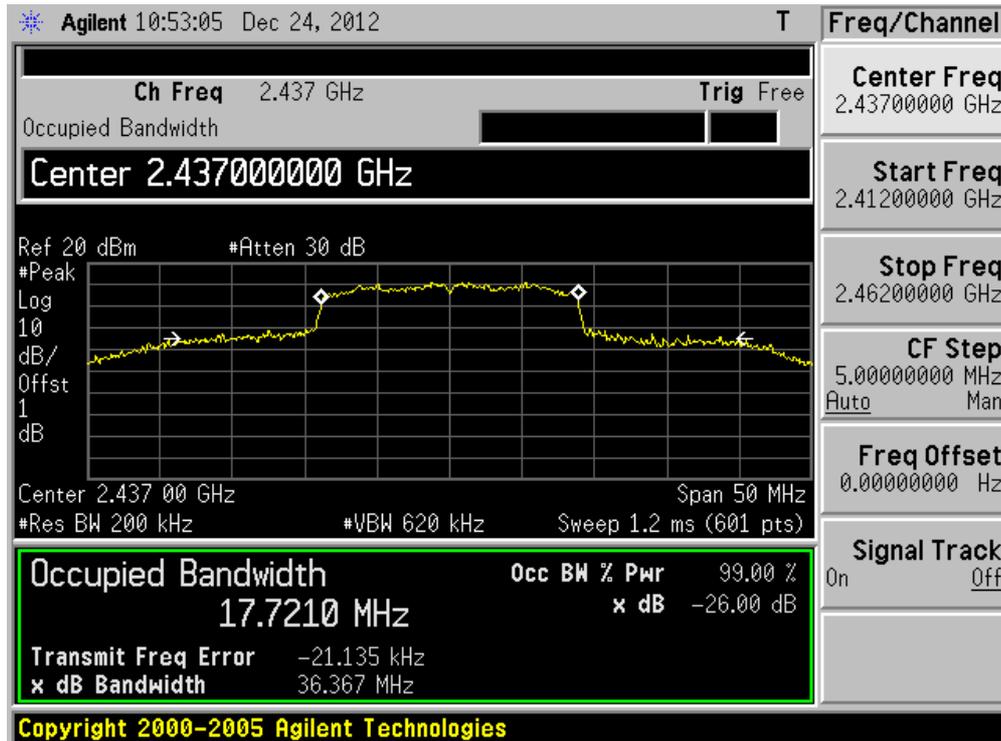
Product	:	xDSL Modem/Router
Test Item	:	99% Occupied Bandwidth
Test Site	:	TR-8
Test Mode	:	Mode 3: Transmit by 802.11n(20MHz) (Ant 1+2) Ant 2

Channel No.	Frequency (MHz)	99% Bandwidth (kHz)
01	2412	17411.5
06	2437	17721.0
11	2462	17374.4

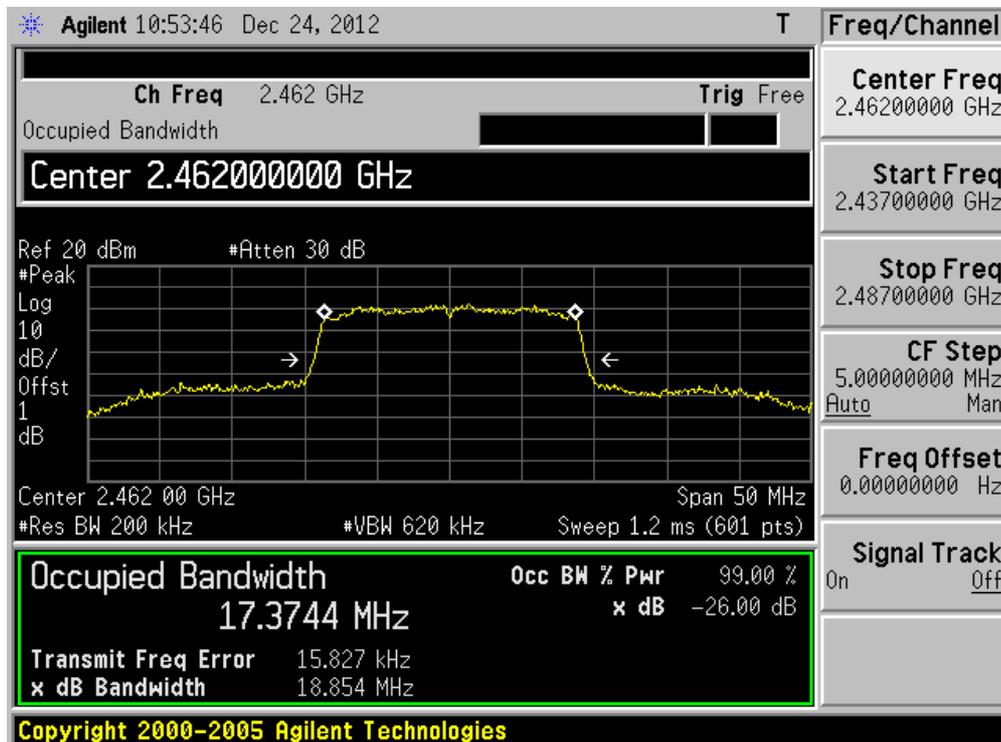
### Channel 01 (2412MHz)



Channel 06 (2437MHz)



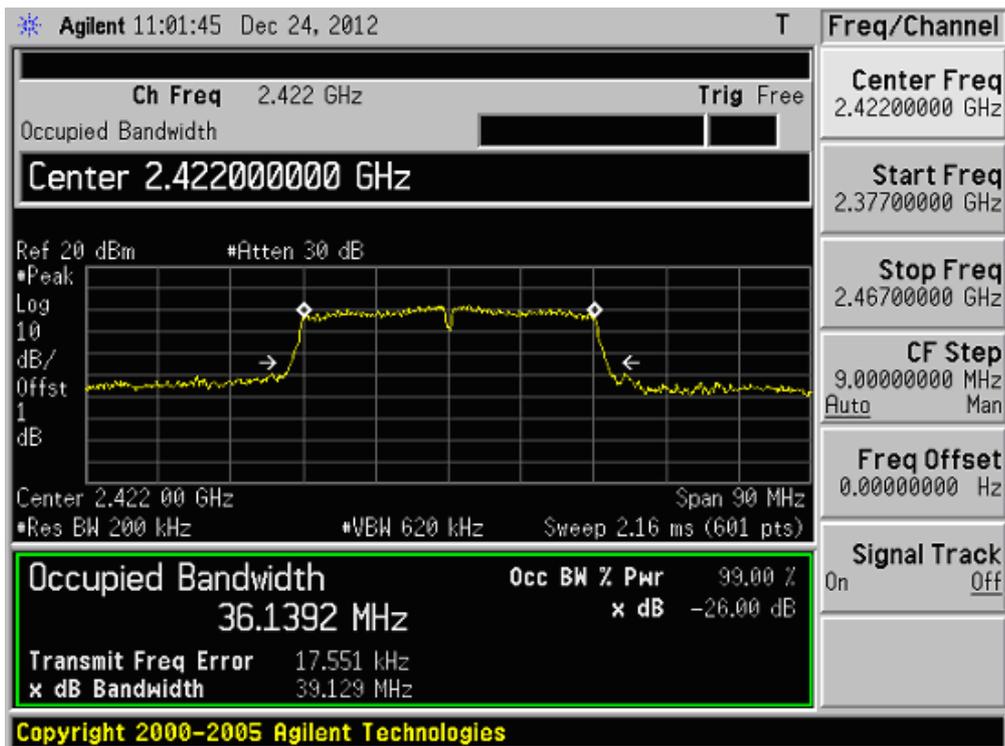
Channel 11 (2462MHz)



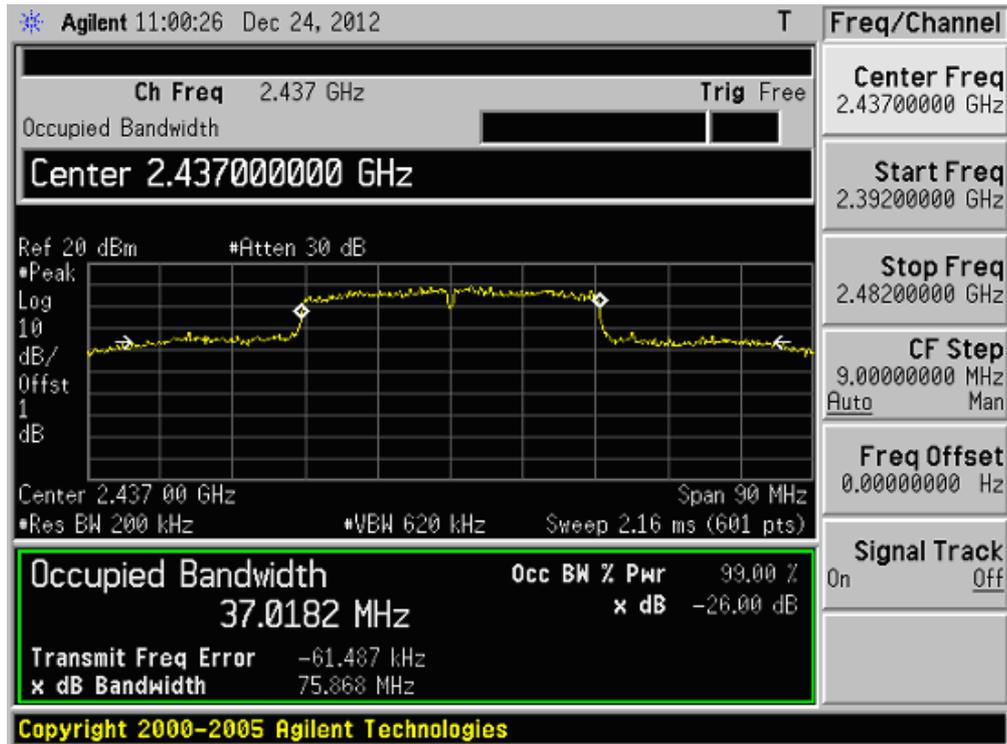
Product	:	xDSL Modem/Router
Test Item	:	99% Occupied Bandwidth
Test Site	:	TR-8
Test Mode	:	Mode 4: Transmit by 802.11n(40MHz) (Ant 1+2) Ant 1

Channel No.	Frequency (MHz)	99% Bandwidth (kHz)
03	2422	36139.2
06	2437	37018.2
09	2452	36141.5

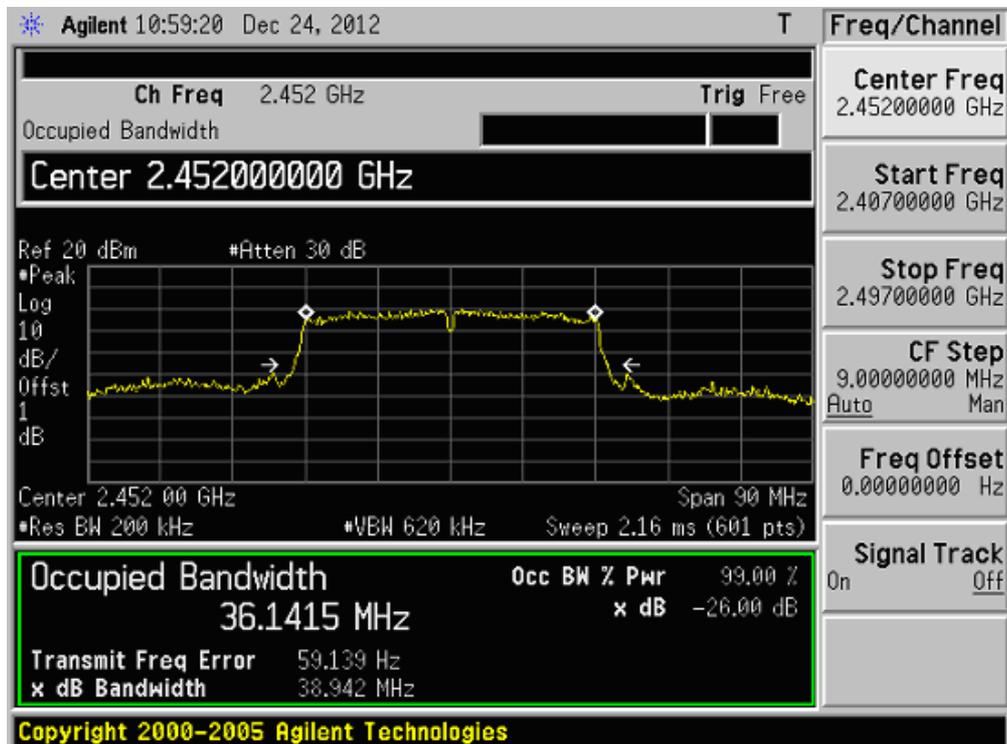
### Channel 03 (2422MHz)



Channel 06 (2437MHz)



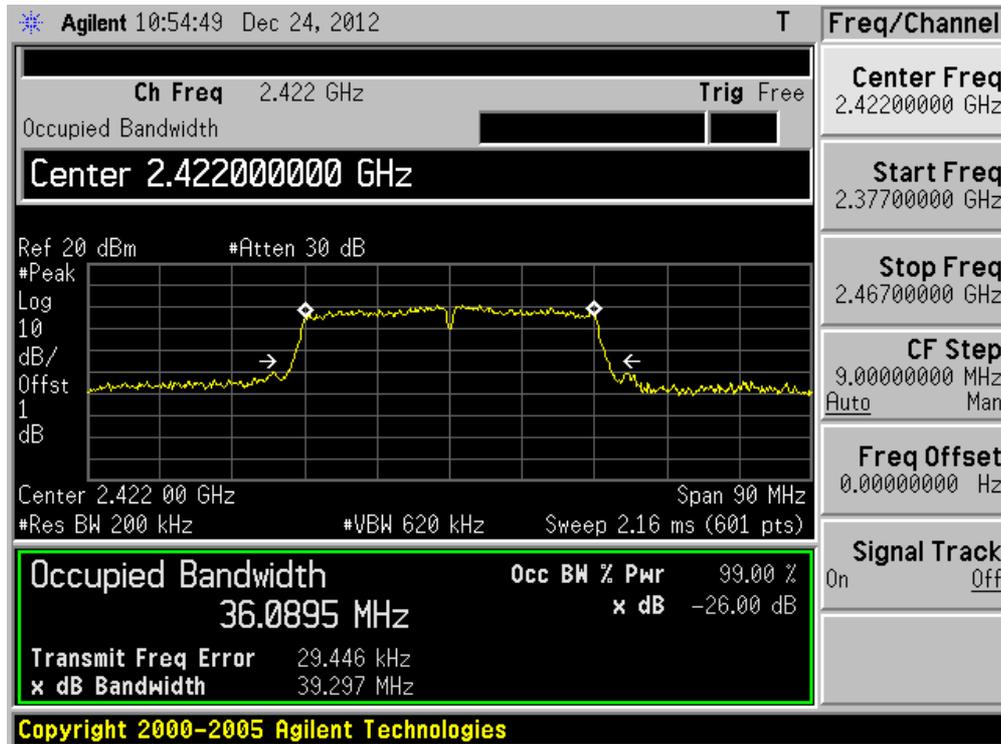
Channel 09 (2452MHz)



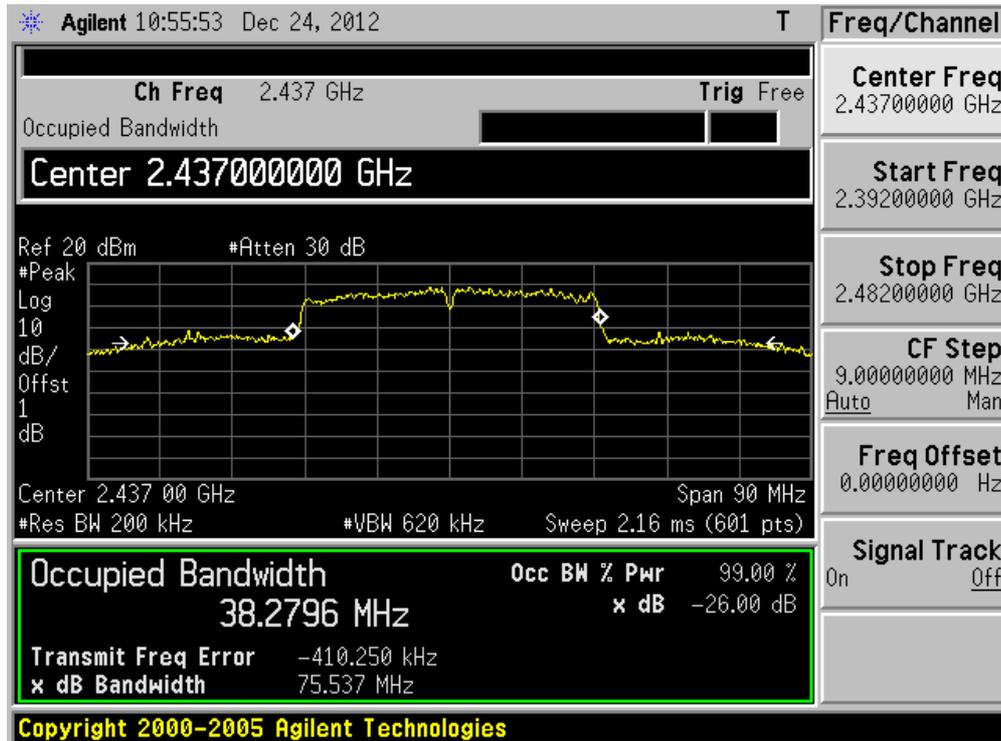
Product	:	xDSL Modem/Router
Test Item	:	99% Occupied Bandwidth
Test Site	:	TR-8
Test Mode	:	Mode 4: Transmit by 802.11n(40MHz) (Ant 1+2) Ant 2

Channel No.	Frequency (MHz)	99% Bandwidth (kHz)
03	2422	36089.5
06	2437	38279.6
09	2452	36082.0

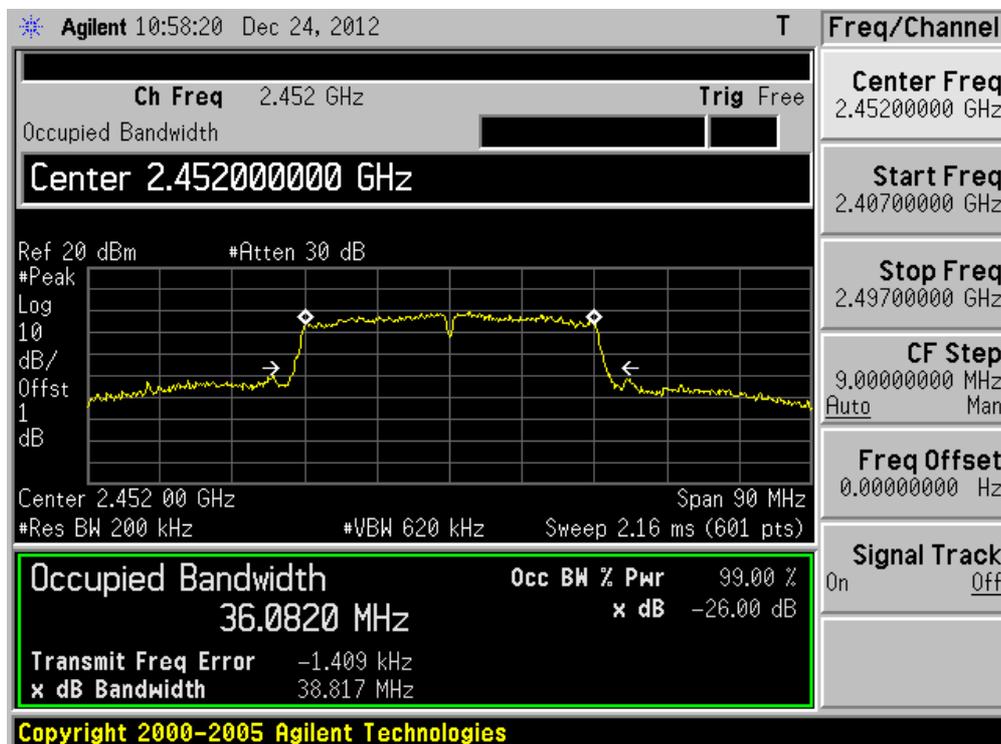
### Channel 03 (2422MHz)



Channel 06 (2437MHz)



Channel 09 (2452MHz)



9. Power Output

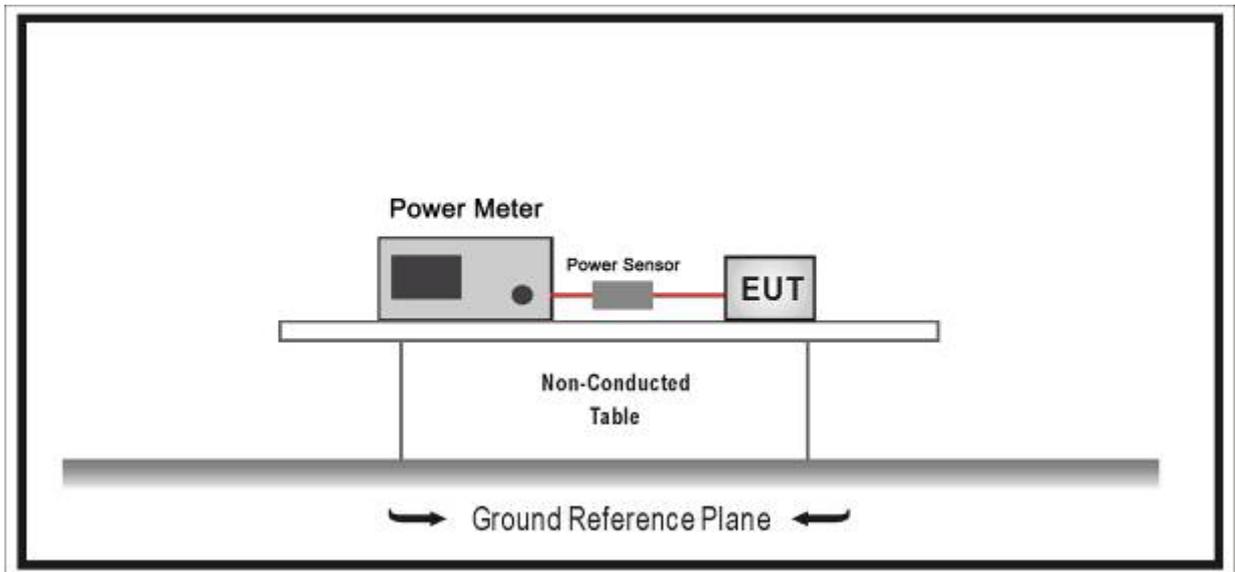
9.1. Test Equipment

Power Output / TR-8

Instrument	Manufacturer	Type No.	Serial No.	Cal. Date
Wideband Peak Power Meter	Anritsu	ML2495A	0905006	2013.01.12
Power Sensor	Anritsu	MA2411B	0846014	2013.01.12
Temperature/Humidity Meter	zhicheng	ZC1-2	TR8-TH	2013.05.07

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

9.2. Test Setup



9.3. Limit

The maximum peak power shall be less 1 Watt (30dBm).

Note: the conducted output power limit specified above is based on the use the antennas with directional gains that do not exceed 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values above, as appropriate, by the amount in dB that the directional gain of antenna exceeds 6 dBi.

#### **9.4. Test Procedure**

The EUT was tested according to ANSI C63.10: 2009 and KDB 558074 for compliance to FCC 47CFR 15.247 requirements.

Use the wideband power meter to test peak power and record the result.

#### **9.5. Uncertainty**

The measurement uncertainty is defined as  $\pm 1.27$  dB

**9.6. Test Result**

Power output test was verified over all data rates of each mode shown as below, and then choose the maximum power output (blue marker) for final test of each channel.

MCS Index for 802.11n	Spatial Streams	Data Rate (Mbps)					
		802.11b	802.11g	20MHz Bandwidth		40MHz Bandwidth	
				800ns GI	400ns GI	800ns GI	400ns GI
0	1	1	6	6.5	7.2	13.5	15.0
1	1	2	9	13.0	14.4	27.0	30.0
0	1	5.5	12	19.5	21.7	40.5	45.0
1	1	11	18	26.0	28.9	54.0	60.0
4	1	---	24	39.0	43.3	81.0	90.0
5	1	---	36	52.0	57.8	108.0	120.0
6	1	---	48	58.5	65.0	121.5	135.0
7	1	---	54	65.0	72.2	135.0	150.0
8	2	---	---	13.0	14.4	27.0	30.0
9	2	---	---	26.0	28.9	54.0	60.0
10	2	---	---	39.0	43.3	81.0	90.0
11	2	---	---	52.0	57.8	108.0	120.0
12	2	---	---	78.0	86.7	162.0	180.0
13	2	---	---	104.0	115.6	216.0	240.0
14	2	---	---	117.0	130.0	243.0	270.0
15	2	---	---	130.0	144.0	270.0	300.0

Power output at various data rates:

Test Mode	Bandwidth	Frequency (MHz)	Channel	Data Rate	Peak Power (dBm)
802.11b(Ant 0)	20	2437	6	1	23.24
				5.5	23.22
				11	23.21
802.11g(Ant 0+1)	20	2437	6	6	29.45
				24	29.44
				54	29.43
802.11n(Ant 0+1)	20	2437	6	MCS0	29.24
				MCS4	29.23
				MCS7	29.21
802.11n(Ant 0+1)	40	2437	6	MCS0	29.36
				MCS4	29.35
				MCS7	29.33

Product	:	xDSL Modem/Router
Test Item	:	Power Output
Test Site	:	TR8
Test Mode	:	Mode 1: Transmit by 802.11b (Ant 2)

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)		Total Power (dBm)	Limit (dBm)	Result	Max.EIRP (dBm)
		Ant 1	Ant 2				
1	2412	N/A	21.39	21.39	30.00	Pass	25.73
6	2437	N/A	23.24	23.24	30.00	Pass	27.58
11	2462	N/A	21.13	21.13	30.00	Pass	25.47

Antenna Gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N]$  dBi=4.34

Max.EIRP=Total Power + Antenna Gain

Product	:	xDSL Modem/Router
Test Item	:	Power Output
Test Site	:	TR8
Test Mode	:	Mode 2: Transmit by 802.11g (Ant 1+2)

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)		Total Power (dBm)	Limit (dBm)	Result	Max.EIRP (dBm)
		Ant 1	Ant 2				
1	2412	24.18	24.15	27.18	30.00	Pass	31.52
6	2437	26.71	26.16	29.45	30.00	Pass	33.79
11	2462	23.23	23.97	26.63	30.00	Pass	30.97

Antenna Gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N]$  dBi=4.34

Max.EIRP=Total Power + Antenna Gain

Product	:	xDSL Modem/Router
Test Item	:	Power Output
Test Site	:	TR8
Test Mode	:	Mode 3: Transmit by 802.11n20 (Ant 1+2)

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)		Total Power (dBm)	Limit (dBm)	Result	Max.EIRP (dBm)
		Ant 1	Ant 2				
1	2412	23.52	23.46	26.50	30.00	Pass	30.84
6	2437	26.34	26.11	29.24	30.00	Pass	33.58
11	2462	23.32	23.52	26.43	30.00	Pass	30.77

$$\text{Antenna Gain} = 10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N] \text{ dBi} = 4.34$$

Max.EIRP=Total Power + Antenna Gain

Product	:	xDSL Modem/Router
Test Item	:	Power Output
Test Site	:	TR8
Test Mode	:	Mode 4: Transmit by 802.11n(40MHz) (Ant 1+2)

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)		Total Power (dBm)	Limit (dBm)	Result	Max.EIRP (dBm)
		Ant 1	Ant 2				
1	2412	24.05	23.11	26.62	30.00	Pass	30.96
6	2437	26.53	26.17	29.36	30.00	Pass	33.70
11	2462	23.45	22.35	25.95	30.00	Pass	30.29

$$\text{Antenna Gain} = 10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N] \text{ dBi} = 4.34$$

Max.EIRP=Total Power + Antenna Gain

## 10. Power Spectral Density

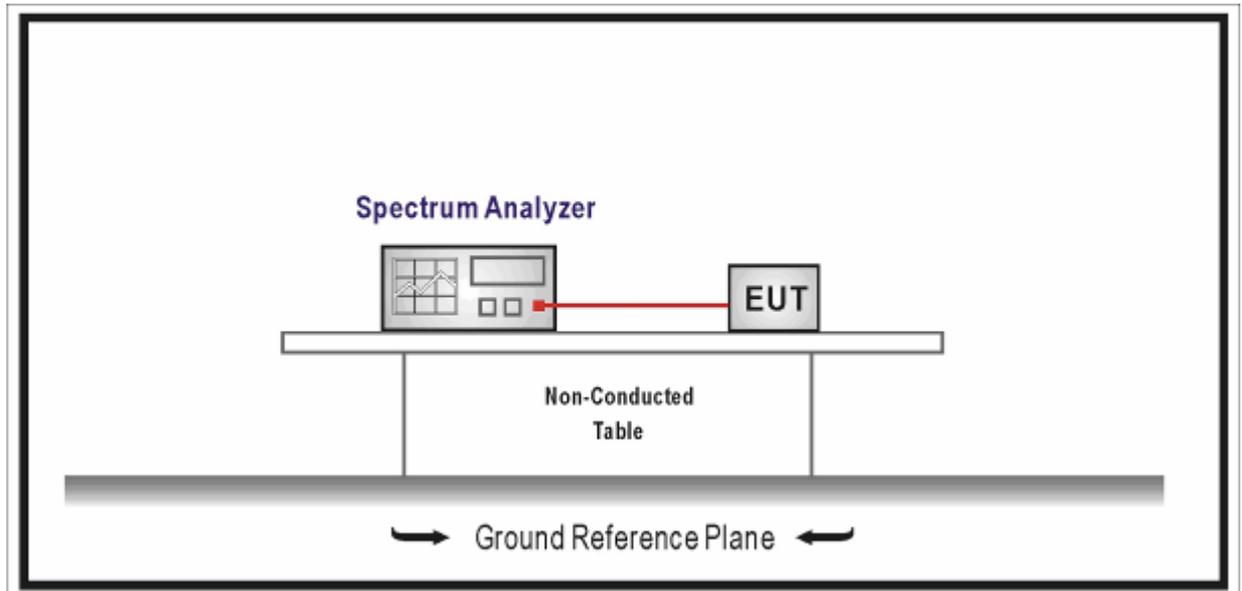
### 10.1. Test Equipment

Power Spectral Density / TR-8

Instrument	Manufacturer	Type No.	Serial No.	Cal. Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2013.04.18
Temperature/Humidity Meter	zhicheng	ZC1-2	TR8-TH	2013.05.07

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

### 10.2. Test Setup



### 10.3. Limit

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

#### 10.4. Test Procedure

The EUT was tested according to ANSI C63.10: 2009 and KDB 558074 for compliance to FCC 47CFR 15.247 requirements.

Set the Span to 1.5 times the DTS channel bandwidth,  $RBW \geq 3 \text{ kHz}$ ,  $VBW \geq 3*RBW$ , Sweep time = auto couple, detector = Peak, trace mode = max hold, allow trace to fully stabilize, use the peak marker function to determine the maximum amplitude level.

#### 10.5. Uncertainty

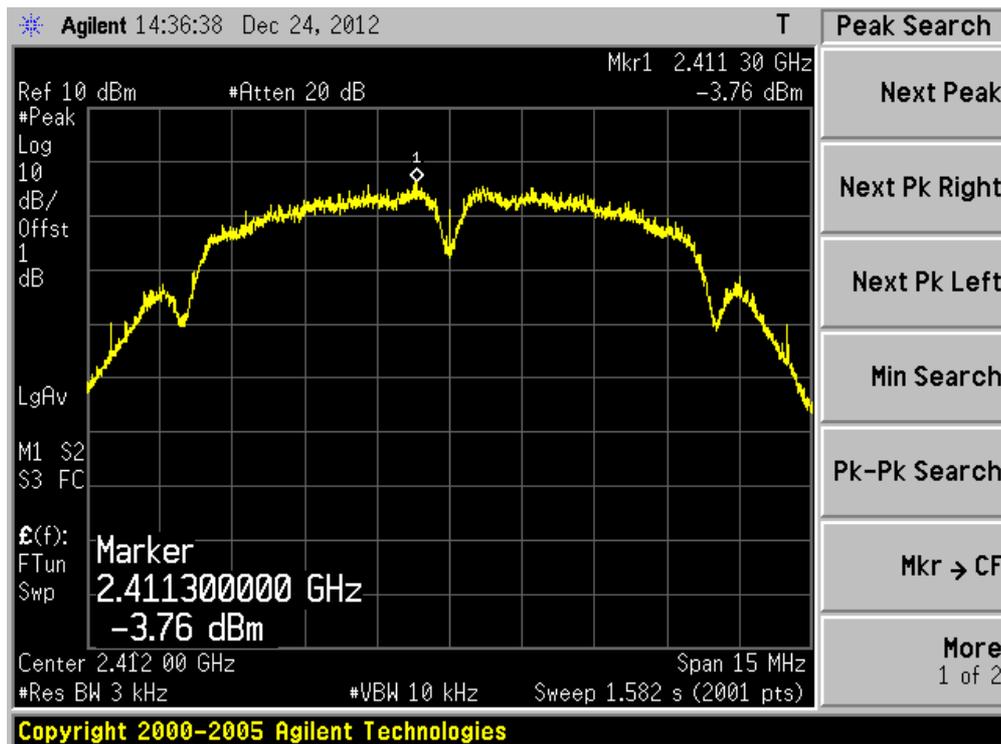
The measurement uncertainty is defined as  $\pm 1.27 \text{ dB}$

## 10.6. Test Result

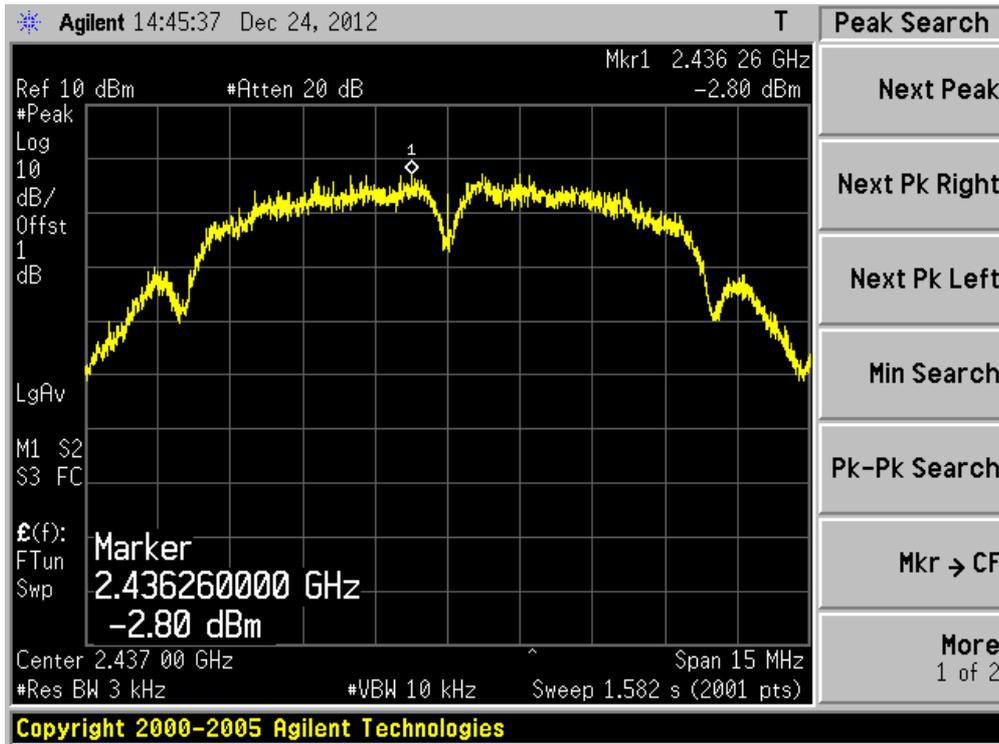
Product	:	xDSL Modem/Router
Test Item	:	Power Spectral Density
Test Site	:	TR-8
Test Mode	:	Mode 1: Transmit by 802.11b (Ant 2)

Channel No.	Frequency (MHz)	Reading Value (dBm)		PSD (dBm)	Limit (dBm)	Result
		Ant 1	Ant 2			
01	2412	N/A	-3.76	-3.76	8	Pass
06	2437	N/A	-2.80	-2.80	8	Pass
11	2462	N/A	-4.58	-4.58	8	Pass

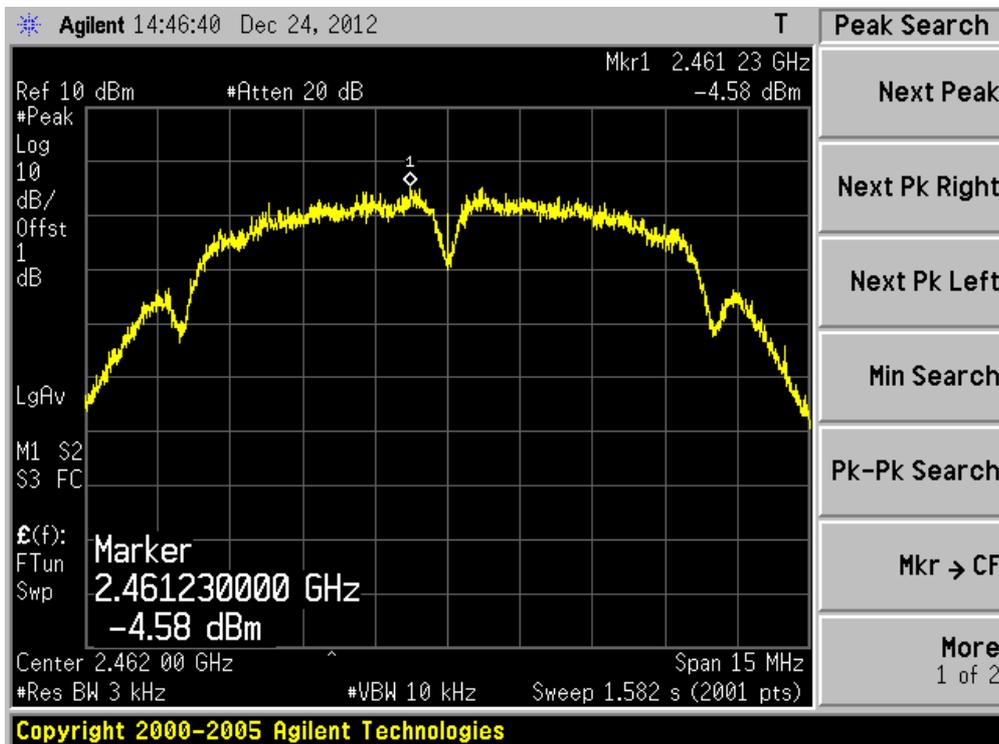
Channel 01 (2412MHz)



Channel 06 (2437MHz)



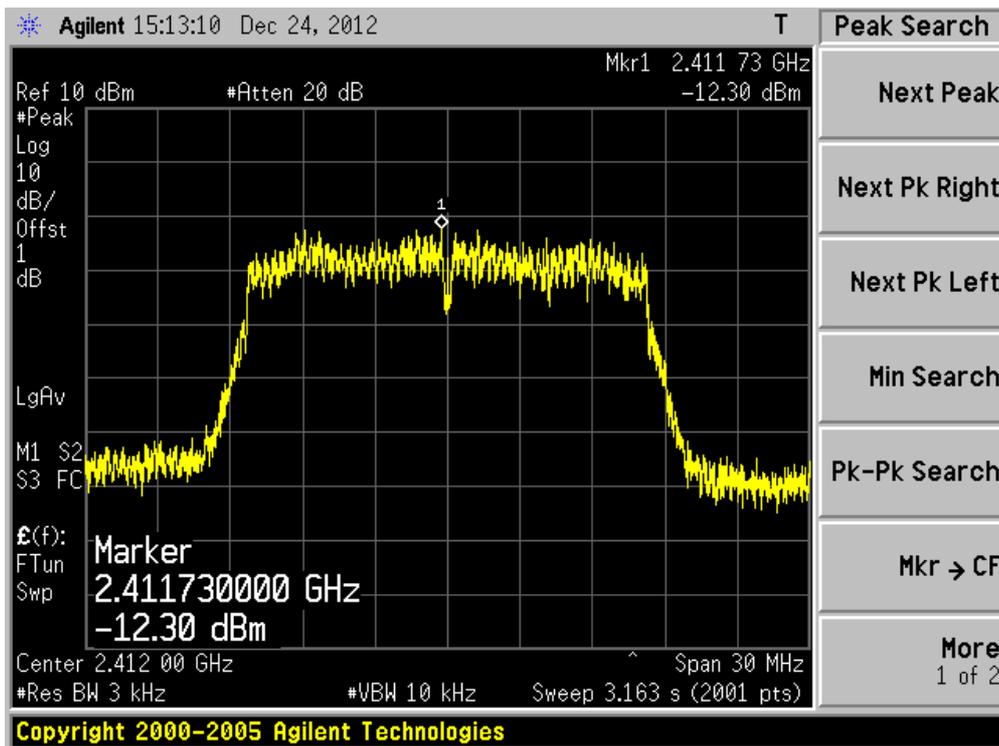
Channel 11 (2462MHz)



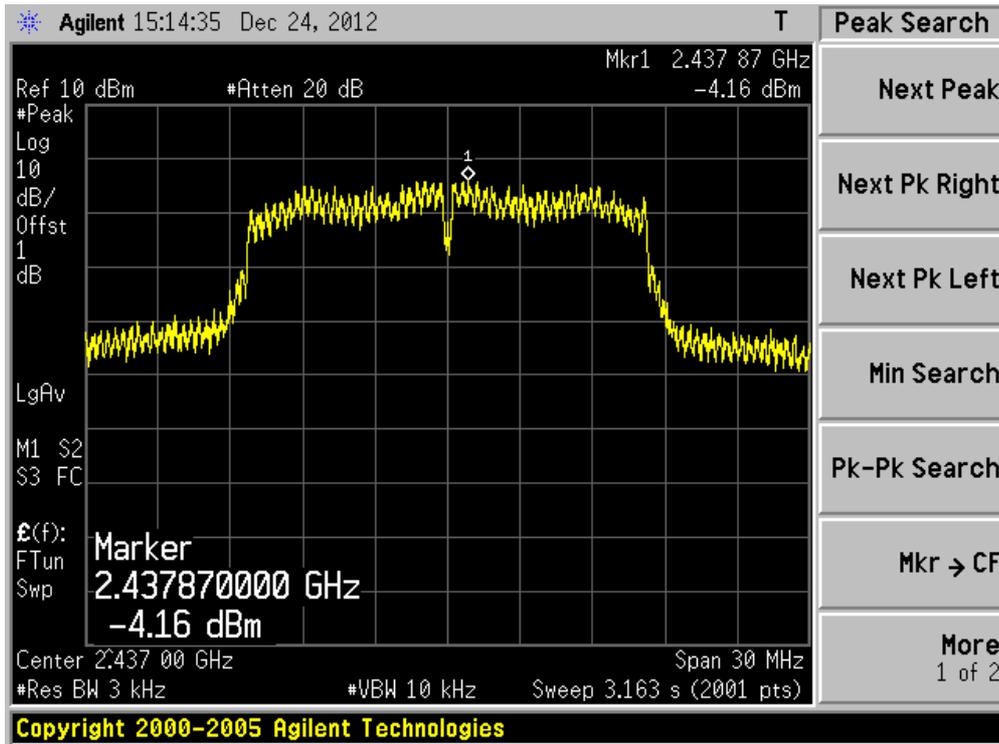
Product	:	xDSL Modem/Router
Test Item	:	Power Spectral Density
Test Site	:	TR-8
Test Mode	:	Mode 2: Transmit by 802.11g (Ant 1+2)

Channel No.	Frequency (MHz)	Reading Value (dBm)		PSD (dBm)	Limit (dBm)	Result
		Ant 1	Ant 2			
01	2412	-12.30	-10.96	-8.57	8	Pass
06	2437	-4.16	-3.87	-1.00	8	Pass
11	2462	-11.82	-12.37	-9.08	8	Pass

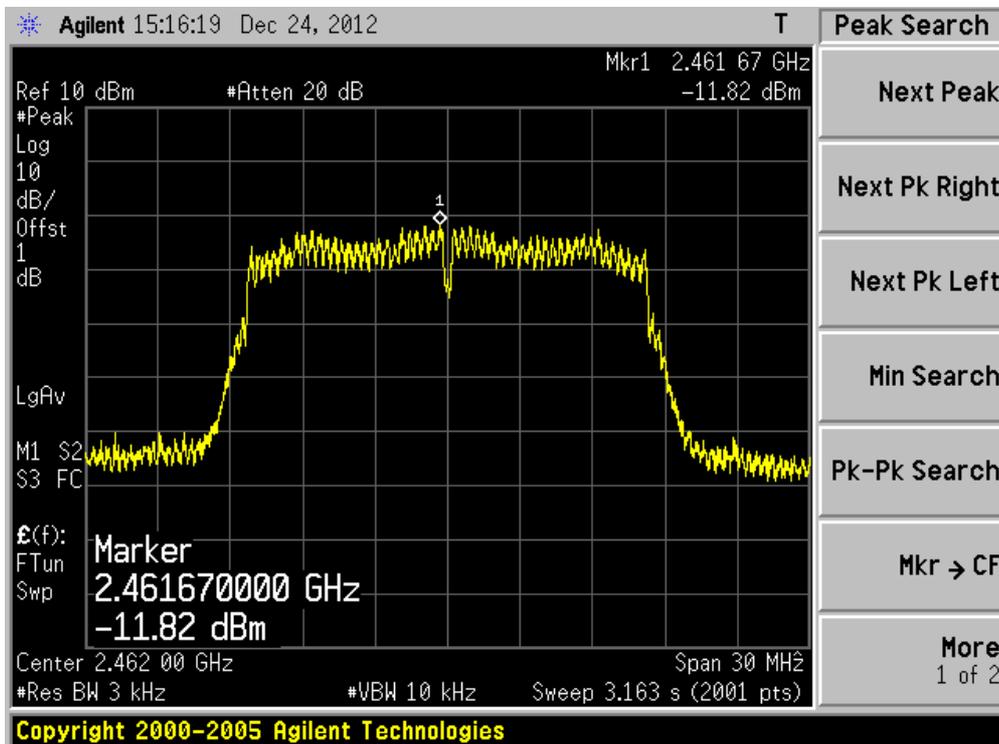
### Channel 01 (2412MHz) ant 1



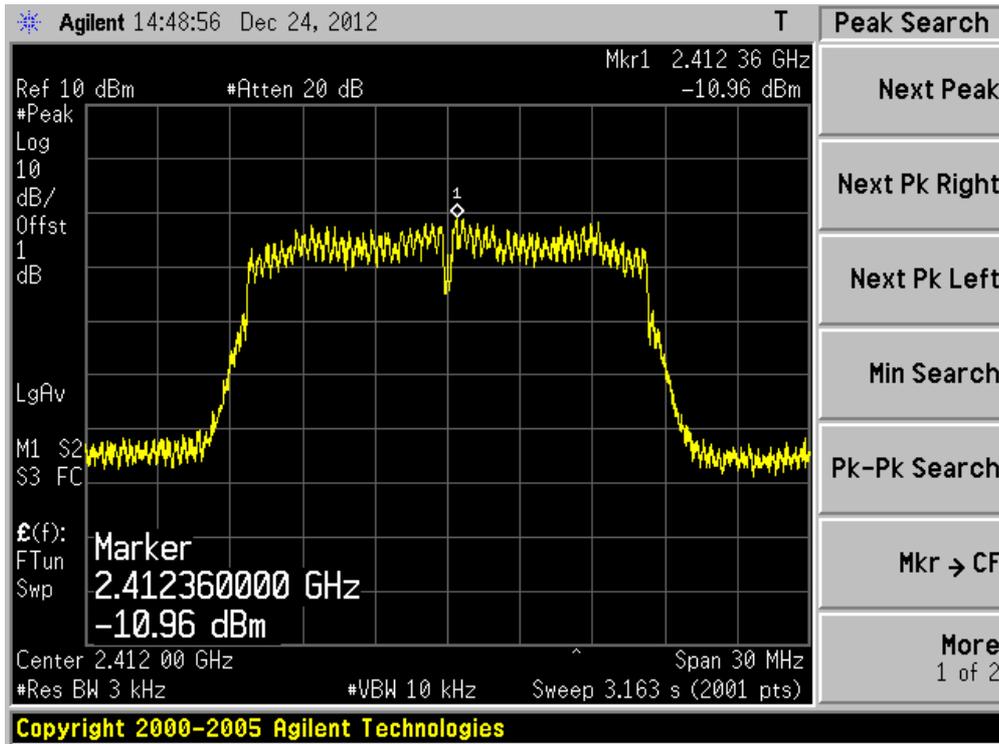
Channel 06 (2437MHz) ant 1



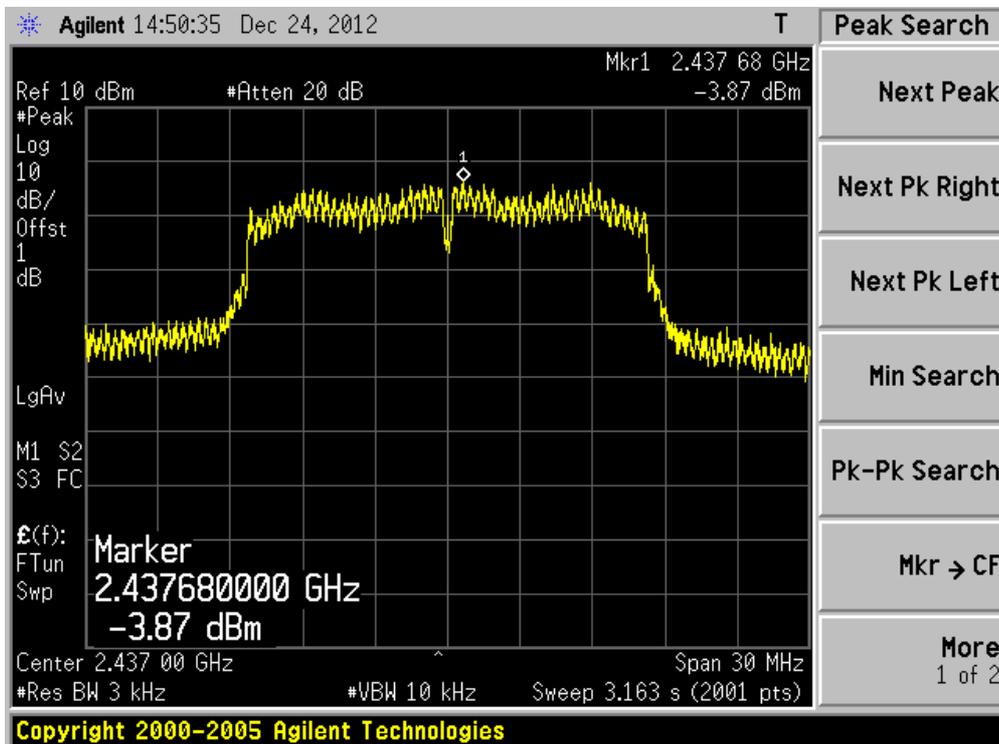
Channel 11 (2462MHz) ant 1



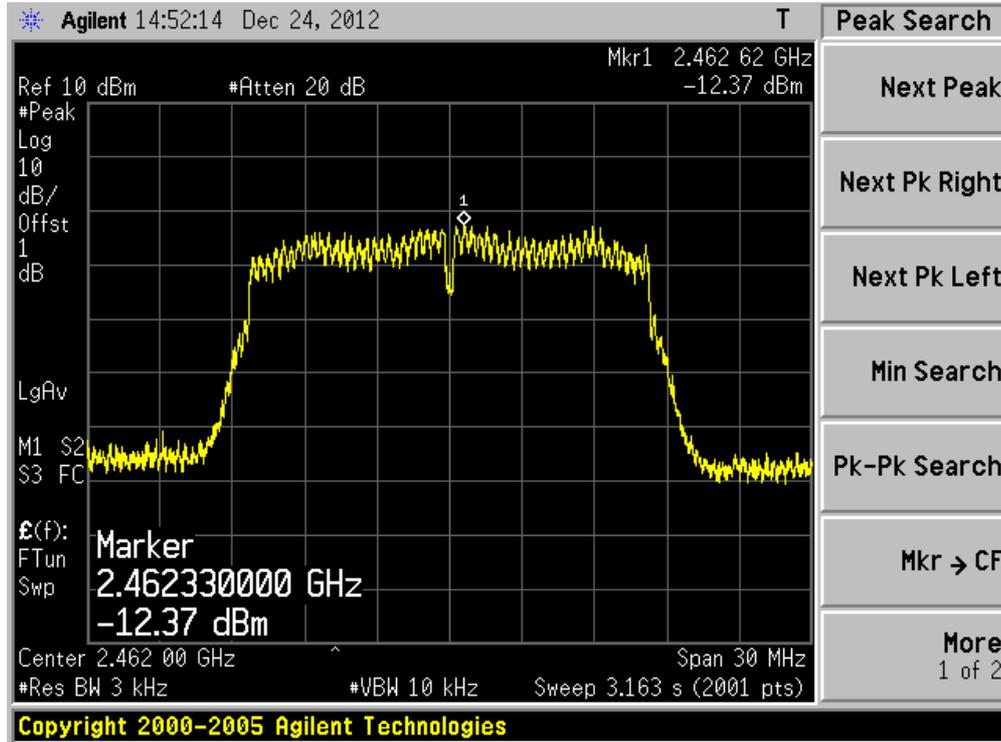
Channel 01 (2412MHz) ant 2



Channel 06 (2437MHz) ant 2



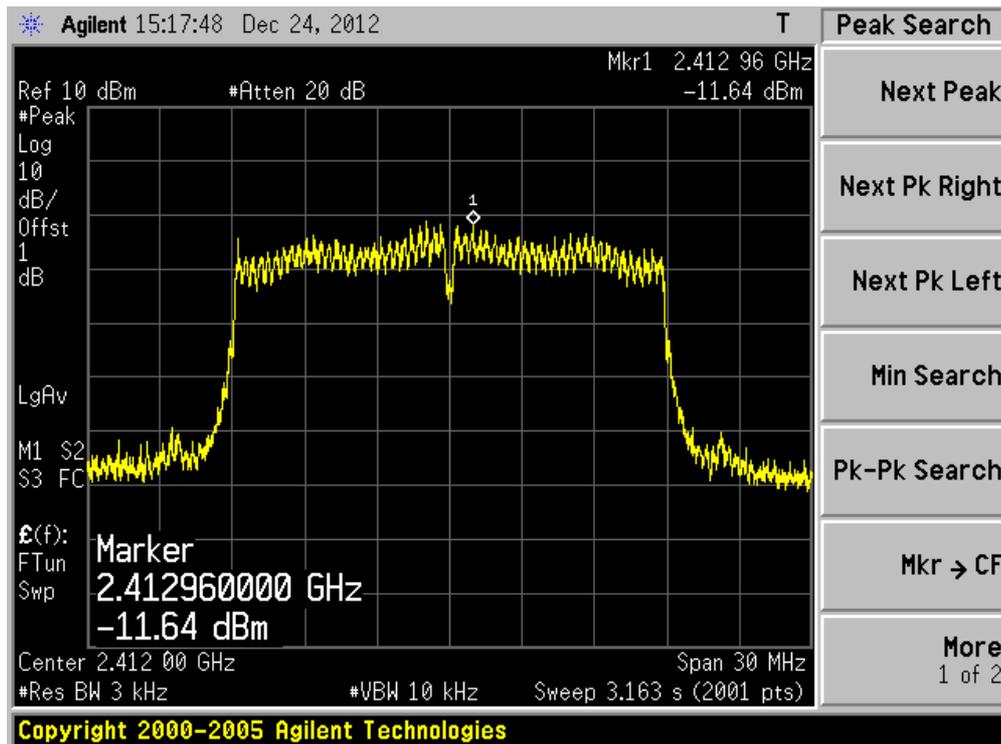
Channel 11 (2462MHz) ant 2



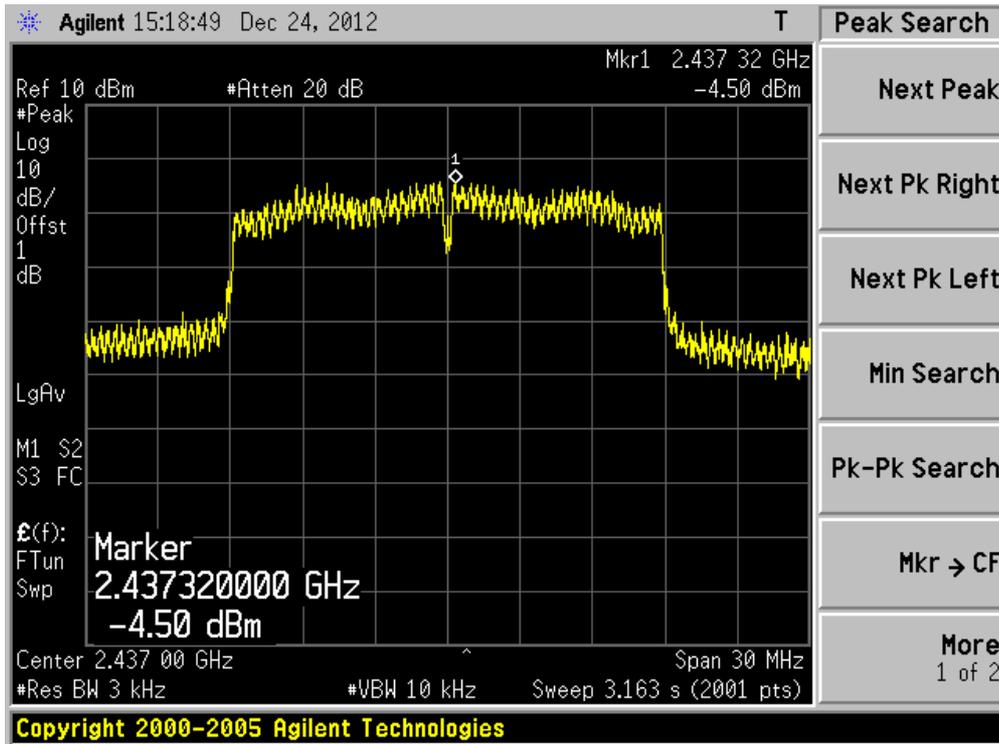
Product	:	xDSL Modem/Router
Test Item	:	Power Spectral Density
Test Site	:	TR-8
Test Mode	:	Mode 3: Transmit by 802.11n (20MHz) (Ant 1+2)

Channel No.	Frequency (MHz)	Reading Value (dBm)		PSD (dBm)	Limit (dBm)	Result
		Ant 1	Ant 2			
01	2412	-11.64	-13.42	-9.43	8	Pass
06	2437	-4.50	-4.04	-1.25	8	Pass
11	2462	-12.37	-13.05	-9.69	8	Pass

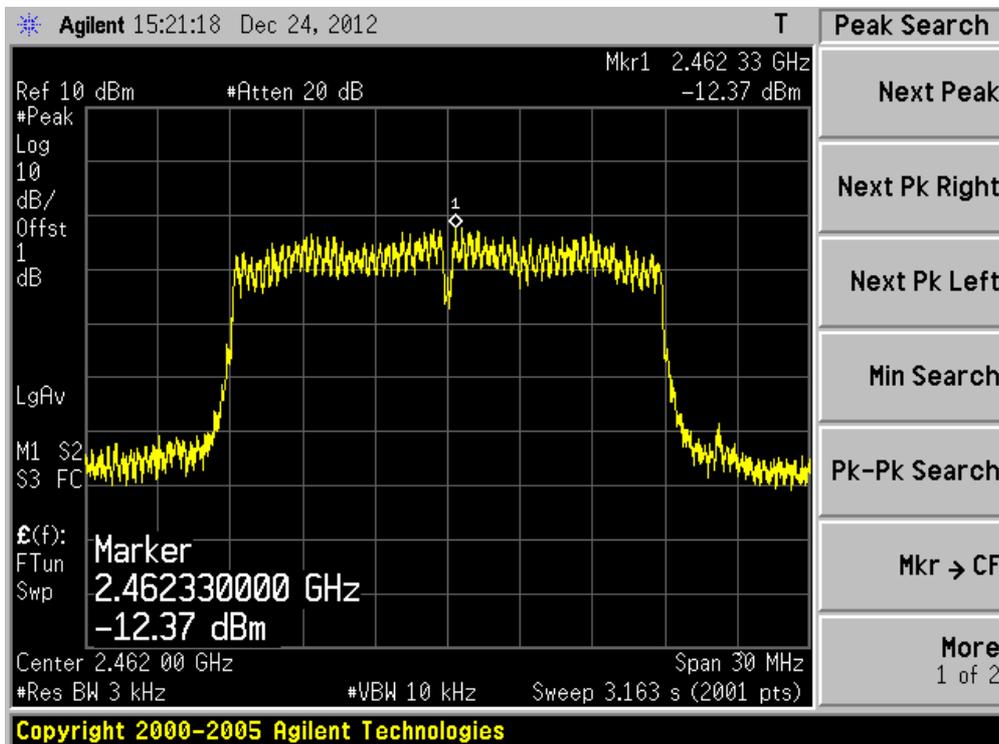
### Channel 01 (2412MHz) ant 1



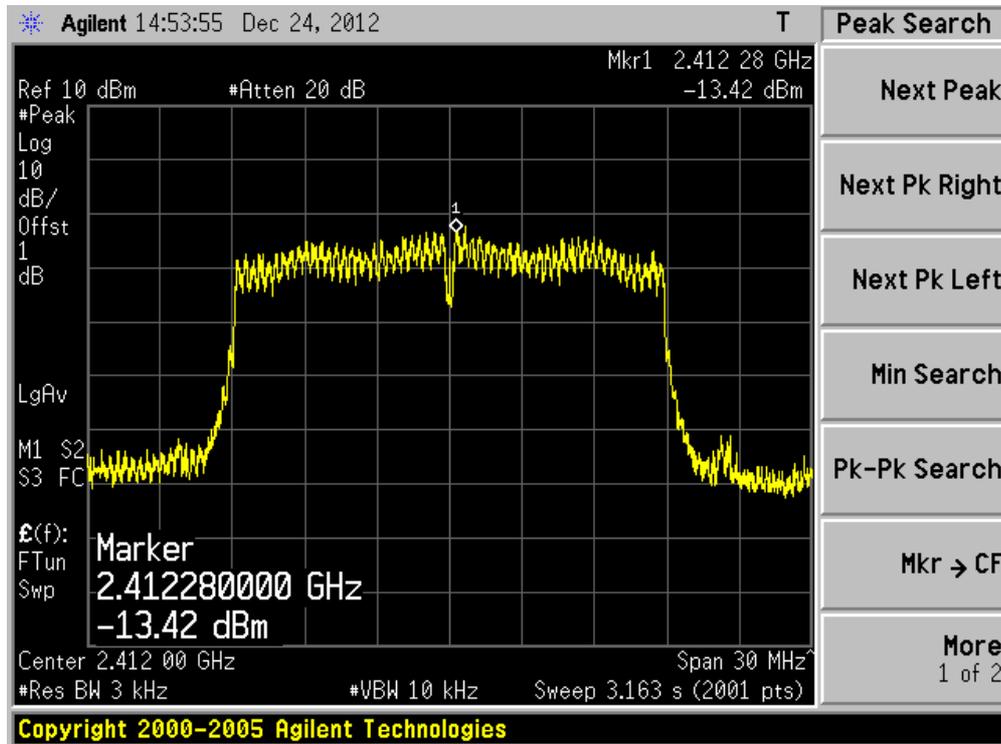
Channel 06 (2437MHz) ant 1



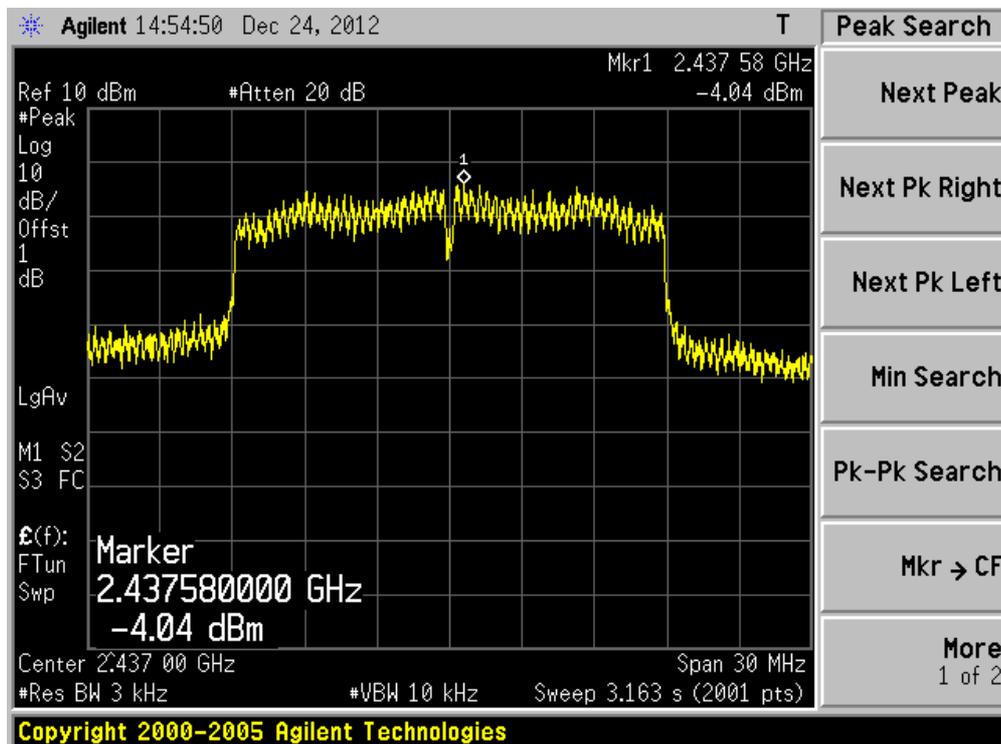
Channel 11 (2462MHz) ant 1



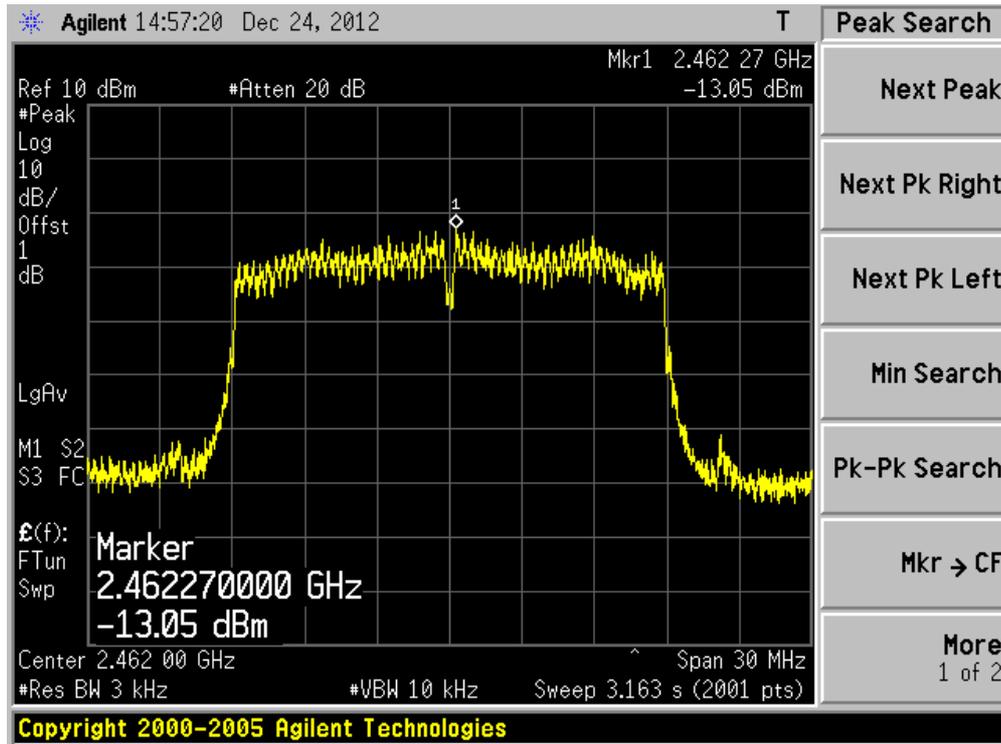
Channel 01 (2412MHz) ant 2



Channel 06 (2437MHz) ant 2



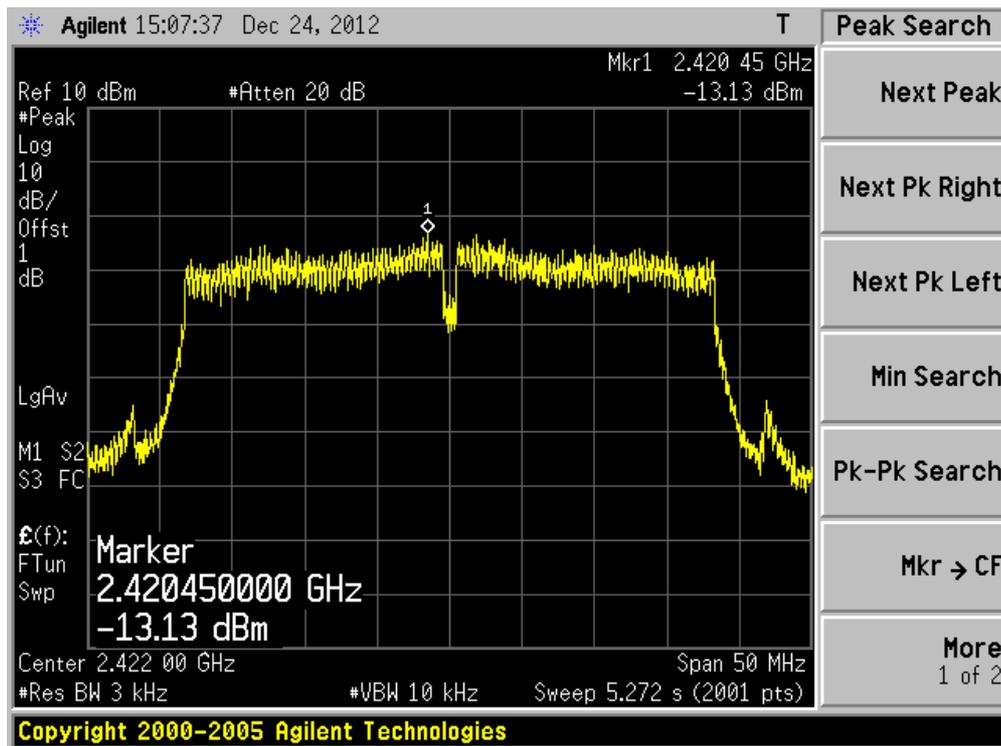
Channel 11 (2462MHz) ant 2



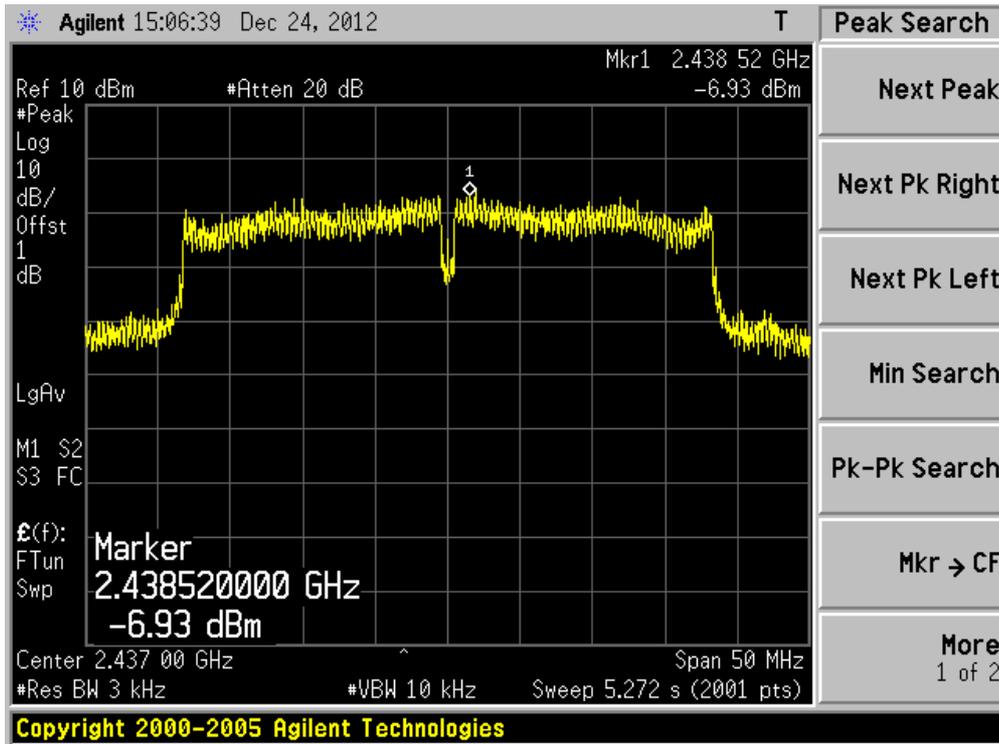
Product	:	xDSL Modem/Router
Test Item	:	Power Spectral Density
Test Site	:	TR-8
Test Mode	:	Mode 4: Transmit by 802.11n (40MHz) (Ant 1+2)

Channel No.	Frequency (MHz)	Reading Value (dBm)		PSD (dBm)	Limit (dBm)	Result
		Ant 1	Ant 2			
01	2412	-13.13	-13.61	-10.35	8	Pass
06	2437	-6.93	-6.55	-3.73	8	Pass
11	2462	-14.17	-16.45	-12.15	8	Pass

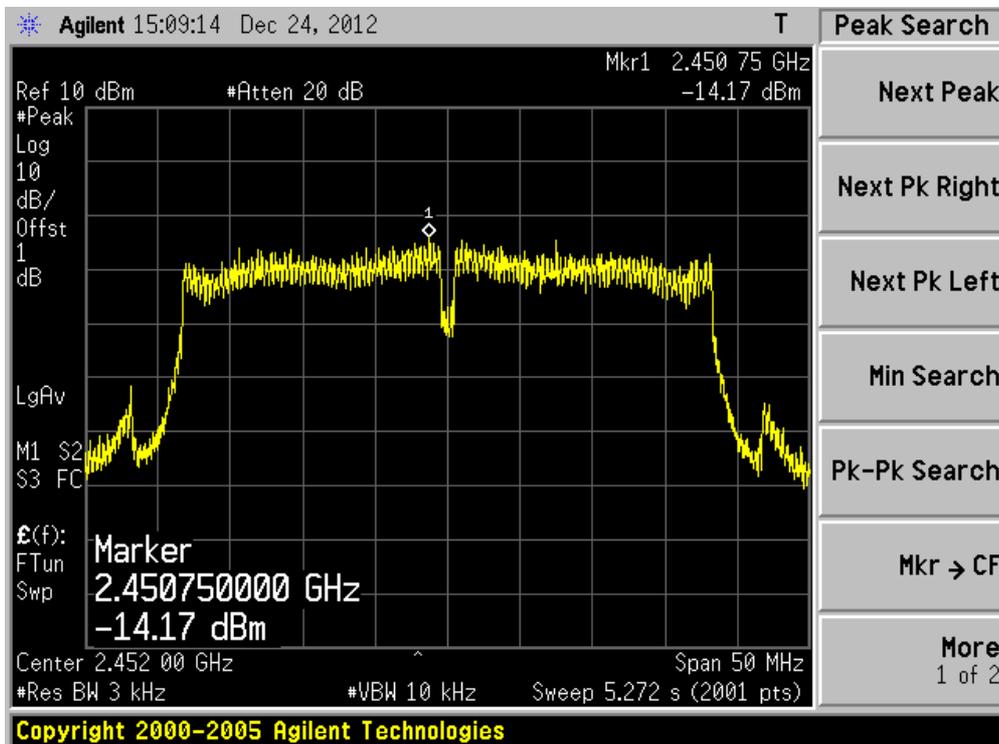
### Channel 01 (2412MHz) ant 1



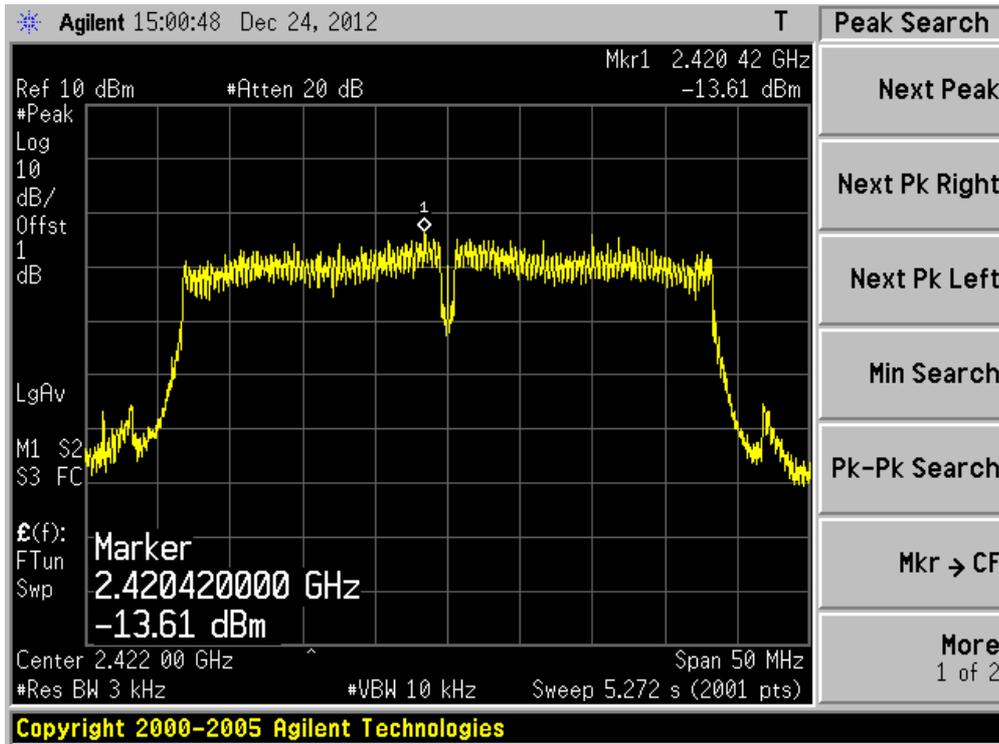
Channel 06 (2437MHz) ant 1



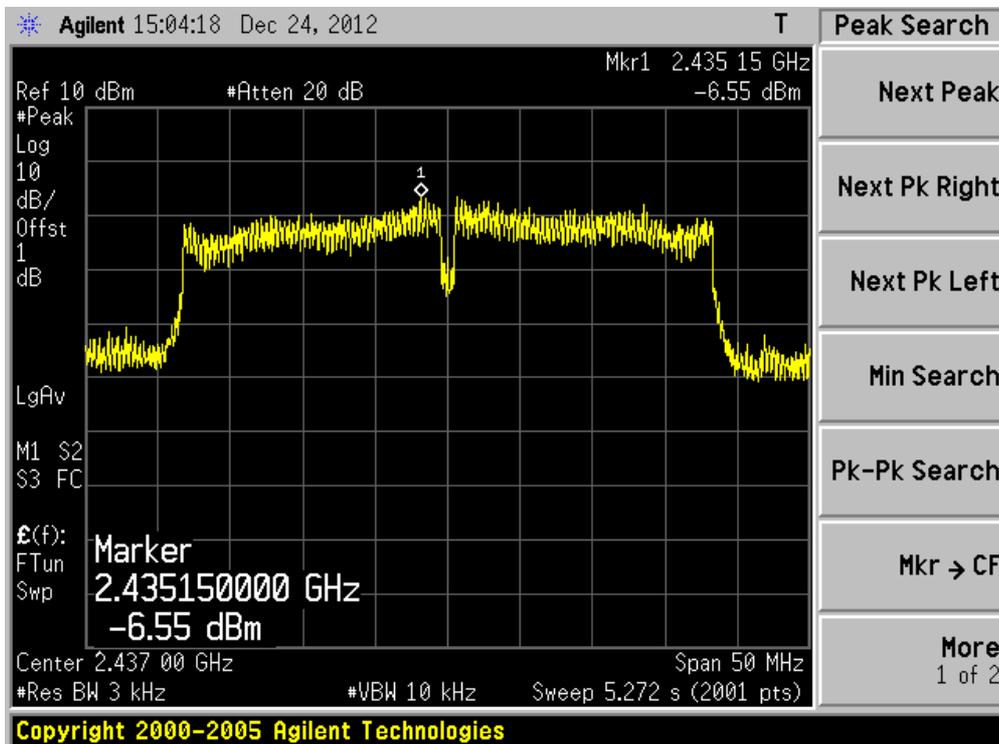
Channel 11 (2462MHz) ant 1



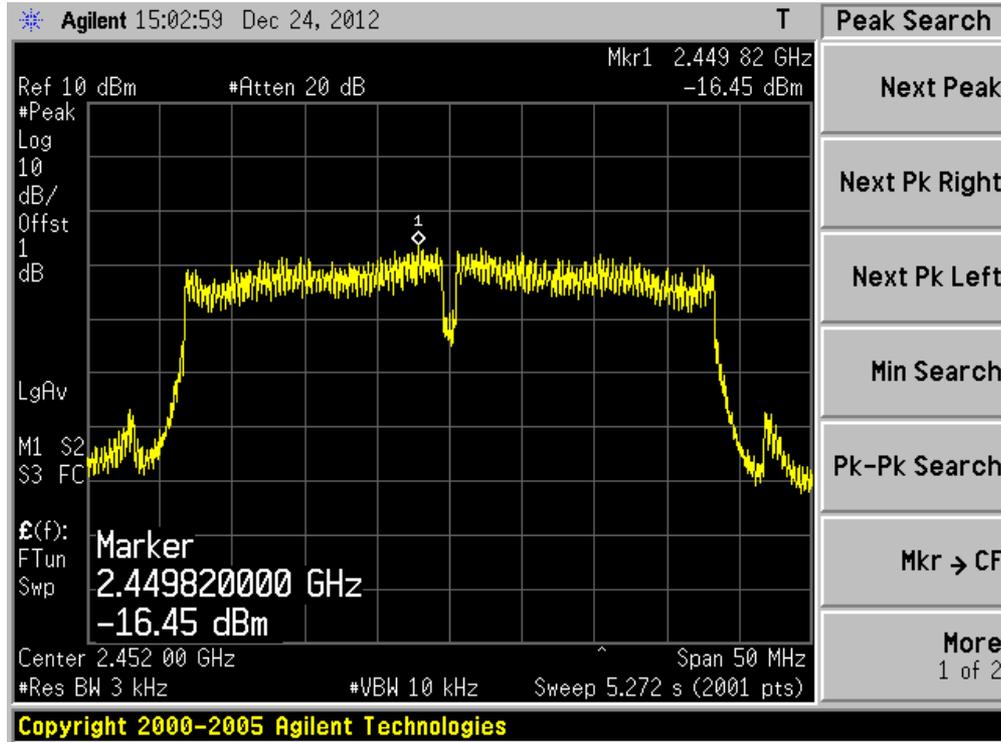
Channel 03 (2422MHz) ant 2



Channel 06 (2437MHz) ant 2



Channel 09 (2452MHz) ant 2



## 11. Receiver Spurious Emission for Industry Canada RSS-Gen Requirement

### 11.1. Test Equipment

#### Radiated Emission / AC-2

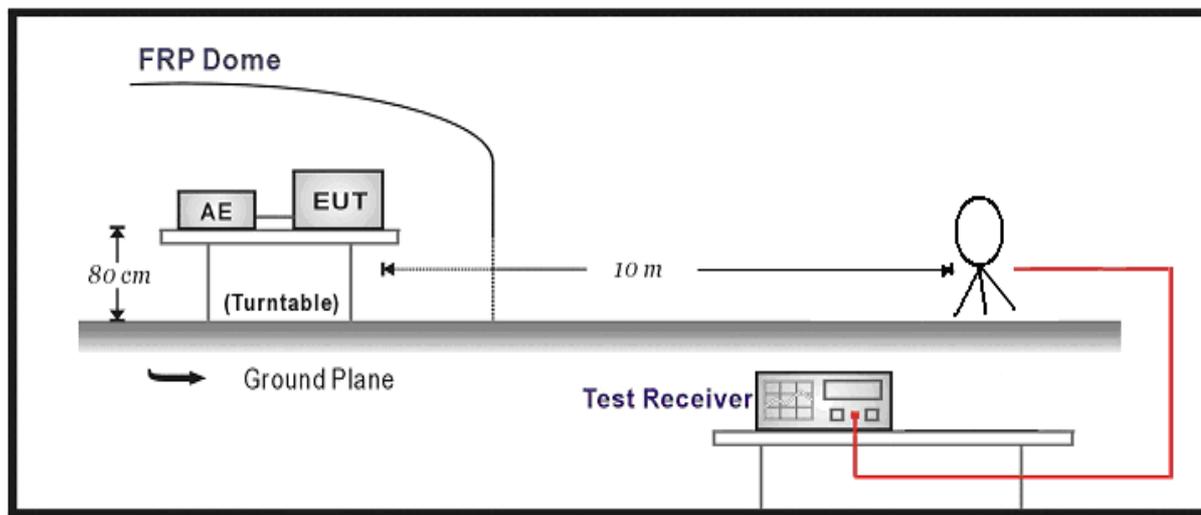
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date
EMI Test Receiver	R&S	ESCI	100573	2013.04.18
Loop Antenna	R&S	HFH2-Z2	833799/003	2013.11.17
Bilog Antenna	Teseq GmbH	CBL6112D	27611	2013.10.15
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC2-C	2013.03.02
Temperature/Humidity Meter	Zhicheng	ZC1-2	AC2-TH	2013.01.10

#### Radiated Emission / AC-5

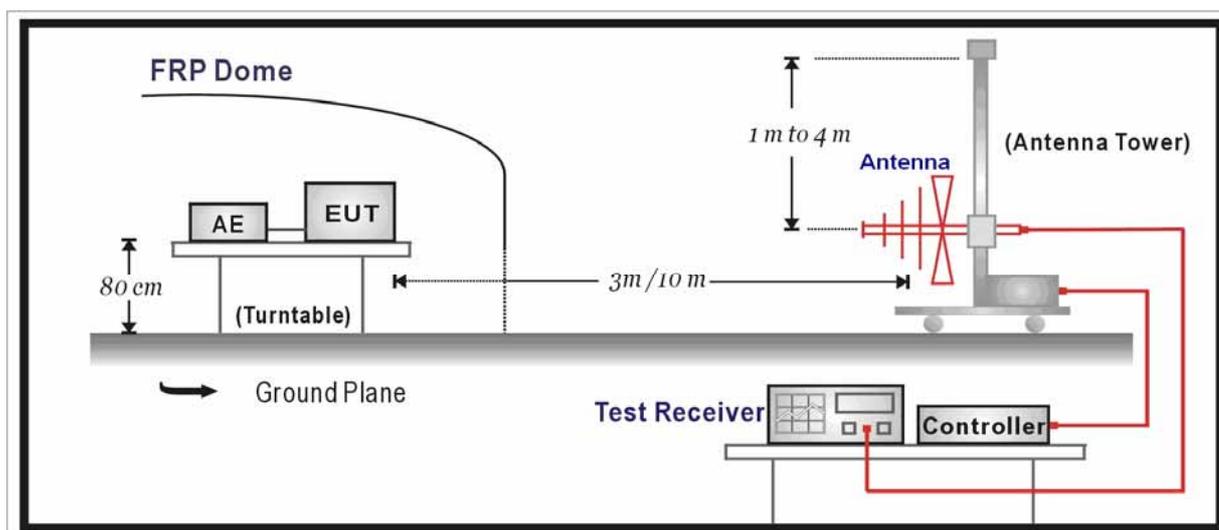
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2013.04.18
Preamplifier	Miteq	NSP1800-25	1364185	2013.05.04
Preamplifier	Quietek	AP-040G	CHM-0906001	2013.05.04
Bilog Antenna	Teseq GmbH	CBL6112D	27612	2013.10.15
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	499	2014.06.08
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	294	2013.11.24
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C1	2013.03.02
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C2	2013.03.02
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	AC5-C3	2013.03.02
Temperature/Humidity Meter	Zhicheng	ZC1-2	AC5-TH	2013.01.10

11.2. Test Setup

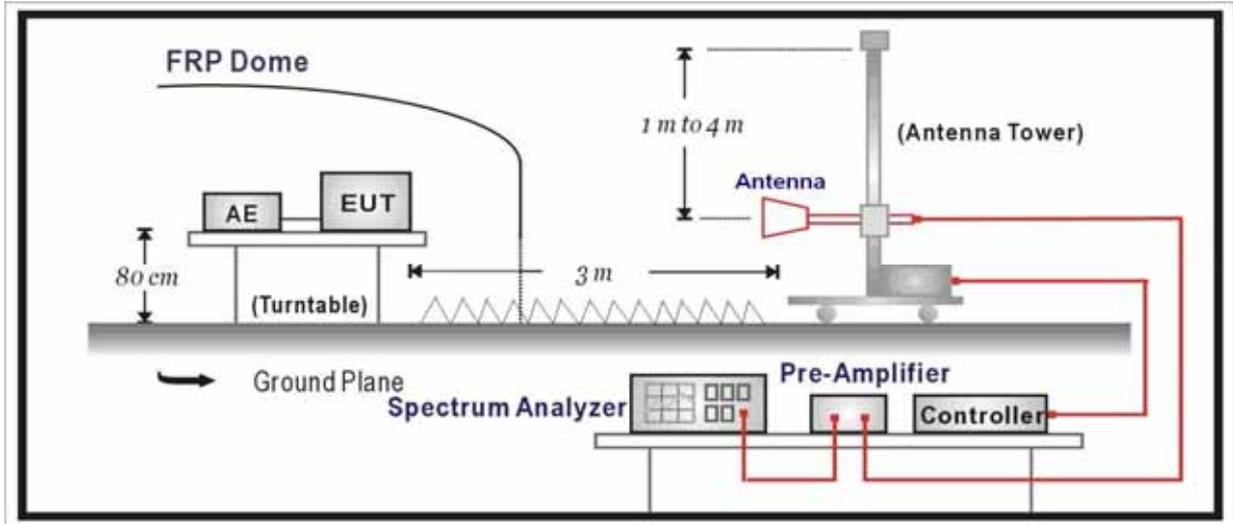
Below 30MHz Test Setup:



Below 1GHz Test Setup:



Above 1GHz Test Setup:



11.3. Limit

FCC Part 15 Subpart B Paragraph 15.109		
Frequency (MHz)	Distance (m)	Level (dBuV/m)
30 - 88	3	40
88 - 216	3	43.5
216 - 960	3	46
Above 960	3	54

Note 1: The lower limit shall apply at the transition frequency.

Note 2: Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

Note 3: E field strength (dBuV/m) = 20 log E field strength (uV/m)

## 11.4. Test Procedure

According to ANSI C63.10: 2009.

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4: 2009 on radiated measurement.

The resolution bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

The frequency range from 9kHz to 10th harmonic is checked.

Note: When doing emission measurement above 1GHz, the horn antenna will be bended down a little (as horn antenna has the narrow beamwidth) in order to keeping the antenna in the "cone of radiation" of EUT. The 3dB beamwidth is 60~10 degrees for H-plane and 90~10 degrees for E-plane.

## 11.5. Uncertainty

The measurement uncertainty above 1G is defined as  $\pm 3.9$  dB

below 1G is defined as  $\pm 3.8$  dB

**11.6. Test Result**

All of the test result shown indicates the worst case, and spectrum analyzer parameters setting as shown below:

Peak detector: RBW = 1MHz, VBW = 3MHz, sweep time = 200ms;

Average detector: RBW = 1MHz, VBW = 10Hz, sweep time = auto.

Measure Level = Reading Level + Cable Loss + Antenna Factor - Preamplifier Gain

Mode 1: Receive by 802.11 b

Ant	CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
Ant2	1	H	286.3	11.5	20.0	31.5	46	-14.5	QP
		V	625.0	7.3	27.3	34.6	46	-11.4	QP
		H	2003.0	56.8	-13.7	43.1	54(Note1)	-10.9	PK
		V	2003.0	55.8	-12.5	43.3	54(Note1)	-10.7	PK
	6	H	282.4	13.0	20.0	33.0	46	-13.0	QP
		V	640.0	8.9	27.4	36.3	46	-9.7	QP
		H	2504.4	57.3	-10.0	47.3	54(Note1)	-6.7	PK
		V	2564.3	58.6	-10.9	47.7	54(Note1)	-6.3	PK
	11	H	375.0	8.2	22.7	30.9	46	-15.1	QP
		V	640.0	8.7	27.4	36.1	46	-9.9	QP
		H	2878.5	59.7	-10.6	49.1	54(Note1)	-4.9	PK
		V	3516.0	55.9	-9.4	46.5	54(Note1)	-7.5	PK

Note1: This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

Mode 2: Receive by 802.11g

Ant	CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
Ant 1+2	1	H	276.3	15.0	19.8	34.8	46	-11.2	QP
		V	640.0	9.0	27.4	36.4	46	-9.6	QP
		H	1246.5	59.0	-17.2	41.8	54(Note1)	-12.2	PK
		V	1280.5	56.6	-16.5	40.1	54(Note1)	-13.9	PK
	6	H	279.9	16.0	20.0	36.0	46	-10.0	QP
		V	640.0	9.4	27.4	36.8	46	-9.2	QP
		H	1501.5	60.5	-16.9	43.6	54(Note1)	-10.4	PK
		V	1501.5	58.4	-17.1	41.3	54(Note1)	-12.7	PK
	11	H	290.2	11.6	20.1	31.7	46	-14.3	QP
		V	640.0	8.7	27.4	36.1	46	-9.9	QP
		H	1748.0	56.6	-12.3	44.3	54(Note1)	-9.7	PK
		V	1603.5	58.2	-15.9	42.3	54(Note1)	-11.7	PK

Note1: This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

Mode 3: Receive by 802.11n (20MHz)

Ant	CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
Ant 1+2	1	H	320.0	10.3	21.2	31.5	46	-14.5	QP
		V	625.0	6.3	27.3	33.6	46	-12.4	QP
		H	2003.0	56.8	-13.7	43.1	54(Note1)	-10.9	PK
		V	2003.0	55.8	-12.5	43.3	54(Note1)	-10.7	PK
	6	H	286.3	11.5	20.0	31.5	46	-14.5	QP
		V	625.0	7.3	27.3	34.6	46	-11.4	QP
		H	2453.5	59.2	-10.3	48.9	54(Note1)	-5.1	PK
		V	2496.0	57.0	-11.0	46.0	54(Note1)	-8.0	PK
	11	H	320.0	10.2	21.2	31.4	46	-14.6	QP
		V	640.0	8.2	27.4	35.6	46	-10.4	QP
		H	2504.5	57.3	-10.0	47.3	54(Note1)	-6.7	PK
		V	2564.0	58.6	-10.9	47.7	54(Note1)	-6.3	PK

Note1: This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

Mode 4: Receive by 802.11n (40MHz)

Ant	CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
Ant 1+2	3	H	282.4	13.0	20.0	33.0	46	-13.0	QP
		V	640.0	8.9	27.4	36.3	46	-9.7	QP
		H	2878.5	59.7	-10.6	49.1	54(Note1)	-4.9	PK
		V	3516.0	55.9	-9.4	46.5	54(Note1)	-7.5	PK
	6	H	282.0	12.7	20.0	32.7	46	-13.3	QP
		V	625.0	5.8	27.3	33.1	46	-12.9	QP
		H	4162.0	53.5	-8.7	44.8	54(Note1)	-9.2	PK
		V	4162.0	54.8	-8.5	46.3	54(Note1)	-7.7	PK
	9	H	375.0	8.2	22.7	30.9	46	-15.1	QP
		V	640.0	8.7	27.4	36.1	46	-9.9	QP
		H	1127.5	57.6	-17.1	40.5	54(Note1)	-13.5	PK
		V	1246.5	57.9	-17.2	40.7	54(Note1)	-13.3	PK

Note1: This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

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