Test Report

FCC Part15 Subpart C

Product Name	:	3G/4G Wireless Router
Model No.	:	MB7900
FCC ID	:	RLI-MB7900

Applicant	:	Bellnet Technologies Co., Ltd
Address	:	51 Zhujiang Road, New District, Wuxi, China

Date of Receipt	:	24/11/2012
Test Date	:	24/11/2012~21/12/2012
Issued Date	:	28/12/2012
Report No.	:	12CS048R-RF-US-P05V01
Report Version	:	V1.2

Test Report Certification

Issued Date : 28/12/2012
Report No. : 12CS048R-RF-US-P05V01

QuieTek

Product Name	:	3G/4G Wireless Router
Applicant	:	Bellnet Technologies Co., Ltd
Address	:	51 Zhujiang Road, New District, Wuxi, China
Manufacturer	:	Bellnet Technologies Co., Ltd
Address	:	51 Zhujiang Road, New District, Wuxi, China
Model No.	:	MB7900
FCC ID	:	RLI-MB7900
EUT Voltage	:	DC 12V
Brand Name	:	BELLNET
Applicable Standard	:	FCC CFR Title 47 Part 15 Subpart C: 2012 ANSI C63.4: 2009; ANSI C63.10: 2009
Test Result	:	Complied
Performed Location	:	Suzhou EMC Laboratory No.99 Hongye Rd., Suzhou Industrial Park Loufeng Hi-Tech Development Zone., Suzhou, China TEL: +86-512-6251-5088 / FAX: +86-512-6251-5098 FCC Registration Number: 800392

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Laboratory Information

We, **QuieTek Corporation**, are an independent EMC and safety consultancy that was established the whole facility in our laboratories. The test facility has been accredited/accepted(audited or listed) by the following related bodies in compliance with ISO 17025, EN 45001 and specified testing scope:

Taiwan R.O.C.	**:**	**BSMI, NCC, TAF**
Germany	**:**	**TUV Rheinland**
Norway	**:**	**Nemko, DNV**
USA	**:**	**FCC, NVLAP**
Japan	**:**	**VCCI**
China	**:**	**CNAS**

The related certificate for our laboratories about the test site and management system can be downloaded from QuieTek Corporation's Web Site :http://www.quietek.com/tw/ctg/cts/accreditations.htm
The address and introduction of QuieTek Corporation's laboratories can be founded in our Web site : http://www.quietek.com/
If you have any comments, Please don't hesitate to contact us. Our contact information is as below:

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1. General Information

1.1. EUT Description

Product Name	3G/4G Wireless Router
Brand Name	BELLNET
Model No.	MB7900
EUT Voltage	DC 12V
Frequency Range	802.11b/g: 2412~2462MHz
Channel Number	802.11b/g: 11
Type of Modulation	802.11b: DSSS
	802.11g: OFDM
Data Rate	802.11b: 1/2/5.5/11 Mbps
	802.11g: 6/9/12/18/24/36/48/54 Mbps
Channel Control	Auto
Antenna Delivery	1*Tx+1*Rx
Antenna Type	Reference to Antenna List
Peak Antenna Gain	2dBi

Channel list

802.11b/g 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

WLAN Antenna List

Antenna	Manufacturer	Peak Gain
Monopole antenna	Honglin Tech	2.4GHz: 2dBi

Parameter Value of the software

Test Mode	Test channel	Parameter Value
802.11b	2412 MHz	54
	2437 MHz	54
	2462 MHz	54
802.11g	2412 MHz	54
	2437 MHz	54
	2462 MHz	54

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

Note:

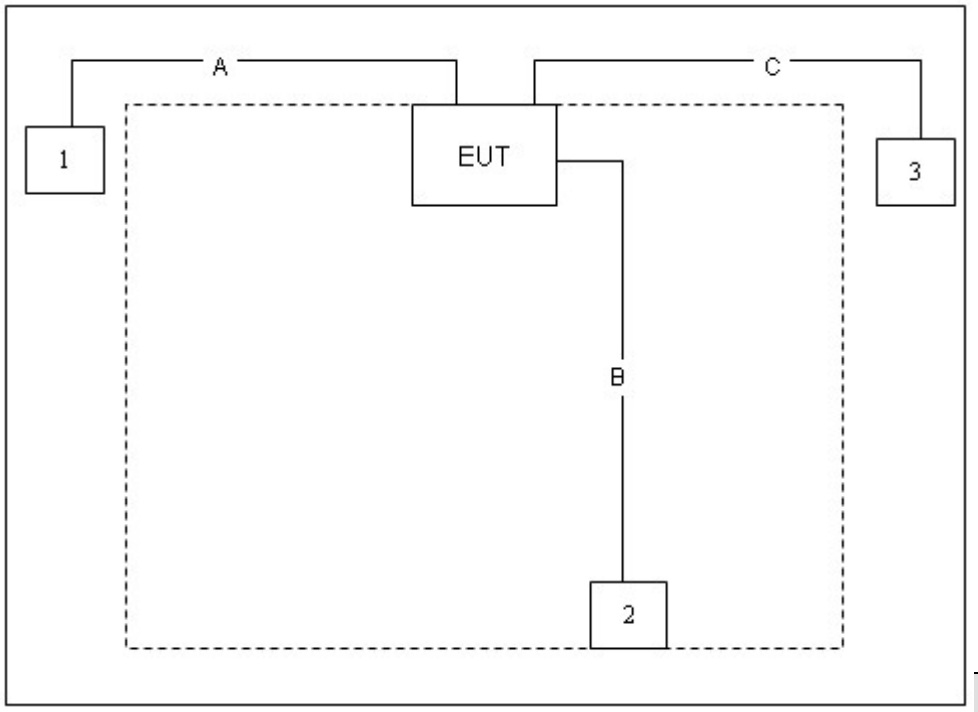
1. Regards to the frequency band operation: the lowest、middle and highest frequency of channel were selected to perform the test, then shown on this report.
2. This device is a composite device in accordance with Part 15 Subpart B regulations. The function for the receiver was measured and made a test report that the report number is 12CS048R-RFUSP01V02.

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	ASUS	N80V	8BN0AS226971468	Non-Shielded, 1.5m
2	iPod	Apple	A1199	7J7307E8VQ5	Power by PC
3	Notebook	DELL	E520	N/A	Non-Shielded, 1.8m

1.4. Configuration of Tested System

Connection Diagram		
		
Signal Cab		
A	LAN Cable	Shielded, >10m
B	USB Cable	Shielded, 1.0m
C	LAN Cable	Shielded, >10m

1.5. EUT Exercise Software

1	Setup the EUT and simulators as shown on above.
2	Turn on the power of equipment.
3	Run the RF test software “MB7900 GUI package”, and set the test mode and channel, then press OK to start continue transmit or receive.

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

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

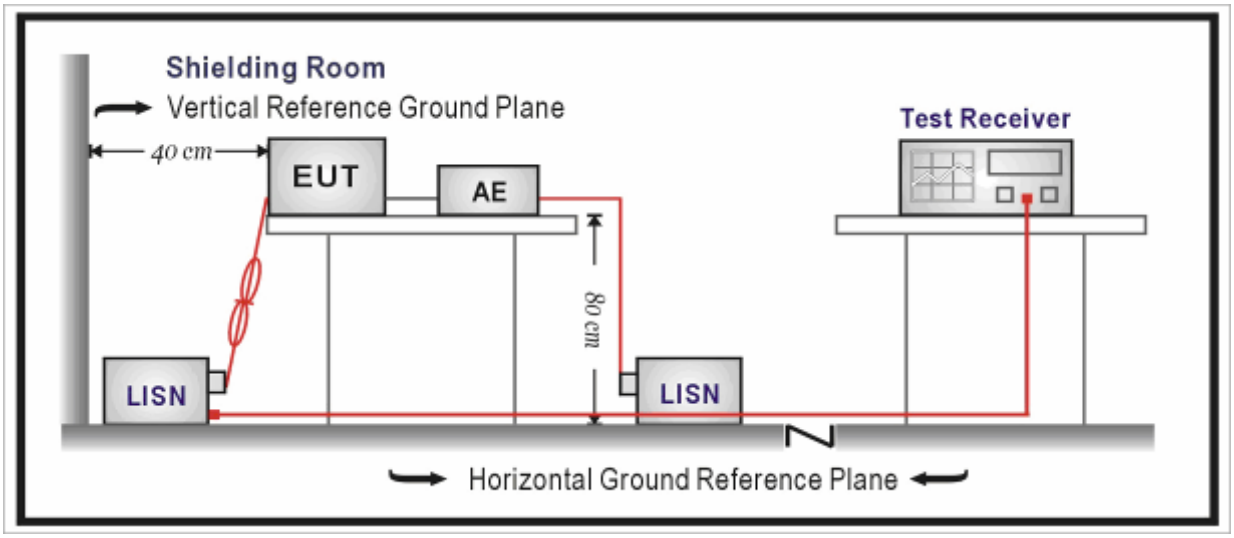
3.1. Test Equipment

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	101044	2013.09.17
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.

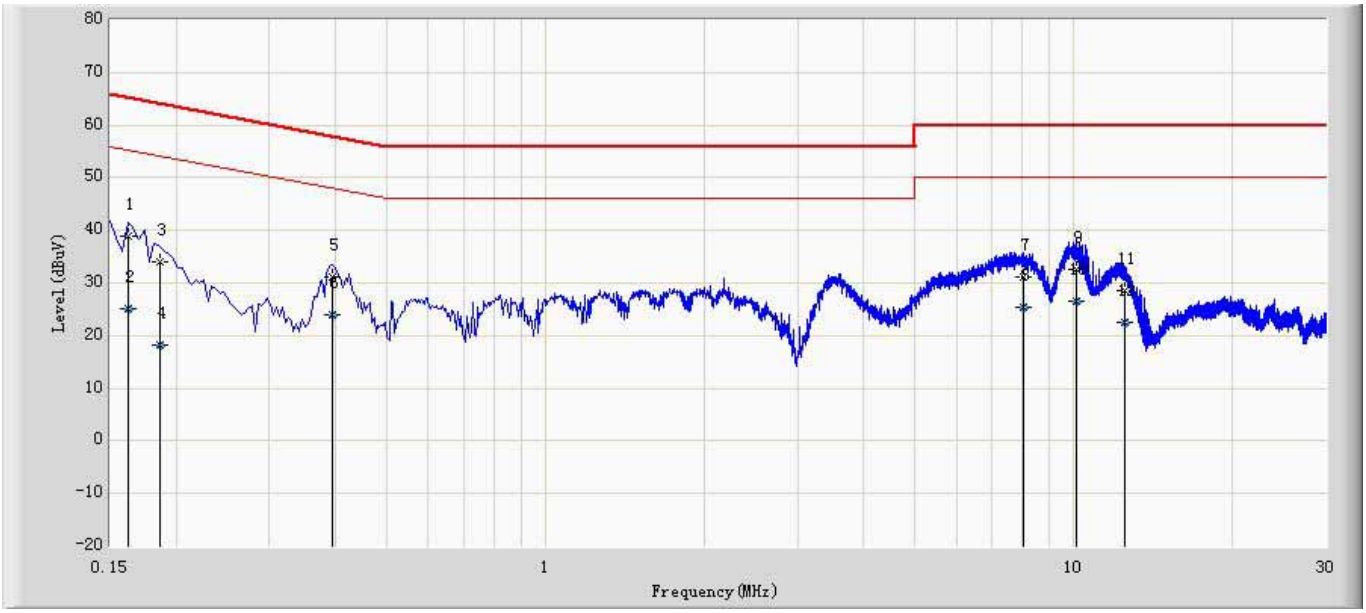
Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.

3.5. Uncertainty

The measurement uncertainty is defined as ± 2.02 dB

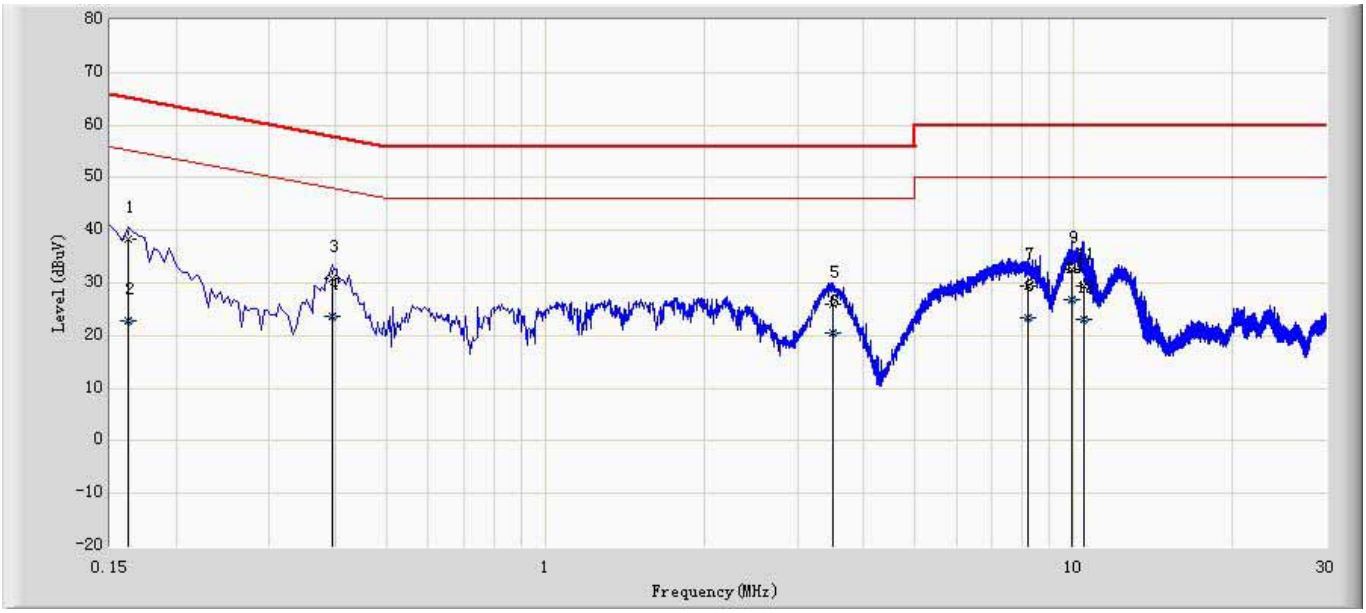
3.6. Test Result

Engineer: emin	
Site: TR1	Time: 2012/12/21 - 12:54
Limit: FCC_Part15.107_CE_AC Power_ClassB	Margin: 0
Probe: ENV216_101044(0.009-30MHz)	Polarity: Line
EUT: 3G/4G Wireless Router	Power: AC 120V/60Hz
Note: Mode 1	



No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1		0.162	38.916	29.069	-26.445	65.361	9.847	QP
2		0.162	25.227	15.380	-30.134	55.361	9.847	AV
3		0.186	33.991	24.134	-30.222	64.213	9.857	QP
4		0.186	18.230	8.373	-35.983	54.213	9.857	AV
5		0.394	31.076	21.188	-26.903	57.979	9.888	QP
6		0.394	23.929	14.041	-24.050	47.979	9.888	AV
7		8.018	31.247	21.297	-28.753	60.000	9.950	QP
8		8.018	25.477	15.527	-24.523	50.000	9.950	AV
9		10.126	32.535	22.534	-27.465	60.000	10.001	QP
10	*	10.126	26.624	16.623	-23.376	50.000	10.001	AV
11		12.514	28.588	18.513	-31.412	60.000	10.075	QP
12		12.514	22.659	12.584	-27.341	50.000	10.075	AV

Engineer: emin	
Site: TR1	Time: 2012/12/21 - 12:59
Limit: FCC_Part15.107_CE_AC Power_ClassB	Margin: 0
Probe: ENV216_101044(0.009-30MHz)	Polarity: Neutral
EUT: 3G/4G Wireless Router	Power: AC 120V/60Hz
Note: Mode 1	



No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1		0.162	38.198	28.213	-27.162	65.361	9.986	QP
2		0.162	22.727	12.742	-32.634	55.361	9.986	AV
3		0.394	30.762	20.764	-27.217	57.979	9.999	QP
4		0.394	23.808	13.810	-24.171	47.979	9.999	AV
5		3.490	26.079	16.054	-29.921	56.000	10.025	QP
6		3.490	20.467	10.442	-25.533	46.000	10.025	AV
7		8.174	29.392	19.097	-30.608	60.000	10.295	QP
8		8.174	23.288	12.993	-26.712	50.000	10.295	AV
9		9.918	32.470	22.093	-27.530	60.000	10.377	QP
10	*	9.918	26.869	16.492	-23.131	50.000	10.377	AV
11		10.446	29.286	18.924	-30.714	60.000	10.362	QP
12		10.446	22.982	12.620	-27.018	50.000	10.362	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	2013.11.22
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

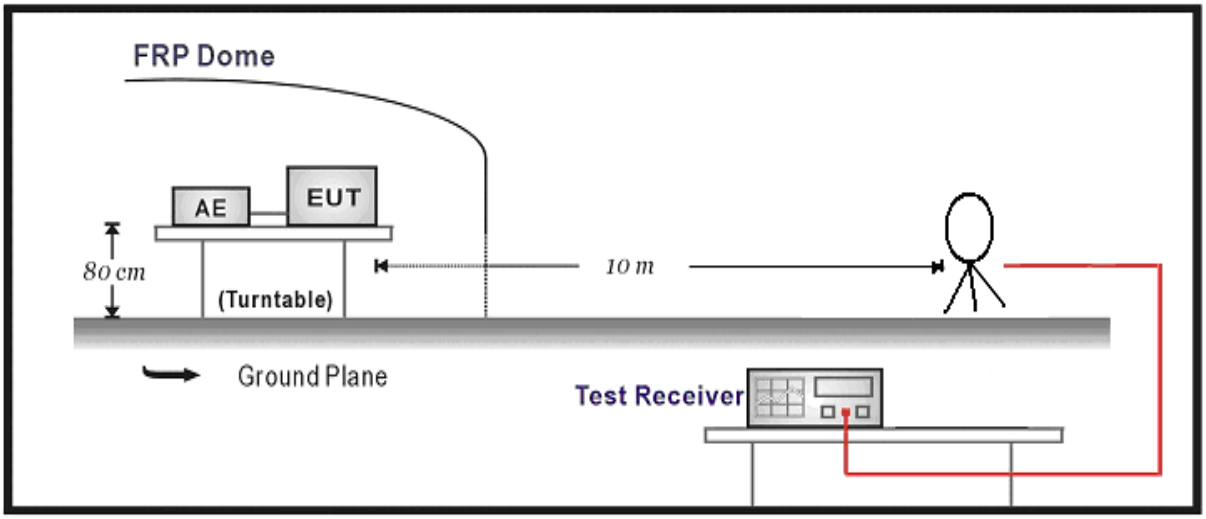
Radiated Emission / AC-5

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

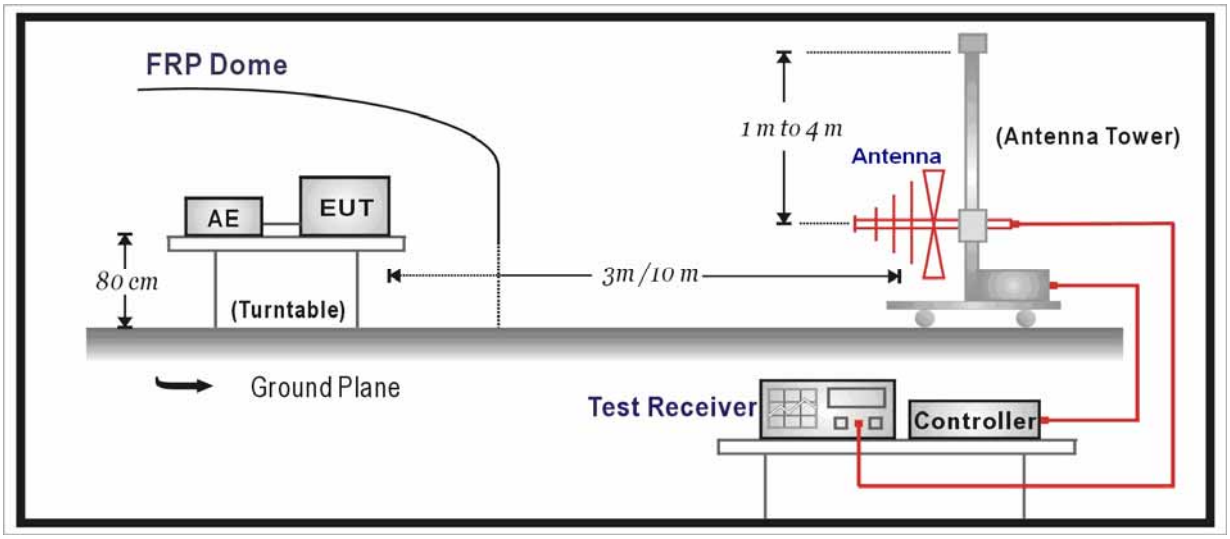
Note 1: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

4.2. Test Setup

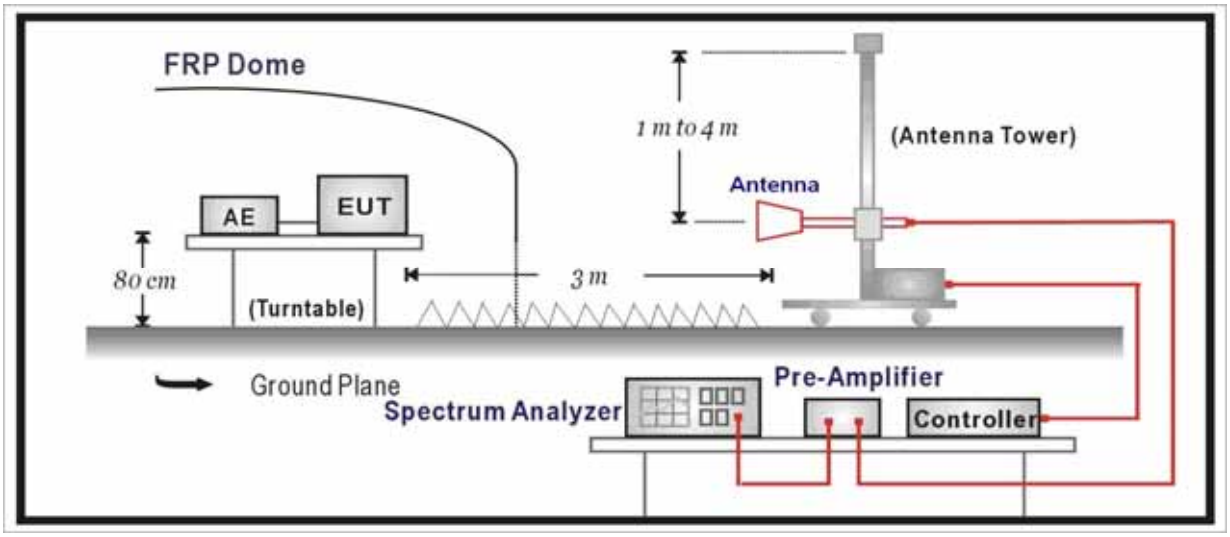
Below 30MHz Test Setup:



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 ± 3.9 dB

below 1G is defined as ± 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 by 802.11b

CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	V	2412.0	74.6	35.8	110.4	Fundamental	/	PK
	H	385.9	19.9	23.0	42.9	46.0	-3.1	QP
	H	480.0	15.6	25.2	40.8	46.0	-5.2	QP
	V	3200.0	50.4	-13.4	37.0	54(note3)	-17.0	PK
	V	4824.0	49.7	-7.7	42.0	54(note3)	-12.0	PK
	V	7236.0	45.7	-3.0	42.7	54(note3)	-11.3	PK
	H	24000.0	59.1	-8.9	50.2	54(note3)	-3.8	PK
6	V	2437.0	70.9	36.0	106.9	Fundamental	/	PK
	H	383.9	19.6	23.0	42.6	46.0	-3.4	QP
	H	480.0	16.5	25.2	41.7	46.0	-4.3	QP
	V	3200	50.3	-13.4	36.9	54(note3)	-17.1	PK
	V	4874.0	48.5	-7.6	40.9	54(note3)	-13.1	PK
	V	7311.0	46.3	-2.9	43.4	54(note3)	-10.6	PK
	H	24000.0	59.1	-8.9	50.2	54(note3)	-3.8	PK
11	V	2462.0	72.4	30.5	102.9	Fundamental	/	PK
	H	383.9	19.9	23.0	42.9	46.0	-3.1	QP
	H	480.1	15.5	25.2	40.7	46.0	-5.3	QP
	V	3200	50.0	-13.4	36.6	54(note3)	-17.4	PK
	V	4927.0	58.0	-7.6	50.4	54(note3)	-3.6	PK
	V	7386.0	46.6	-2.7	43.9	54(note3)	-10.1	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 by 802.11g

CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	V	2411.7	59.3	36.5	95.8	Fundamental	/	PK
	H	384.1	18.7	23.0	41.7	46.0	-4.3	QP
	H	480.0	17.0	25.2	42.2	46.0	-3.8	QP
	V	3200	50.0	-13.4	36.6	54(note3)	-17.4	PK
	V	4824.0	49.2	-7.6	41.6	54(note3)	-12.4	PK
	V	7236.0	45.4	-3.0	42.4	54(note3)	-11.6	PK
	H	24000.0	59.1	-8.9	50.2	54(note3)	-3.8	PK
6	V	2437.0	72.0	31.2	103.2	Fundamental	/	PK
	H	360.0	19.2	22.3	41.5	46.0	-4.5	QP
	H	480.0	17.3	25.2	42.5	46.0	-3.5	QP
	V	3200	49.9	-13.4	36.5	54(note3)	-17.5	PK
	V	4874.0	51.2	-7.6	43.6	54(note3)	-10.4	PK
	V	7311.0	45.1	-2.9	42.2	54(note3)	-11.8	PK
	H	24000.0	59.1	-8.9	50.2	54(note3)	-3.8	PK
11	V	2461.5	68.8	36.0	104.8	Fundamental	/	PK
	H	384.1	17.9	23.0	40.9	46.0	-5.1	QP
	H	480.0	14.7	25.2	39.9	46.0	-6.1	QP
	V	3200	50.2	-13.4	36.8	54(note3)	-17.2	PK
	V	4924.0	51.4	-7.6	43.8	54(note3)	-10.2	PK
	V	7386.0	44.8	-2.7	42.1	54(note3)	-11.9	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

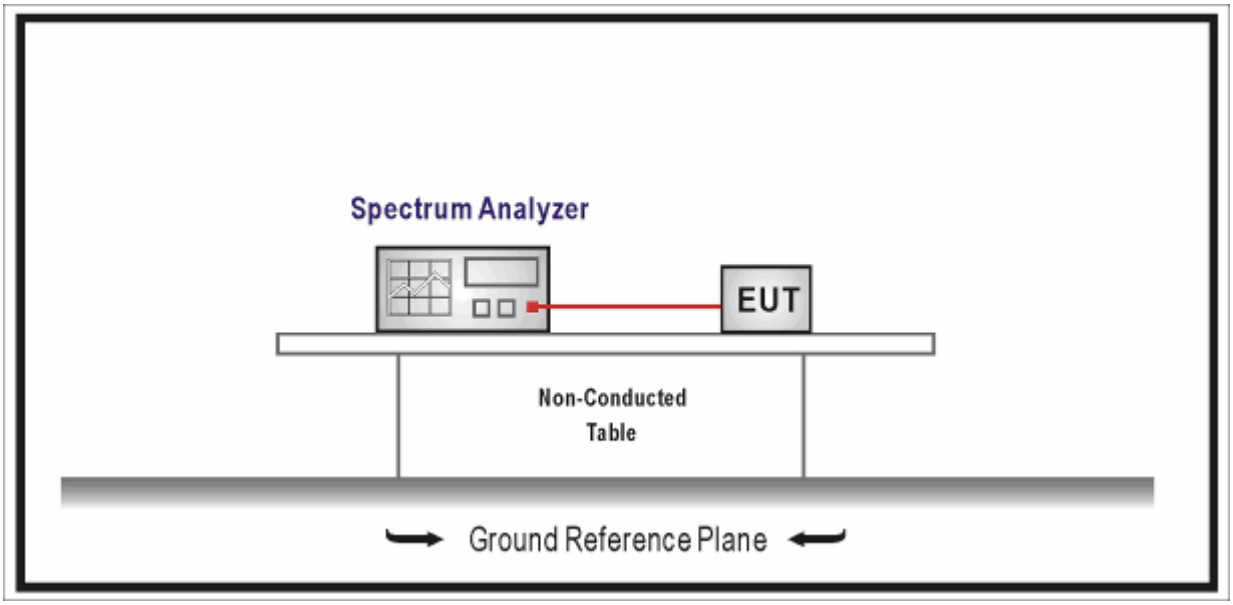
5.1. Test Equipment

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.

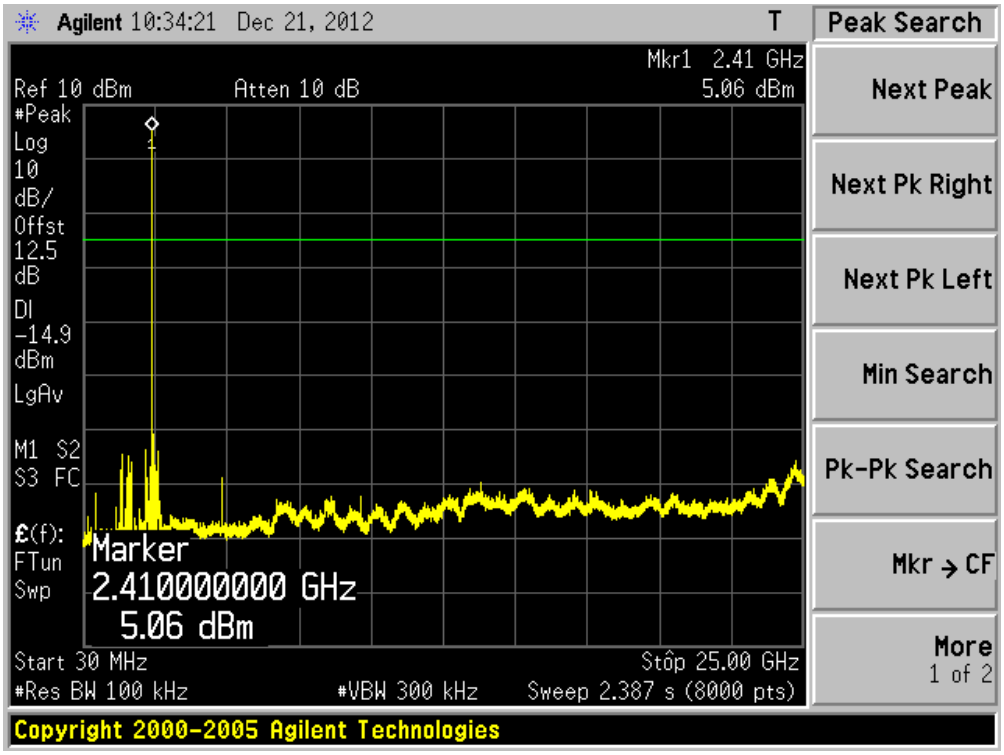
5.5. Uncertainty

The measurement uncertainty is defined as ± 1.27 dB

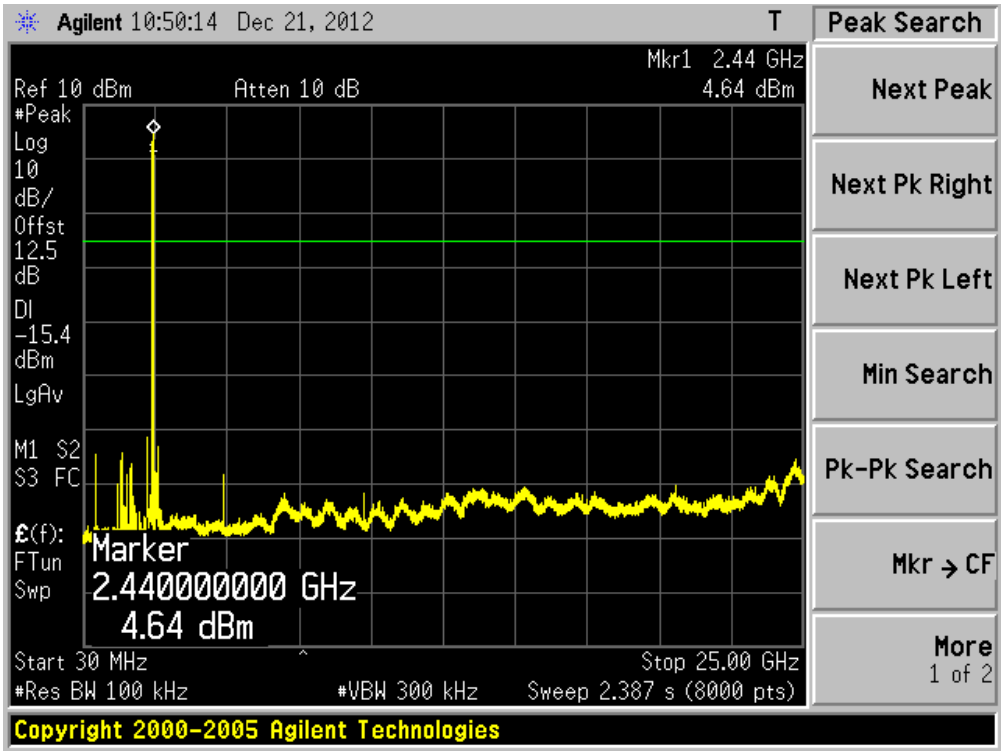
5.6. Test Result

Product	:	3G/4G Wireless Router
Test Item	:	RF Antenna Conducted Spurious
Test Site	:	TR-8
Test Mode	:	Mode 1: Transmit by 802.11b

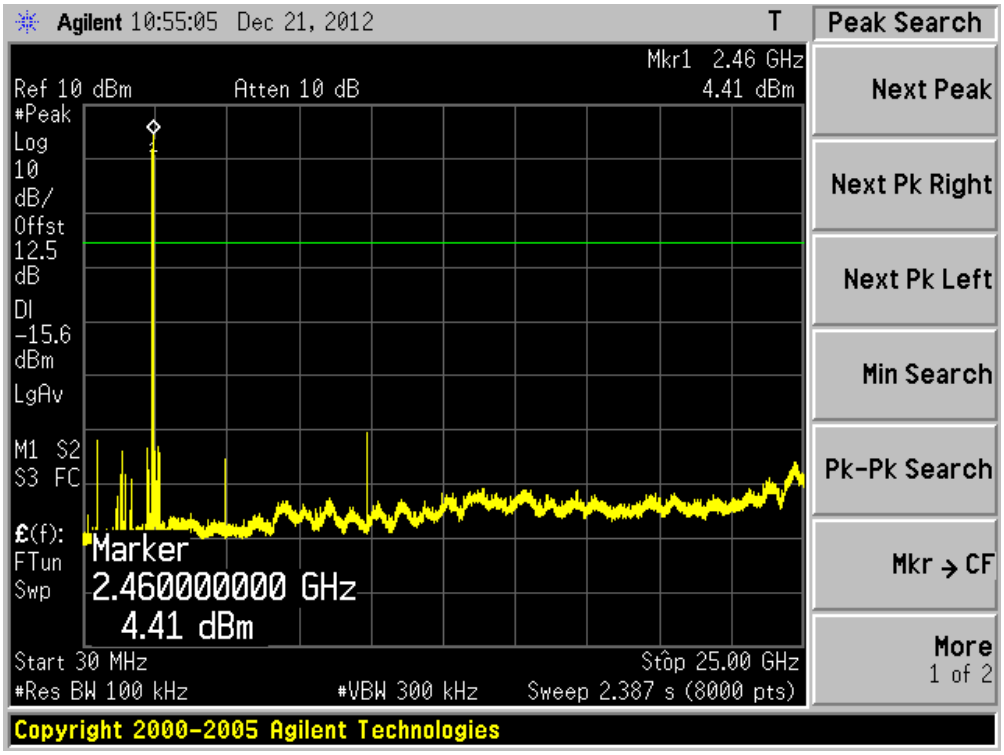
Channel 01 (2412MHz)



Channel 06 (2437MHz)

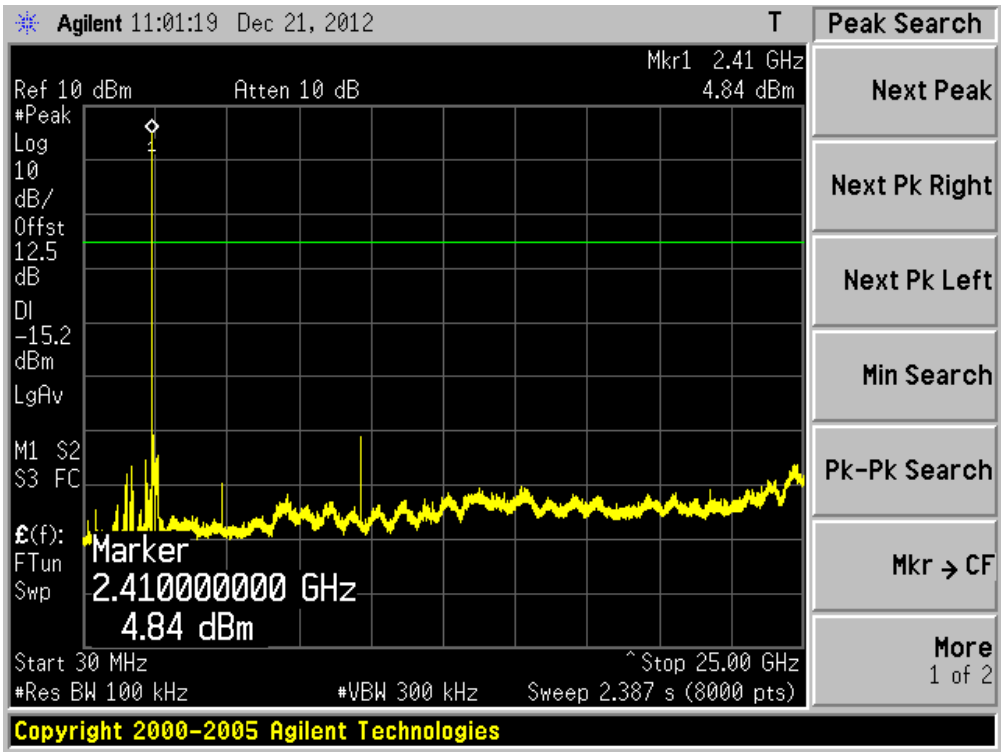


Channel 11 (2462MHz)

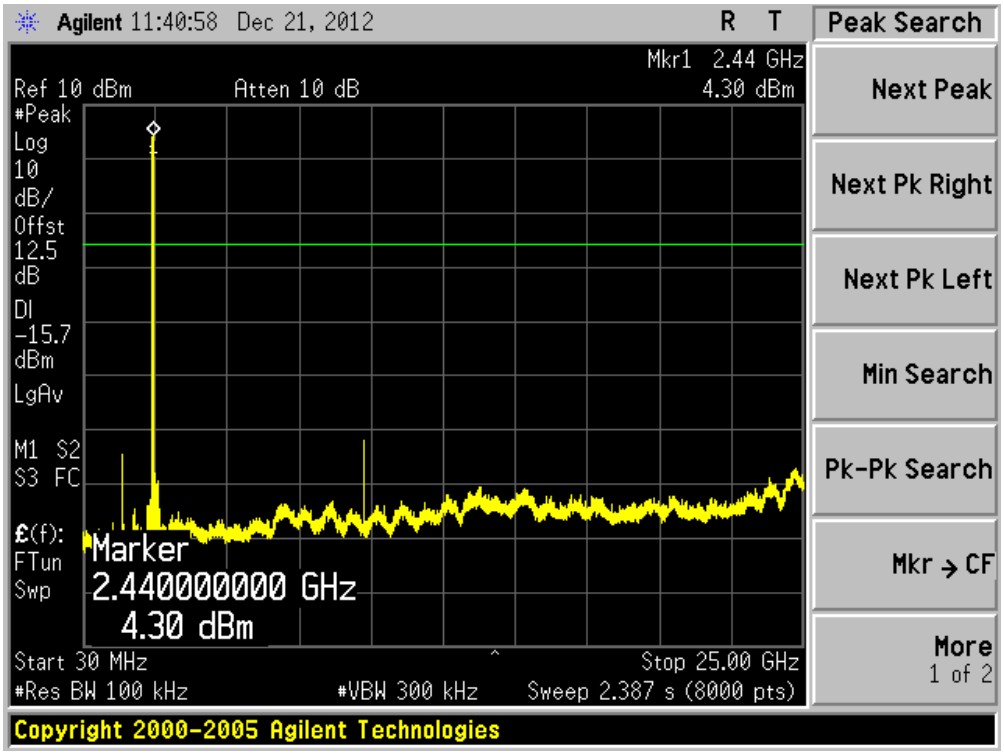


Product	:	3G/4G Wireless Router
Test Item	:	RF Antenna Conducted Spurious
Test Site	:	TR-8
Test Mode	:	Mode 2: Transmit by 802.11g

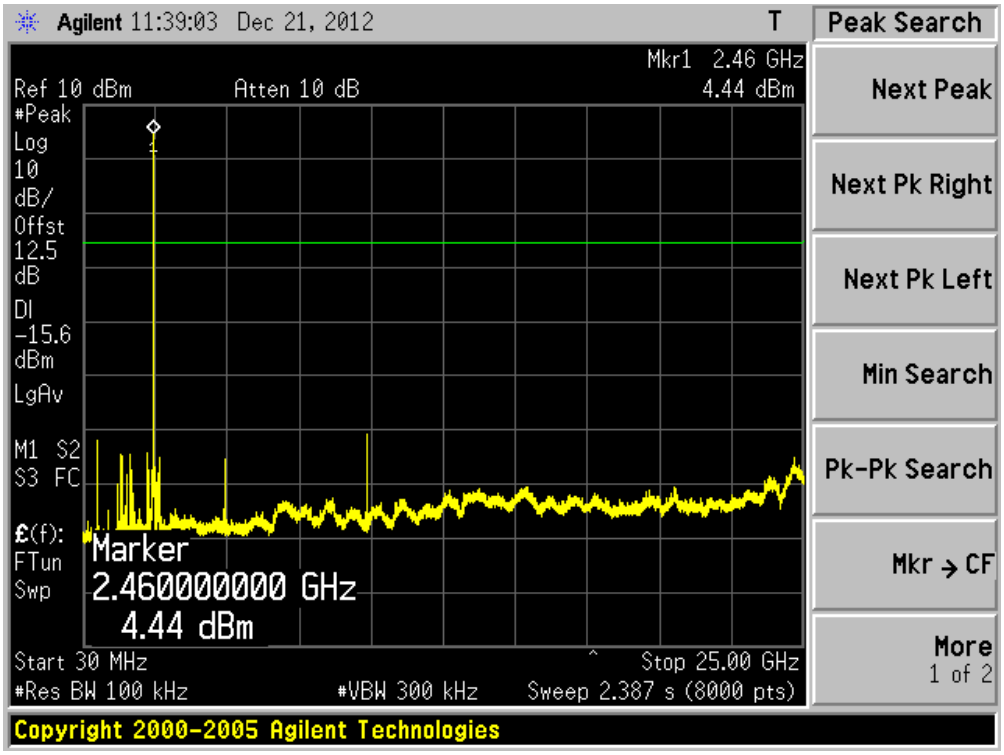
Channel 01 (2412MHz)



Channel 06 (2437MHz)



Channel 11 (2462MHz)



6. Radiated Emission Band Edge

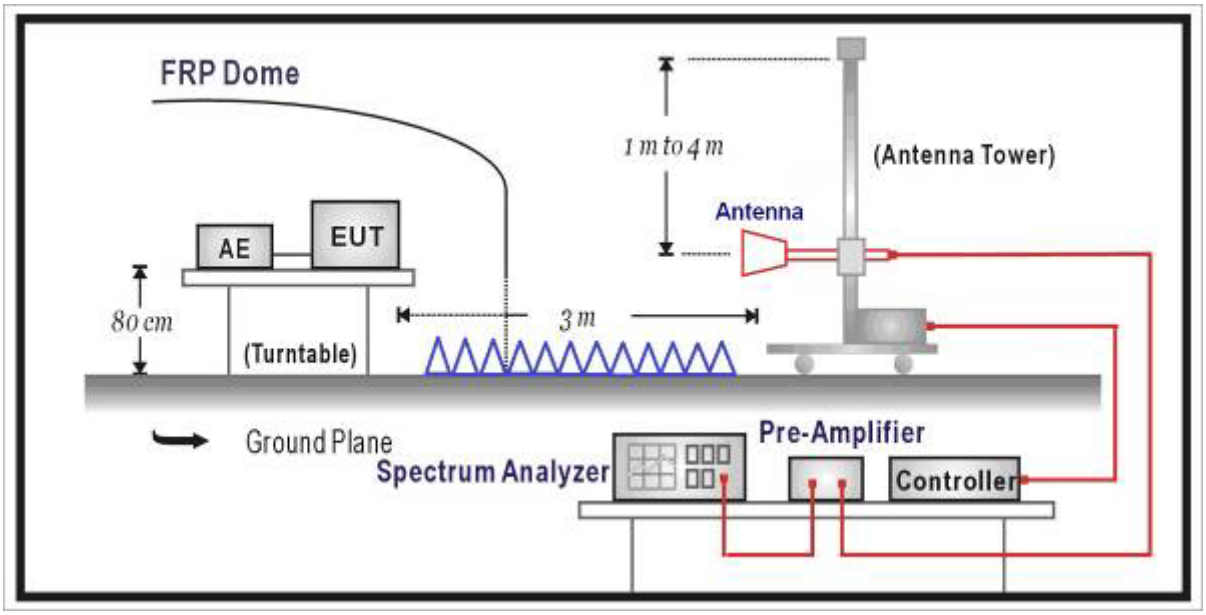
6.1. Test Equipment

☒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 ± 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:

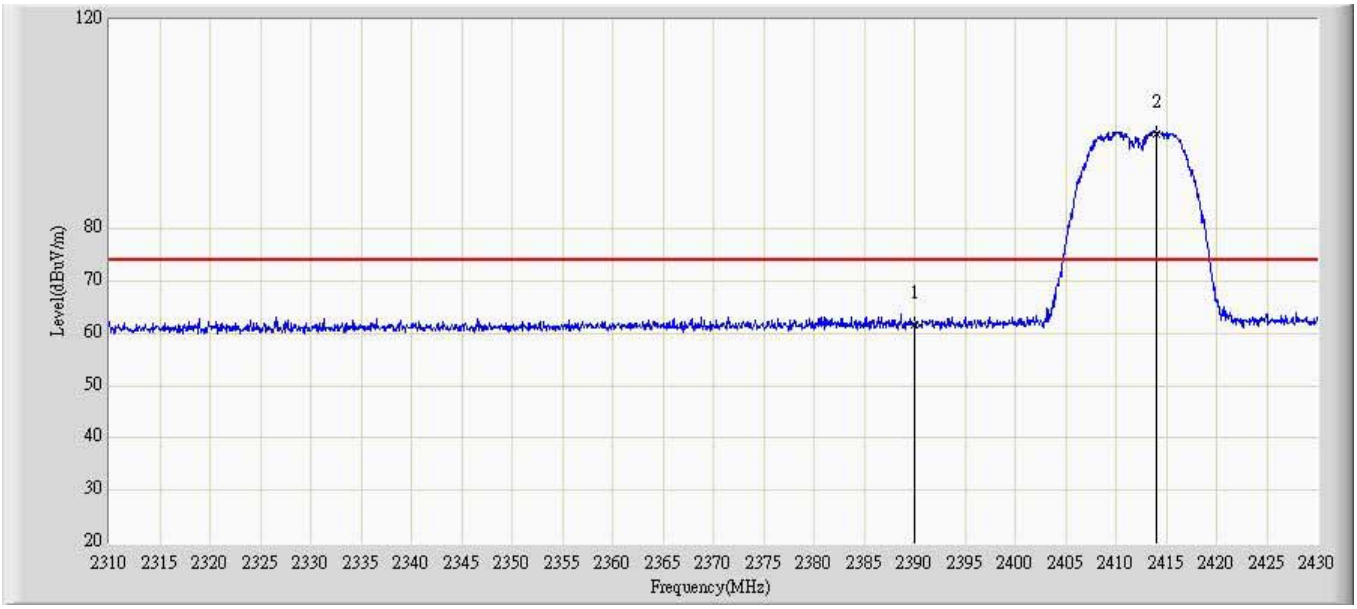
Peak detector: RBW = 1MHz, VBW = 3MHz, sweep time = 200ms;

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

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

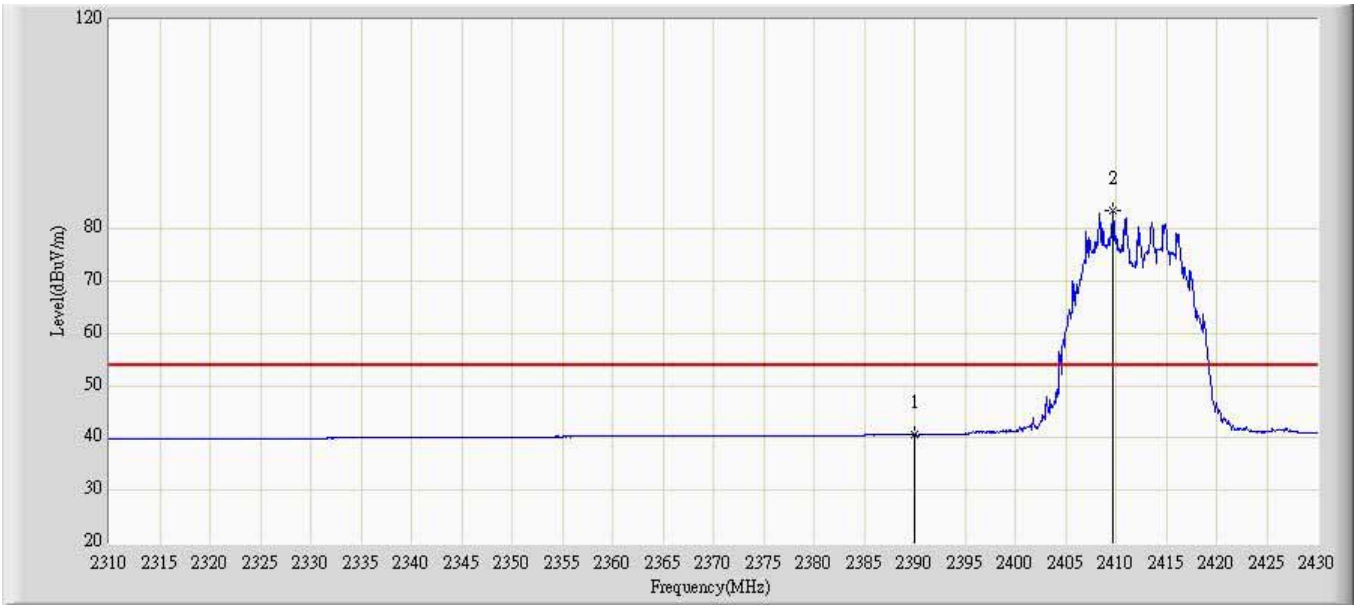
In case the emission is fail due to the used RB/VB is too wide, marker-delta method of FCC Publc Notice will be followed.

Engineer: emin	
Site: AC5	Time: 2012/11/26 - 11:04
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Horizontal
EUT: 3G/4G Wireless Router	Power: AC 120V/60Hz
Note: Mode 1: Transmit by 802.11b at channel 2412MHz	



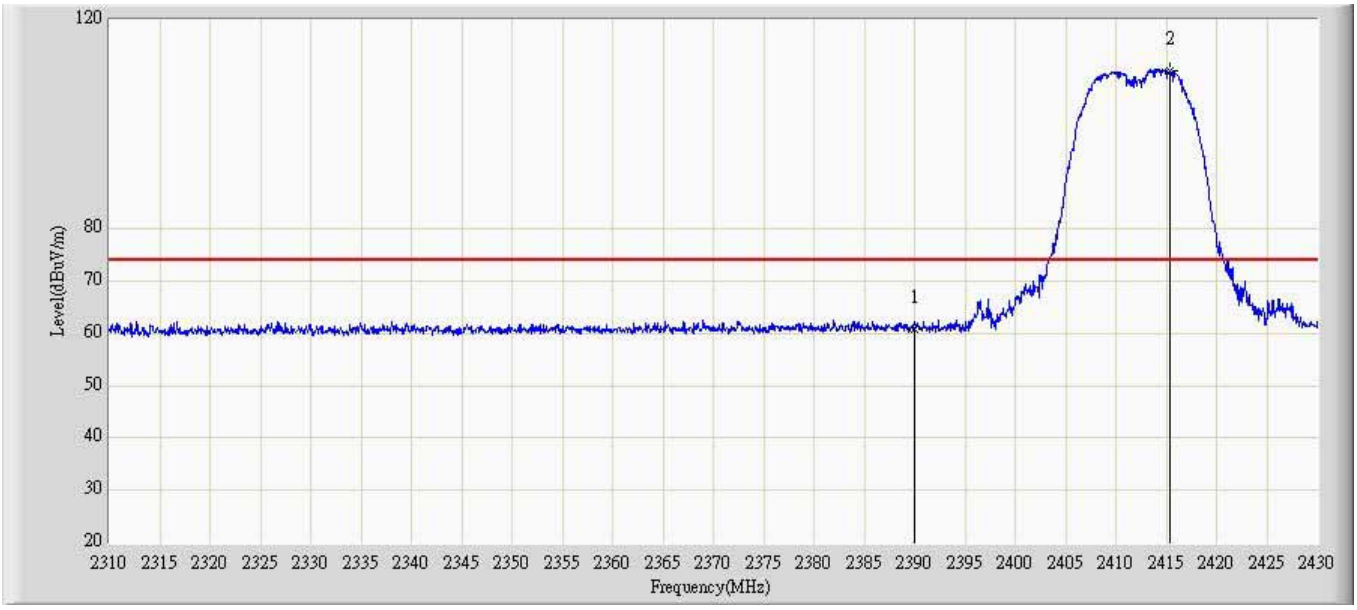
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	61.742	25.441	-12.258	74.000	36.302	PK
2		*	2414.100	98.035	61.534	N/A	N/A	36.502	PK

Engineer: emin	
Site: AC5	Time: 2012/11/26 - 11:06
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Horizontal
EUT: 3G/4G Wireless Router	Power: AC 120V/60Hz
Note: Mode 1: Transmit by 802.11b at channel 2412MHz	



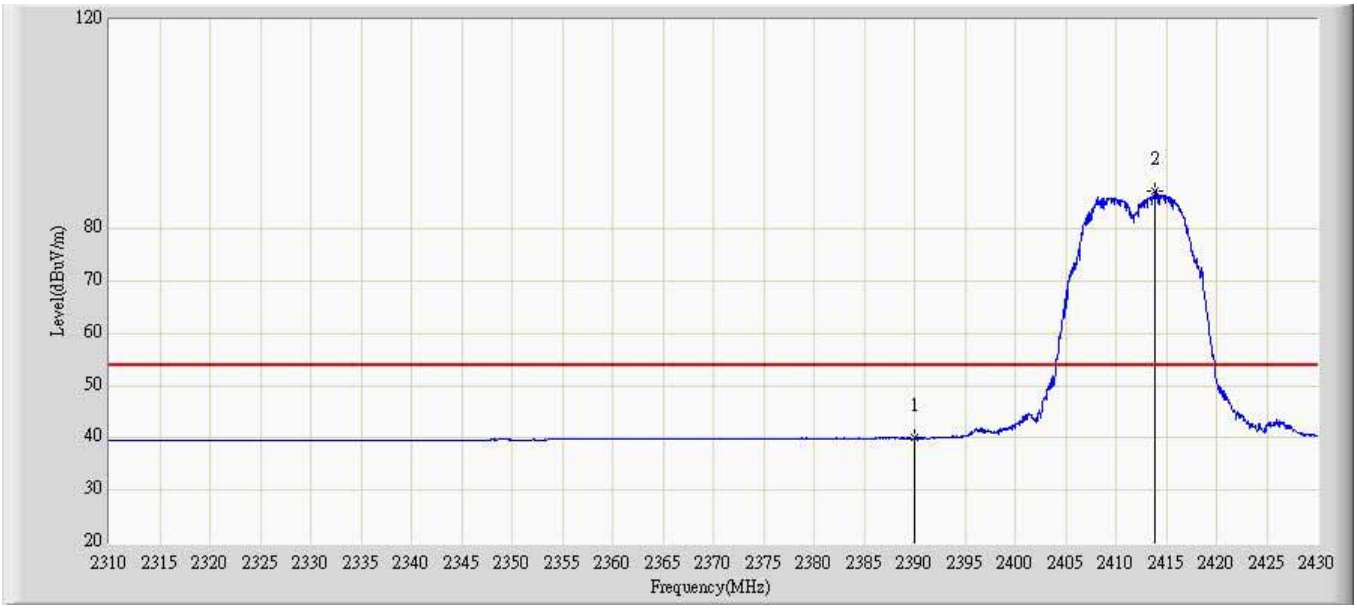
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	40.567	4.266	-13.433	54.000	36.302	AV
2		*	2409.660	83.468	47.005	N/A	N/A	36.463	AV

Engineer: emin	
Site: AC5	Time: 2012/11/26 - 11:08
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Vertical
EUT: 3G/4G Wireless Router	Power: AC 120V/60Hz
Note: Mode 1: Transmit by 802.11b at channel 2412MHz	



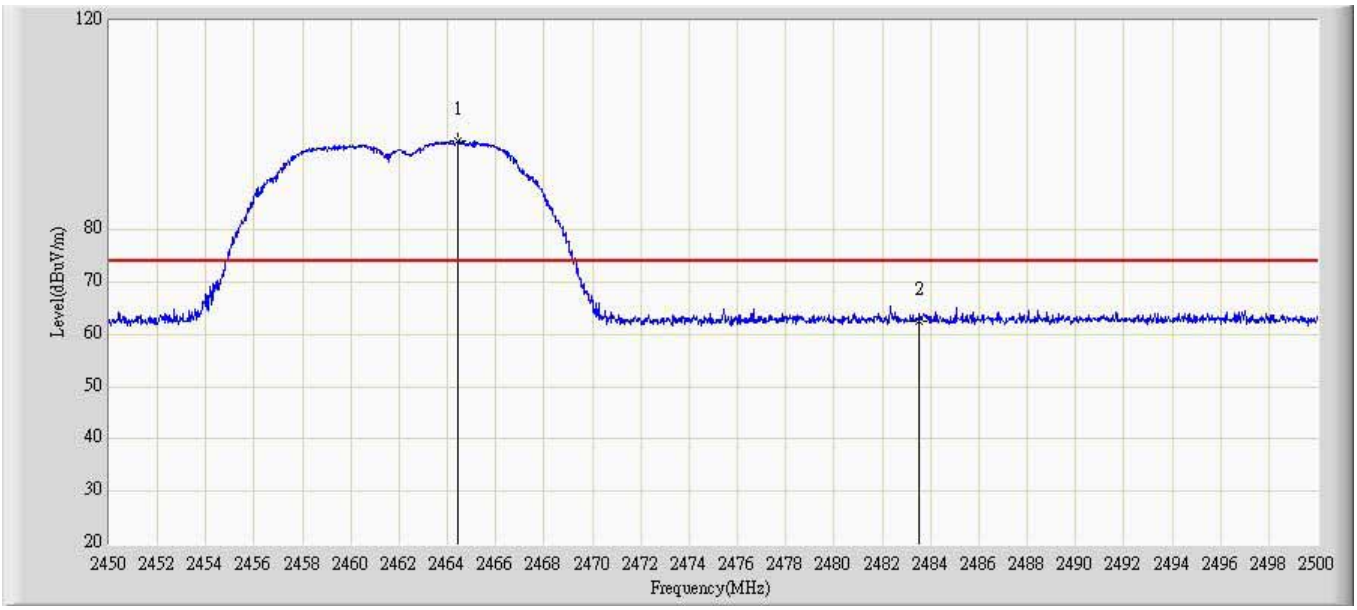
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	60.679	25.038	-13.321	74.000	35.642	PK
2		*	2415.360	110.322	74.571	N/A	N/A	35.751	PK

Engineer: emin	
Site: AC5	Time: 2012/11/26 - 11:09
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Vertical
EUT: 3G/4G Wireless Router	Power: AC 120V/60Hz
Note: Mode 1: Transmit by 802.11b at channel 2412MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	39.975	4.334	-14.025	54.000	35.642	AV
2		*	2413.920	87.343	51.599	N/A	N/A	35.743	AV

Engineer: emin	
Site: AC5	Time: 2012/11/26 - 10:41
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Horizontal
EUT: 3G/4G Wireless Router	Power: AC 120V/60Hz
Note: Mode 1: Transmit by 802.11b at channel 2462MHz	

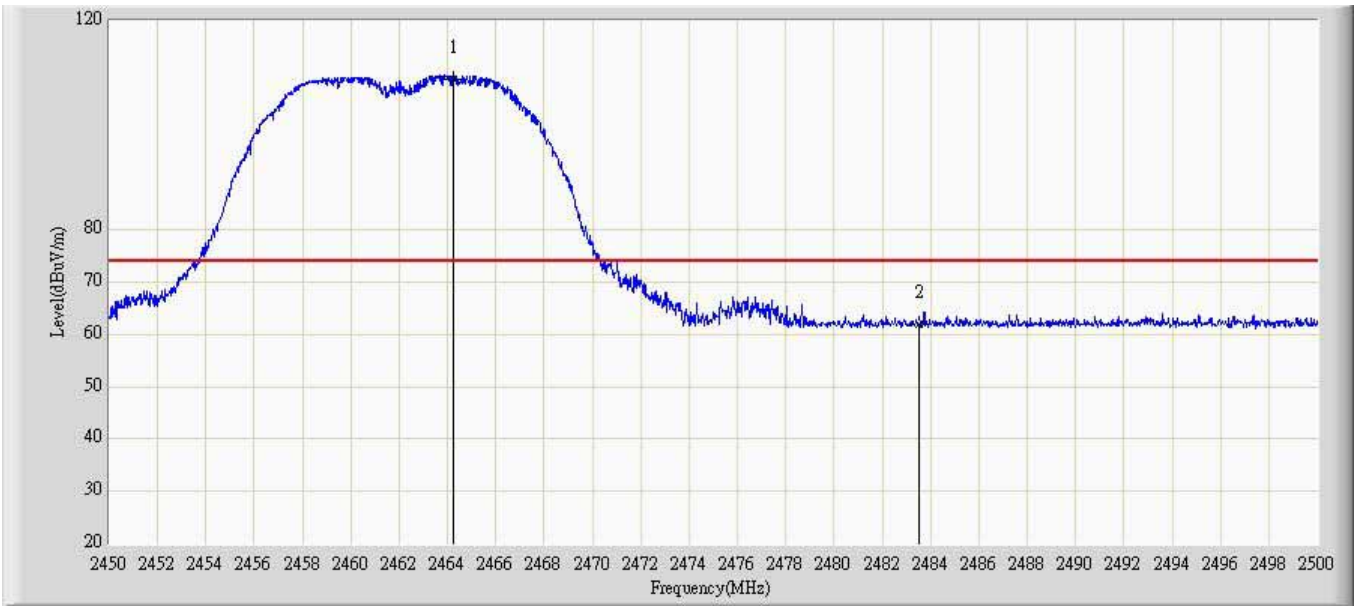


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2464.400	96.882	59.951	N/A	N/A	36.930	PK
2			2483.500	62.596	25.506	-11.404	74.000	37.089	PK

Engineer: emin	
Site: AC5	Time: 2012/11/26 - 10:45
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Horizontal
EUT: 3G/4G Wireless Router	Power: AC 120V/60Hz
Note: Mode 1: Transmit by 802.11b at channel 2462MHz	

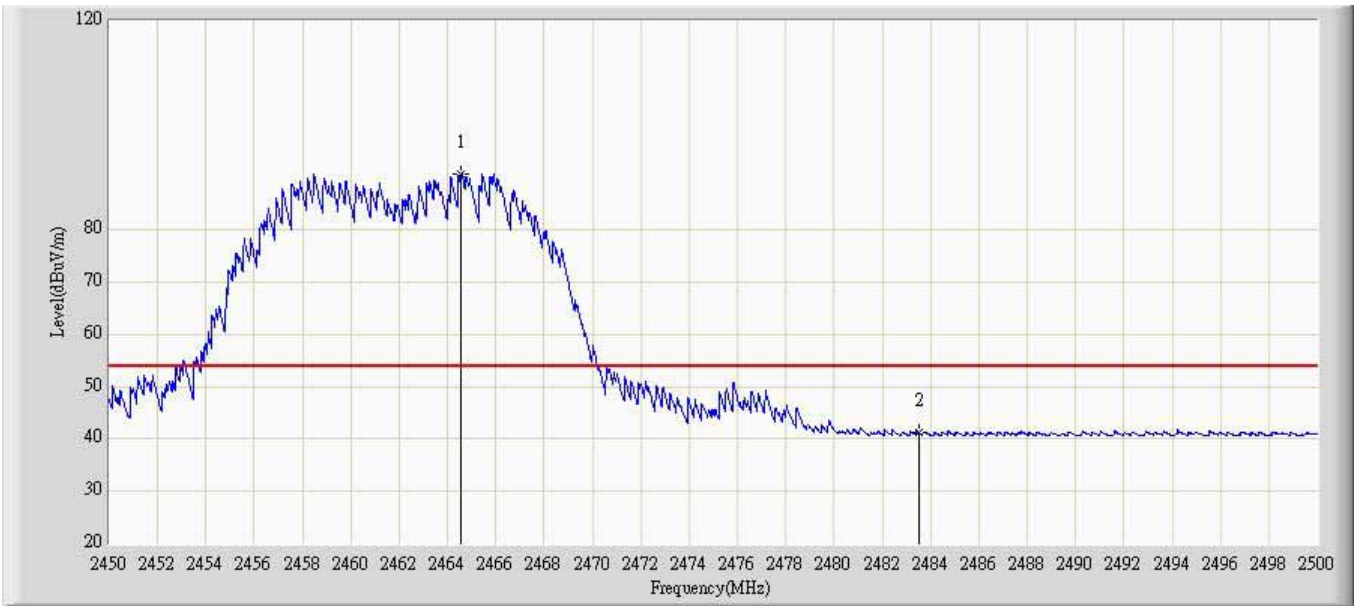
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2464.200	77.579	40.650	N/A	N/A	36.929	AV
2			2483.500	41.463	4.373	-12.537	54.000	37.089	AV

Engineer: emin	
Site: AC5	Time: 2012/11/26 - 10:50
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Vertical
EUT: 3G/4G Wireless Router	Power: AC 120V/60Hz
Note: Mode 1: Transmit by 802.11b at channel 2462MHz	



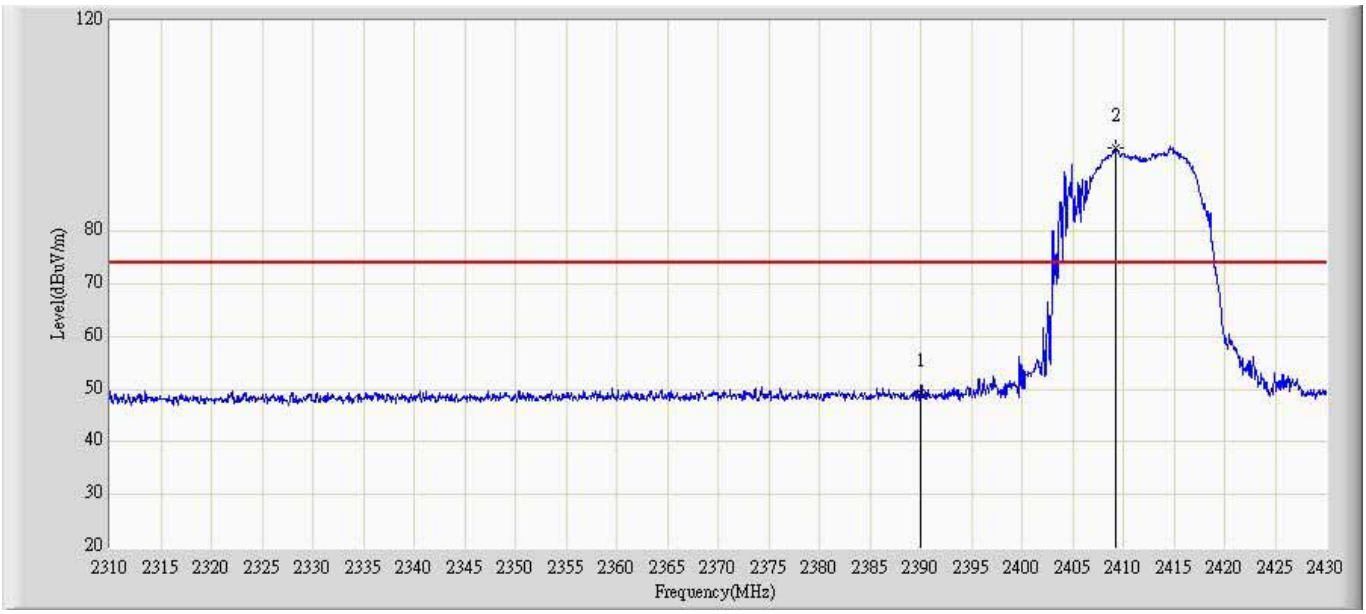
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2464.250	108.826	72.854	N/A	N/A	35.972	PK
2			2483.500	61.947	25.891	-12.053	74.000	36.055	PK

Engineer: emin	
Site: AC5	Time: 2012/11/26 - 10:56
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Vertical
EUT: 3G/4G Wireless Router	Power: AC 120V/60Hz
Note: Mode 1: Transmit by 802.11b at channel 2462MHz	



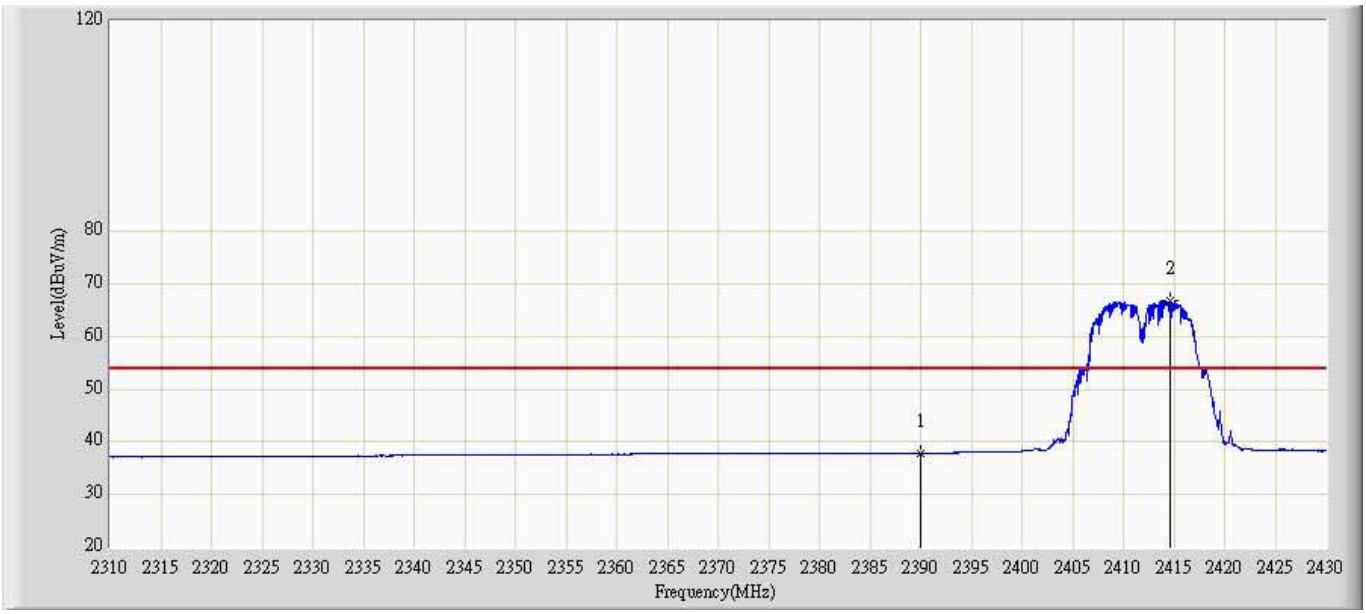
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2464.575	90.822	54.848	N/A	N/A	35.974	AV
2			2483.500	41.284	5.228	-12.716	54.000	36.055	AV

Engineer: emin	
Site: AC5	Time: 2012/12/05 - 10:06
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Horizontal
EUT: 3G/4G Wireless Router	Power: AC 120V/60Hz
Note: Mode 2: Transmit by 802.11g at channel 2412MHz	



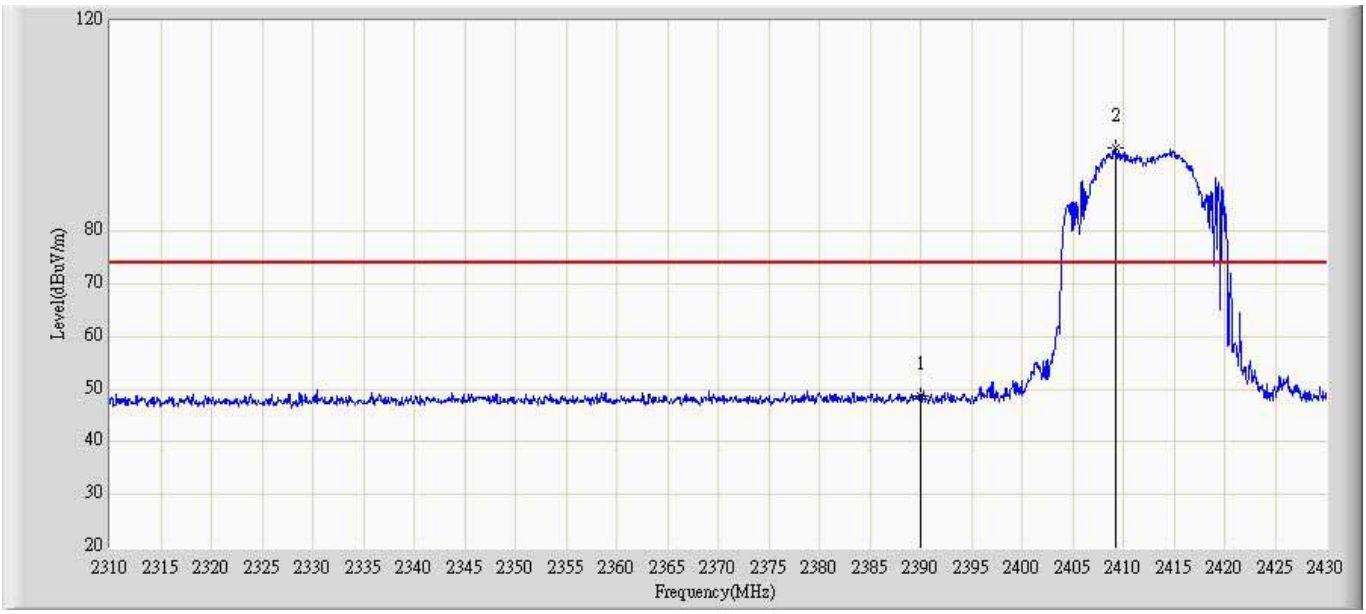
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	49.265	12.964	-24.735	74.000	36.302	PK
2		*	2409.240	95.722	59.262	N/A	N/A	36.460	PK

Engineer: emin	
Site: AC5	Time: 2012/12/05 - 10:12
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Horizontal
EUT: 3G/4G Wireless Router	Power: AC 120V/60Hz
Note: Mode 2: Transmit by 802.11g at channel 2412MHz	



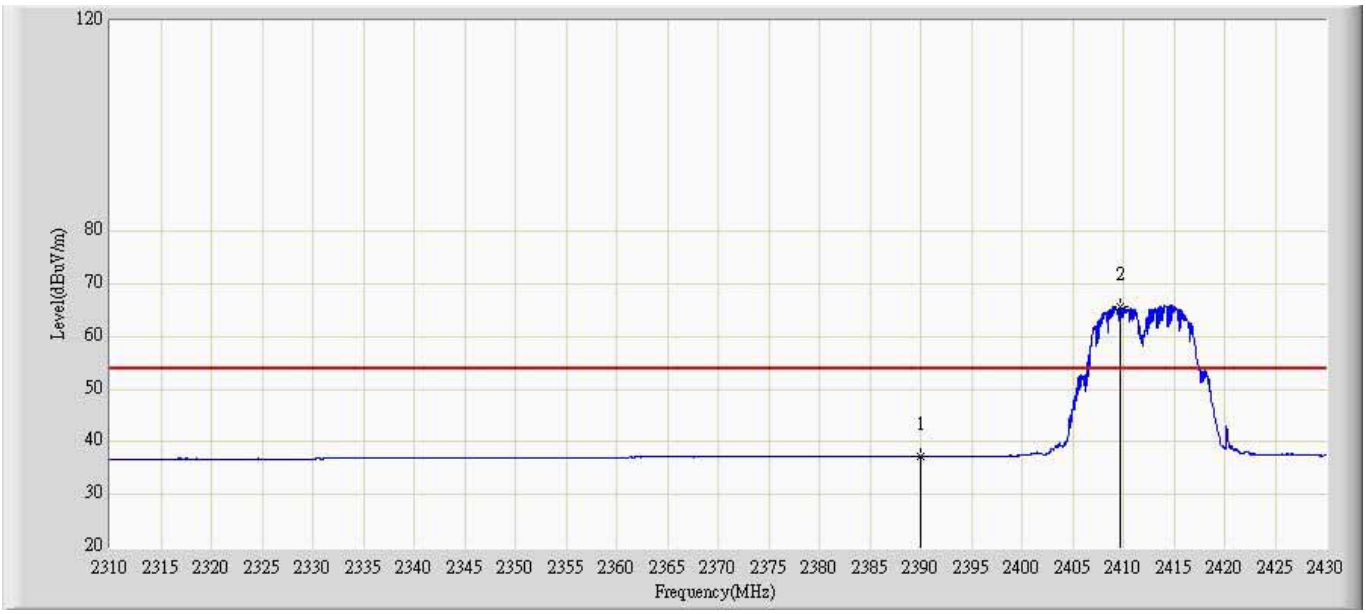
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	37.940	1.639	-16.060	54.000	36.302	AV
2		*	2414.580	66.826	30.321	N/A	N/A	36.505	AV

Engineer: emin	
Site: AC5	Time: 2012/12/05 - 10:17
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Vertical
EUT: 3G/4G Wireless Router	Power: AC 120V/60Hz
Note: Mode 2: Transmit by 802.11g at channel 2412MHz	



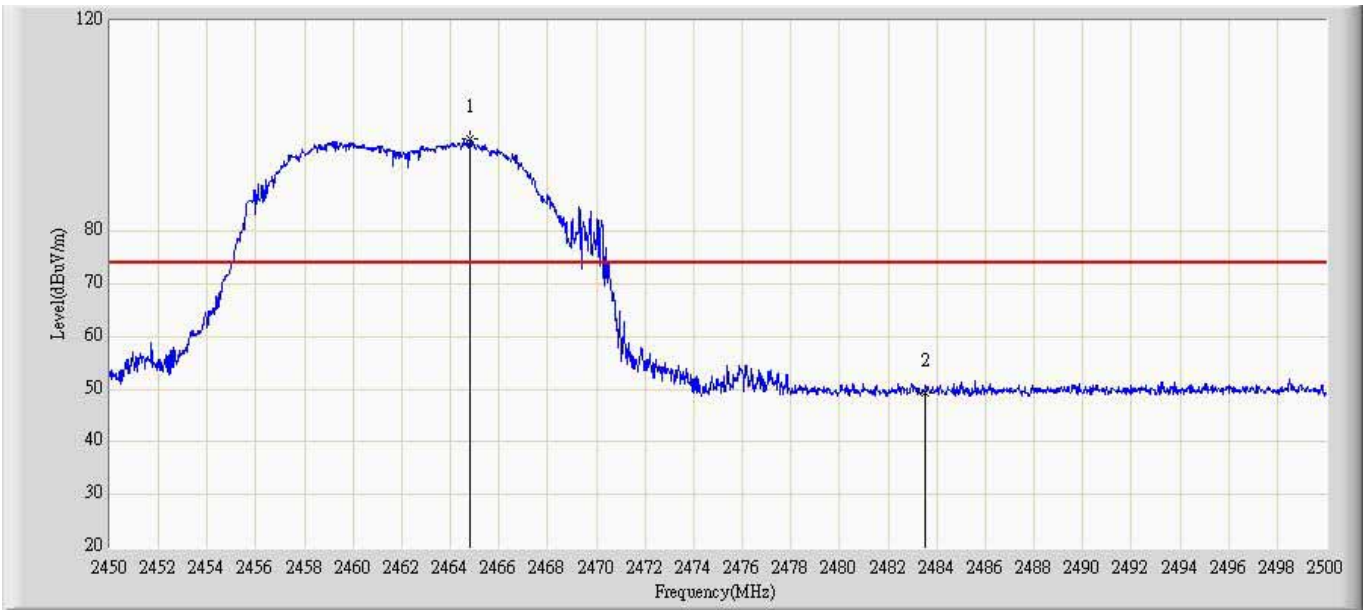
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	48.687	13.046	-25.313	74.000	35.642	PK
2		*	2409.240	95.825	60.102	N/A	N/A	35.723	PK

Engineer: emin	
Site: AC5	Time: 2012/12/05 - 10:19
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Vertical
EUT: 3G/4G Wireless Router	Power: AC 120V/60Hz
Note: Mode 2: Transmit by 802.11g at channel 2412MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	37.236	1.595	-16.764	54.000	35.642	AV
2		*	2409.660	65.566	29.842	N/A	N/A	35.724	AV

Engineer: emin	
Site: AC5	Time: 2012/12/05 - 10:22
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Horizontal
EUT: 3G/4G Wireless Router	Power: AC 120V/60Hz
Note: Mode 2: Transmit by 802.11g at channel 2462MHz	

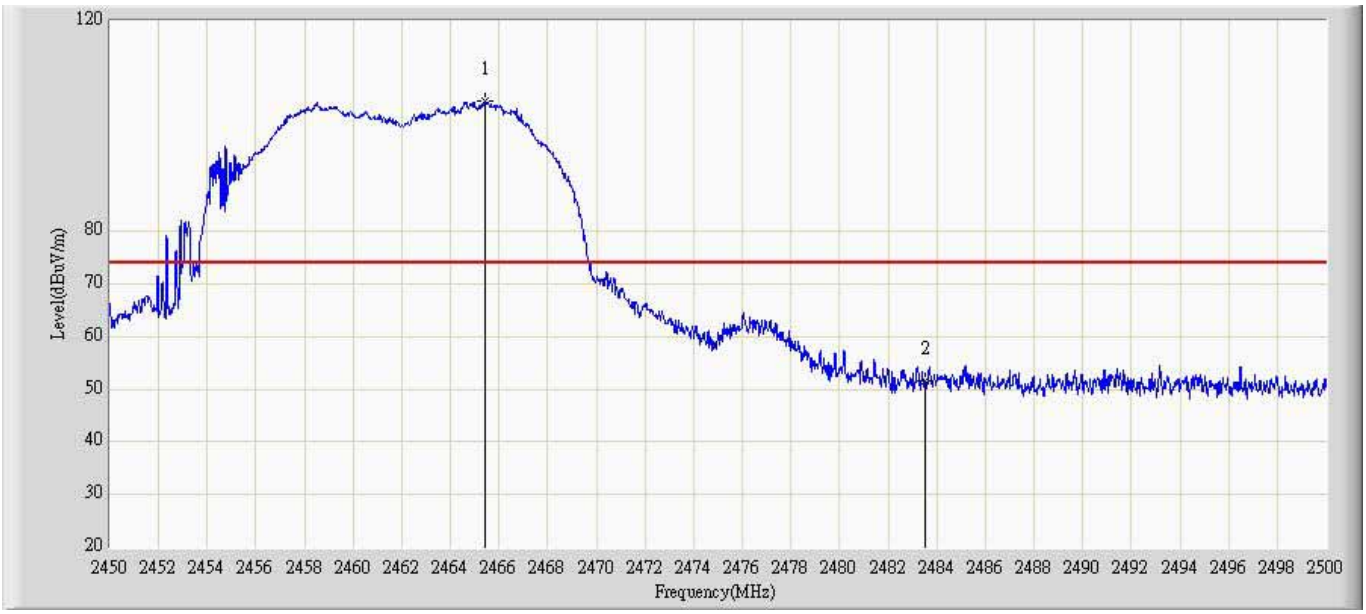


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2464.825	97.599	60.665	N/A	N/A	36.934	PK
2			2483.500	49.302	12.212	-24.698	74.000	37.089	PK

Engineer: emin	
Site: AC5	Time: 2012/12/05 - 10:29
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Horizontal
EUT: 3G/4G Wireless Router	Power: AC 120V/60Hz
Note: Mode 2: Transmit by 802.11g at channel 2462MHz	

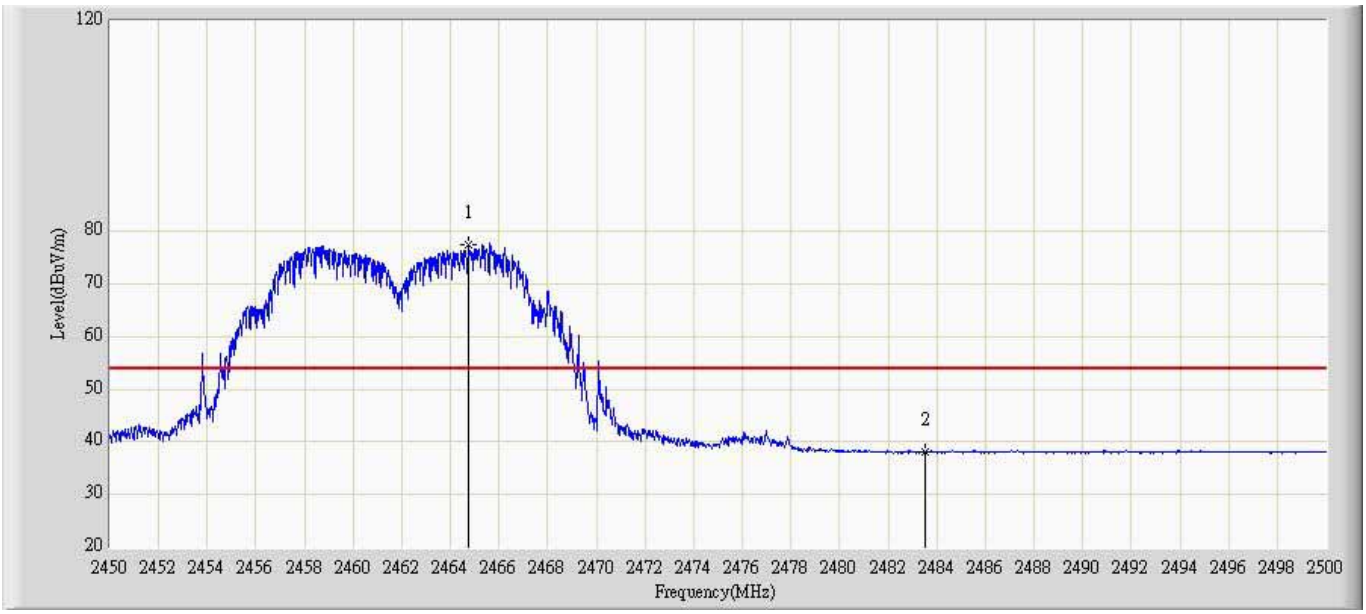
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2459.550	65.280	28.390	N/A	N/A	36.890	AV
2			2483.500	38.776	1.686	-15.224	54.000	37.089	AV

Engineer: emin	
Site: AC5	Time: 2012/12/05 - 10:32
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Vertical
EUT: 3G/4G Wireless Router	Power: AC 120V/60Hz
Note: Mode 2: Transmit by 802.11g at channel 2462MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2465.425	104.768	68.791	N/A	N/A	35.977	PK
2			2483.500	51.508	15.452	-22.492	74.000	36.055	PK

Engineer: emin	
Site: AC5	Time: 2012/12/05 - 10:34
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Vertical
EUT: 3G/4G Wireless Router	Power: AC 120V/60Hz
Note: Mode 2: Transmit by 802.11g at channel 2462MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2464.725	77.347	41.373	N/A	N/A	33.974	AV
2			2483.500	38.173	2.117	-15.827	54.000	36.055	AV

7. Operation Frequency Range of 20dB Bandwidth

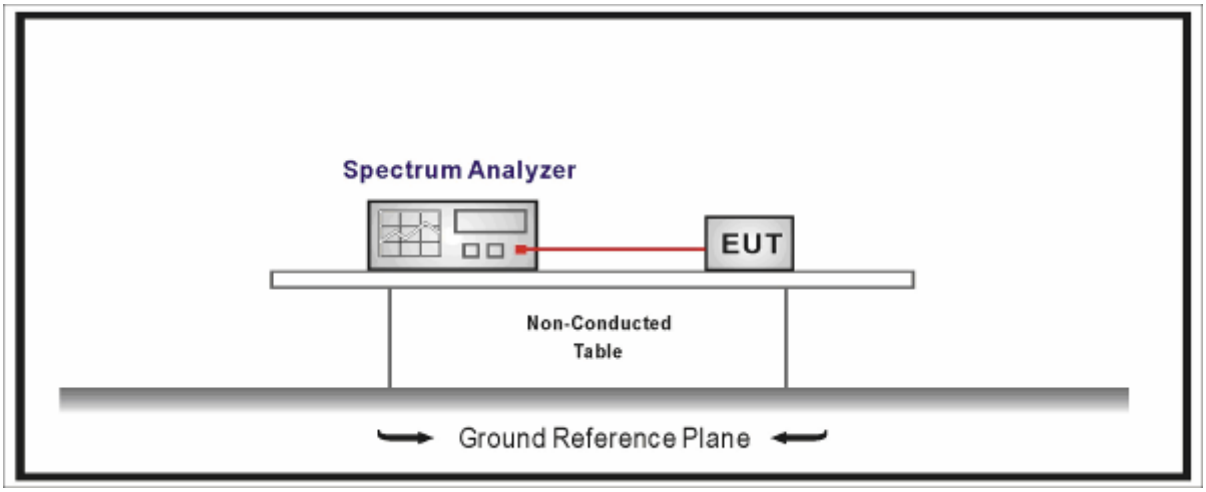
7.1. Test Equipment

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.

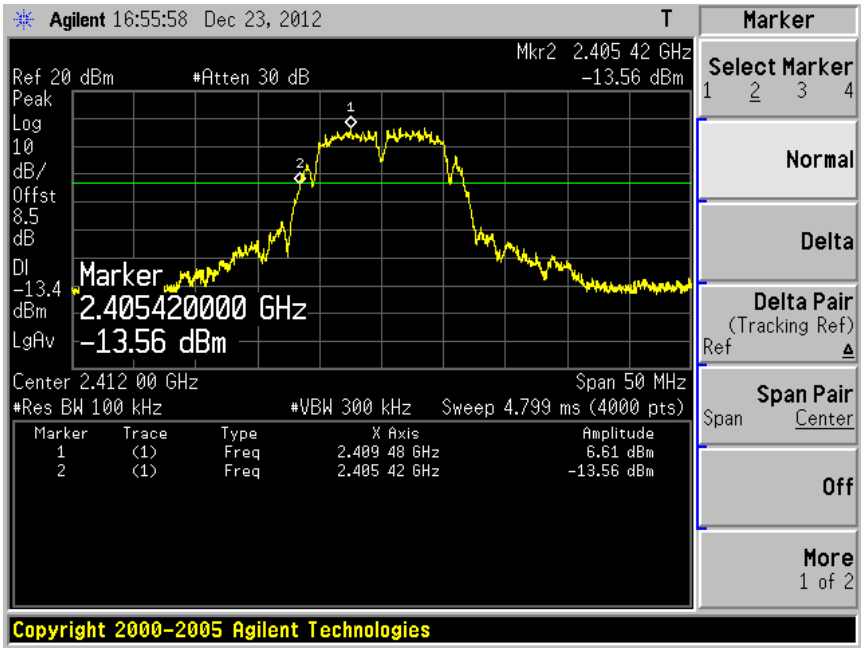
7.5. Uncertainty

The measurement uncertainty is defined as ± 1 kHz

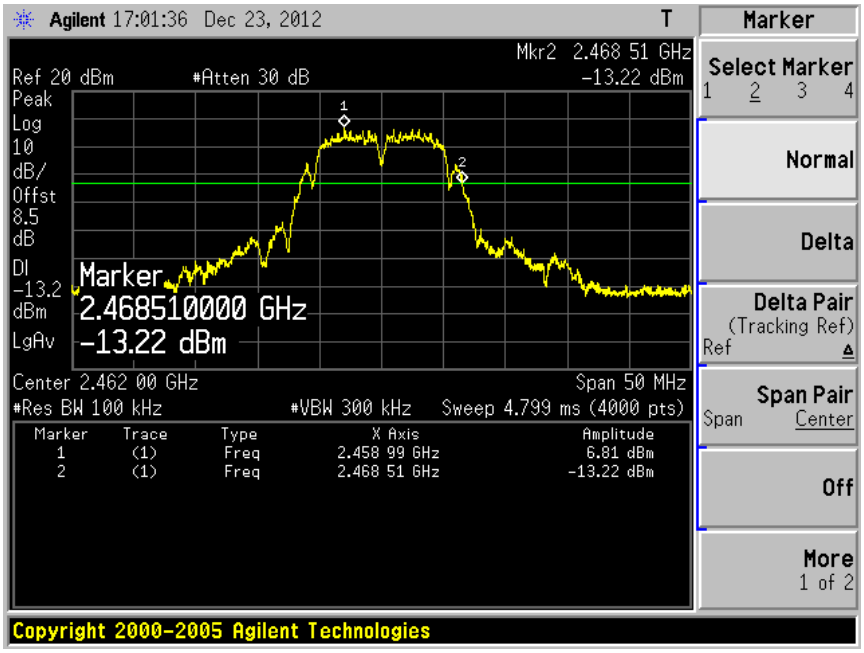
7.6. Test Result

Product	:	3G/4G Wireless Router
Test Item	:	Operation Frequency Range of 20dB Bandwidth
Test Site	:	TR-8
Test Mode	:	Mode 1: Transmit by 802.11b

Channel 01 (2412MHz)

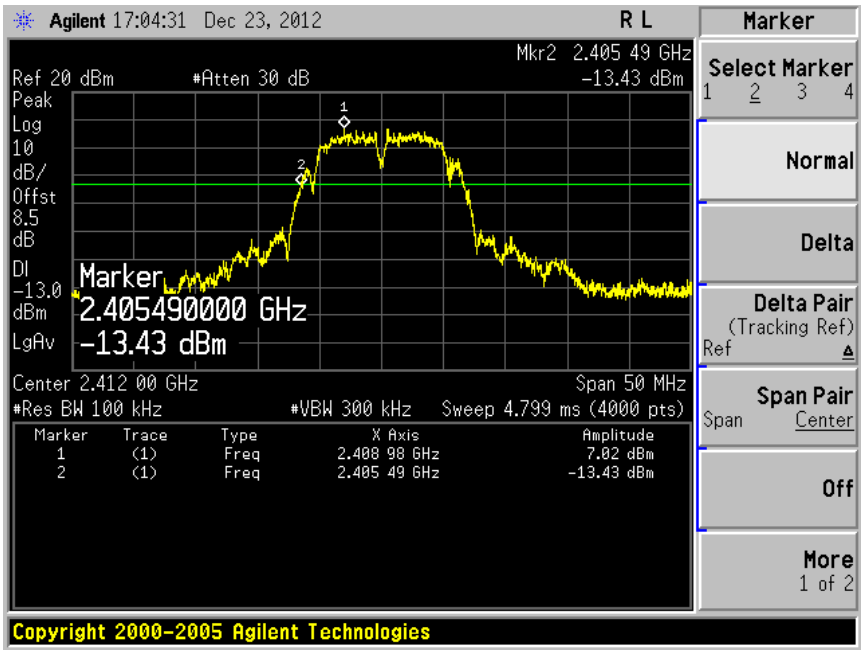


Channel 11 (2462MHz)

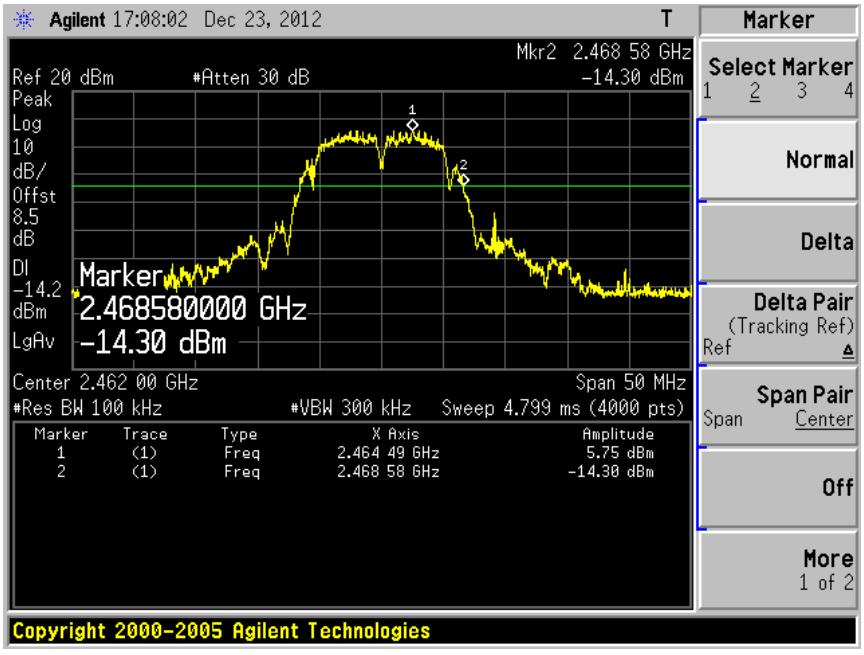


Product	:	3G/4G Wireless Router
Test Item	:	Operation Frequency Range of 20dB Bandwidth
Test Site	:	TR-8
Test Mode	:	Mode 2: Transmit by 802.11g

Channel 01 (2412MHz)



Channel 11 (2462MHz)



8. Occupied Bandwidth

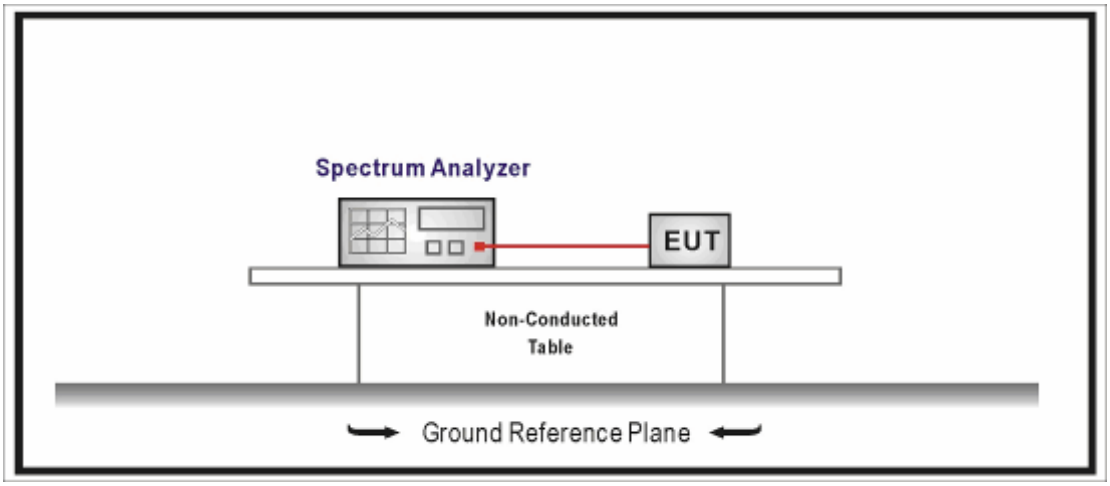
8.1. Test Equipment

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

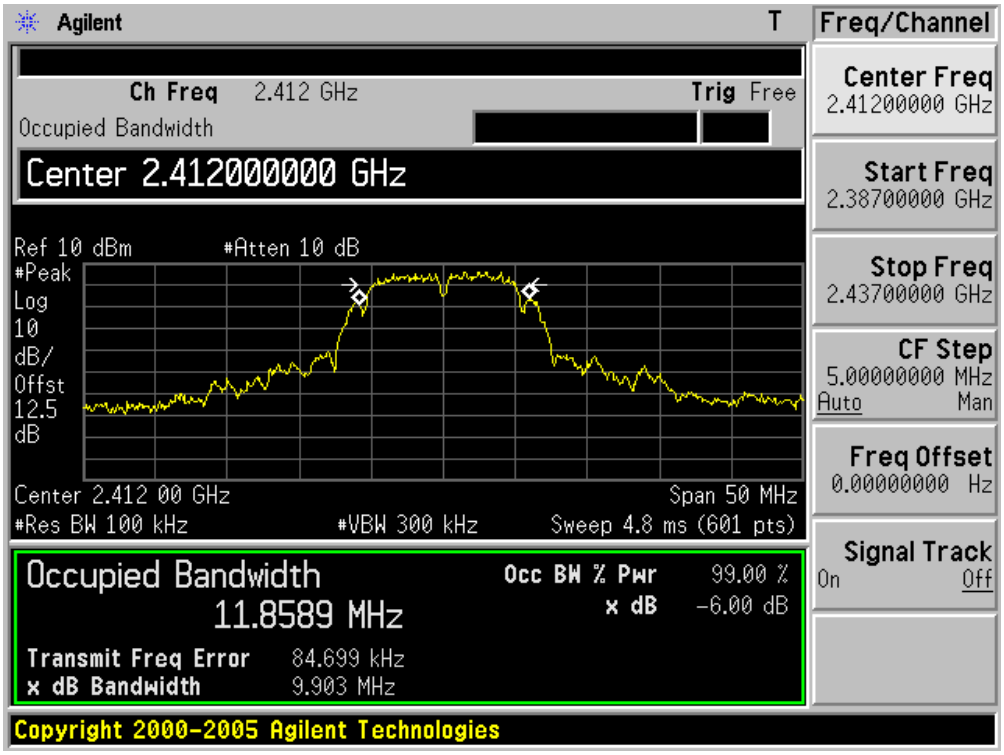
The measurement uncertainty is defined as ± 1 kHz

8.6. Test Result

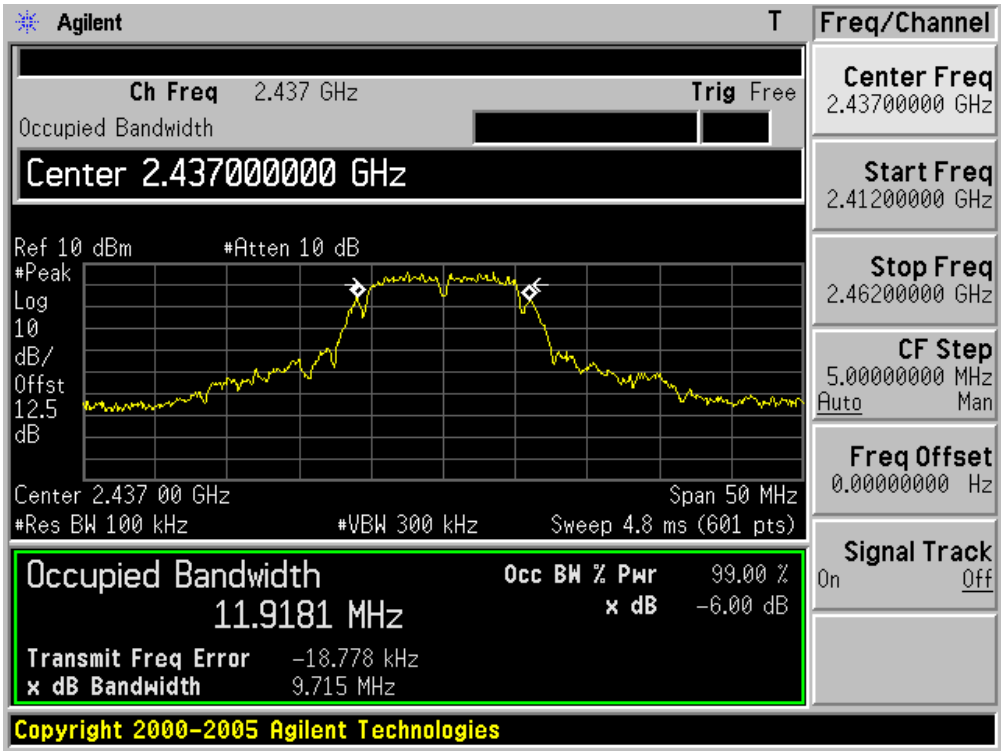
Product	:	3G/4G Wireless Router
Test Item	:	6dB Occupied Bandwidth
Test Site	:	TR-8
Test Mode	:	Mode 1: Transmit by 802.11b

Channel No.	Frequency (MHz)	Occupied Bandwidth (kHz)	Limit (kHz)	Result
01	2412	9903	500	Pass
06	2437	9715	500	Pass
11	2462	9353	500	Pass

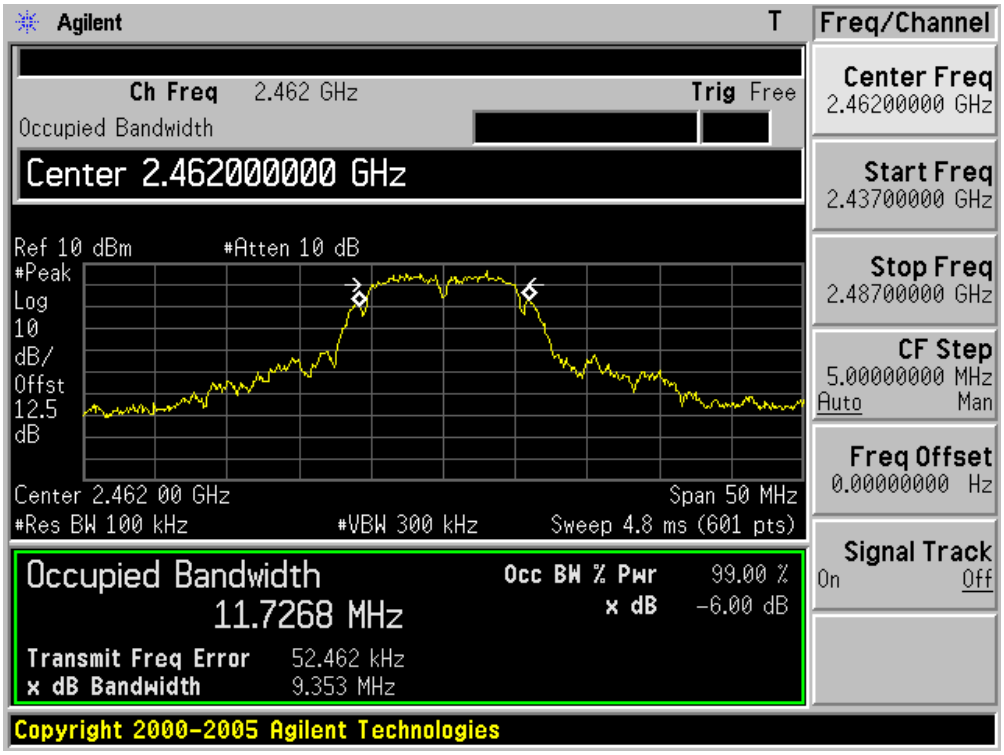
Channel 01 (2412MHz)



Channel 06 (2437MHz)



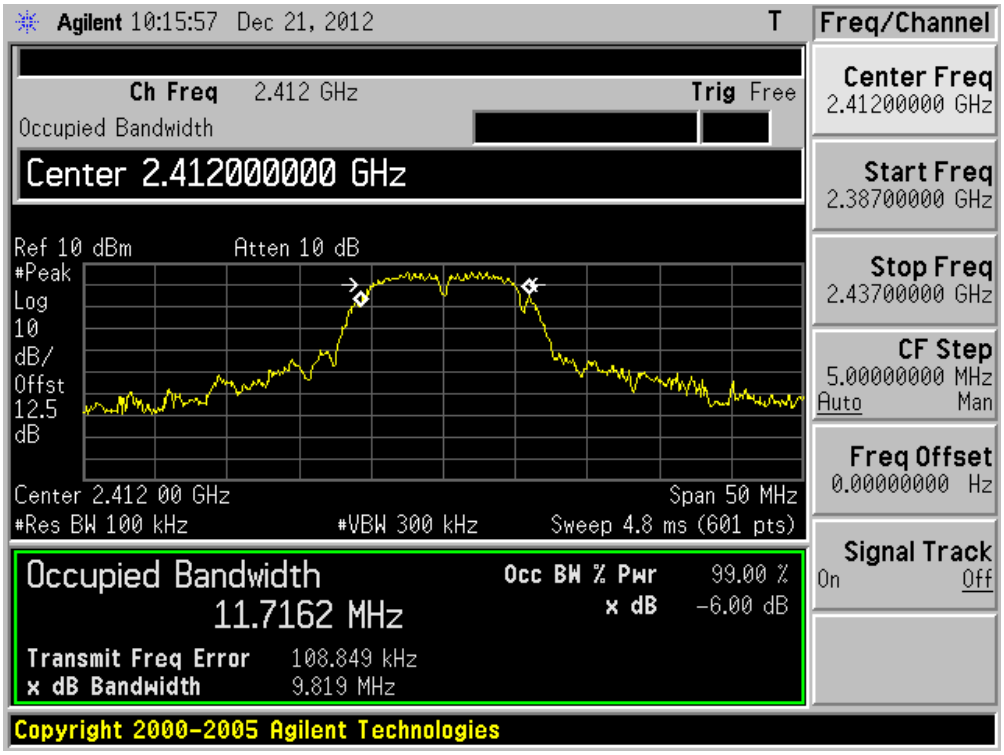
Channel 11 (2462MHz)



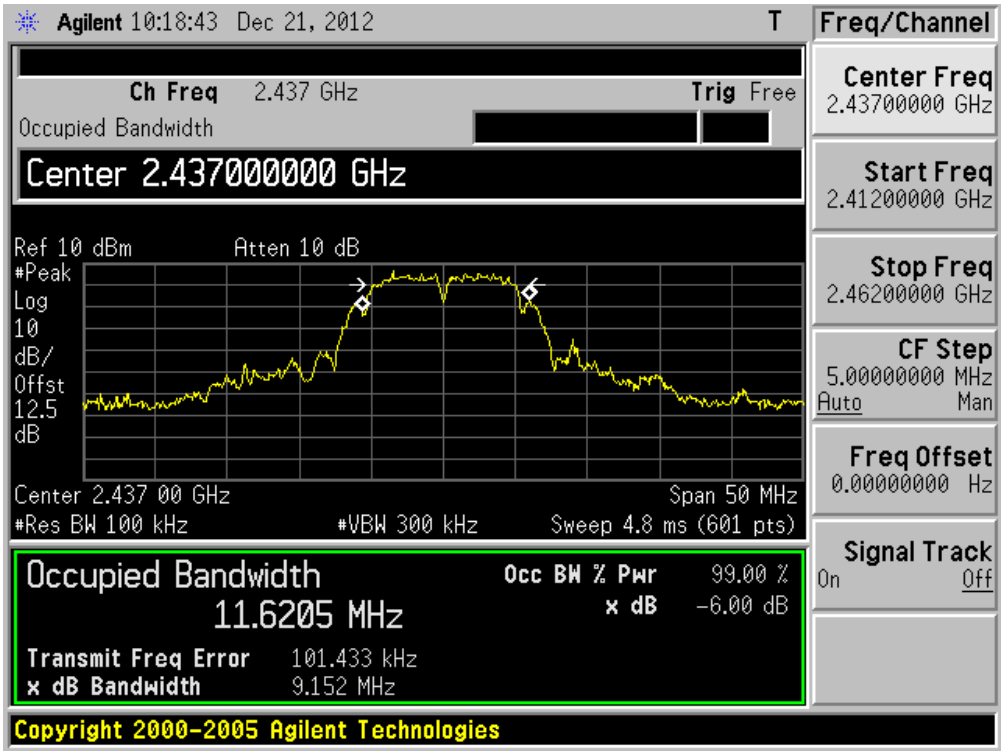
Product	:	3G/4G Wireless Router
Test Item	:	6dB Occupied Bandwidth
Test Site	:	TR-8
Test Mode	:	Mode 2: Transmit by 802.11g

Channel No.	Frequency (MHz)	Occupied Bandwidth (kHz)	Limit (kHz)	Result
01	2412	9819	500	Pass
06	2437	9152	500	Pass
11	2462	9486	500	Pass

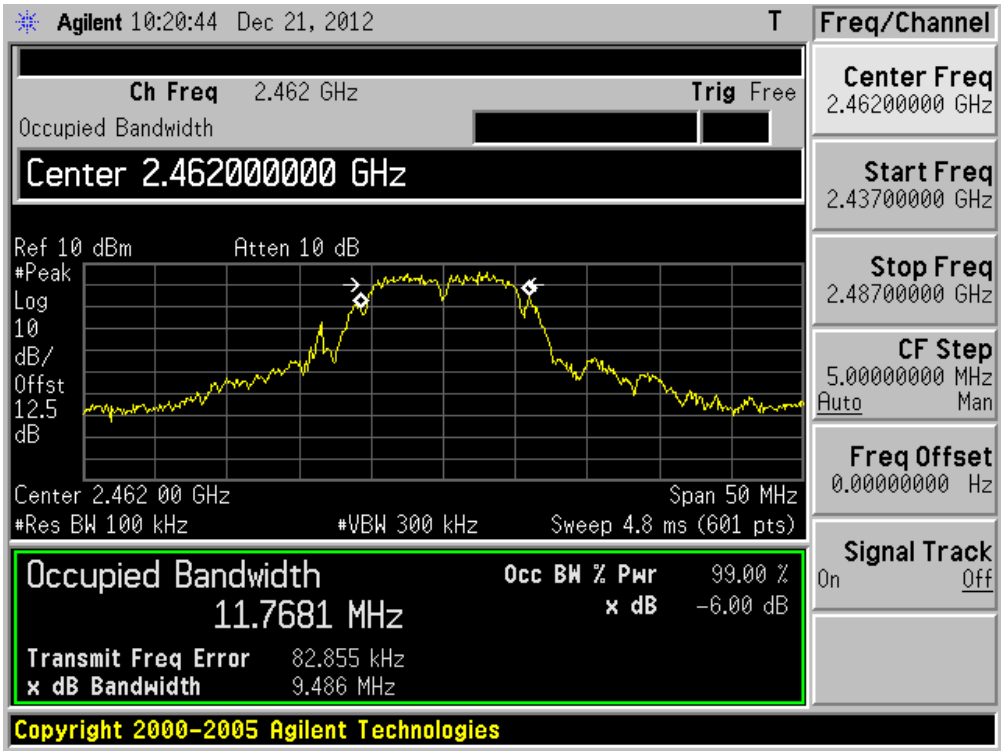
Channel 01 (2412MHz)



Channel 06 (2437MHz)



Channel 11 (2462MHz)



9. Power Output

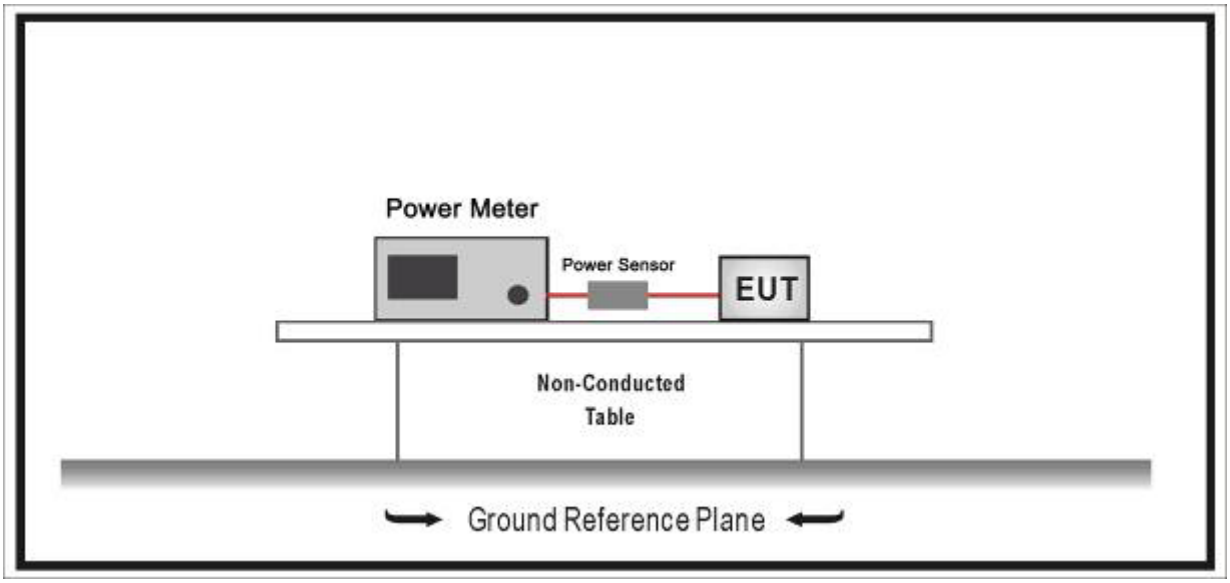
9.1. Test Equipment

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 ± 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
0	1	1	6
1	1	2	9
2	1	5.5	12
3	1	11	18
4	1	---	24
5	1	---	36
6	1	---	48
7	1	---	54

Power output at various data rates:

Test Mode	Bandwidth	Frequency (MHz)	Channel	Data Rate	Peak Power (dBm)
802.11b	20	2437	6	1	20.05
				5.5	20.00
				11	19.98
802.11g	20	2437	6	6	21.48
				24	21.12
				54	21.22

Product	:	3G/4G Wireless Router
Test Item	:	Power Output
Test Site	:	TR8
Test Mode	:	Mode 1: Transmit by 802.11b

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)	Limit (dBm)	Result
1	2412	20.27	30.00	Pass
6	2437	20.05	30.00	Pass
11	2462	19.77	30.00	Pass

Product	:	3G/4G Wireless Router
Test Item	:	Power Output
Test Site	:	TR8
Test Mode	:	Mode 2: Transmit by 802.11g

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)	Limit (dBm)	Result
1	2412	21.34	30.00	Pass
6	2437	21.48	30.00	Pass
11	2462	21.54	30.00	Pass

10. Power Spectral Density

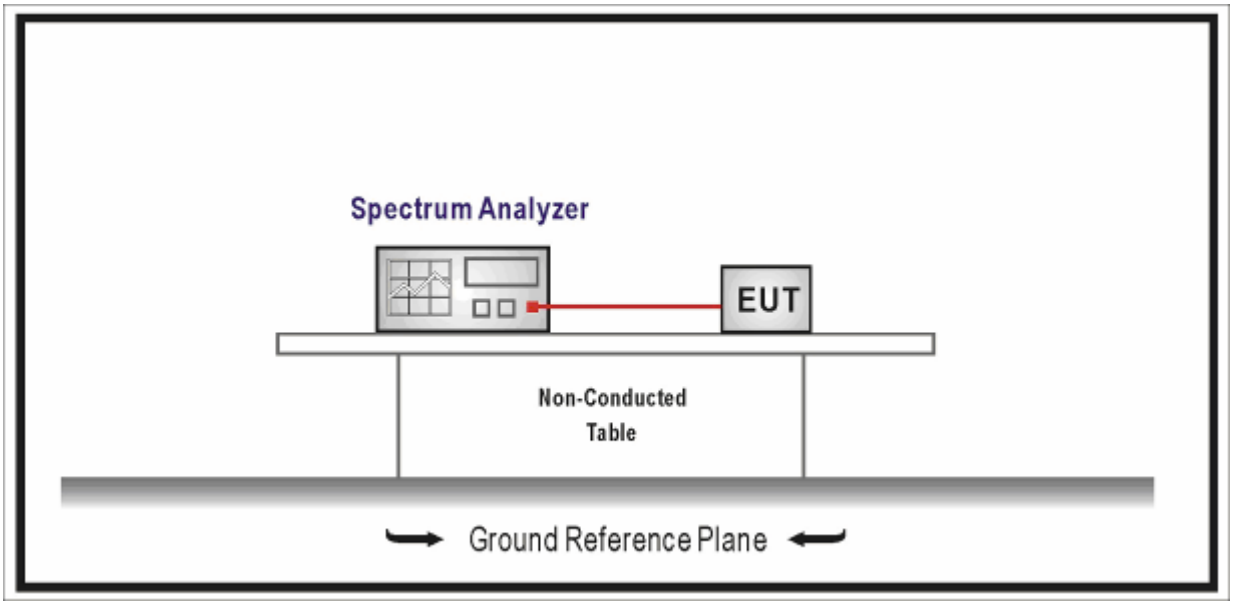
10.1. Test Equipment

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 ≧ 3 kHz, VBW ≧ 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

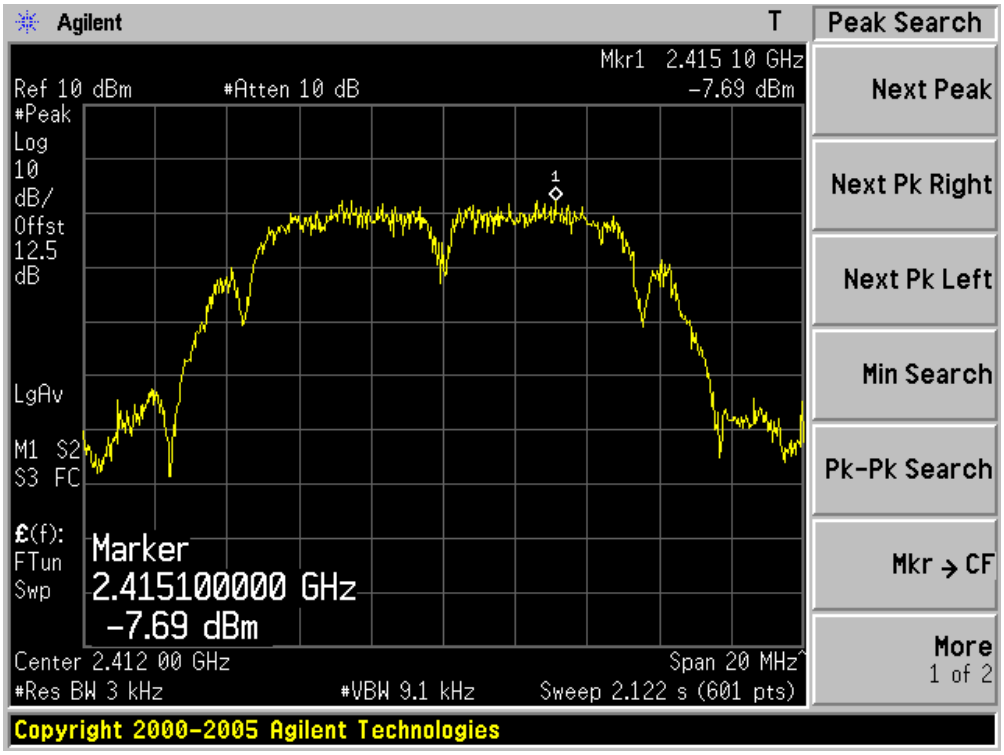
The measurement uncertainty is defined as ± 1.27 dB

10.6. Test Result

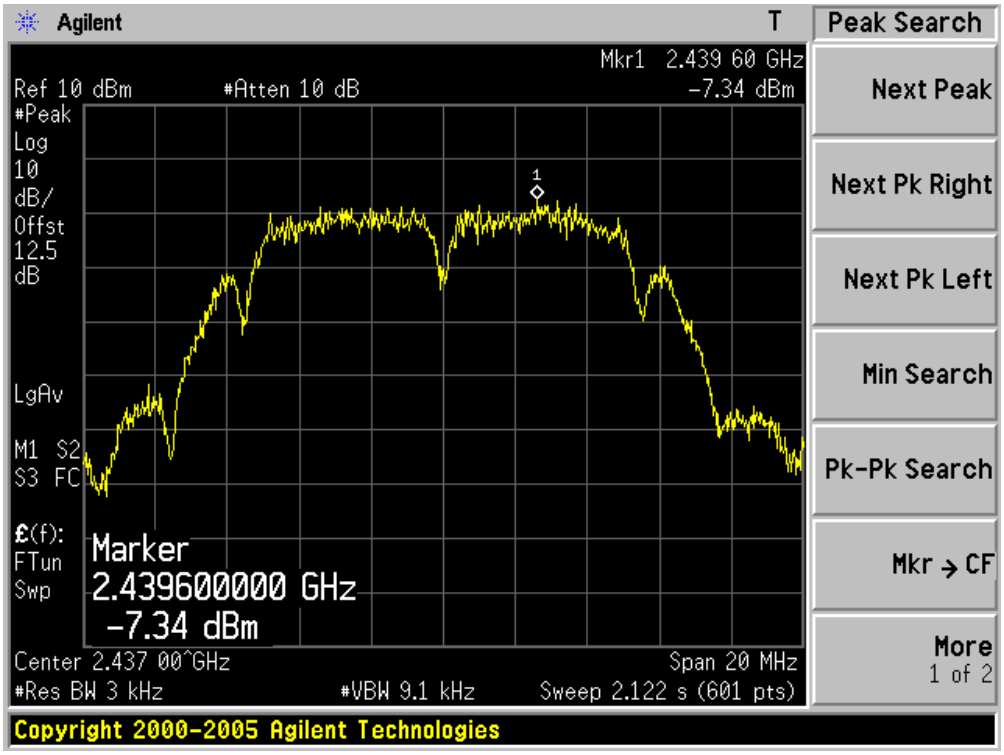
Product	:	3G/4G Wireless Router
Test Item	:	Power Spectral Density
Test Site	:	TR-8
Test Mode	:	Mode 1: Transmit by 802.11b

Channel No.	Frequency (MHz)	Reading Value (dBm)	PSD (dBm)	Limit (dBm)	Result
01	2412	-7.69	-7.69	8	Pass
06	2437	-7.34	-7.34	8	Pass
11	2462	-7.30	-7.30	8	Pass

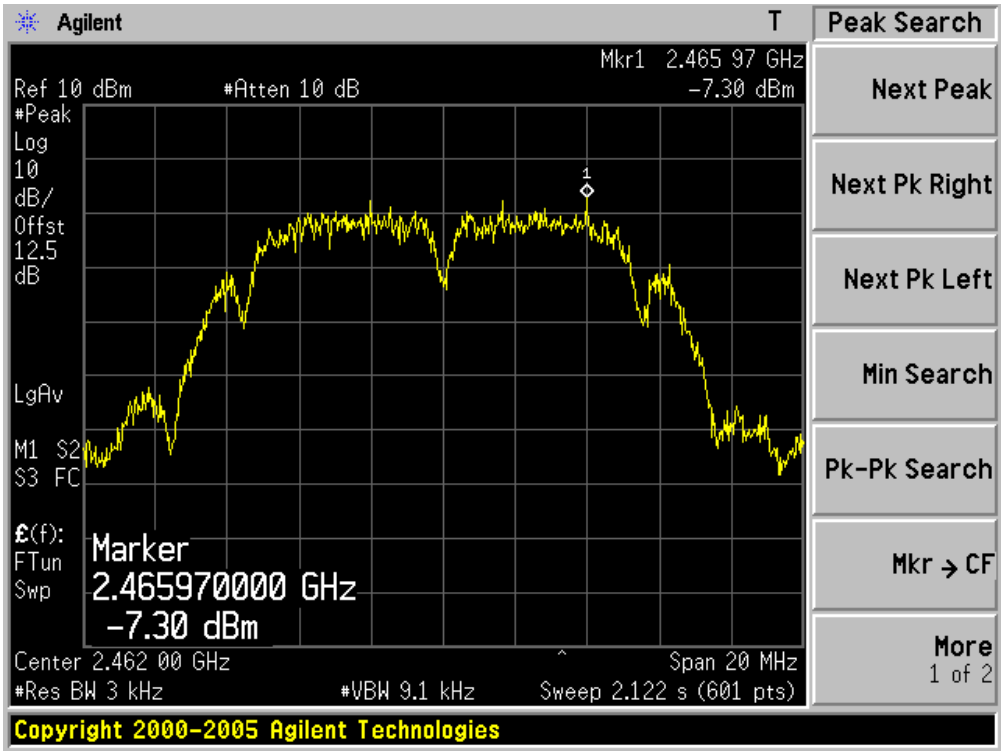
Channel 01 (2412MHz)



Channel 06 (2437MHz)



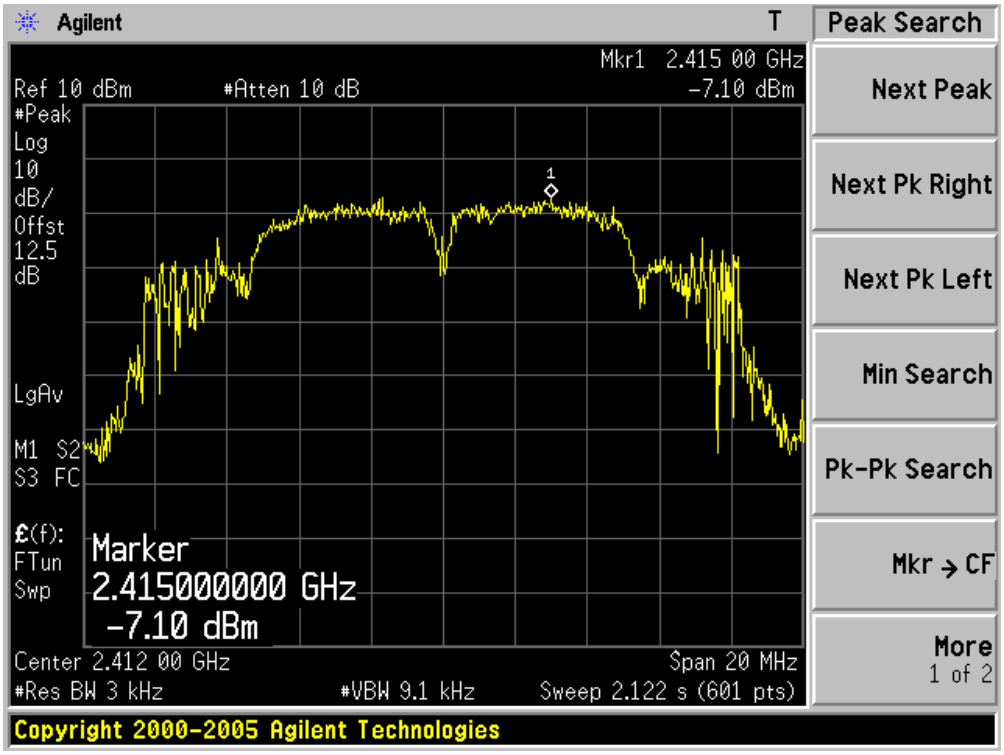
Channel 11 (2462MHz)



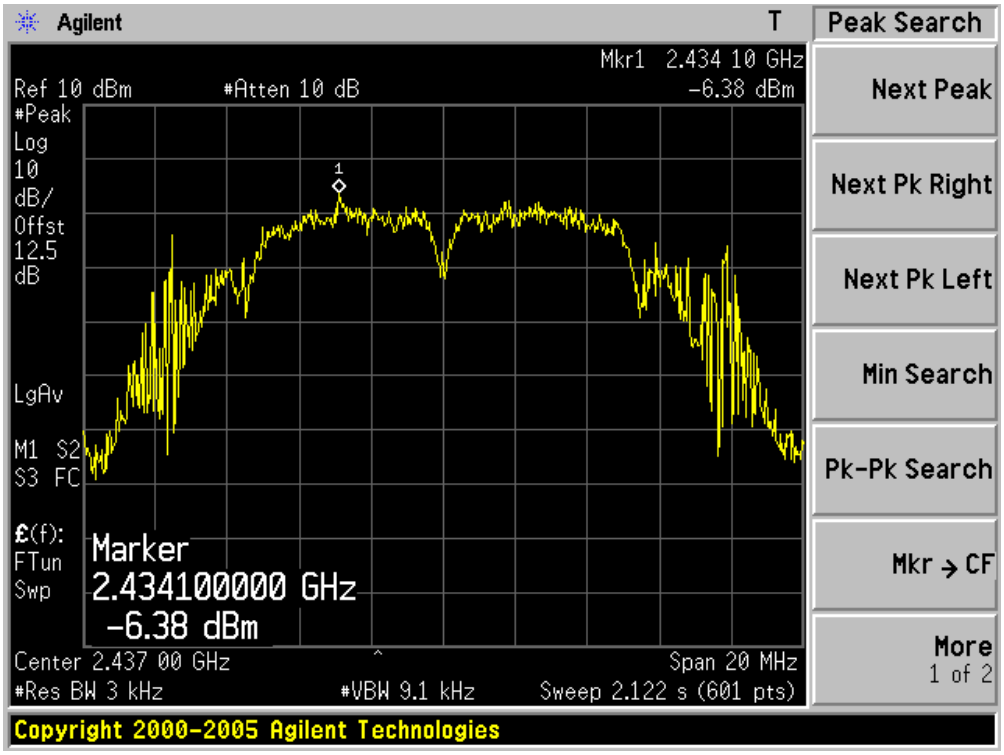
Product	:	3G/4G Wireless Router
Test Item	:	Power Spectral Density
Test Site	:	TR-8
Test Mode	:	Mode 2: Transmit by 802.11g

Channel No.	Frequency (MHz)	Reading Value (dBm)	PSD (dBm)	Limit (dBm)	Result
01	2412	-7.10	-7.10	8	Pass
06	2437	-6.38	-6.38	8	Pass
11	2462	-7.14	-7.14	8	Pass

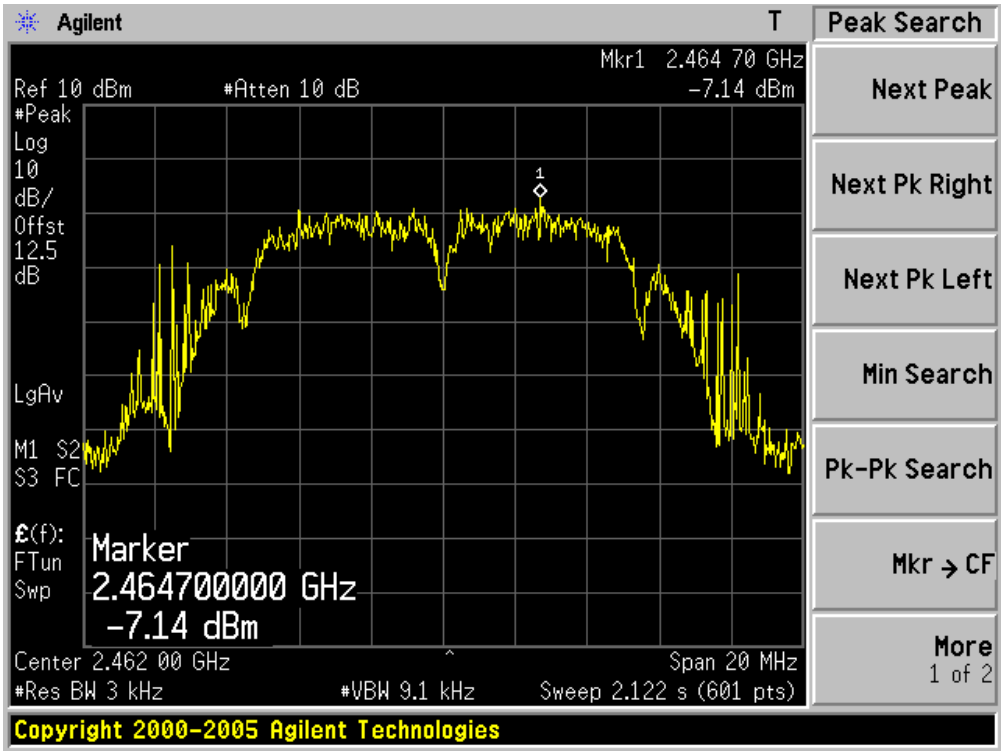
Channel 01 (2412MHz)



Channel 06 (2437MHz)



Channel 11 (2462MHz)



The End